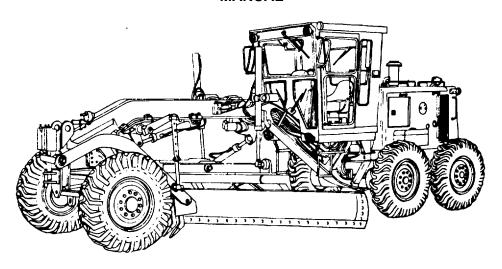
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# DEPARTMENT OF THE ARMY TECHNICAL MANUAL

# UNIT MAINTENANCE

# TECHNICAL MANUAL



GRADER, HEAVY, ROAD, MOTORIZED, CATERPILLAR MODEL 130G (NSN 3805-01-150-4795)

Approved for public release; Distribution is unlimited.

# HEADQUARTERS, DEPARTMENT OF THE ARMY

# **APRIL 1992**

\*This manual, combined with TM 5-3805-261-34, 25 Apr 89, supersedes TM 5-3805-261-14&P-2, 29 Jul 85, and TM 5-3805-261-14&P-3, 29 Jul 85.

### **FIRE HAZARD**

Diesel fuel and combustible materials are used in operation and maintenance of this equipment. Do not smoke or allow open flames or sparks in areas where diesel fuel and combustible materials are used or stored. DEATH or injury may result if personnel fail to observe this precaution. If you are burned, seek medical help immediately.

### **WARNING**

#### **OIL UNDER 2500 PSI PRESSURE**

HIGH PRESSURE HYDRAULICS OPERATE THIS EQUIPMENT. NEVER disconnect any hydraulic lines or fittings without checking manual to see how to drop the pressure to zero. Failure to follow this procedure may cause INJURY. If you are struck by a high pressure oil stream, seek medical help immediately.

#### WARNING

### STEAM UNDER PRESSURE

Remove radiator cap slowly to relieve pressure before completely removing it when the engine is hot. Failure to follow this procedure may cause INJURY. If you are scalded by steam, seek medical help immediately.

#### WARNING

### **ELECTRICAL SHOCK HAZARD**

With disconnect switch in OFF position, always disconnect right battery positive cable before working on electrical components of this equipment. DEATH or severe injury may result if you fail to observe this procedure. If you receive an electrical shock, seek medical help.

### **WARNING**

# **FALLING EQUIPMENT HAZARD**

Never crawl under equipment when performing maintenance unless equipment is securely blocked. Keep clear of equipment when it is being raised or lowered. Do not allow heavy components to swing while suspended by lifting device. Exercise extreme caution when working near a cable or chain under tension.

### **WARNING**

# **BURN HAZARD**

Allow engine to cool off before you perform maintenance on the muffler, exhaust pipe, exhaust manifold, or turbocharger. If necessary, use insulated pads and gloves and remove all jewelry. If you are burned, seek medical help immediately.

# Change 1 a

# **EXHAUST GASES CAN BE DEADLY**

Exhaust gas can produce symptoms of headache, dizziness, loss of muscular control or coma. Permanent brain damage can result from severe exposure. You can insure your safety by following these rules:

- Do not operate the engine in an enclosed area unless properly ventilated.
- Do not drive with any inspection plates, cover plates or hoods off unless necessary for maintenance.
- If you notice exhaust odors or exposure symptoms, IMMEDIATELY VENTILATE the area. If symptoms persist, remove and treat the affected personnel:
  - Expose them to fresh air
  - If necessary, give artificial respiration
  - Keep them warm
  - Do not permit physical exercise

Refer to FM 21-11, First Aid for Soldiers, for first aid treatment of injured personnel.

#### WARNING

### **NOISE HAZARD**

Excessive noise levels are present any time the equipment is operating. Wear hearing protection while operating or working around equipment while it is running. Failure to do so could result in damage to your hearing. Seek medical help should you suspect a hearing problem.

Change 1 b

# TIRE DEFLATION

Deflate tire completely before removing from rim. Refer to the manual to find out how to completely deflate the tire. Improperly seated tires can burst with explosive force. DEATH or injury may result if you do not observe this procedure. If you are injured while deflating the tire, seek medical help immediately.

### WARNING

# **HIGH VELOCITY AIR**

Compressed air, used for cleaning purposes, must not exceed 30 psi. Safety glasses must be used when cleaning parts with compressed air. Failure to protect your eyes may cause INJURY and possible BLINDNESS. If you injure your eyes or if a foreign object is blown into your eyes, seek medical help immediately.

### WARNING

### **JACKING VEHICLE**

Make sure that the vehicle will not roll or shift. Secure with chock blocks. DEATH or injury may result by your failure to follow this procedure due to vehicle turning or slipping off jack or jack stands.

#### WARNING

#### TOXIC/FLAMMABLE

Dry cleaning solvent (P-D-680) used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well-ventilated area. Avoid contact with skin, eyes and clothes. Do not breathe the vapors. Do not use near open flame or excessive heat. Do not smoke while using it. Failure to do so may cause INJURY. If you become dizzy while using cleaning solvent, immediately seek fresh air, and if necessary, medical attention. If contact with skin or clothes is made, flush thoroughly with water. If the solvent contacts your eyes, wash with water immediately and obtain medical help.

# **OIL UNDER PRESSURE**

Keep hands and feet clear of steering cylinder assemblies while checking for hydraulic leakage, when engine is running. INJURY may result if you fail to follow this procedure.

### WARNING

# **OIL UNDER PRESSURE**

When bleeding air from hydraulic cylinder assemblies, do not look directly at bleed fitting. Hydraulic oil is under high pressure. INJURY may result if you fail to follow this procedure.

### WARNING

# **FUEL UNDER PRESSURE**

When testing fuel injectors, always direct fuel injector tip away from you. Fuel from the orifices can penetrate clothing and skin. This can cause SERIOUS INFECTION. Be sure the fuel injector tip is enclosed in a receptacle to contain the spray. If your skin is broken by fuel injector spray, seek medical help.

### WARNING

# **PARTS UNDER SPRING TENSION**

Exercise care when removing parts under spring tension. INJURY may result by the part striking your eye if you do not observe this caution. If your eye is struck by a foreign object, seek medical help immediately.

# **WARNING**

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

# TOXIC/BURN HAZARD/HIGH VELOCITY AIR

Hydraulic fluid may be absorbed through the skin. If hydraulic fluid gets on your skin, thoroughly wash it off with soap and water as soon as possible.

Always wear safety glasses when working on the hydraulic system. If hydraulic fluid gets in your eyes, you can be blinded.

Hot equipment can burn you. Wait until hydraulic tubes and hoses are cool enough to touch before you start work.

Cleaning compound can cause skin rash and can give off harmful vapors. To avoid injury, use in a well-ventilated area. Wash immediately with soap and water if compound gets on skin or clothing.

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

# **WARNING**

### TOXIC/FLAMMABLE

Solvent burns easily and can give off harmful vapors. To avoid injury, keep away from open fire and use in a well-ventilated area.

#### WARNING

# TOXIC/FLAMMABLE

Sealing compound and solvent burn easily and can give off harmful vapors. To avoid injury, keep away from open fire and use in a well-ventilated area.

### WARNING

# **TOXIC**

Lubricating oil (MIL-L-23699 or MIL-L-7808) can cause skin rash. If oil gets on skin or clothing, wash with soap and water.

# **ELECTRICAL HAZARD**

Before removing any component of electrical system, be sure VEHICLE MASTER POWER switch is set to OFF. You can get electrical burs if power is on.

# WARNING

# TOXIC/FLAMMABLE

Solvent can irritate skin and can give off harmful vapors. To avoid injury, keep solvent away from heat, wear protective clothing and use in a well-ventilated area.

### WARNING

# **FLUID HAZARD**

Hydraulic fluid is slippery. To avoid injury wipe up spilled fluids immediately with rags.

### WARNING

### **ELECTRICAL HAZARD**

Batteries discharge highly explosive hydrogen gas and can explode and shower you with sulfuric acid if a spark is created near the battery. Batteries can also cause burn injuries when a circuit between the positive battery post and the frame of the machine. To prevent injuries, always remove all rings and watches and wear safety glasses while work is done on or near the batteries. Use extra caution not to cause sparks near the battery. Disconnect the positive cable, right side battery first and connect it last with the disconnect switch in the off position.

**CHANGE** 

NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 29 October 1992

# UNIT MAINTENANCE MANUAL FOR GRADER, HEAVY ROAD, MOTORIZED CATERPILLAR MODEL 130G (NSN 3805-01-150-4795)

TM 5-3850-261-20, 30 APRIL 1992, is changed as follows:

- 1. Remove old pages and insert new pages as indicated below.
- 2. New or changed material is indicated by a vertical bar in the margin of the page.

Remove Pages	Insert Pages
a and b 6-161 and 6-162 7-43 and 7-44 7-47 and 7-48 7-271 and 7-272 7-281 and 7-282	a and b 6-161 and 6-162 7-43 and 7-44 7-47 and 7-48 7-271 and 7-272
1-201 and 1-202	7-281 and 7-282

3. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

GORDON R. SULLIVAN General, United States Army Chief of Staff

Official:

MILTON H. HAMILTON Administrative Assistant to the Secretary of the Army 03103

Distribution:

To be distributed in accordance with DA Form 12-25-E, Block 5785, Requirements for TM 5-3805-261-20.

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HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., 30 April 1992

# UNIT MAINTENANCE MANUAL FOR GRADER, HEAVY, ROAD, MOTORIZED, CATERPILLAR MODEL 130G GRADER (NSN 3805-01-150-4795)

# **Reporting Errors and Recommending Improvements**

You can help improve this manual. If you find any mistakes, or if you know a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual, directly to: Commander, U.S. Army Tank-Automotive Command, ATTN: AMSTA-MB, Warren MI, 48397-5000. A reply will be furnished to you.

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# **HOW TO USE THIS MANUAL**

This manual is designed to help you maintain the 130G Grader. It's divided into chapters, sections and appendices. The chapters contain organizational maintenance procedures and are divided into sections which contain specific maintenance procedures for the various systems that comprise the 130G Grader.

The appendices contain supplemental information to help you maintain the 130G Grader. Included in the appendices is the Maintenance Allocation Chart.

You must familiarize yourself with the entire maintenance procedure before beginning the maintenance tasks.

The maintenance procedures contained in this manual tell you several things:

- what tools you need to do the job
- materials or parts required
- what condition the vehicle is to be in before work is started

In addition to the text, you'll have either an assembled or an exploded view illustration of the associated parts. Sometimes the illustration will be keyed by an arrow to an overall view of the vehicle to help you determine the approximate location of the parts. The illustration is keyed to the text by numbers and shows you how to take the part off and put it on. The following example will show some of the features of this manual.

### **EXAMPLE**

An operator brings his CCE 130G Grader into the shop with an engine problem: the engine stalls frequently or doesn't develop full power. The best way to solve this problem is by using your manual. This is what you do:

1. How do you start?

Look at the cover of the manual.

On the cover you'll find a listing for TROUBLESHOOTING SYMPTOM INDEX. It tells you to go to page 5-1. To find the page fast, open the manual by using the black tab that lines up with the listing on the cover.

2. What kind of problem do you have?

Find it in the symptom index.

The symptom index is a list of problems covered by a section. It tells you that your problem, "engine misfires or runs rough," is covered in paragraph 6-2h.

# **HOW TO USE THIS MANUAL**

- 3. How do you determine what is causing the problem? Go to paragraph 6-2h., which refers you to Fuel System paragraph 6-12b. There you'll find the troubleshooting procedures you'll need. The procedure has columns with the headings: MALFUNCTION, TEST OR INSPECTION and CORRECTIVE ACTION. Starting at step 1, read the procedure. Check to see if the description is accurate for the troubleshooting section. Each step tells you what to do and what to look for. Follow the steps, in order, until you find your problem. The CORRECTIVE ACTION column will tell you what to do next.
- 4. procedure contains all information you'll need to replace the fuel injection nozzle. First check the introductory material. It tells you what you'll need before you start the job. Below the introductory material is an assembled view of the vehicle showing the approximate location of the fuel injection nozzle and an illustration which shows you how to do the job.
- 5. If on the other hand, you know the cause of the problem, refer to the alphabetical index located at the rear of this manual. Find the name of the part to be replaced and the paragraph number for the maintenance procedure. For example, the engine is overheating. On filling the radiator with water you see that coolant is pouring out of the hose, indicating that the hose needs replacement. Refer to the alphabetical index. Under the listing "Hoses, Lines and Fittings," page 6-137 is referenced. Turn to this paragraph for hose removal and installation procedures.

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### **CHAPTER 1**

### INTRODUCTION

### **CHAPTER OVERVIEW**

The purpose of this chapter is to familiarize the technician with the 130G Grader capabilities, characteristics, major components and features. This familiarization is provided through a physical description and associated pictures. Covered are subjects that the Organizational Maintenance level technician is required to understand and service.

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### Section I. GENERAL INFORMATION.

### 1-1. SCOPE.

- a. <u>Type of Manual</u>. Organizational Maintenance Manual.
- **b.** <u>Model Number and Equipment Name</u>. Grader, Heavy, Road, Motorized, DED, Commercial Construction Equipment (CCE), Caterpillar Model 130G Grader (NSN 3805-01-150-4795).
- **c. Purpose.** The grader is designed for rough and finished grading, low and high bank sloping, flat and V-ditching, scarifying bituminous road mixes, and snow removal. Mission support role includes construction and maintenance of roads, airfields, hardstands, drainage, site preparation for pipelines and river crossings.
- **1-2. MAINTENANCE FORMS, RECORDS AND REPORTS**. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System.
- **1-3. DESTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE**. TM 750-244-3, "Procedures for Destruction of Equipment to Prevent Enemy Use."
- **1-4. PREPARATION FOR STORAGE AND SHIPMENT.** Refer to TM 740-90-1 "Administrative Storage of Equipment"; TB 740-97-2 "Preservation of USAMECOM Mechanical Equipment for Shipment and Storage"; TM 38-230-1&2 "Preservation and Packing of Military Supplies and Equipment"; MIL-V062038 "Shipment and Limited Storage"; and SB 740-98-1 "Storage and Serviceability Standard: Tracked Vehicles, Wheeled Vehicles and Component Parts".

### 1-5. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC).

- **a**. No particular quality assurance or quality control technical manuals pertain specifically to the 130G Grader. Use standard QA/QC procedures.
- **b.** Defective material received through the supply system should be reported on a Quality Deficiency Report (QDR), SF368. QDR's should be mailed directly to: Commander, U.S. Army Tank Automotive Command, ATTN: AMSTA-MVB, Warren, Michigan 48397-5000. A reply will be furnished directly to you.

# **GENERAL INFORMATION. (cont)**

### 1-6. NOMENCLATURE CROSS REFERENCE.

Common Term	Military Term
Lube Order	LO
O Ring	Packing, Preformed
Dipstick	Level Indicator
Grader	Grader, Road
Technical Manual	TM
Sight Gage	Level Indicator
Servicemeter	Hourmeter
Blade	Moldboard Assembly
Circle Drive	Circle Turn Assembly
Transmission	XMSN
Hydraulic Tank	Hydraulic Reservoir
Dipstick	Oil Level Gage

**1-7. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)**. EIR's will be prepared using a DA Form 2407, maintenance request. Instructions for preparing EIR's are provided in DA PAM 738-750, the Army Maintenance Management System. EIR's should be mailed direct to: Commander, U.S. Army Tank Automotive Command, ATTN: AMSTA-MB, Warren, Michigan 48090.

### Section II. EQUIPMENT DESCRIPTION AND DATA.

Refer to TM 5-3805-261-10 for additional description and data.

### 1-9. EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES.

### a. Characteristics.

- Performs earthmoving tasks.
- Rollover and falling object cab protection for operator.
- Heater located in cab for cold weather operation.
- Built-on cab and engine sound suppression.
- Vandalism guards and covers.
- Low profile cab permits sit-down operation with easily accessed controls.
- Tinted glass windows permit excellent visibility and weather insulation.
- Front wheel steering and articulated (pivoting) frame.
- Tandem drive train.
- · Rear four wheel oil disc brakes.

### b. Capabilities and Features.

- Supplemental steering takes over if main steering system hydraulic pressure fails.
- Front mounted scarifier for scarifying and grading in one operation.
- Ether starting aid assists cold weather starting.
- Blade circle drive permits a full 360 degree rotation in horizontal plane with scarifier raised and scarifier shanks removed.
- Blade centershift allows up to 90 degrees of blade angle for ditching and banking.
- Hydraulic blade tip and sideshift controls.
- Equipped for operation under blackout conditions.
- Direct injection fuel system with nonadjustable injection pumps and valves.

### **EQUIPMENT DESCRIPTION AND DATA.** (cont.)

### 1-10. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS. (cont)

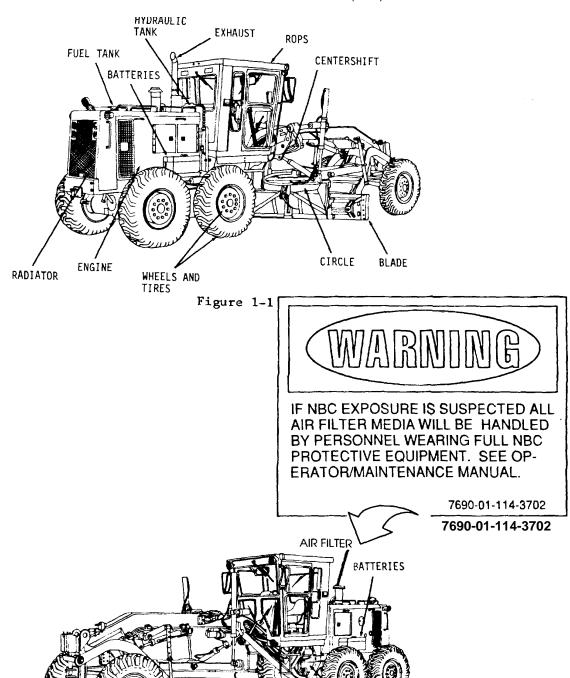


Figure 1-2.

SCARIFIER

ARTICULATION HITCH

TRANSMISSION

### **EQUIPMENT DESCRIPTION AND DATA.**

### 1-10. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Figures 1-1 and 1-2).

- **a. Engine**. Four cylinder, turbocharged diesel.
- **b.** Fuel Tank. 75 gal. capacity.
- **c. Exhaust.** Muffler reduces noise. Exhaust pipe directs exhaust fumes into air.
- d. Hydraulic Tank. 18 gal capacity.
- **e. ROPS.** Rollover protective structure. Also serves as FOPS, falling object protective structure.
- f. <u>Centershift</u>. Provides five different blade positions for high and low bank work and other operations needing extended side reach.
- **g.** Wheels and Tires. Interchangeable rim and wheel assemblies. Tubeless tires, 1300 x 24 size. Operating pressure, 35 psi.
  - h. Blade. Hydraulically controlled from cab, 12 ft. wide. Manual and hydraulic sideshift. Front to rear tip.
  - i. <u>Scarifier</u>. Front mounted V-type. Removeable shanks. Replaceable tips. Shank storage in front of vehicle.
  - **<u>j. Circle.</u>** Hydraulically driven from control in cab. Rotates blade.
  - **k.** Articulation Hitch. Provides a 20 degree frame articulation, right or left. Hydraulically controlled from cab.
  - **Batteries**. Two 12 volt batteries, one on each side, connected in series, providing a 24 volt system.
  - m. Transmission. Direct drive power shift transmission. Transmits power to differential.
  - n. Radiator. 10 gal. capacity. Low and full marks in filler neck indicate proper coolant level.
- **o.** <u>Operating Instructions on Decals and Instruction Plates</u>. The plates and decals are attached for personnel protection and convenience. Replace them if they become damaged or illegible.

### **EQUIPMENT DESCRIPTION AND DATA.** (cont)

### 1-11. EQUIPMENT DATA.

### a. Engine.

ManufacturerCaterpillarModel number3304Part number2W821

Type 4 Stroke-cycle turbocharged diesel

Horsepower

(SAE Net at 2200 rpm) 135 hp Number of cylinders 4

Bore 4.75 inch Stroke 6.0 inch

Piston displacement

Crankshaft rotation (viewed

from rear of engine)

No. 1 cylinder

Counterclockwise
Forward end of engine

Cylinder number sequence Firing order (cylinder

injection sequence) 1-3-4-2 Main bearings (number) 5

Oil filter Full flow

### b. Fuel System.

Air cleaner

Manufacturer Donaldson
Part number EGB11-0026

Type Dry

Governor Centrifugal, variable speed

**Timing** 

@ 700 rpm@ 2300 rpm19.5 to 21.9 degrees21.1 to 23.5 degrees

### c. <u>Electrical System.</u>

Alternator

Manufacturers

1) Delco Remy
2) Bosch

Part number 1) 1117248 2) 0122469002

Rating 50 amp

Starter

Manufacturers 1) Delco Remy

2) Prestolite

425 cubic inch

Front to rear of engine

3) Bosch

1) 1114845 2) MES6601K

3) 3T6305

Monitoring system (MS)

Part number

### **EQUIPMENT DESCRIPTION AND DATA.**

### 1-11. EQUIPMENT DATA.

### c. <u>Electrical System</u>.

Lights

Head (cab mounted) Upper front 2 Flood Lower front 2

Turn Signals
Sides 2
Rear 2
Stop/Taillights
Front 1
Blackout
Front 1

Batteries (storage) 2-12 volt, 220 ampere hour

### d. <u>Transmission.</u>

Type Single lever, direct power shift

Rear 2

Characteristics • No torque converter

• No clutch. One lever shifting

Planetary gear sets

• Large diameter clutch assemblies

• Plates lubricated and cooled by oil

Full flow filter

### Speeds (At Rated rpm)

1st Forward and Reverse	2.3 mph
2nd Forward and Reverse	3.7 mph
3rd Forward and Reverse	5.9 mph
4th Forward and Reverse	9.7 mph
5th Forward and Reverse	15.5 mph
6th Forward and Reverse	24.5 mph

### **EQUIPMENT DESCRIPTION AND DATA.** (cont)

### 1-11. EQUIPMENT DATA. (cont)

### e. Axle (Front).

Type Arched bar (solid steel)

Ground clearance 24 inch
Oscillation 32 degrees

Wheel lean angle 18 degrees left or right

Steering (front wheels)

Steering range (full

hydraulic power) (frame) 50 degrees left or right

Steering range

(hydraulically activated) 20 degrees left or right

Minimum turning radius

(outside front tires) 24 feet

Leaning Wheel Hydraulic

Cylinder

Part 3G4752
Bore diameter 0.14 inch
Rod diameter 0.06 inch
Stroke 0.23 inch
Closed length (pin to pin) 0.72 inch

### f. Axle (Rear).

Type Full floating (forged heat treated steel)

Tandems treated stee

Height 18.38 inch
Width 7.90 inch

Sidewall thickness

Outer 0.71 inch
Inner 0.62 inch
Drive train pitch 2 inch
Wheel axle spacing 5 feet

1-10

<sup>\*</sup>Using front wheel steering, frame articulation and differential unlock.

### **EQUIPMENT DESCRIPTION AND DATA.**

### 1-11. EQUIPMENT DATA.

### g. Brakes.

Service

Type

4 wheel oil disc

Characteristics

- Sealed
- No adjustment
- Air actuated
- Low air pressure warning (visual & audible)

Parking/Emergency

Type

 Multiple oil disc (located in transmission case)

Characteristics

- Manual activation
- · Spring engaged
- Air disengaged
- Neutral lock control to prevent machine movement if engine is started with transmission engaged

Emergency Type

Characteristics

Dual circuit air system

Individual circuit to each tandem

### h. Air Compressor.

Manufacturer

Б. .

Type

Part number

Cylinders Bore size

Stroke Maximum recommended rpm

Minimum coolant flow at

maximum rpm Approximate horsepower

required at 1250 rpm

Bendix Corp. - Heavy Vehicle

Systems Group

102655

Single stage, reciprocating

piston

2

2.0625 inch 1.5 inch 3,000

2.5 gal/min

1.2 hp

1-11

### **EQUIPMENT DESCRIPTION AND DATA.** (cont)

### 1-11. EQUIPMENT DATA. (cont)

### i. Wheels (6).

Type Interchangeable rim and wheel

assemblies

Tires (6) Tubeless

Size 13.00-24 (10PR) traction type

Pressure 35 psi

### j. Steering.

Type Adjustable steering console

Steering Hydraulic Pump

Manufacturer John S. Barnes Corp. Part number GC-6100-4-20-13-02

Steering (supplemental)

Motor

Manufacturer John S. Barnes Corp.

Part number GC-2918-B Type 24 volt

Steering Hydraulic Cylinders

Part number

Right hand 3G8069
Left hand 3G8070
Bore diameter 2.5 inch
Rod diameter 1.5 inch
Stroke 10.5 inch
Closed length (pin to pin) 18.96 inch

### k. Frame.

Front

Type Flanged box-section structure (runs from front bolster to

articulation joint)

Top and Bottom Plates

Width 12 inch
Thickness 0.88 inch

Side Plates

Height 9.75 inch
Thickness 0.5 inch
Minimum weight 104 ft-lb

Rear

Type Two box-section channels

(Integral with final brake case)

### **EQUIPMENT DESCRIPTION AND DATA.**

#### **EQUIPMENT DATA.** 1-11.

### **ROPS (Rollover Protective Structure).**

Low profile enclosed cab Type

**Features** Windows (sealed, tinted safety glass)

- 2 Doors (entry either side)
- Inside mounted:

Adjustable operator's seat Adjustable steering console Rear view mirror Dome light Front window washer

3 windshield wipers

Heater

Defroster fans

Monitoring system (MS)

### m. Hydraulic System.

**Features** 

Type Closed center, constant pressure system. Variable displacement

piston pump powers:

Blade controls Articulation Wheel lean Scarifier controls

Steering

- · Constant pressure, parallelcontrol valve circuit provides immediate implement response
- Dual-level pump capacity matches horsepower use to system needs
- · Hydraulic lock valves in all implement circuits prevent cylinder drift

1-13

### **EQUIPMENT DESCRIPTION AND DATA.** (cont)

### 1-11. EQUIPMENT DATA. (cont)

### m. <u>Hydraulic System</u>. (cont)

Hydraulic Pumps Implement/Variable Displacement Piston Pump.

Type Axial piston Output @ 2150 psi

@ 2200 rpm 3 to 51 gpm

(depending upon system

requirements)

Pressure

Low 2150 psi High 3500 psi

Oil Cooler Pump

Manufacturer Cessna Industries

Part number 24306-LAX

Type Gear

Output @ 50 psi

@ 2000 rpm 9.7 gpm

Circle Drive Motor

Manufacturer TRW Inc-Ross Gear Div

Part number MAE10013 Type Hydraulic driven

Hydraulic Cylinders

Centershift

Part number 3G5224
Bore diameter 3.25 inch
Rod diameter 2.0 inch
Stroke 18.1 inch
Closed length (pin to pin) 31.9 inch

Blade Tip

Part number 9J3466
Bore diameter 0.11 inch
Rod diameter 0.06 inch
Stroke 0.47 inch
Closed length (pin to pin) 0.95 inch

Blade Lift

Part number 3G5223
Bore diameter 3.25 inch
Rod diameter 2.0 inch
Stroke 40 inch
Closed length (pin to pin) N/A

### **EQUIPMENT DESCRIPTION AND DATA.**

### 1-11. EQUIPMENT DATA.

### m. Hydraulic System.

Articulation

Part number 8J546
Bore diameter 0.12 inch
Rod diameter 0.07 inch
Stroke 0.44 inch
Closed length (pin to pin) 1.18 inch

Side Shift

Part number 8J28
Bore diameter 0.12 inch
Rod diameter 0.07 inch
Stroke 1.85 inch
Closed length (pin to pin) 2.75 inch

Scarifier

Part number 3G1853
Bore diameter 0.12 inch
Rod diameter 0.07 inch
Stroke 0.65 inch
Closed length (pin to pin) 1.16 inch

### n. Earthmoving Equipment Components.

Moldboard

Type High-carbon steel

Length 12 feet
Height 24 inch
Thickness 0.75 inch

Cutting

Type Hardened curved DH-2 steel

Width 6 inch Thickness 0.62 inch

Drawbar

Type Box section, A-frame

Characteristics • 4 shoes support circle

 Shoes have vertical and horizontal adjustment

# **EQUIPMENT DESCRIPTION AND DATA.** (cont)

### 1-11. EQUIPMENT DATA. (cont)

# n. <u>Earthmoving Equipment Components</u> (Figure 1-3). (cont)

Blade range Circle Centershift Right 20.5 inch Left 25.5 inch Moldboard Sideshift Right 26.5 inch Left 20.5 inch Shoulder Reach (maximum outside tire)\* Right 6 feet 1.5 inch Left 5 feet 11 inch Blade position and angle Both sides 90 degree maximum Lift above ground 17.25 inch Depth of cut 17.75 inch Blade tip 40 degree forward 5 degree rear

<sup>\*\*</sup>Mid-range bank sloping (2:1) capability requires addition of optional centershift cylinder extension.

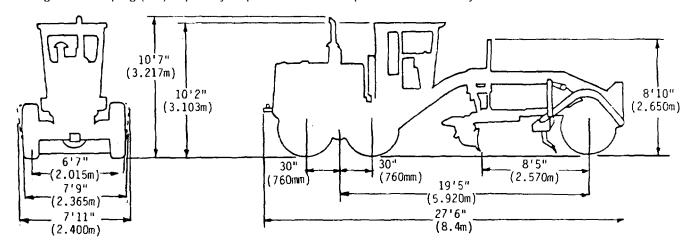


Figure 1-3.

<sup>\*</sup>With main frame in crab position, add right or left 3 feet 1 inch.

### **EQUIPMENT DESCRIPTION AND DATA.**

### 1-11. EQUIPMENT DATA.

### n. <u>Earthmoving Equipment Components.</u>

Circle

Type Seamless steel forging

Diameter

Characteristics

60.25 inch

Flame cut teeth

 Wear surfaces (top and bottom) prevent circle teeth from contacting support shoes

 Hydraulically driven worm gear (provides 360 degree circle rotation)

Scarifier

Type Vee-type, 11 shank (mounted forward

to moldboard)

Working width 46.62 inch Scarifying depth (maximum) 11.5 inch Shank holder spacing 4.56 inch

**Blade Data Controls** 

Type Fully hydraulic

Characteristics • Constant control independent of engine speed

 Lock valves in each implement circuit eliminate drift

Constant pressure system
 enables use of more than one
 control without decrease in
 control response speed

Blade Beam

Type Manually controlled, solenoid

actuated

Width 5.5 inch
Thickness 1.25 inch

1-17

### **EQUIPMENT DESCRIPTION AND DATA.** (cont)

**1-12. SAFETY, CARE AND HANDLING**. Proper repair is important to the personal safety of the maintenance technician and to the safe and reliable operation of the road grader. This manual outlines basic recommended procedures, some of which require special tools, devices or work methods. Although not necessarily complete, a list of warnings is provided inside of the front cover of this manual.

Improper repair procedures can be dangerous and may cause INJURY.

# READ AND UNDERSTAND ALL SAFETY WARNINGS AND CAUTIONS BEFORE PERFORMING REPAIRS ON THIS VEHICLE

Basic safety cautions are listed before the procedures to which they apply. Warning labels have also been put on the machine to provide instructions and identify specific hazards which if not heeded may cause INJURY. These labels identify hazards during repair for an untrained mechanic. There is no way to label the machine against all such hazards. Warnings in the service manual and on the machine are identified by the word WARNING.

Operations that may result in machine damage are identified by labels on the machine and in this manual by the word CAUTION.

Every possible hazard cannot be anticipated. If you use a procedure, tool, device, or work method not specifically recommended, satisfy yourself that it is safe for you and others. Make sure that the machine will not be damaged or made unsafe by the procedure you choose.

### **IMPORTANT**

Know the weight of components. Do not lift heavy components by hand. Use a hoist. When using a hoist, follow the recommendations in the manual. Use correct lift tools as shown in illustrations to get the correct balance of the component you lift. This makes your work safer at all times. Lower it onto blocks or stands. Make sure the component rests solidly. A sudden fall can cause an accident.

When jacking up the vehicle, be sure to block the wheels at front and rear. Always place earthmoving equipment (blade and scarifier) in lowered position when parking vehicle to prevent possible injury to personnel and to prevent needless stress on hydraulic and mechanical components.

Perform all maintenance operations, unless otherwise specified, with ALL equipment lowered, transmission control lever in NEUTRAL position, parking/emergency brake applied, engine stopped and electrical disconnect key removed.

### Section III. PRINCIPLES OF OPERATION.

- **1-13. 130G GRADER**. The 130G Grader is an all-purpose, medium sized, wheeled vehicle used for spreading and evening various types of granular material (dirt, stone, sand, etc.). Power is by a Caterpillar in-line, four-cylinder, direct-injected, turbocharged and intercooled diesel engine. Hydraulically operated implements allow blade positioning for forward or backward grading, ditch or embankment grading and snow removal. A scarifier allows loosening of compacted material prior to grading. Front leaning wheel and frame articulation provide maximum maneuverability. A sound-suppressing ROPS cab with insulation, heater and windows allows for all-weather operation.
- **a.** <u>Engine</u>. The turbocharged engine is an internal combustion power unit. The engine uses the heat of compression to ignite the fuel. Fuel flow and engine speed are controlled by the fuel injection pump governor and fuel injectors.
- **b.** <u>Fuel System</u>. Fuel is drawn from the tank by a fuel transfer pump, filtered by a primary fuel filter, routed to the fuel injection pump and secondary filter and then injected through the fuel injector nozzles into the engine cylinders. Air is drawn in through dry type replaceable filter elements. A dust ejector removes incoming dust from the air and routes it out through the exhaust system.
- **c. Exhaust System**. Engine combustion by-products are channeled through the exhaust manifold, muffler and exhaust pipe. The muffler aids in quieting engine noise.
- **d.** <u>Cooling System</u>. Provides coolant to the engine. Coolant is circulated through the engine by a gear driven water pump. Hydraulic oil cooler is located in front of the radiator. Engine and transmission oil coolers are mounted on the left side of the engine.
- **e.** <u>Electrical System</u>. The 24 volt system with negative ground is powered by two batteries. Alternator is mounted on the engine and driven by a V-belt. Disconnect switch controls battery power to the main light switch and the starting motor. A back-up alarm is also included.
- **f.** <u>Transmission</u>. Six speeds are provided in both forward and reverse. A transmission modulator places the transmission in neutral. Another foot pedal provides limited movement for close guarter maneuvering.
- **g.** <u>Final Drive Assembly</u>. Axle shafts turn the planetary gears of the final drive. Final drive sprockets turn the rear wheel spindles through drive chains within the tandem axle housings.

### **1-13. 130G GRADER.** (cont)

- h. <u>Front Axle Assembly</u>. A trunnion mounted solid front axle swings a maximum of 32 degrees and provides 24 inches of ground clearance.
- i. Rear Axle Differential and Lock Differential. A four-wheeled tandem rear axle arrangement houses axle shafts driven by a lock-unlock equipped differential. The axle shafts turn the final drive sprocket chains through planetary reduction gears. The sprocket chains then drive the sprocket spindles and wheels.
- **j.** <u>Air Brake System.</u> The rear four-wheel brakes are air actuated and of multiple oil disc design. They are housed within the wheel spindle housings. A pedal operated valve at the cab controls the braking air pressure. An engine driven, two cylinder air compressor supplies a two section air reservoir to provide braking pressure.

The manually actuated multiple oil disc parking/emergency brake located in the transmission case is spring engaged and air disengaged. A dual circuit air system arrangement maintains one half of the service braking power in the event of a brake system circuit malfunction. If service brakes are lost, the parking/emergency brake can be applied.

- **k.** Wheels and Tires. Rim and wheel assemblies are interchangeable. There are six tubeless 13-24 (8 PR) traction type tires.
- I. <u>Steering</u>. The engine driven main hydraulic system pump powers two hydraulic steering cylinders, controlling the front wheels. An electrical supplemental steering pump is automatically actuated and supplies power for steering in the event that the main pump fails. The articulated cylinders are driven by the main hydraulic pump.
- m. Frame, Towing Attachments, Drawbars and Articulation System. A frame and case at the rear section of the vehicle serves as a mounting for the engine, rear wheels and drive train. A front frame section serves as a mounting for the cab, earthmoving components and front wheels. The two sections are articulated (hinged) at the center of the vehicle. The angle of articulation is controlled by hydraulic cylinders driven by the main hydraulic pump. There is a tow pin at each end of the vehicle.
- **n.** <u>Cab and Hood</u>. A low profile ROPS (Rollover Protective Structure) and FOPS (Falling Object Protective Structure) cab protects operator from dust, sound and weather. It also houses the controls and instrumentation. An engine and radiator hood with side door assemblies provides sound suppression and weather protection.
  - **o. Bumper.** One bumper equipped with a tow pin is located at the rear of the vehicle.

### PRINCIPLES OF OPERATION.

### 1-13. 130G GRADER.

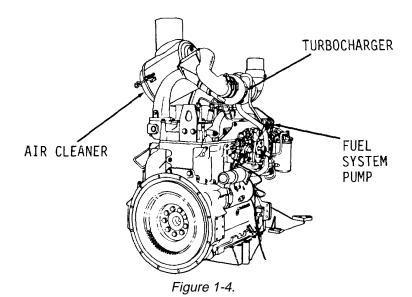
- **p.** <u>Body, Chassis and Hull Accessory Items</u>. Windshield wipers, windshield washers, horn, side mirrors, defrosting fan, heater.
- **q.** <u>Hydraulic System</u>. A main hydraulic pump driven by the engine provides power for steering and earthmoving equipment operation. A battery powered hydraulic supplemental steering pump provides emergency steering power.

### r. Gages and Indicators (Non-electrical).

- (1) <u>Air cleaner indicator</u>. Mounted at the right side of the engine on the air inlet pipe elbow between the air filter and the turbocharger. When it shows red, the cleaner elements need cleaning or replacing.
- (2) <u>Air pressure gages</u>. Mounted in a small instrument panel at the upper right hand forward section of the engine hood. Indicate amount of air pressure in each section of the air tank.
- (3) <u>Articulation indicator</u>. Mounted at the top of the steering console. It shows how far from the straight position the frame has been pivoted.
- (4) <u>Centershift indicator</u>. Mounted at the right hand centershift pivot point. Refer to paragraph 1-10 for location. Guides operator in moving centershift lock pin to new position.
- (5) <u>Coolant level indicator</u>. Located within the radiator coolant fill opening. Maintain coolant level between the low and full coolant level indicator marks in the filler opening.
- (6) <u>Hydraulic reservoir sight gage</u>. Position half way up the left side of the hydraulic reservoir which is located directly to the rear of the cab.
  - (7) Tandem housing dipstick assembly. Located on top of forward ends at tandem housings.
  - (8) Engine oil dipstick assembly. Located at the left side of the engine.
  - (9) Transmission and differential dipstick assembly. Located inside of left rear engine hood access door.
  - (10) Fuel level dipstick. Located within the fuel fill opening.
- s. <u>Blade</u>. Hydraulically controlled side shift, tip, centershift, circle and blade float. Additional manually adjusted sideshift. The drawbar is attached to a ball joint at the front of the vehicle.
- t. <u>Scarifier Assembly</u>. Assembly is located forward of the blade. It is hydraulically raised and lowered, and the drawbar attaches to the front of the vehicle.

### PRINCIPLES OF OPERATION. (cont)

**1-14. ENGINE** (Figure 1-4). Caterpillar 4 stroke cycle 3304 turbocharged diesel engine with four cylinders. Direct injection Caterpillar fuel system with individual nonadjustable injection pumps and valves. Dry type air cleaner with primary and secondary elements.



Pressure lubrication with full flow filtered oil and oil cooler. Oil sampling valve mounted at the left side of the engine on the intake manifold (Figure 1-5). Refer to LO 5-3805-261-12 and TB 43-0210 for oil sampling instructions.

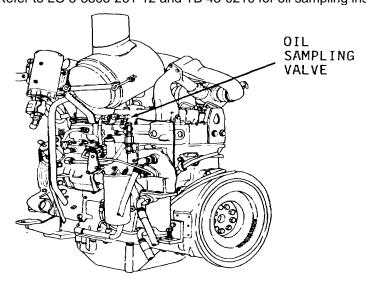


Figure 1-5.

Uses economical No. 2 fuel oil (ASTM Specification D396, No. 2 furnace or burner oil) with a minimum cetane rating of 35. Premium quality fuel can be used but is not required.

### PRINCIPLES OF OPERATION.

### 1-15. FUEL SYSTEM.

- **a.** <u>Fuel Injector Nozzles</u>. Mounted on cylinder head. Four used. Closed end, differential pressure, hydraulically operated, hole type.
- **b.** <u>Fuel Transfer Pump</u> (Figure 1-6). Mounted on the fuel injector pump at forward, right side of engine. Cam operated. Draws fuel from fuel tank through inline primary fuel filter and pushes it through the secondary filter to the individual fuel injectors.

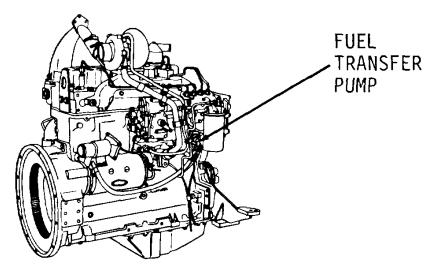


Figure 1-6.

**c.** <u>Air Cleaner</u> (Figure 1-7). Dry type. Filters air before it is applied to the inlet manifold by the turbocharger. Mounted at top of engine and projects upward through the hood. Dust is drawn from incoming air through dust ejector line attached to exhaust system.

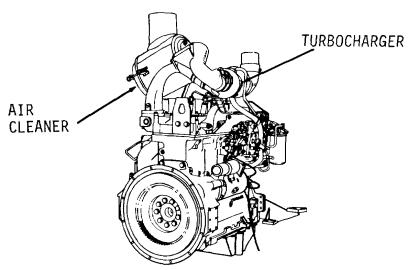


Figure 1-7.

- **d.** <u>Turbocharger</u>. Mounted on top of engine on right side. Forces incoming air under pressure into the inlet manifold to raise engine efficiency.
  - e. <u>Fuel Tank</u>. 75 gal capacity. Mounted at rear of 130G Grader between the engine and the radiator.

### 1-15. FUEL SYSTEM. (cont)

**f.** <u>Fuel Injector Pump</u>. Fuel from primary fuel filter flows to gear driven fuel injection pump. Fuel is again filtered, then metered accurately and applied to each cylinder at high pressure through fuel injector nozzles. The fuel is delivered at precisely timed intervals.

The throttle control lever controls fuel metering through a cable connection. This also attaches to an accelerator pedal. The centrifugal speed regulating governor is located within the fuel injector pump housing.

- g. <u>Fuel Filters</u>. Primary filter is mounted on the fuel tank. Secondary filter is mounted on the fuel injector pump housing. Primary and secondary fuel filters remove fuel oil impurities which may damage the fuel injector pump and/or nozzles.
- h. <u>Fuel Strainer</u> (Figure 1-8). Located in fuel tank fill opening. Prevents passage of foreign material into the fuel tank.

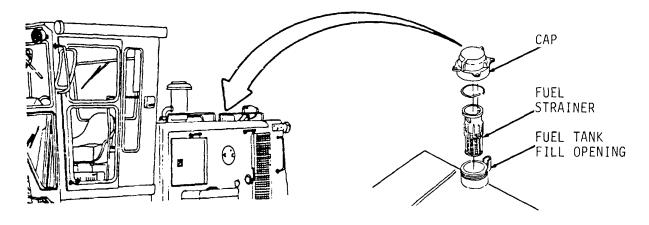


Figure 1-8.

i. Ether Aid Cold Start Kit (Figure 1-9). The ether starting aid bottle and operator controlled electric activator are mounted on rear surface of fuel tank toward the right side of the vehicle. Ether is injected through a tube attached to the intake manifold. Temperature sensitive automatic closure switch mounted on water pump prevents ether aid use above 32 degrees F.

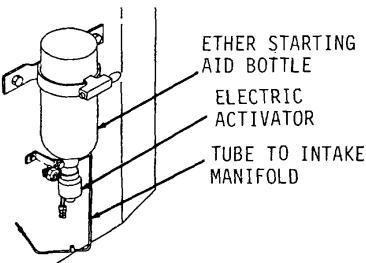


Figure 1-9

# PRINCIPLES OF OPERATION.

### 1-16. EXHAUST SYSTEM.

**a.** <u>Muffler</u> (Figure 1-10). Mounted on top of engine at turbocharger outlet. Reduces engine exhaust noise. Projects upward through hood. Dust ejector line from air cleaner is attached to bottom.

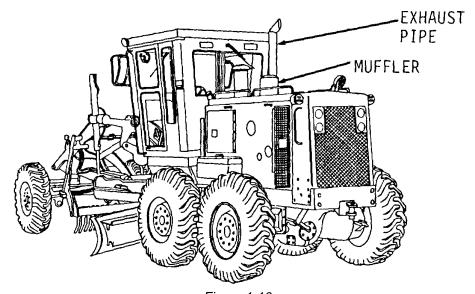


Figure 1-10.

**Exhaust Pipe**. Attached to muffler. Projects upward to carry exhaust fumes away from the vehicle.

### 1-17. COOLING SYSTEM.

- a. Radiator. Mounted at rear of 130G Grader. Transfers heat from coolant to air.
- **b.** <u>Thermostat Housing</u> (Figure 1-11). Mounted on cylinder head at left front of engine. Opens at 175 degrees F. Housing also serves as coolant hose connection.

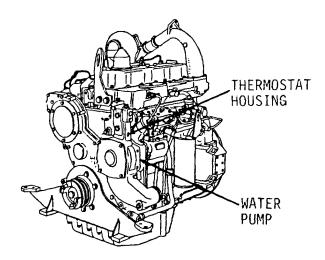


Figure 1-11

**c.** <u>Water Pump</u>. Mounted on forward left lower section of engine. Gear driven by engine. Propels coolant through the cooling system.

### 1-17. COOLING SYSTEM. (cont)

- **d.** <u>Hoses</u>. Upper hoses and line route coolant from the cylinder head coolant outlet into the upper section of the radiator. Lower hoses and line supply radiator coolant which is pushed through the cylinder block by the water pump.
  - **e. Fan**. Mounted on fan drive assembly located between fuel tank and radiator.
- f. <u>Drive Belts</u> (Figure 1-12). Dual belts mounted so that the fan drive and he alternator are driven by the transmission oil pump pulleys.

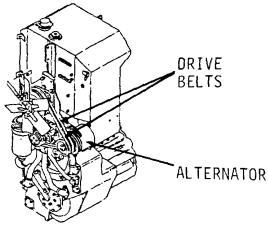


Figure 1-12.

- **g.** Engine Oil Cooler (Figure 1-13). Mounted horizontally along left side of engine. Engine coolant flows through the unit to remove heat from the engine oil.
- h. <u>Transmission Oil Cooler</u>. Mounted vertically along left side of engine. Engine coolant flows through the unit to remove heat from the transmission oil.

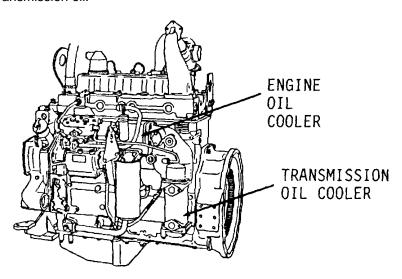


Figure 1-13.

### PRINCIPLES OF OPERATION.

### 1-17. COOLING SYSTEM.

i. <u>Hydraulic Oil Cooler</u> (Figure 1-14). Mounted at the upper forward surface of the radiator. Air passing through the cooler removes heat from the hydraulic system oil before it returns to the hydraulic oil reservoir behind the cab.

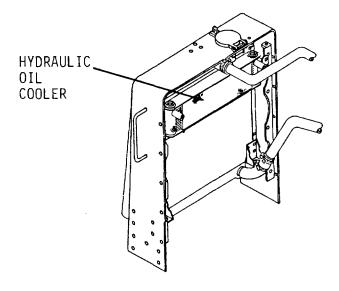


Figure 1-14.

### 1-18. ELECTRICAL SYSTEM.

**a.** <u>Alternator</u> (Figure 1-15). 50 ampere rating. Belt driven by transmission oil pump pulleys. Charges batteries and supplies current for additional electrical power. A voltage regulator is located behind the end cover.

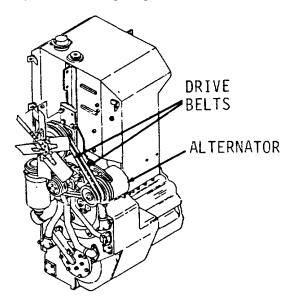


Figure 1-15.

### 1-18. ELECTRICAL SYSTEM. (cont)

- **b. Drive Belts.** Driven by transmission oil pump pulley. The oil pump is driven by the engine crankshaft.
- **c.** <u>Starting Motor</u> (Figure 1-16). Electric with overrunning clutch. Solenoid mounted on starter with engaging mechanism enclosed in the housing.

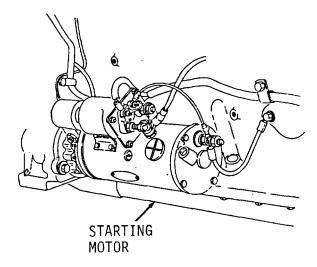


Figure 1-16.

**d.** Monitoring System Panel (MS) (Figure 1-17). Mounted at top of steering console in cab. Contains warning and operating indicators for hydraulic, electric and mechanical systems. Used in place of conventional instrument panel. Refer to paragraph 1-10 and TM 5-3805-261-10.

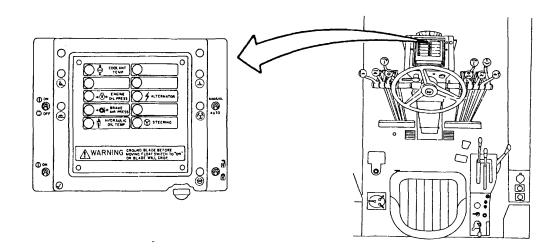


Figure 1-17.

### PRINCIPLES OF OPERATION.

### 1-18. ELECTRICAL SYSTEM.

**e.** <u>Lights</u> (Figure 1-18). Mounted forward on the 130G Grader cab are two lower floodlights, two upper headlights and two turn signals. One blackout light is mounted far forward on the frame. Mounted at the rear of the engine hood are one floodlight, two stop and taillights, two blackout stop and taillights and two turn signals.

Front and rear floodlights are controlled by individual switches mounted on the operator's panel console. Operation of other lights is controlled by a vehicle light switch assembly mounted at the left of the driver's seat. The headlight dimmer switch is mounted in the cab floor toward the left of the steering console. It is foot operated. Refer to TM 5-3805-261-10 for light control operation.

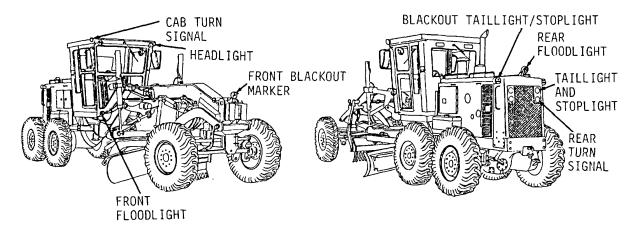


Figure 1-18.

**f.** <u>Service Meter</u> (Figure 1-19). Mounted at right front vertical section of engine hood assembly. Registers engine hours. Electrically driven by an oil pressure actuated switch.

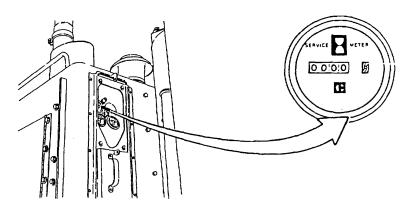


Figure 1-19.

### 1-18. ELECTRICAL SYSTEM. (cont)

### g. Sending Units.

Name of Unit

(1) Right side brake circuit air pressure for Monitor System panel (Figure 1-20) Location
At brake pedal treadle valve.

(2) Left side brake circuit air pressure for Monitor System panel.

At brake pedal treadle valve.

(3) Stoplight switch.

At brake pedal treadle valve.

(4) Blackout stoplight switch.

At brake pedal treadle valve.

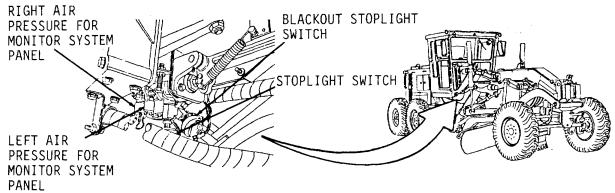


Figure 1-20.

(5) Oil pressure switch for servicemeter (Figure 1-21).

Left side center of engine block.

(6) Oil pressure switch for Monitor System panel.

Left side center of engine block.

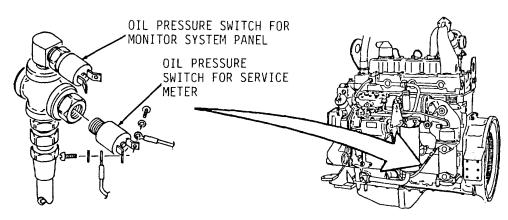


Figure 1-21.

# 1-18. ELECTRICAL SYSTEM

# g. Sending Units.

# Name of Unit

(7) Ether starting aid temperature switch (Figure 1-22).

#### Location

Engine left side on water pump.

(8) Coolant temperature fault indicator switch.

Engine left side on water pump.

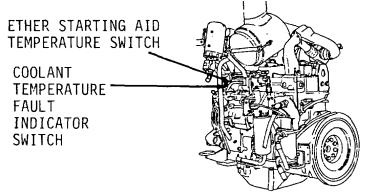


Figure 1-22.

(9) Supplemental steering sensor (Figure 1-23).

Right side combination valve.

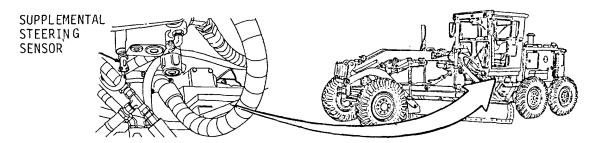


Figure 1-23.

(10) Hydraulic oil temperature switch (Figure 1-24).

Right side of hydraulic oil reservoir.

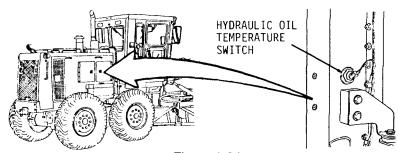


Figure 1-24.

# PRINCIPLES OF OPERATION. (cont)

# 1-18. ELECTRICAL SYSTEM. (cont)

# g. Sending Units. (cont)

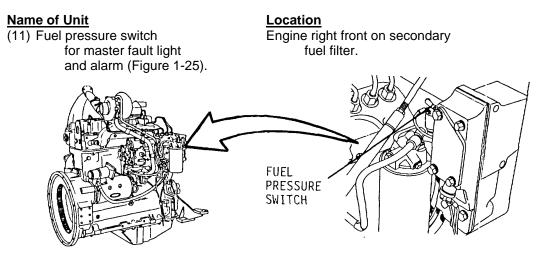
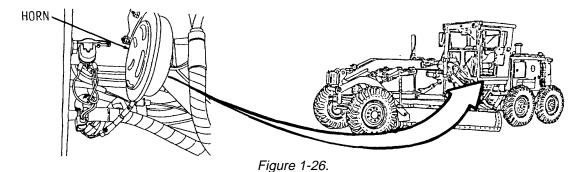


Figure 1-25.

h. <u>Horn and Horn Switch</u> (Figure 1-26). 24 volt horn unit is located under the cab. Horn switch at center of steering wheel applies voltage to horn when horn button is depressed. Light switch must be on to activate horn system.



i. <u>Back-up Alarm</u> (Figure 1-27). Mounted on upper surface of rear bumper. Alarm is activated by a magnet when transmission is placed in reverse. Loudness adjustment is mounted on the back of the alarm unit.

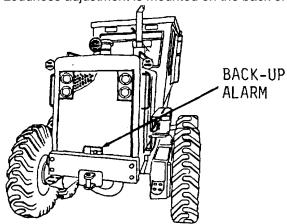


Figure 1-27.

# 1-18. ELECTRICAL SYSTEM.

**j.** <u>Batteries</u> (Figure 1-28). Two 12 volt batteries are used. Each battery is enclosed in a battery box. One is mounted at each side of the engine hood. They are connected in series to provide 24 volts of power. Refer to paragraph 1-10 for location.

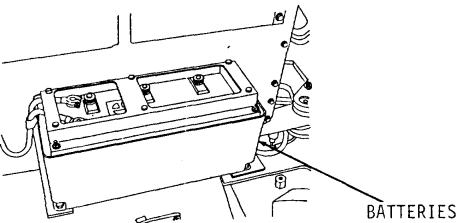


Figure 1-28.

**1-19. TRANSMISSION** (Figure 1-29). The transmission is attached to the rear of the engine. Engine power enters the upper (forward and reverse) section of the transmission. It is transferred to the lower (six speeds) planetary section and then forward into the differential and outward to the final drives. No torque converter is used.

A transmission and differential oil sampling valve is mounted vertically on the transmission oil cooler bonnet. Refer to LO 5-3805-261-12 and TB 43-0210 for oil sampling instructions.

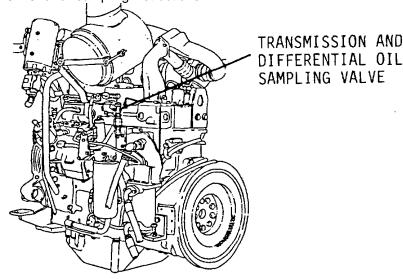


Figure 1-29.

**1-20. FINAL DRIVE ASSEMBLY** (Figure 1-30). The final drives are mounted at each side of the differential and provide planetary gear reduction for the chain driven sprockets and wheel spindles within the tandem housings. A dipstick assembly and breather are provided at each tandem to check the chain and sprocket oil supply.

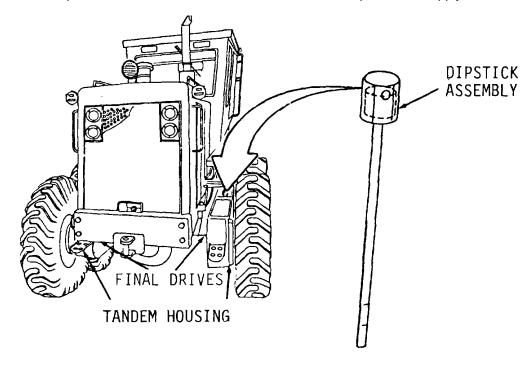


Figure 1-30.

**1-21. FRONT AXLE ASSEMBLY**. (Figure 1-31). Provides mounting for hydraulically actuated steering and leaning wheel mechanism. The front leaning wheel serves to counteract sideward pressure caused by the blade and for other grading conditions.

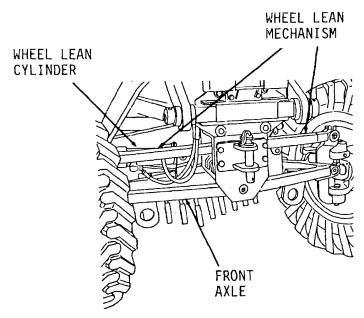


Figure 1-31.

**1-22. REAR AXLE/DIFFERENTIAL AND LOCK DIFFERENTIAL** (Figure 1-32). The differential is mounted to the forward lower section of the transmission. It provides gear reduction and transfers power through the final drives to the rear wheels at each side of the vehicle. It allows power to be transmitted equally to both sides even though the wheels on one side are moving more slowly when the vehicle is turning.

A differential lock-unlock feature includes a hydraulic valve that operates a clutch which causes drive wheels at both sides to travel at the same speed and pull evenly to reduce slippage.

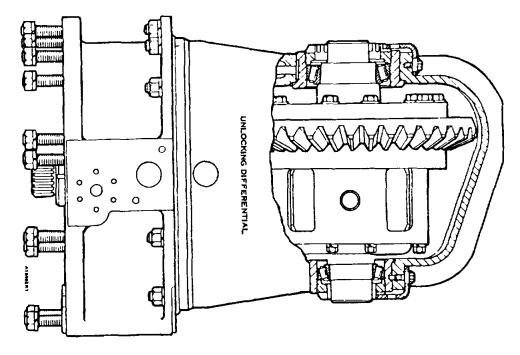


Figure 1-32.

#### 1-23. AIR BRAKE SYSTEM.

**a.** <u>Air Compressor and Reservoir</u> (Figure 1-33). A gear driven two cylinder air compressor mounted at the left forward side of the engine provides air pressure for the service brakes. A dual section air reservoir is connected by air lines and mounted under the rear of the vehicle. A governor controls the pressure.

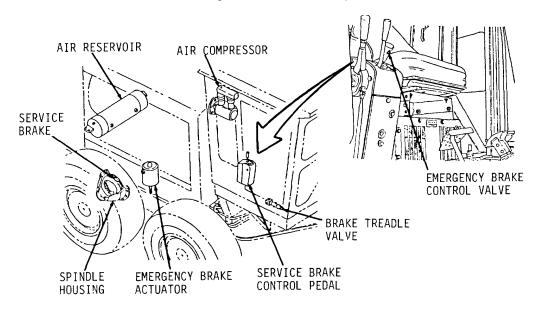


Figure 1-33.

- **b.** <u>Service Brakes</u>. A foot pedal operated air valve in the cab directs air pressure through air lines for engaging multiple oil disc brake assemblies for each wheel, within the tandem and spindle housings. Refer to Appendix F for air system schematic.
- **c.** <u>Parking/Emergency Brake</u>. Multiple oil disc type located in the transmission case. Manually actuated by forward movement of red lever on transmission control console. Lever engages parking brake and activates transmission neutral lock to prevent machine movement. Brake is spring engaged and air disengaged. Can be used for emergency stopping if air supply fails.
- **d.** <u>Emergency Braking</u>. Duel air system provides separate circuit at each tandem for safety. Malfunction of one circuit leaves remaining circuit with at least half of original braking capacity. Refer to Appendix for air system schematic.
- e. <u>Blade Centershift Lock Pin</u>. Though not part of the air brake system, the centershift lock pin is mentioned here because it also is operated by the air supply from the air brake system. The centershift lock pin is part of the blade system. Refer to paragraph 1-31 for location.

**1-24. WHEELS AND TIRES**. The six interchangeable rim and wheel assemblies are each mounted to the wheel spindle flanges. Ten lug nuts are used to mount each wheel. Refer to paragraph 1-10 for location and paragraph 1-11 for tire specifications.

#### 1-25. STEERING.

**a.** <u>Steering</u> (Figure 1-34). An engine driven, variable displacement pump mounted under the cab provides hydraulic flow for the steering. Refer to paragraph 1-29. The steering wheel actuates a small hydraulic pump directing oil to the two steering cylinders which steer the front wheels. An adjustable relief valve assembly is mounted at each side of the chassis above the front axle. Refer to Appendix F for hydraulic system schematic. Also, refer to paragraph 1-21 for location of hydraulic cylinders at front axle.

When the steering wheel is not being turned, the oil in lines and in cylinders, cannot move and the front wheels stay in position. If the side of one of the front wheels hits a restriction (material that will not move), the positions of the front wheels will move. The force on the side of the wheel causes an increase in the pressure of the oil in the cylinders and in one of the lines to the cylinders. When the pressure of the oil in the line gets to 1700 psi, the relief valves opens. The high pressure oil in the line goes through the open relief valve and into the other line to the cylinders. This lets the position of the front wheels change.

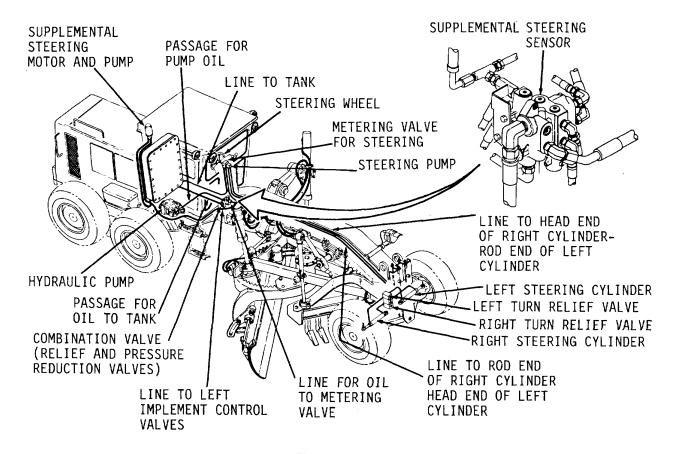


Figure 1-34.

#### 1-25. STEERING. (cont)

**b.** <u>Supplemental Steering</u>. Provides hydraulic oil flow to the steering if the engine fails or implement hydraulic flow is lost while the machine is operating. The main components are the electrically driven motor/pump mounted in the engine compartment, and a sensor mounted on the hydraulic combination valve. Refer to paragraph 1-29.

The sensor activates the motor/pump when pressure is lost in the hydraulic system. A switch on the engine governor prevents automatic activation of the motor/pump during normal engine shutdown. A switch on the panel activates the system for testing or for use during towing. Refer to Appendix F for supplemental steering system schematic.

# 1-26. FRAME, TOWING ATTACHMENTS, DRAWBARS AND ARTICULATION SYSTEM.

**a.** <u>Front Frame Section</u> (Figure 1-35). Frame section is a large welded unit built up from heavy I-beam to serve as a mounting for the front axle, blade, scarifier, hydraulic and electrical lines, and the cab. The cab mounting end includes large hitch bushings to provide for articulation (pivoting) of the two section frame.

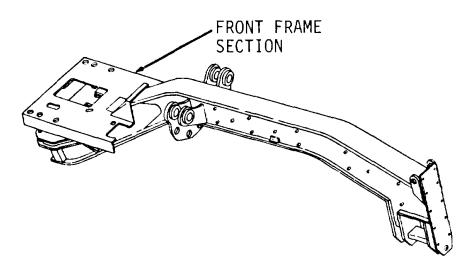


Figure 1-35.

**b.** <u>Frame and Case</u> (Rear Frame Section) (Figure 1-36). This large weldment includes hitch bushings for articulation and serves as a mounting for the engine and hood, radiator and fuel tank, transmission, differential, and final drives.

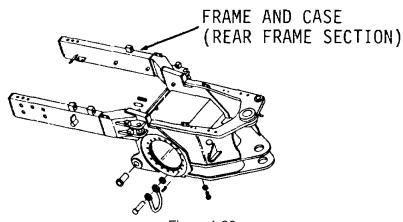
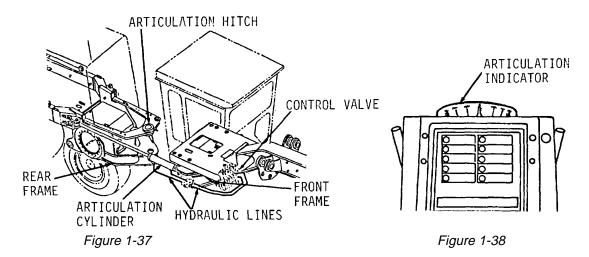


Figure 1-36.

# 1-26. FRAME, TOWING ATTACHMENTS, DRAWBARS AND ARTICULATION SYSTEM.

- **c.** <u>Articulation System</u> (Figure 1-37). The front frame section and the frame and case (rear frame section) are joined (hinged) at their hitch bushings. Two hydraulic cylinders and lines provide power for articulation. They are controlled from the cab. One cylinder is mounted at each side of the front frame and extends to attach to the rear frame to provide articulation control.
- **d.** <u>Articulation Indicator</u> (Figure 1-38). Mounted inside the cab at the top of the steering console. A small housed cable mounted on the front frame attached to a lever fastened to the rear frame. When the frame is articulated the cable moves the pointer on the indicator to show the amount of articulation. Refer to paragraph 1-31 for operation.



e. <u>Tow Pins and Brackets</u> (Figure 1-39). There is one tow pin and bracket at the front of the 130G Grader and one at the rear. The rear tow pin is held in its bracket by cross pin and cotter pin at the bottom of the tow pin. The front tow pin is held in the bracket by a latch assembly at the top of the bracket. The front bracket is bolted to the frame. The rear bracket is welded to the bumper assembly.

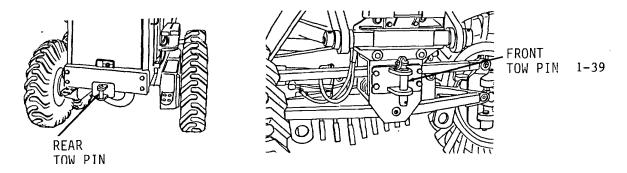


Figure 1-39.

# 1-27. BODY, CAB, HOOD AND HULL.

- **a.** <u>Hood Assembly</u> (Figure 1-40). Serves as weather protection for engine, fuel tank, fan, and radiator. The side door assemblies provide sound suppression and vandalism protection. Door assemblies and hood are removable for easier access to engine components.
- **b.** ROPS (Rollover Protective Structure) Cab. Cab protects operator and controls from weather and mechanical damage. Provides mounting for controls, operator's seat, heater, and various lights.

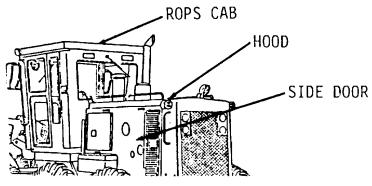


Figure 1-40.

c. Operator's Panel Console and Steering Console Assembly (Figure 1-41). Operator's console, mounted at right of operator's seat includes transmission and operator's controls. Steering console, in front of operator, has the Electronic Monitoring panel, steering wheel and implement controls.

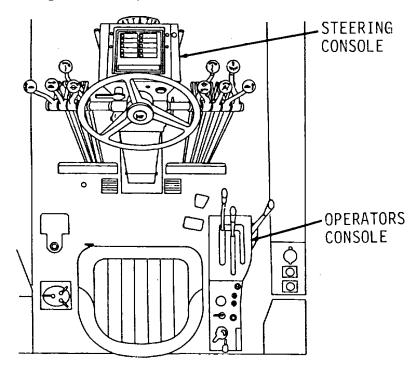


Figure 1-41.

# 1-27. BODY, CAB, HOOD AND HULL.

**d.** <u>Seat Assembly</u> (Figure 1-42). Adjustable with seat belts. Seat base serves as housing for heater. Refer to TM 5-3805-261-10 for adjustment procedure.

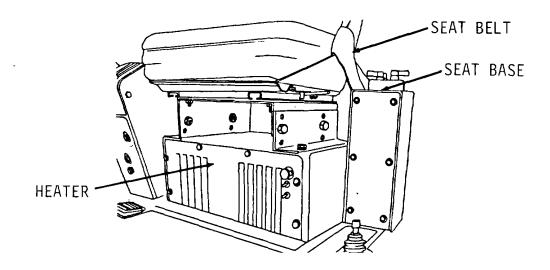


Figure 1-42.

e. <u>Tool Box Assembly</u> (Figure 1-43). Mounted directly forward of the circle drive motor. Contains scarifier shank removing tool, and wheel lean lock pin.

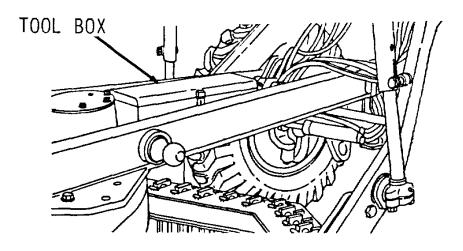


Figure 1-43.

# 1-28. BODY, CHASSIS AND HULL ACCESSORY ITEMS (Figure 1-44).

- **a.** <u>Windshield Wipers</u>. Front and rear. Driven by electric motors inside the cab. Control panel located on right hand wall inside cab. Upper and lower knobs control upper and lower wipers.
  - b. Windshield Washers. For front upper and lower wipers. Actuated by pushing wiper control knobs.
  - c. Cigarette Lighter. Located below wiper control knobs. On wiper control panel.
  - d. Rear View Mirrors. Mounted inside of cab above windshield.
  - e. Side View Mirrors. Mounted outside of cab at right and left front.
  - **f.** <u>Defrosting Fans</u>. Electric. Inside of cab at left front and right rear. Switches are mounted on the motors.
  - g. <u>Heater</u>. Under seat with controls. Heated by engine coolant. Circulation by electric fan.

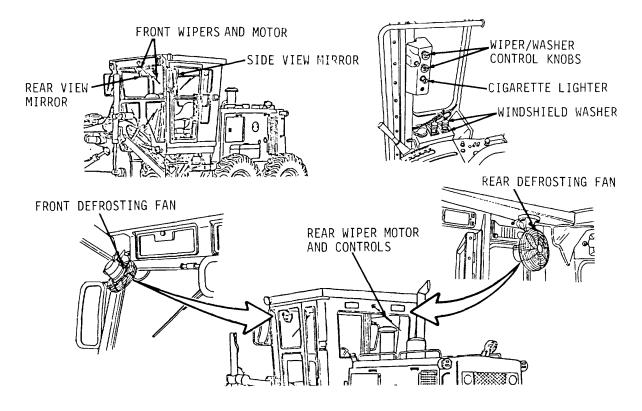


Figure 1-44.

h. <u>Data and Instruction Plates</u>. Refer to TM 5-3805-261-20 for location.

- **1-29. HYDRAULIC SYSTEM**. The hydraulic system is a closed center system. The oil from the variable displacement pump supplies pressure to the parts of the system while the engine is running. The main parts of the system are illustrated and explained in the following paragraphs. Refer to Appendix F for Hydraulic System Schematics.
- **a.** <u>Hydraulic Variable Displacement Pump Assembly and Lines</u> (Figure 1-45). Mounted under the cab. Shaft driven by engine. The variable displacement rear section draws oil from the hydraulic tank and provides oil flow for steering, articulation, wheel lean, and earthmoving components. The constant displacement front section circulates oil to the reservoir (tank) through the cooler, the filter, and the strainer.

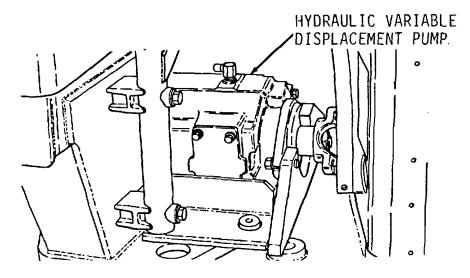


Figure 1-45.

**b.** <u>Combination Valve</u> (Figure 1-46). Located at the left of the variable displacement pump. Oil from the variable displacement pump flows through the combination valve when the engine is running. It then goes to the control valves for the earthmoving components and to the steering metering valve. A hydraulic pressure unloading valve is included for cold weather starting.

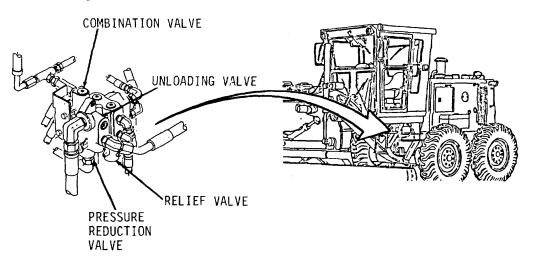


Figure 1-46.

#### PRINCIPLES OF OPERATION. (cont)

#### 1-29. HYDRAULIC SYSTEM. (cont)

**c.** <u>Hydraulic Control Valve</u> (Figure 1-47). Each of the control levers at the sides of the steering console operates a hydraulic control valve. The control valves are mounted side by side with the pump oil passages connected and with the return oil passages connected so that only one line is needed for each. Each valve controls a hydraulic cylinder or motor in the hydraulic system.

The operation of each control valve is the same. The rate of oil flow from each opening in a control valve for a hydraulic cylinder is not the same. There are valves that have approximately the same rate of oil flow from each opening. The size of the orifices from valve spool to openings is one of the controls for the rate of flow. The other control is the force of spring against valve. The spring force is not the same in each control valve.

The resolver valve lets the oil with the higher pressure in either passage opening then through the valve into next passage. The higher pressure of the oil on the ball in valve closes the valve passage with oil that has low pressure.

The implement valve in HOLD position has pump oil at a pressure of approximately 2150 psi in the valve when the engine is running.

When the engine is started, the pump oil in passage goes into next passage and then through the holes in valve to the chamber for the valve that has no spring. The pump oil in passage is stopped by valve spool and there is an increase in the pressure of the oil from the pump. As the pressure of the oil gets higher, the oil pushes the valve against the force of spring until valve is moved to a position where not much pump oil can go around valve into passage. There is a small amount of oil leakage around valve spool in HOLD position because of the high pressure of the oil in passage.

The location of the implement valve puts the valve lower than the oil in the tank. Oil at tank pressure, through passages, is in all passages in the valve that do not have pump oil. Air cannot get into the implement valve because of the oil in all of the passages in the valve.

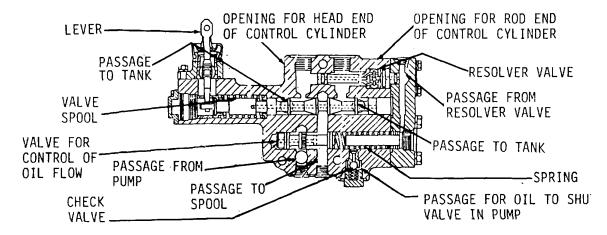


Figure 1-47.

# 1-29. HYDRAULIC SYSTEM.

d. <u>Lock Check Valve</u> (Figure 1-48). There is a lock check valve between the control valve and the hydraulic cylinder (of motor) in each of the hydraulic systems. The purpose of each lock check valve is the same, but several designs are used because of the different systems requirements. Lock check valves prevent hydraulic cylinder rods from drifting when the controls are in HOLD (neutral) position by locking the hydraulic pressure in against ball check valves. Outlet chokes in lock check valves serve to slow down the hydraulic flow when needed. Relief valves serve to prevent overloading the system.

The circle drive and leaning wheel systems use lock check valves without chokes or relief valves.

The centershift, articulation, and right hand lift systems use lock check valves with chokes and without relief valves.

The left hand lift system and the scarifier system use lock check valves with chokes and a relief valve.

The tip and sideshift systems use lock check valves with relief valves but without chokes.

When the control valve is in HOLD position, the oil in lines is stopped and the rod in the cylinder cannot move. The springs against balls, and the oil in lines, keep the balls on seats. The oil in lines is at tank pressure.

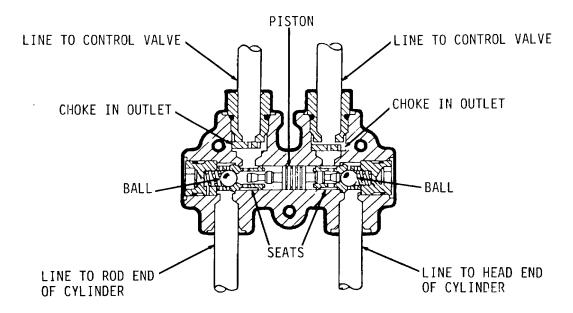


Figure 1-48.

# PRINCIPLES OF OPERATION. (cont)

# 1-29. HYDRAULIC SYSTEM. (cont)

e. <u>Dual Crossover Relief Valve</u> (Figure 1-49). Located at right and left sides of the frame above the front axle. An adjustable relief valve in each housing controls oil flow for earthmoving components the steering system.

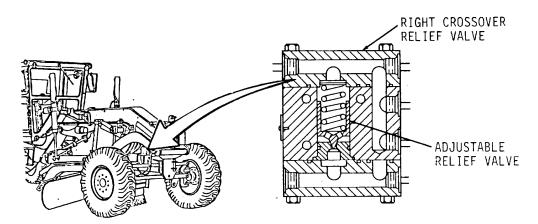


Figure 1-49.

f. <u>Steering Wheel Pump</u> (Valve) (Figure 1-50). Mounted at the steering console in the cab, steering wheel is attached to the pump shaft. When the steering wheel is turned, the valve directs oil to the steering cylinders to produce the desired amount of turning at the front wheels.

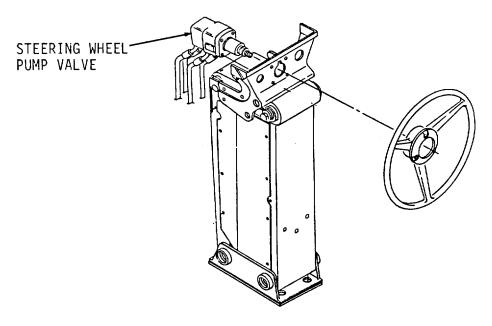


Figure 1-50

# 1-29. HYDRAULIC SYSTEM.

**g.** <u>Steering Cylinders</u> (Figure 1-51). Mounted at the front axle. Refer to paragraph 1-21 for location. The two steering cylinders turn the front wheels. Powered by the hydraulic system. Controlled by the steering wheel pump and steering wheel.

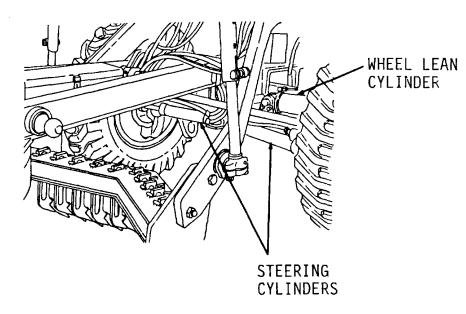


Figure 1-51.

- h. <u>Wheel Lean Cylinder</u>. Mounted at the front axle. Refer to paragraph 1-21 for location and further description. Powered by hydraulic system. Controlled by a lever in the cab. Sets front wheels at angle to counteract blade pressure exerted sideways against the front wheels when grading or moving heavy material. Also, sets front wheel angle to prevent the front of the vehicle from slipping sideways and downward when the vehicle is moving across a slope. Refer to TM 5-3805-261-10 for further description of operation.
- i. <u>Circle Drive Motor Assembly and Lines</u> (Figure 1-52). Mounted on drawbar over forward section of blade circle ring gear. Hydraulically driven. A gear on the motor drives an internal gear on the blade circle. Controlled by a lever in the cab. Refer to paragraph 1-31 for further descriptions.

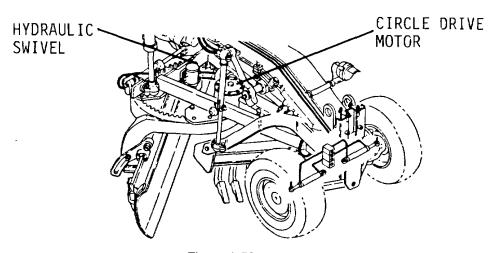


Figure 1-52.

# 1-29. HYDRAULIC SYSTEM. (cont)

**j.** <u>Hydraulic Swivel</u> (Figure 1-53). Mounted at the center of the circle assembly. The swivel allows hydraulic pressure to be transmitted to blade tip and sideshift cylinders during 360 degrees of blade circle rotation.

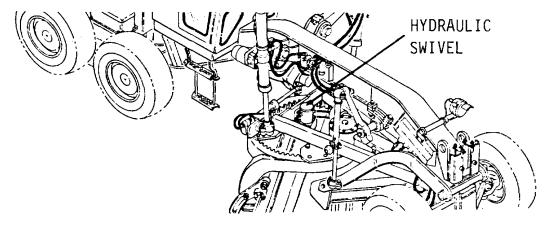
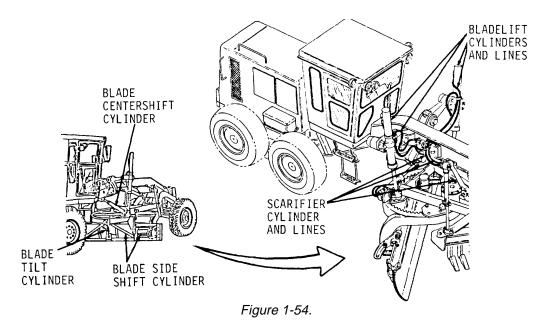


Figure 1-53.

- k. Blade Control Cylinders and Lines (Figure 1-54). Refer to paragraph 1-31 for operation.
- I. Scarifier Control Cylinders and Lines. Refer to paragraph 1-32 for operation.



m. <u>Articulation Systems</u>. Refer to paragraph 1-26 for location and description.

# 1-30. GAGES AND INDICATORS (NON-ELECTRICAL).

**a.** <u>Air Cleaner Indicator</u> (Figure 1-55). Mounted on air inlet elbow. Contains a vacuum sensitive, color coded piston inside of a calibrated plastic housing. When air cleaner elements become dirty, air inlet vacuum increases and moves the piston so that red appears in an aperture on the housing. This indicates that the elements need cleaning or replacing. After cleaning or replacing, indicator is reset and green appears at the aperture.

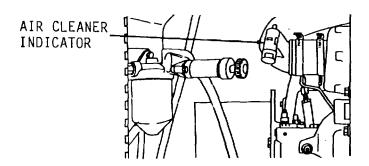


Figure 1-55.

**b.** <u>Air Pressure Gages</u> (Figure 1-56). Mounted in instrument panel at forward section of engine hood. Each one is connected by air lines to a section of the dual air tank. Each shows air pressure for one section of the air tank.

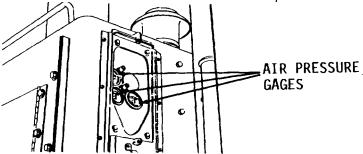


Figure 1-56.

**c.** <u>Articulation Indicator</u> (Figure 1-57). Mounted behind steering console. Connected by lever and cable downward through cab floor and linked to rear frame. Registers amount of articulation (pivoting) of frame from straight (0) to maximum (FULL).

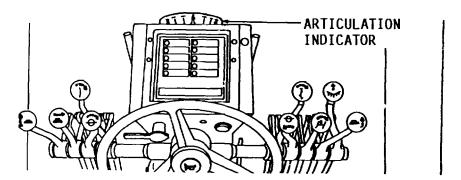


Figure 1-57.

# 1-30. GAGES AND INDICATORS (NON-ELECTRICAL). (cont)

**d.** <u>Centershift Indicator</u> (Figure 1-58). Mounted in front of cab at centershift pivot point, to right side of frame. Indicates amount of rotation of circle drive and blade from the level (center or C) grading position.

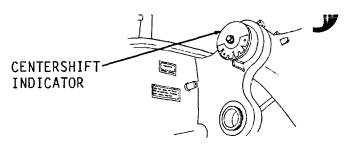
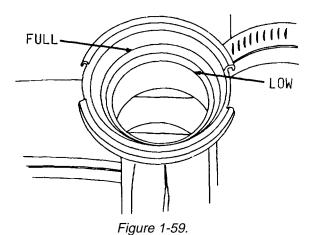


Figure 1-58.

e. <u>Coolant Fill Level Indicators</u> (Figure 1-59). Raised marks can be seen in the coolant fill opening after removing the cap. The marks indicate full and low coolant levels.



**f.** <u>Hydraulic Reservoir Sight Gage</u> (Figure 1-60). Mounted on left side of hydraulic reservoir. Level of hydraulic oil can be seen through glass in sight gage. The oil level is maintained between "FULL" and "ADD" with the engine off.

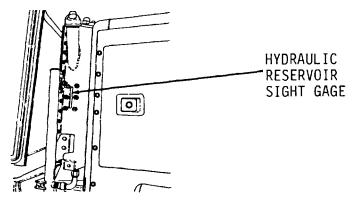


Figure 1-60.

# 1-30. GAGES AND INDICATORS (NON-ELECTRICAL).

**g.** <u>Tandem Housing Dipstick</u> (Figure 1-61). Located on top of tandem housing toward front. Breather filter located in hex nut handle.

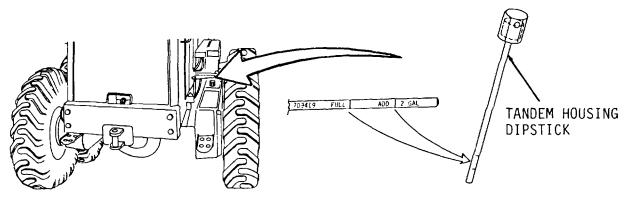


Figure 1-61.

h. <u>Engine Oil Dipstick</u> (Figure 1-62). Located next to air compressor on left side of engine.

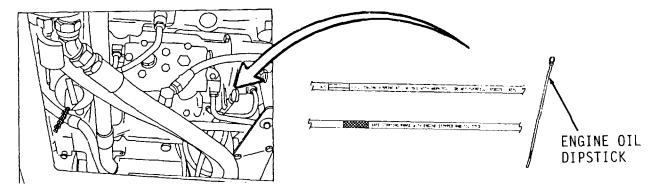


Figure 1-62.

i. <u>Transmission and Differential Dipstick</u> (Figure 1-63). Located inside of right side rear hood door assembly. T-handle must be unscrewed before removing, and must be screwed in tightly when repositioning to maintain seal.

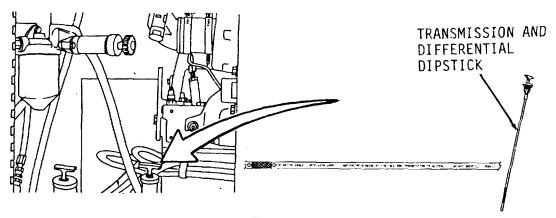
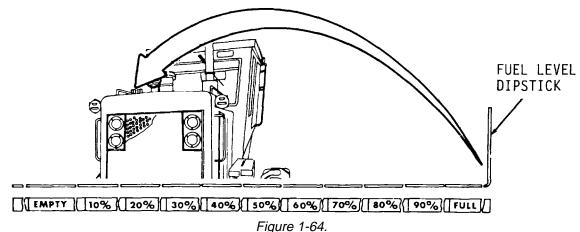


Figure 1-63.

# 1-30. GAGES AND INDICATORS (NON-ELECTRICAL). (cont)

**j.** <u>Fuel Level Dipstick</u> (Figure 1-64). Located in fuel fill opening. Calibrations show FULL, EMPTY, and percentage of fuel in tank.



rigure 1-04.

**1-31. BLADE SYSTEM**. The blade system uses hydraulic cylinders and a hydraulic circle drive motor to move the blade. The hydraulic system provides power for the cylinders and motor. Refer to paragraph 1-29 for hydraulic system operation and location of components. The blade control levers are located at the sides of the steering console in the cab. Refer to paragraph 1-29 for description of control valve and lock deck valve. Refer to TM 5-3805-261-10 for blade operating instructions and exact location of operator's controls. The blade centershift lock is powered by pressurized air. Refer to Appendix F, Section II, paragraph F-5.

When the engine is running, the oil from the variable displacement pump goes through the relief and pressure reduction valves, through lines to the control valves for the blade system cylinders. The pressure of the oil can get as high as the pressure setting of the relief valve. When the control valves for the blade system cylinders are not being used, the pressure of the oil is 2150 psi.

When the engine is running and the cylinders are not being used, the pressure of the pump oil to the control valve is approximately 2150 psi. The oil in lines and passage is open to the tank and the pressure of the oil in these lines is the same as the oil in the tank. Lock check valve stops the oil in the lines between pressure reduction valve and cylinder and the rod in the cylinder cannot move.

When the blade control valve lever for the cylinder is held in the forward position, the pump oil goes through control valve through lines and lock check valve into the head end of cylinder. The oil in the head of cylinder pushes the piston and rod out of the cylinder which moves the blade. When more force is needed, there is an increase in the pressure of the pump oil to the head end of cylinder. When the pressure of the pump oil goes to 1500 psi, the oil moves the shuttle valve in the pump and the oil pressure from the pump can go to approximately 3500 psi.

# 1-31. BLADE SYSTEM.

The separate blade systems are:

**a.** <u>Blade Centershift Cylinder</u> (Figure 1-65). The cylinder is attached to the circle assembly so that the drawbar and the blade can be moved to the right or to the left.

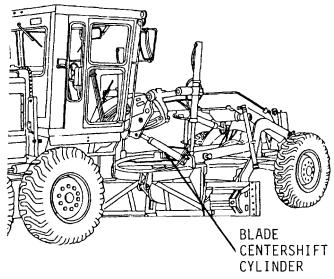


Figure 1-65.

**b.** <u>Blade Centershift Lock</u> (Figure 1-66). This mechanical lock is mounted on the blade lift bar. The lock pin is moved by an air operated valve in the housing.

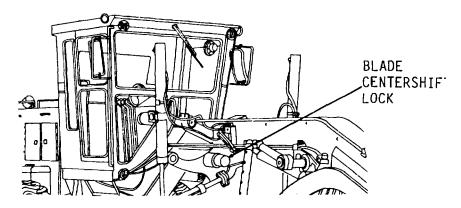


Figure 1-66.

# 1-31. BLADE SYSTEM. (cont)

**c.** <u>Blade Tip Cylinder</u> (Figure 1-67). Attached to circle assembly and blade assembly so that the blade can be tipped forward or to the rear. Hydraulic oil for tip cylinder operation is sent through the hydraulic swivel. Refer to paragraph 1-29.

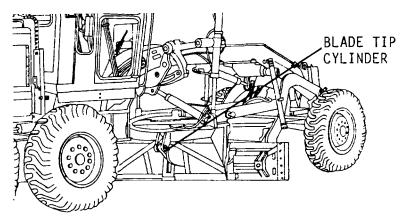


Figure 1-67.

**d.** <u>Blade Lift Cylinder</u> (Figure 1-68). Each cylinder is attached to a blade lift arm and the circle assembly at each side of the frame. There is a lift cylinder control lever and a right cylinder control lever in the cab. The lift cylinders are used to raise or lower the blade. They are also used to rotate the blade lift arms to set the blade angle for ditching and banking. Blade lift arms must be rotated with blade grounded and the centershift lock in the unlock position.

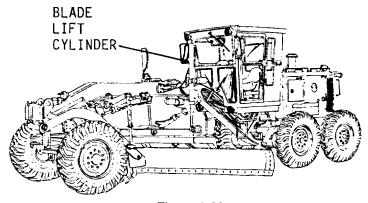


Figure 1-68.

# 1-31. BLADE SYSTEM.

**e. Blade Float Hydraulic System**. The purpose of this circuit is to allow blade lift cylinder rods along with the blade to move freely up and down over uneven surfaces when moving snow, gravel, and other loose materials.

The system consists of: a manual switch at the Monitor System panel, one blade float pilot valve assembly, one blade float check valve for each cylinder, and a limit switch at each of the blade lift lever linkages. Refer to hydraulic system for lift cylinder above.

When moved to the ON position, the switch at the Monitor System panel opens a normally closed solenoid valve and closes a normally open solenoid valve in the blade float pilot valve assembly. The opened valve sends pump pressure oil to actuate the blade float check valves and the closed valve prevents pressure oil from returning to the tank from the blade float check valves.

Pistons within the blade float check valves then move check balls off their seats which allows free movement of oil between the head and rod ends of the lift cylinders. This allows the blade to move freely up and down over uneven surfaces.

The limit switches on the blade lift lever linkage allow raising and lowering of the blade lever even when the blade float system is on. If the lift lever is moved, the limit switch turns off the current to the solenoids in the blade float pilot valve. This turns off the blade float system until the lever is returned to its NEUTRAL position.

When moved to the OFF position, the blade float pilot valve assembly returns to normal which now prevents free circulation of oil between upper and lower ends of the cylinders. It also allows any pressure remaining in the check valve to return to the tank.

# 1-31. BLADE SYSTEM. (cont)

**f.** <u>Blade Sideshift Cylinder</u> (Figure 1-69). Attached to blade mounting bracket and to blade assembly. Control lever is located in control lever group mounting at side of steering console. Provides sideways movement of blade. Hydraulic oil for sideshift cylinder operation is routed through the hydraulic swivel. Refer to paragraph 1-29.

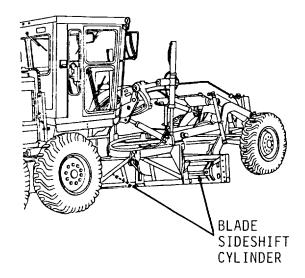


Figure 1-69.

**g.** Blade Circle Drive Motor (Figure 1-70). Mounted on drawbar assembly so that hydraulically driven gear on motor drives the circle gear. The circle gear rotates the blade horizontally. The motor is controlled by a lever in the cab.

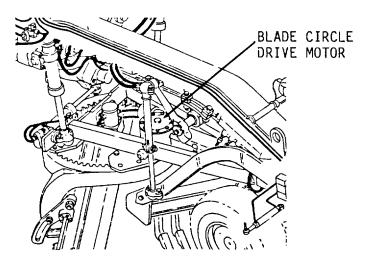


Figure 1-70.

**1-32. SCARIFIER ASSEMBLY** (Figure 1-71). The scarifier assembly uses a hydraulic cylinder to move the scarifier upward or downward. The scarifier control lever is located in the lever group at the right side of the steering console in the cab. Refer to TM 5-3805-261-10 for scarifier operating instructions and control lever location. Refer to paragraph 1-29 for description of control valve and lock check valve.

When the engine is running, the oil from the variable displacement pump goes through the relief and pressure reduction valve through lines, to the control valve for the scarifier cylinder. The pressure of the oil in lines can get as high as the pressure setting of the relief valve. When the control valve for the scarifier cylinder is not being used, the pressure of the oil in lines is 2150 psi.

When the engine is running, and the scarifier is not being used, the pressure of the pump oil in lines to the control valve is approximately 2150 psi. The oil in lines in passage is open to the tank and the pressure of the oil in these lines is the same as the oil in the tank. Lock check valve stops the oil in the lines between valve and cylinder and the rod in the cylinder cannot move. The pressure of the oil in lines is the same as the oil in the tank.

When the scarifier control valve lever is held in the LOWER position, the pump oil goes through control valve through lines and lock check valve into the head end of cylinder. The oil in the head of cylinder pushes the piston and rod out of the cylinder which moves the scarifier down. When more force is needed to lower the scarifier, there is an increase in the pressure of the pump oil to the head end of cylinder. When the pressure of the pump oil goes to 1500 psi, the oil moves the shuttle valve in the pump and the oil pressure from the pump can go to approximately 3500 psi.

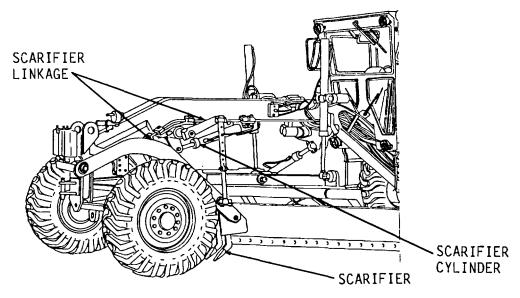


Figure 1-71.

1-57 (1-58 blank)

#### **CHAPTER 2**

#### **SERVICE UPON RECEIPT**

#### **CHAPTER OVERVIEW**

The purpose of this chapter is to provide those of you at the organizational level with all needed instructions and additional information to help keep the equipment in good repair.

#### **INDEX**

<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
Handling New Equipment	2-1	2-1
Servicing New Equipment	2-2	2-1
Initial Checkout and Adjustment	2-3	2-2
General Maintenance Information	2-4	2-4

#### 2-1. HANDLING NEW EQUIPMENT

- **a.** <u>Unloading Instructions</u>. Vehicle is shipped unboxed and mobile on railcar with tiedowns over front and rear axles.
  - (1) Remove blocking from front, rear and sides of vehicle.
  - (2) Perform paragraphs 2-1b., 2-2c. and 2-3b.(1).
  - (3) Remove tiedowns and remove vehicle from flat bed or rail car.
  - **b.** <u>Unpacking.</u> Remove tape, banding, paper and other packing materials. Remove tape from exhaust pipe.

#### 2-2. SERVICING NEW EQUIPMENT.

#### **WARNING**

Dry cleaning solvent P-D-680, used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well-ventilated area. Avoid contact with skin, eyes and clothes and do not breathe the vapors. Do not use near open flame or excessive heat. Do not smoke while using it. Failure to do so may cause INJURY. If you become dizzy while using cleaning solvent, immediately seek fresh air, and if necessary, medical attention. If contact with skin or clothes is made, flush thoroughly with water. If the solvent contacts your eyes, wash with water immediately and obtain help.

# 2-2. SERVICING NEW EQUIPMENT. (cont)

- a. <u>Removal of Protective Compounds</u>. Remove preservative compounds from metal surfaces with cleaning solvent P-D-680. Check to ensure that all fill openings are clear.
- **b.** <u>Cleaning</u>. Clean all dust and dirt from seat, operator's panel console, monitoring system panel, wiring, engine and radiator.
  - **c.** <u>Lubrication</u>. Lubricate vehicle in accordance with LO 5-3805-261-12.

#### 2-3. INITIAL CHECKOUT AND ADJUSTMENT.

# a. Inspection.

- (1) Inspect equipment for damage incurred during shipment. If equipment has been damaged, report the damage on DD Form 6, Packaging Improvement Report. Refer to DA PAM 700-3 for instructions on preparation of DD Form 6.
- (2) Check equipment against packing slip to see if shipment is complete. Report all discrepancies in accordance with instruction in DA PAM 738-750.
  - (3) Check to see whether equipment has been modified.
  - (4) Check air cleaner and exhaust system for damage.
  - (5) Check gages, operator's panel console and glass for breakage or other damage.
  - (6) Check control levers for bent or broken condition.
  - (7) Check engine accessories for loose connections and insecure mounting.
  - (8) Check wiring for loose connections, damaged insulation and broken wires.
  - (9) Check fittings, lines and hoses for cracks, loose connections and broken or missing parts.
  - (10) Check that all drain plugs are securely tightened.

# **SERVICE UPON RECEIPT.**

# 2-3. INITIAL CHECKOUT AND ADJUSTMENT.

# b. Service Check.

(1) Remove leaning wheel lock pin from holes at front axle and stow in tool box (Figure 2-1).

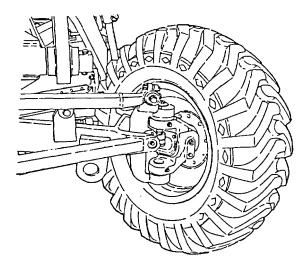


Figure 2-1.

(2) Remove antipivot pin from lock position and place in storage position (Figure 2-2).

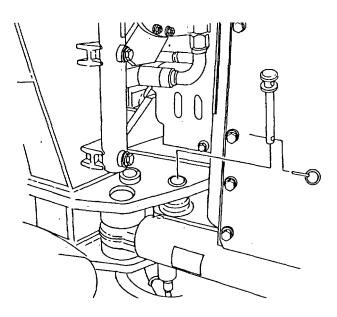


Figure 2-2.

#### 2-4. GENERAL MAINTENANCE INFORMATION.

**a. General.** This section provides general repair methods and cleaning procedures. Special repair and cleaning procedures are provided, as required, in the individual maintenance instructions.

#### b. Repair Methods.

- (1) Complete disassembly is not always necessary to make a repair. Exercise good judgment to keep disassembly and assembly to a minimum.
- (2) Repair or replace unserviceable parts and hardware. Always replace packings, gaskets and seals with new parts.
- (3) Remove burrs with a stone or file. Remove burrs on closely fitted mating surfaces by lapping the surfaces with abrasive grade compound.
- (4) Remove corrosion or rust with crocus or emery cloth. Use the method that will not damage the surface being cleaned. Crocus cloth should be used to remove corrosion and rust from polished surfaces. Make sure that critical dimensions are not altered when using crocus cloth.
  - (5) Repair damaged threads with a thread chaser or die.
- (6) When welding is authorized, procedures in TM 9-327 must be followed. Welds must be inspected for cracks.
  - (7) Bearings should be inspected and maintained following procedures in TM 9-214.
- (8) Clean electrical ground contracts with crocus cloth or emery cloth. Make sure ground connections are tight.
- (9) Repair chafed, broken or damaged electrical wiring with insulation tape, electrical, specification MIL-HH-I-595. When soldering is required, procedures in TB SIG-222 must be followed.
  - (10) After locating the malfunction and repairing the component, test it for proper function.

#### c. Cleaning.

(1) Wire brush metal parts to remove rust and corrosion.

# WARNING

Solvent vapors are toxic. Do not use solvent in a confined space. Avoid long periods of breathing solvent vapors and/or contact with skin.

(2) Clean metal parts with dry cleaning solvent (SD2). Metal or fiber brushes may be used to apply cleaning solvent and to remove softened or dissolved material. Hand scraping with metal scrapers may be used to remove soft coatings or deposits.

#### 2-4. GENERAL MAINTENANCE INFORMATION.

- (3) Soak oily or greasy metal parts in a tank containing dry cleaning solvent (SD2). The time parts must be in solvent varies with the type and amount or material to be removed.
- (4) Do not use solvent to clean electrical insulation, wires, cables or wiring harnesses. Clean these parts by wiping with a damp cloth. Use a mild soap solution if necessary. Dry immediately with clean dry cloths. Clean contact points with flint abrasive paper and dust thoroughly after cleaning.
- (5) Do not use solvent to clean rubber parts. Clean rubber parts by washing with mild solution of soap and water.
  - (6) Dry parts by blowing with low pressure compressed air or wiping with clean, lint-free cloths.
  - (7) Bearings should be cleaned by procedures in TM 9-214.
- (8) Paint metal surfaces after repair, as required. Sand damaged paint areas. Apply one coat of rust inhibitor primer (Spec TT-P-659). Allow primer to dry a minimum of 30 minutes before applying enamel. Paint with enamel to match existing color. Use a white enamel (Spec TT-E-489) or olive drab enamel (Spec TT-E-529).
- **d.** Painting. Look in TM 43-0139 and AR 750-58 for ways to paint and supplies to use. Look in TM 5-200 for ways to camouflage parts.
  - e. Welds. Inspect and repair welds as shown in TM 9-327.
- **f.** <u>Tagging Parts</u>. Before you turn in a bad part to support maintenance, write down the faults or fault symptoms on a tag. Then tag each bad part with the information.
- g. Reporting Equipment Improvement Recommendations (EIR's). If your equipment needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you do not like about your equipment. Let us know why you do not like the design. Tell us why a procedure is hard to perform. Put the improvement on an SF 368 (Quality Deficiency Report). Mail SF 368 to us at: Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: DRSMC-MAO, Rock Island, IL 61299. We will send you a reply.
- h. <u>Disposition of Components and/or Parts</u>. When you are removing components and/or parts from your vehicle, you will notice that the manual tells you either to turn in or get rid of an item. The guidelines below should be followed at all times.

#### 2-4. GENERAL MAINTENANCE INFORMATION. (cont)

#### h. <u>Disposition of Components and/or Parts</u>. (cont)

- (1) Turn in. Components and/or parts should be turned over to your immediate supervisor (motor sergeant, motor officer, section chief, etc.) who will in turn dispose of them in accordance with local policy and standing operating procedures (SOP).
- (2) Get rid of. Parts that are metal or contain metal (lockwashers, cotter pins, gaskets, etc.) should be disposed of in accordance with local policy and standing operating procedures (SOP). Parts that are not made of metal (gaskets, seals, packings, etc.) should be disposed of in a refuse container.
- i. <u>Maintenance Forms and Records</u>. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, as contained in the Maintenance Management Update.
- **j.** <u>Lubrication.</u> Keep a light coat of lubricating oil (PL medium or PL -special) on parts during repair procedures to prevent rusting. Lubricate parts during repair and assembly as required by LO 9-2350-304-12.
- **k.** <u>Air Induction System Maintenance</u>. When working on the air induction system, always keep in mind that the system's function is to provide the engine with clean air. Always protect the engine against severe damage from dirt, dust and foreign objects. Do everything you can to keep dirt out of the system. The following maintenance practices must be followed any time you are working on the air induction system.
  - (1) Never start the engine without the air induction system completely installed.
- (2) Always protect the system when it is disassembled by closing off all ducts leading to the engine with heavy paper and tape.
  - (3) Take off paper and tape and wipe all dirt out of the system before reassembling.
- (4) Always make sure seals are airtight and in top condition. Replace any seals that are cracked, split, torn or hardened.
- (5) Before taking off any hydraulic hoses, tubes or electrical harnesses, tag them to show location. Tagging saves time and avoids errors. Remove tags after parts are installed.

#### 2-4. GENERAL MAINTENANCE INFORMATION.

#### 1. Hydraulic System Maintenance.

#### WARNING

Hydraulic fluid may be absorbed through the skin. If hydraulic fluid gets on your skin, thoroughly wash it off with soap and water as soon as possible.

Always wear safety glasses when working on the hydraulic system. If hydraulic fluid gets in your eyes, you can be blinded.

Hot equipment can burn you. Wait until hydraulic tubes and hoses are cool enough to touch before you start work.

Cleaning compound can cause skin rash and can give off harmful vapors. To avoid injury, use in a well-ventilated area. Wash immediately with soap and water if compound gets on skin or clothing.

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

- (1) Clean all hydraulic connections and mating parts with cleaning compound and rags when taking them off. If available, use compressed air to clean fittings.
- (2) Before taking off any hydraulic hoses, tubes, electrical wires, harnesses or cables, tag them to show location. Tagging saves time and avoids errors. Remove tags after parts are installed.
  - (3) Keep a suitable container under tubes, hoses and fittings even after fluid has been drained.

#### WARNING

Wipe up spilled fluids immediately with rags. Hydraulic fluid is slippery.

- (4) Put a rag under all connections to catch spilled fluids before you disconnect them.
- (5) Unscrew connections with two wrenches. Use one wrench to unscrew the connection and the other wrench to hold the fitting or line to keep it from twisting. Make sure any old sealing compound or tape is removed.
- (6) Cap or plug all open hydraulic tubes, lines or fittings when you disconnect them. This will keep dirt and dust out of the hydraulic system, and will also stop fluid from siphoning through hoses and tubes. Do not take off caps or plugs until you are ready to connect the system.

# 2-4. GENERAL MAINTENANCE INFORMATION. (cont)

- 1. Hydraulic System Maintenance. (cont)
  - (7) Cover large openings or ports with cardboard, sheets of plastic or masking tape.

#### **WARNING**

Solvent burns easily and can give off harmful vapors. To avoid injury, keep away from open fire and use in a well-ventilated area.

- (8) Clean up all spills and leaks with rags. When gasket is taken off, clean area with dry cleaning solvent P-D-680 and rags.
  - (9) Look at tube and hose nuts and fittings for bad threads. Replace bad nuts and fittings.
- (10) Take protective caps or plugs off all tubes, lines, fittings, receptacles and connectors before they are installed.
  - (11) Make sure connection points and insides of all tubes, lines and fittings are clean before installing them.

#### **WARNING**

Sealing compound and solvent burn easily and can give off harmful vapors. To avoid injury, keep away from open fire and use in a well-ventilated area.

- (12) Before you put connection points together again, wipe off openings with solvent (P-D-680) and a clean rag. If sealing compound was used around connection points, make sure it is removed.
- (13) Put a light coat of lubricant, same as lubricant in system being worked on, on all preformed packings before installing packing.

#### **WARNING**

Lubricating oil (MIL-L-23699 or MIL-L-7808) can cause skin rash. If oil gets on skin or clothing, wash with soap and water.

- (14) Put lubricating oil on all threads, except pipe (tapered) threads, before you screw parts together.
- (15) Always screw on and tighten tubes, hoses and fittings by hand to make sure that they are not crossthreaded. Tighten with two wrenches whenever possible until you feel solid resistance, then tighten 1/4 turn more.

#### 2-4. GENERAL MAINTENANCE INFORMATION.

# 1. <u>Hydraulic System Maintenance</u>.

#### **CAUTION**

Make sure that no hose is twisted, stretched or kinked. Hoses that are twisted or kinked can close off flow through the system and lead to component failure.

- (16) Screw on both tube nuts with your fingers to position tubing and clamps correctly before tightening tube nuts.
  - (17) Put antiseizing tape (MIL-T-27730) on pipe (tapered) threads. Do not put tape on first two threads.
- (18) Operate the system being worked on and check the system for leaks at all connections that were loosened. If a connection leaks, unscrew a full turn, then tighten. If it is still leaking, replace leaking parts.
- (19) Always look carefully at equipment for likely signs of trouble while doing routine work. If hydraulic oil is leaking down on harnesses and connectors, repair the leak at once. Tie down any harness that is free to move and rub against metal. If you look for possible trouble spots and make repairs at once, you can cut down on repair time and extra work.
  - (20) Installing Adjustable Fittings.
- (a) Put a light coat of lubricant, same as lubricant in system being worked on, on packing (1, Figure 2-3). Slide packing (1) on fitting (2) so that packing (1) is seated in groove (3) against washer (4) as far as it will go.
  - (b) Turn lock nut (5) clockwise until it touches washer (4).
  - (c) Screw fitting (2) into boss (6) until washer (4) touches boss (6).
  - (d) Turn fitting (2) counterclockwise, up to one full turn, until desired position is reached.
- (e) Whenever possible, hold fitting (2) in position with one wrench and tighten lock nut (5) clockwise with other wrench.

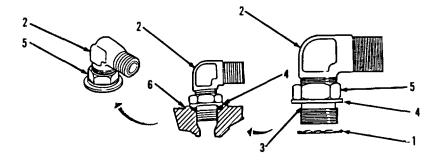


Figure 2-3.

### 2-4. GENERAL MAINTENANCE INFORMATION. (cont)

- m. <u>Electrical System Components and Wiring</u>. The electrical system can be damaged by broken, bent, pushed-in or dirty pins and contacts or connectors and receptacles mated with the wrong equipment or harnesses. Harnesses improperly routed can also cause damage to the electrical system. The following practices must be followed any time you work on electrical systems.
  - (1) Tagging Electrical Wires.
- (a) Look at part or wire to see if it has numbers, letters or an identification band. Each cable or each harness should have an identification band. If the identification band is missing or unreadable, tag each cable end termination before taking out the harness.
- (b) Write numbers or letters on tags with pencil. Fasten tag on wire, terminal or part by twisting wire ends. Remove tag after part or wire is installed. If you cannot tag a wire because it must fit through a small hole, or because you cannot reach it, write down the wire location and terminating point on paper.
  - (c) After installing a harness, take off any tags that were put on harness cables.
  - (2) Cleaning Electrical Components.

#### WARNING

Solvent can irritate skin and can give off harmful vapors. To avoid injury, keep solvent away from heat, wear protective clothing and use in a well-ventilated area.

#### **CAUTION**

Do not use a wire brush or any metal tool to remove corrosion from a connector shell, receptacle or pin. This could scratch the surface plating and let corrosion begin in the metal below.

- (a) Clean off oil, grease and any dirt from cable harnesses and parts other than connectors with solvent and non-metallic brush or lint-free cloth. Be sure to cover clean parts with dust caps, plugs or lint-free cloths.
  - (b) Wipe up wet or damp places. Take steps to keep water away from electrical components.
  - (c) Dry the connector and receptacle to be cleaned either in open air or with air heat gun.

#### 2-4. GENERAL MAINTENANCE INFORMATION.

# m. Electrical System Components and Wiring.

#### **WARNING**

Cleaning compound can cause skin rash and can give off harmful vapors. To avoid injury, use in a well-ventilated area. Wash immediately with soap and water if compound gets on skin or clothing.

- (d) Remove any corrosion and other contaminants inside the connector or receptacle with cleaning compound MIL-C-81302 on a pipe cleaner, acid swabbing brush or cotton swab. Remove external corrosion by scrubbing with aluminum abrasive material.
- (e) Put about one ounce of cleaning compound MIL-C-81302, for each connector being cleaned, in an applicator bottle. Wash the connector shell and pins with compound. Hold connector with openings for pins (sockets) pointed slightly downward, when possible, while spraying compound into socket openings. This will rinse away loose corrosion products, dirt and other contaminants.
  - (f) Wipe away any excess spray with a lint-free cloth.

#### **WARNING**

Before removing any component of electrical system, be sure VEHICLE MASTER POWER switch is set to OFF. You can get electrical burns if power is on.

- (g) Clean dirt, grease, dust and old compounds off cable harnesses and parts by dipping them into container filled with cleaning compound MIL-C-81302. Shake parts in compound or wipe them clean in lint-free cloth. Clean dirt, grease and dust from recessed areas with acid-swabbing brush or lint-free cloth. Dry components completely with low pressure (25 to 30 psi) dry compressed air, or with a clean, lint-free cloth.
- (h) Remove rust from parts other than connector parts by scraping, wire brushing or both. If rust damage is too great, or is on small thin parts that would be weakened by rust, you may need to replace the part. Find the cause of the rust and correct the problem.

#### **WARNING**

Cleaning compound can cause skin rash and can give off harmful vapors. To avoid injury, use in a well-ventilated area. Wash immediately with soap and water if compound gets on skin or clothing.

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

#### 2-4. GENERAL MAINTENANCE INFORMATION. (cont)

# m. Electrical System Components and Wiring. (cont)

- (i) Threaded holes in metal must be thoroughly clean when sealing compounds are used to lock screws in place. Take off old preservative or sealing compounds from threads with tap and tap wrench. Blow loose particles out of holes with compressed air, then clean threads with cleaning compound MIL-C-81302 and brush. Let holes dry before putting in screws.
- (j) Check intake cooling vents and screens and exhaust ducts for anything that will block the flow of air. Clean intake vents and screens to keep dirt from getting inside equipment.
  - (3) Replacing Electrical Wiring or Components.
- (a) Always look carefully at equipment for likely signs of trouble while doing routine work. Tie down any harness that is free to move and rub against metal. If you look for possible trouble spots and make repairs at once, you can cut down on repair time and extra work. Replace any harness or harness wires that have splits, tears or worn spots. If troubleshooting isolates a broken harness, replace that harness.
  - (b) Replace broken or torn instrument or gage lenses, rubber eye cups, headrests and other parts.
- (c) Replace damaged or crossthreaded screws and nuts. Check for torn or stretched gaskets and leaks.
- (d) Replace any burned out lamps or fuses. If you cannot replace a lamp or fuse right away, tag it and go back to it later.
- (e) Tighten all loose parts. Use correct torque values when tightening screws and nuts. Straighten bent parts where possible and check for cracks. Replace all missing parts.
  - (f) Make sure that ground points in electrical system are kept clean, free of corrosion and tight.
  - (g) Check mountings, parts and shafts for proper alignment.
  - (4) Removing Electrical Connectors.

#### **WARNING**

Be sure MASTER POWER is OFF before taking off or putting on connectors; refer to TM 5-3805-261-10. You could get a shock or cause equipment damage.

#### 2-4. GENERAL MAINTENANCE INFORMATION.

# m. Electrical System Components and Wiring.

#### **CAUTION**

Do not use pliers without plastic jaw inserts on electrical connectors. Unprotected pliers will damage the outer plating of the connector. This will expose the metal beneath and cause corrosion.

- (a) Dry the outside surface of electrical connectors and receptacles with a lint-free cloth before loosening them for disassembly. Moisture can be present from rain, snow, washing or dew.
- (b) If connectors cannot be removed by hand, use conduit style, slip joint pliers with plastic jaw inserts to loosen them. Finish removal by hand. Straighten any bent contacts with long round nose pliers. When installing connectors on larger harnesses, another soldier will be needed to help aline the mating ends of the cable. Make sure that contacts and keyways line up. Tighten twist-snap-type connectors until a click is heard. Tighten screw-on-type connectors until ratchet noise is heard to indicate that connectors are tight.
- (c) Put a protective cap or cover over any electrical connector that is left uncovered. Cover connectors on any item being moved to or from the vehicle. Take off covers when connectors are put back.
- (d) Look at connectors for broken, missing or pushed in contacts before making any connections. If a connector is bad, repair it.
  - (e) Tighten connectors by hand whenever tools are not called out.
  - (5) Cleaning Electrical Connectors.
    - (a) Use gun-type electric heater or open air to dry connector and receptacle.

#### **WARNING**

Cleaning compound can cause skin rash and can give off harmful vapors. To avoid injury, use in a well-ventilated area. Wash immediately with soap and water if compound gets on skin or clothing.

#### **CAUTION**

Do not use wire brush or any metal tool to take corrosion from connector, receptacle or pin. These could scratch the surface of the connector and expose metal and cause corrosion.

(b) Clean internal corrosion and other contamination from the connector or receptacle with cleaning compound MIL-C-81302. Clean external corrosion by scrubbing with abrasive mat.

# 2-4. GENERAL MAINTENANCE INFORMATION. (cont)

#### m. Electrical System Components and Wiring. (cont)

- (c) Rinse away loose corrosion, dirt and other contamination from the connector and pins with cleaning compound MIL-C-81302. Hold connector pointed slightly downward, if possible, while spraying cleaning compound into socket openings.
  - (d) Wipe excess spray with a lint-free cloth.
  - (e) Do steps 2 through 4 again, if necessary, to remove corrosion.
- (f) Threaded holes in metal must be thoroughly clean when sealing compounds are used to lock screws in place. Clean old sealing compound out of threads with tap and tap wrench. Blow loose particles out of holes with compressed air and clean threads with cleaning compound MIL-C-81302 and acid-swabbing brush. Let holes dry before putting in screws.
- (g) When cleaning and inspecting ground points, take off ground contact from mounting point. Clean ground point bolt, nut and contact with cleaning compound MIL-C-81302 and acid-swabbing brush. If corrosion is present, clean with wire brush and abrasive cloth. Look at all parts for cracks, looseness or stripped threads. Replace damaged or crossthreaded screws and nuts. Check for torn or stretched gaskets and leaks. Turn in bad parts. Be sure to tighten all nuts when mounting ground contacts.
- (h) Rub corrosion off connector contacts and other parts with pencil eraser. Remove rust be scraping, wire brushing, or both. If rust damage is too great, or on small thin parts that would be weakened by rust, you may need to replace the part. Find the cause of the rust and correct the problem.
  - (6) Inspecting Connectors.
    - (a) Disconnect the electrical connector to be inspected.

### **NOTE**

#### Use a good light source to look at electrical contacts.

- (b) Look for white powdery or granular material anywhere on the outer or inner surfaces of the connector and receptacle. Look at the male and female sockets for signs of blue-green discoloration at the base of the pins or sockets. Clean off surface corrosion before assembling. Electrical contacts corroded badly enough to destroy the outer metal coating should be replaced. Any part corroded badly enough to weaken it should be replaced.
- (c) Look for bent, broken, missing or pushed-in contacts. Straighten bent pins with long, round-nosed pliers. Other damage should be repaired or parts replaced.

#### 2-4. GENERAL MAINTENANCE INFORMATION.

### m. Electrical System Components and Wiring.

(7) Preserving Connectors.

#### WARNING

Water-displacing corrosion preventive compound vapors can be harmful to eyes and lungs. To avoid harm, keep the corrosion preventive away from heat, wear protective goggles, and use in a well-ventilated area.

#### **CAUTION**

Use water-displacing corrosion preventive compound MIL-C-81309, Type III, Class 2 only, on internal connector surfaces.

(a) Where possible, hold connectors with opening pointing slightly downward. Spray an even, thin film of compound over the male pin area of the connector and into the female socket openings.

#### **CAUTION**

Use water-displacing corrosion preventive compound MIL-C-85054, Type I only, on external connector surfaces.

- (b) After preserving connectors internally, assemble connectors. Wipe the outer surface of the connector shell with a lint-free cloth dampened with cleaning compound MIL-C-81302. Spray a thin coating of water-displacing corrosion preventive compound MIL-C-85054, Type I, on all external surfaces of the connector set. Make sure the area where the connector set comes together is completely covered.
  - (c) Wipe away excess spray with a lint-free cloth.
  - (8) Soldering Techniques.

#### **WARNING**

Cleaning compound can cause skin rash and can give off harmful vapors. To avoid injury, use in a well-ventilated area. Wash immediately with soap and water if compound gets on skin or clothing.

#### **NOTE**

Electrical Maintenance/Repair Kit, 12285360, contains instructions and tools needed for repair and replacement of connectors, contacts and wires.

### 2-4. GENERAL MAINTENANCE INFORMATION. (cont)

#### m. Electrical System Components and Wiring. (cont)

- (a) Solder connections must be bright and clean before soldering. Remove dirt and grease from connections with solvent cleaning compound MI1-C-81302 and small, stiff fiber brush.
- (b) Solder must be non-acid type (SN60WRAP2, QQ-S-571). Rosin flux, O-F-506, Type 1, Form A, can be used.
- (c) All wires, parts and soldering iron must be pretinned for good connection and maximum transfer of heat.
- (d) Clean all solder joints with acid-swabbing brush and cleaning compound MIL-C-81302 after soldering to obtain a clean, bright surface.
  - (9) Crimping Wires.
- (a) Cut off and get rid of broken, bent or discolored contacts with diagonal cutting pliers. Get rid of bad contacts. Using thermal wire stripper, strip insulation off wires.
- (b) Put contact crimping tool with color band toward rear. Put bare wire into contact and squeeze crimping tool. Take crimped contact out of tool and check crimp by looking into inspection hole. You must be able to see end of bare wire.
  - (10) Installing Insulation Sleeving.
- (a) Insulation sleeving should be twice the diameter of the part over which it will be shrunk. Slide insulation over wire and terminal. Hold portable heat gun 4 to 5 inches away from insulation and apply heat for 30 seconds. Take heat gun away as soon as insulation forms to shape of wire and terminal. Let insulation cool for 30 seconds before handling.

#### WARNING

Cleaning compound can cause skin rash and can give off harmful vapors. To avoid injury, use in a well-ventilated area. Wash immediately with soap and water if compound gets on skin or clothing.

(b) When replacing wires, cut insulation sleeving off terminals of wire to be replaced. Unsolder wire or cut if crimped. When soldering wires, hold the bare wire near the soldering point with long, round-nosed pliers. Pliers act as a heat sink, preventing heat damage to electrical and electronic components. Cut new wire to desired length and slide new insulation over ends of wire. Using thermal wire stripper, push insulation back and strip insulation off wiring. Solder or crimp wire to end terminal. Clean soldered joint with acid-swabbing brush and cleaning compound MIL-C-81302. Slide insulation over connection. Shrink insulation with heat gun.

#### 2-4. GENERAL MAINTENANCE INFORMATION.

### m. Electrical System Components and Wiring.

(11) Applying Preservatives to Electrical Connectors.

#### WARNING

Water-displacing corrosion preventive compound vapors can be harmful to eyes and lungs. To avoid injury, keep the corrosion preventive away from heat, wear protective goggles and use in a well-ventilated area.

#### **CAUTION**

There are two types of water-displacing corrosion preventive compounds. Care must be used to apply the correct compound. Failure to do so can cause loss of continuity or moisture protection.

- (a) Pin contacts: Spray an even, thin coat of compound MIL-C-81309 over male pin area of connector.
- (b) Socket contacts: Hold connector with openings pointed slightly downward, if possible. Spray compound MIL-C-81309 into socket openings. Wipe off any excess compound with a lint-free cloth.

#### **CAUTION**

Do not use water-displacing corrosion preventive compound MIL-C-81309 on the external surface of an electrical connector. MIL-C-81309 is too light and will not give the protection needed to keep moisture out of the connector.

- (c) External surfaces: Spray a thin coat of water-displacing corrosion preventive compound MIL-C-85054 on all external surfaces of the clean connector set. Make sure the area where the connector set comes together is completely covered.
  - (12) Installing Electrical Connectors.
- (a) Look at connectors for broken, missing or pushed-in contact before making any connections. If connector is bad, notify supervisor.
- (b) When installing connectors on large harnesses, another soldier will be needed to help aline the mating ends of the cable. Make sure that contacts and key washers line up. Tighten twist-snap-type connectors until a click is heard. Tighten screw-on-type connectors until the connector is tight. Tighten ratchet-type connectors until colored alining marks line up.

# 2-4. GENERAL MAINTENANCE INFORMATION. (cont)

#### m. Electrical System Components and Wiring. (cont)

- (c) Tighten connectors by hand only.
- (d) Wipe the outer surface of the connector with a lint-free cloth dampened with cleaning compound.
- (13) Connecting and Disconnecting Connectors.
- (a) Look for broken, bent or missing pins when disconnecting or connecting receptacles and connectors. If you find any bent pins, tell your supervisor. Look at harnesses for cuts, kinks or torn or burned insulation. If insulation is bad, replace harness.
- (b) If connectors cannot be removed by hand, use conduit-style, slip-joint pliers with plastic jaw inserts to remove them. When installing connectors on larger harnesses, another soldier will be needed to help aline the mating ends of the cable. Make sure that pins and keyways line up. Tighten twist-snap-type connectors by hand only until a click is heard. Tighten the screw-on-type connectors by hand only until the connector is tight.
- (c) Put protective caps and plugs on all connectors when they are taken to keep pins from being damaged and to keep out dirt, dust or grease. When connectors are being put on, take off all caps and plugs.

#### (14) Harness Routing.

- (a) Before removing harnesses that require being placed over and under components during installation, the routing must be identified during removal to insure proper installation.
- (b) If harness routing can be reached, route and tag twine where harness branches are laying before pulling harness out of place for removal.
- (c) If harness routing cannot be reached, tie twine to ends of harness branches. Twine should be longer than harness. Pull harness out until twine can be tagged and untiled from harness branches.
- (d) Install harness by either feeding harness branches through where twine was placed, or tie tagged twine to mating harness branch and pull harness into place with twine. Remove twine.
- (e) Be sure that routed harness and branches are not twisted or sticking up where they can rub the opposite frame when the vehicle is being articulated.

# 2-4. GENERAL MAINTENANCE INFORMATION.

### m. Electrical System Components and Wiring.

- (f) Routed harness and branches should not be lying loose against any rough surface that could cause chafing. Use additional tiedown straps as required to make harness stay in position.
- (g) If it is necessary to articulate the vehicle to remove or install wiring harnesses, make sure harnesses are clear of moving parts which could damage harnesses or equipment.
- (h) Do not tighten clamps or install tie wraps on replaced harnesses until entire harness is installed and positioned.
  - (15) System Testing.

After you install a harness, always test the harness by operating the system it is in.

(16) Anti-chafing Sleeves.

Make sure all tubes, hoses and metal-braided electrical cables are protected against chafing (rubbing) on one another. If they cannot be repositioned, install anti-chafing sleeves (P/N 94835-1 or 94835-2) in the area where rubbing could occur. In areas where tiedown straps are used to hold metal braided-electrical cables to tubes or hoses, anti-chafing sleeves will be used as required.

2-19/(2-20 blank)

#### **CHAPTER 3**

# **MOVEMENT TO A NEW WORK SITE**

#### **CHAPTER OVERVIEW**

The purpose of this chapter is to help you prepare the vehicle for movement to a new site by roading, trailering or towing.

#### **INDEX**

<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
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Towing	3-2	3-1
Transporting	3-3	3-1

- **3-1. ROADING.** The vehicle may be moved under its own power. Refer to TM 5-3805-261-10.
- **3-2. TOWING.** Vehicle is towed using tow hook located in front of vehicle. Special procedures should be performed prior to towing operation. Refer to TM 5-3805-261-10.
- **3-3. TRANSPORTING**. The vehicle may be transported on a suitable flat bed or rail car.

# Preparation for Traveling.

(1) Block the trailer or rail car wheels before loading.

#### WARNING

Be sure ramp is securely fastened to flat bed to prevent injury and damage to equipment.

#### **NOTE**

#### Ramps must not provide a grade of more than 40%.

- (2) Place ramps between flat bed and ground.
- (3) Set the blade lengthwise under the vehicle. Lower all raised equipment. Move the transmission control lever to NEUTRAL position.
  - (4) Install the leaning wheel lock pin. Refer to paragraph 2-3b.(1).
  - (5) Install the antipivot pin. Refer to paragraph 2-3b.(2).

# **MOVEMENT TO A NEW WORK SITE.** (cont.)

# **3-3. TRANSPORTATION.** (cont.)

- (6) Drive vehicle up ramps and position on flat bed. Turn engine off and apply parking/emergency brake.
- (7) Block the vehicle at front, rear and sides. Secure with tie-downs.
- (8) Cover the exhaust opening to prevent turbocharger "windmilling" in transit.
- (9) Tip or cover the seat to protect the cushion.
- (10) Disconnect the parking brake rotochamber. See Towing. Refer to TM 5-3805-261-10.
- (11) Turn the disconnect key off and remove the key.
- (12) Lock all compartments and vandalism guards.
- (13) In freezing weather, make certain that the cooling system is either protected with antifreeze to the lowest expected ambient temperature or is completely drained.

#### **CHAPTER 4**

# PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

#### **CHAPTER OVERVIEW**

This chapter contains a complete list of all preventive maintenance checks and services to be performed on the 130G Grader at the organizational level.

### **INDEX**

<u>Section</u>	<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
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II	ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES		
	Preventive Maintenance Checks and Services Procedures Organizational Preventive Maintenance Checks and Services	4-3	4-2

# Section I. PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

**4-1. GENERAL INFORMATION**. Preventive maintenance is step-by-step care, inspection and service of equipment. It maintains a vehicle in good condition. It spots problems before extensive and time-consuming repairs or replacements are needed.

# 4-2. MAINTENANCE FORMS AND RECORDS.

**Record Keeping**. All deficiencies and shortcomings must be recorded as well as corrective action noted on DA Form 2404 at the earliest possible opportunity. DA Form 2404, Equipment Inspection and Maintenance Worksheet, is used by the mechanic to record periodic maintenance services performed and faults corrected. The item number on the DA Form 2404 must correspond to the item number of the preventive maintenance check.

#### Section II. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

#### 4-3. PMCS PROCEDURES.

#### **General Procedures.**

- (1) If something doesn't work, troubleshoot it with the instructions in this manual or notify your supervisor.
- (2) Always do your preventive maintenance in the same order, so it gets to be a habit. Once you've had some practice, you'll spot anything wrong in a hurry.
- (3) If anything looks wrong and you can't fix it, write it down on your DA Form 2404. If you find something seriously wrong, report it to Direct Support as soon as possible.

#### WARNING

- Dry cleaning solvent P-D-680, used to clean parts is toxic and flammable. Wear protective goggles and gloves and use only in a well-ventilated area. Avoid contact with skin, eyes and clothes. Do not breathe vapors. Do not use near open flame or excessive heat. Do not smoke while using it. Failure to do so may cause INJURY. If you become dizzy while using cleaning solvent, immediately seek fresh air, and if necessary, medical attention. If contact with skin or clothes is made, flush thoroughly with water. If the solvent contacts your eyes, wash with water immediately and obtain medical help.
- Compressed air, used for cleaning purposes, must not exceed 30 psi. Safety glasses must be
  used when cleaning parts with compressed air. Failure to protect your eyes may cause
  INJURY and possible BLINDNESS. If you injure your eyes or if a foreign object is blown into
  your eyes, seek medical help immediately.
- (4) Before you begin to check specific items, remember that there are things to be checked that are common in all areas to be inspected as follows:

#### ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

# 4-3. PMCS PROCEDURES.

- (a) Keep it clean: Dirt, grease, oil and debris only get in the way and may cover up a serious problem. Clean as you work and as needed. Use dry cleaning solvent P-D-680 to clean metal surfaces. Use soap and water when you clean rubber or plastic material.
- (b) Bolts, nuts and screws: Check that they are not loose, missing, bent or broken. You can't try them all with a tool, of course, but look for chipped paint, bare metal or rust around bolt heads. Tighten any that you find loose.
- (c) Welds: Look for loose or chipped paint, rust or gaps where parts are welded together. If you find a bad weld, report it to Direct Support.
- (d) Electric wires and connectors: Look for cracked or broken insulation, bare wires and loose or broken connectors. Tighten loose connections and make sure the wires are in good condition.
- (e) Hoses and fluid lines: Look for wear, damage and leaks. Make sure clamps and fittings are tight. Wet spots show leaks, of course, but a stain around a fitting or connector can also mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, either correct it or report it to Direct Support. Refer to MAC Chart.
- (5) It is necessary for you to know how fluid leaks affect the status of your equipment. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your equipment. Learn and be familiar with them and REMEMBER, when in doubt, notify your supervisor.

#### LEAKAGE DEFINITIONS FOR ORGANIZATIONAL PMCS

- Class I Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
- Class II Leakage of fluid great enough to form drops but not enough to cause drops to drip from the item being checked/inspected.
- Class III Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

# ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (cont)

INTERVAL

#### Legend

Q - Quarterly B - Biannually S - Semiannually H - Hours A - Annually Mi - Miles

ITEM TO BE INSPECTED

PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED. PERFORM

ITEM NO. Q S A B H MI ALL OPERATOR PMCS FIRST.

Perform operator/crew PMCS prior to or in conjunction with organization PMCS if:

**a.** There is a delay between the daily operation of equipment and the organizational PMCS.

operator is **b.** Regular not assisting/participating.

#### NOTE

For Army Oil Analysis Program (AOAP), refer to TB 43-0210. The AOAP laboratory recommendation to change oil and filter will apply; however, oil and filter changes will not exceed the change interval (calendar, miles or hours) established by the manufacturer during warranty period.

The AOAP sampling interval for the hydraulic system is scheduled to be published in the next change to TB 43-0210, Appendix F.

# ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

#### Legend

	Q - Quarterly S - Semiannı A - Annually					B - Bian H - Hour Mi - Mile	rs
ITEM NO.	Q	S	INTE A	RVAL B	Н	MI	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED. PERFORM ALL OPERATOR PMCS FIRST.
1	•				250		<u>TIRES</u>

#### WARNING

- Explosions of air inflated earth-moving tires have resulted from heat induced gas combustion inside the tires. The heat generated by welding or heating rim components, external fire or excessive use of brakes can cause gaseous combustion. A tire explosion is much more violent than a blowout. The explosion can propel the tire rim and components as far as 1500 ft or more from the machine. Both the force of the explosion and the flying debris may cause injury or property damage. All personnel should be aware of this danger and the actions to take to minimize the risk.
- Proper air inflation equipment and training in its use are necessary to avoid possible over-inflation. A tire blowout or rim failure can result from improper or misused equipment.

Check and service. Refer to TM 5-3805-261-10. Proper inflation pressure is 35 psi.

# ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (cont)

#### Legend

	Q - Quarterly S - Semiannu A - Annually					B - Biannu H - Hours Mi - Miles	ally
ITEM NO.	Q	s	INTE A	RVAL B	Н	MI	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED. PERFORM ALL OPERATOR PMCS FIRST.
2	•				250		FAN ASSEMBLY
							Fan/alternator belts; check and adjust. Apply a 25 lb force midway between the pulleys. Deflection should be 1/2 in.
3	•				250		BATTERY

# **WARNING**

Never disconnect any charging unit circuit or battery circuit cable from battery when the charging unit is operating. A spark can cause an explosion from the flammable vapor mixture of hydrogen and oxygen that is released from the electrolyte through the battery outlets. Injury to personnel may be the result.

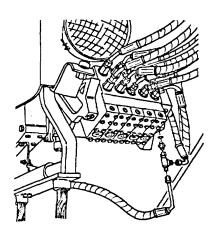
Clean top of batteries. Remove filler caps and check electrolyte level. Maintain electrolyte level to bottom of filler openings. Install filler caps.

At the proper charge rate, the batteries will not require more than 1 ounce of water per cell per week.

# ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

# Legend

	Q - Quarterly S - Semiannu A - Annually				B - Biann H - Hours Mi - Miles	3
ITEM NO.	Q	s	INTER A	 Н	MI	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED. PERFORM ALL OPERATOR PMCS FIRST.
4	•			 250		HEADLIGHTS, TAILLIGHTS, BLACKOUT LIGHTS, FLOODLIGHTS
						Inspect for operation.
5	•			250		HYDRAULIC CONTROL VALVES



Inspect valves and linkages. Look for bent levers and control arms and worn bushings.

# ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (cont)

#### Legend

Q - Quarterly B - Biannually S - Semiannually H - Hours A - Annually Mi - Miles

INTERVAL

ITEM TO BE INSPECTED

PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED. PERFORM

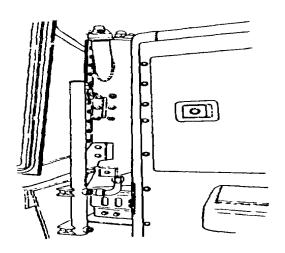
ALL OPERATOR PMCS FIRST.

ITEM NO. Q S а в н MI

500 **HYDRAULIC TANK** 6

#### **WARNING**

Hot oil can burn. At operating temperature, the hydraulic tank is hot and under pressure. Remove the fill cap only when the engine is stopped and the cap is cool enough to touch with your hand. Remove the fill cap slowly to relieve pressure.



Inspect and service tank for leaks, broken fittings, cracked welds or missing parts. Replenish fluid level if needed. Take oil sample. Refer to TB 43-0210, Oil **Analysis Program (AOAP).** 

7 500 **TRANSMISSION** 

> Take oil sample. Refer to TB 43-0210, Army Oil Analysis Program (AOAP).

# ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (cont)

# Legend

	Q - Quarterly S - Semiannua A - Annually	ally			B - Biannua H - Hours Mi - Miles	ally
ITEM NO.	Q	S	INTEF A	Н	МІ	ITEM TO BE INSPECTED PROCEDURE: CHECK FOR AND HAVE REPAIRED, FILLED OR ADJUSTED AS NEEDED. PERFORM ALL OPERATOR PMCS FIRST.
8		•		500		COOLING SYSTEM
						WARNING  The cooling system is pressurized. Personal injury may result when removing the radiator cap after operating temperature is reached. If it becomes necessary to check the coolant level during operation, use proper protection when removing the radiator cap.
						Check and replace thermostat or anti-freeze, if required.
9		•		500		ENGINE OIL
						Take oil sample. Refer to TB 43-0210, Army Oil Analysis Program (AOAP).
10		•		500		CYLINDERS, HYDRAULIC
						Test cylinders for worn piston seals.

4-9(4-10 blank)

#### **CHAPTER 5**

#### TROUBLESHOOTING SYMPTOM INDEX

#### **CHAPTER OVERVIEW**

This chapter contains an index of all troubleshooting data located within the manual. Included in the index are the paragraph/malfunction and page where the detailed procedure will be found.

- **5-1. GENERAL INFORMATION**. This list of MALFUNCTIONS will give you an indication of where a possible problem might be found.
- **5-2. MALFUNCTION IDENTIFICATION PROCEDURES**. To use this symptom index effectively, follow this procedure:

FIRST: Locate the appropriate MALFUNCTION from this index and go to the troubleshooting procedure paragraph designated, locate the MALFUNCTION.

**SECOND:** Do the TEST OR INSPECTION until you verify where the problem originates.

**THIRD:** Do the CORRECTIVE ACTION procedure to correct your problem.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

Component System	Paragraph/ <u>Malfunction</u>	<u>Page</u>
ENGINE, FUEL, EXHAUST AND COOLING SYSTEM		
Engine		
Engine will not crank.	6-2a	6-3
Engine cranks, but will not start.	6-2b	6-3
Engine starts, but will not keep running.	6-2c	6-3
Low engine oil pressure.	6-2d	6-4
Engine uses too much oil.	6-2e	6-5
Engine will not shut down.	6-2f	6-5
Engine knocks.	6-2g	6-6
Engine misfires, runs rough or stalls.	6-2h	6-6

# TROUBLESHOOTING SYMPTOM INDEX (cont.)

Component System	Paragraph/ <u>Malfunction</u>	<u>Page</u>
ENGINE, FUEL, EXHAUST AND COOLING SYSTEM (cont.)		
Engine STE/ICE Tests		
Test 10. Engine RPM (Average) Test 11. Engine RPM (Cranking) Test 12. Power Test Test 14. Compression Unbalance Test 35. Engine Oil Pressure	6-3a 6-3b 6-3c 6-3d 6-3e	6-7 6-9 6-11 6-13 6-14
Fuel System		
Engine cranks, but does not start. Engine misfires or runs roughly. Engine gallops. Engine has low fuel supply/low fuel pressure. Engine lacks power. Engine makes too much black or gray smoke. Engine makes too much white or blue smoke. Fuel consumption too high.	6-12a 6-12b 6-12c 6-12d 6-12e 6-12f 6-12g 6-12h	6-35 6-38 6-42 6-43 6-44 6-45 6-45
Fuel STE/ICE Tests		
Test 24. Fuel Supply Pressure	6-13	6-47
Exhaust System		
Exhaust system temperature is too high. Excessive noise from exhaust system.	6-30a 6-30b	6-108 6-108
Cooling System		
Engine overheats. Engine does not reach operating temperature. Cooling system not pressurized. Pressure of oil in cooling system.	6-34a 6-34b 6-34c 6-34d	6-114 6-115 6-116 6-116

# TROUBLESHOOTING SYMPTOM INDEX

Component System	Paragraph/ <u>Malfunction</u>	<u>Page</u>
ELECTRICAL SYSTEM		
Charging System		
Battery low or requires too much fluid.	7-2	7-7
Charging System STE/ICE Tests		
Test 82. Alternator/Generator Output Voltage Test 85. Alternator Output Current Sense	7-3a 7-3b	7-8 7-9
Starting Motor		
Engine will not start. Starting motor cranks too slowly.	7-8a 7-8b	7-19 7-20
Starting System STE/ICE Tests		
Test 68. Starter Motor Voltage Test 69. Starter Negative Cable Voltage Drop Test 70. Starter Solenoid Voltage Test 71. Starter Current (Average) Test 72. Starter Current (First Peak) Test 74. Starter Circuit Resistance Test 89. 0-45 Volts	7-9a 7-9b 7-9c 7-9d 7-9e 7-9f 7-9g	7-21 7-23 7-25 7-27 7-28 7-29 7-30
Steering Control Console		
Steering control console support moves without lever disengagement. Steering control console support slips out of position.	7-16a 7-16b	7-51 7-51

# TROUBLESHOOTING SYMPTOM INDEX (cont.)

Component System	Paragraph/ <u>Malfunction</u>	<u>Page</u>
ELECTRICAL SYSTEM (cont.)		
Operator's Panel Console		
Operator's panel vibrates. Control light does not operate. Floodlight switch does not operate. Ether control switch does not operate. Disconnect switch does not operate. Start switch does not operate.	7-26a 7-26b 7-26c 7-26d 7-26e 7-26f	7-73 7-74 7-74 7-75 7-75 7-76
Miscellaneous Electrical		
Hourmeter does not operate.	7-36	7-97
Cab Switch Panel		
Windshield wipers do not operate. Cigar lighter does not operate Panel lamp does not operate.	7-41a 7-41b 7-41c	7-105 7-106 7-106
Electrical System		
Blade float limit switch does not operate.	7-53	7-132
Fuse Box		
Fuse box loose. Fuse box door will not close. Fuses will not stay in fuse box. Flasher will not operate.	7-58a 7-58b 7-58c 7-58d	7-139 7-139 7-140 7-140
Dome Light and Switch		
Dome light will not operate.	7-66	7-159
Light Switch and Dimmer		
Lights will not operate.  Dimmer switch does not operate.	7-71a 7-71b	7-167 7-168

# TROUBLESHOOTING SYMPTOM INDEX

Component Sys	<u>tem</u>	Paragraph/ Malfunction	<u>Page</u>
ELECTRICAL SY	/STEM		
Light Syster	n		
All stop/tail Headlights Individual li All signal li Turn signal Both flood Blackout di	tail and panel lights fail to operate. , panel and articulation lights fail to operate. fail to operate. ights fail to operate. ghts and indicators fail to operate. lamps fail to blink. lights fail to operate. rive lights fail to operate. fails to operate.	7-78a 7-78b 7-78c 7-78d 7-78e 7-78f 7-78g 7-78h 7-78i	7-180 7-180 7-180 7-182 7-183 7-185 7-185 7-186 7-187
Sending Uni	ts and Warning Switches		
Engine oil p Coolant ter Fuel pressi Hydraulic o	e switch not operating. pressure switch does not operate. presture switch does not operate. pure switch does not operate. plight switch does not operate. plight switch does not operate.	7-89a 7-89b 7-89c 7-89d 7-89e 7-89f	7-216 7-217 7-217 7-218 7-219 7-219
Horn and Ba	nck-up Alarm		
	s to operate. alarm fails to operate with transmission in reverse.	7-99a 7-99b	7-240 7-241
Battery			
Battery cas	not hold charge. se cracked or worn through. ctrolyte low or missing.	7-107a 7-107b 7-107c	7-259 7-260 7-260
Battery STE	/ICE Tests		
Test 67. Test 77. Test 79.	Battery Voltage Battery Resistance Battery Resistance Change	7-108a 7-108b 7-108c	7-261 7-262 7-263

# TROUBLESHOOTING SYMPTOM INDEX (cont.)

Component System	Paragraph/ <u>Malfunction</u>	<u>Page</u>
ELECTRICAL SYSTEM (cont.)		
Wiring Harne <i>ss</i>		
Alternator ground lead.	7-115a	7-283
Starting motor lead.	7-115b	7-284
Air pressure_switch lead.	7-115c	7-284
Supplemental steering governor switch and dump		
valve lead	7-115d	7-285
Blade float valve harness.	7-115e	7-285
Rear defroster lead.	7-115f	7-286
Front floodlight lead.	7-115g	7-286
Rear floodlight lead.	7-115h	7-287
Cab signal light lead.	7-115i 7-115j	7-287 7-288
Dome light harness.  Dome light resistor wiring harness.	7-115j 7-115k	7-288
Disconnect switch cable.	7-115K 7-1151	7-289
Heater wiring lead.	7-1151 7-115m	7-289
Right and left blade float harnesses.	7-115n	7-290
Supplemental steering pump power leads.	7-115o	7-290
TRANSMISSION		
Transmission does not operate in any speed or		
slips in all speeds.	8-2a	8-2
Transmission does not shift.	8-2b	8-4
Transmission engages suddenly (rough shifting).	8-2c	8-6
Slow shifting.	8-2d	8-7
Transmission does not operate in first and fourth		
speeds.	8-2e	8-8
Transmission does not operate in second and fifth	0.01	0.0
speeds.	8-2f	8-8
Transmission does not operate in third and sixth	9.20	8-8
speeds. Transmission will not operate in reverse.	8-2g 8-2h	8-8
Transmission does not operate in forward.	8-2i	8-8
Transmission does not operate in fourth, fifth or	0-21	0-0
sixth speeds.	8-2j	8-9
Transmission does not shift out of speed when	5 Zj	0 0
control lever moved.	8-2k	8-9
Transmission engages but vehicle will not move.	8-2l	8-10
Transmission gets hot.	8-2m	8-10
<u> </u>		

# TROUBLESHOOTING SYMPTOM INDEX

Component System	Paragraph/ <u>Malfunction</u>	<u>Page</u>
BRAKE		
Parking brake does not engage correctly. Parking brake not releasing correctly. Service brakes not engaging correctly. Service brakes do not release correctly. Centershift lock pin not operating correctly. Differential lock not releasing correctly. Differential lock not engaging correctly.	9-2a 9-2b 9-2c 9-2d 9-2e 9-2f 9-2g	9-2 9-3 9-3 9-5 9-5 9-6
WHEELS AND TIRES		
Tire wears unevenly. Wheel bent or cracked.	10-2a 10-2b	10-2 10-2
BODY, CAB, HOOD AND HULL		
Cab rollover protective structure is not secure. Defective window seals. Door assembly will not close or catch.	13-2a 13-2b 13-2c	13-2 13-3 13-3
BODY, CHASSIS AND HULL ACCESSORY ITEMS		
All windshield wipers and washers fail to operate. One or more windshield wipers fail to operate. Windshield washer fails to operate. Front or rear window defroster fails to operate. Heater fans and controls operate but no heat. Both heater fans fail to operate. One heater fan fails to operate.	14-2a 14-2b 14-2c 14-2d 14-2e 14-2f 14-2g	14-2 14-2 14-3 14-3 14-4 14-4
HYDRAULIC SYSTEM		
All implements fail to operate or operate slowly. Circle drive operates slowly or fails to operate. Blade float fails to operate. Blade lift fails to operate. Center shift fails to operate. Blade tip fails to operate. Leaning wheel fails to operate. Side shift fails to operate.	15-2a 15-2b 15-2c 15-2d 15-2e 15-2f 15-2g 15-2h	15-3 15-4 15-4 15-5 15-5 15-6 15-6

# TROUBLESHOOTING SYMPTOM INDEX (cont.)

Component System	Paragraph/ <u>Malfunction</u>	<u>Page</u>
GAGES AND INDICATORS (NON-ELECTRICAL)		
Air cleaner indicator fails to show air filter condition. Air pressure gages fail to operate.	16-2a 16-2b	16-2 16-3
EARTHMOVING EQUIPMENT		
Blade System		
Blade cutting edges or end tips are broken or missing. Centershift lock assembly fails to operate.	17-2a 17-2b	17-2 17-2
Scarifier System		
Scarifier shanks are broken or missing. Scarifier block, sleeve or link assembly	17-9a	17-28
is damaged.	17-9b	17-29

# **CHAPTER 6**

# ENGINE, FUEL, EXHAUST AND COOLING SYSTEM TROUBLESHOOTING AND MAINTENANCE

# **CHAPTER OVERVIEW**

The purpose of this chapter is to help the technician efficiently troubleshoot and repair malfunctioning equipment and to perform authorized organizational support level maintenance procedures on the 130G Grader engine, fuel, exhaust and cooling system.

# **INDEX**

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III	FUEL SYSTEM TROUBLESHOOTING		
	General Information Fuel System Troubleshooting Procedures Fuel System STE/ICE Tests	6-11 6-12 6-13	6-35 6-35 6-47
IV	FUEL SYSTEM MAINTENANCE		
	Fuel System Maintenance Procedures Injection Lines Air Precleaner Primary Element Air Cleaner Turbocharger Air Lines Turbocharger Turbocharger Exhaust Elbow Fuel Tank Hoses, Lines and Fittings Fuel Tank Fuel Tank	6-14 6-15 6-16 6-17 6-18 6-19 6-20 6-21 6-22 6-23 6-24	6-49 6-50 6-56 6-59 6-63 6-66 6-70 6-73 6-75 6-81

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V	EXHAUST SYSTEM TROUBLESHOOTING		
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VI	EXHAUST SYSTEM MAINTENANCE		
	Exhaust System Maintenance Procedures Muffler and Exhaust Pipes	6-31 6-32	6-109 6-110
VII	COOLING SYSTEM TROUBLESHOOTING		
	General Information Cooling System Troubleshooting Procedures	6-33 6-34	6-114 6-114
VIII	COOLING SYSTEM MAINTENANCE		
	Cooling System Maintenance Procedures Radiator and Support Shields, Baffles and Plates Grille Vent Guard Radiator Hoses, Lines and Fittings Radiator Drain Line Temperature Regulator Coolant Pump Fan Belts Fan Lubrication Line Fan and Fan Drive Transmission Oil Pump Pulley Radiator Servicing Side Screen Door Assembly	6-35 6-36 6-37 6-38 6-39 6-40 6-41 6-42 6-43 6-44 6-45 6-46 6-47 6-48 6-49	6-117 6-118 6-126 6-132 6-134 6-137 6-143 6-146 6-149 6-155 6-158 6-161 6-168 6-170 6-174

#### Section I. ENGINE TROUBLESHOOTING.

- **6-1. GENERAL INFORMATION**. This section lists the common engine trouble-shooting malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **6-2. ENGINE TROUBLESHOOTING PROCEDURES**. This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### ENGINE TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

a. ENGINE WILL NOT CRANK.

Check electrical system. Refer to Electrical System Troubleshooting.

If electrical system operates--contact Direct Support.

- b. ENGINE CRANKS, BUT WILL NOT START.
  - Step 1. Check for a cranking speed fast enough to start engine. Refer to Electrical System Troubleshooting.
  - Step 2. Check the fuel system. Refer to Fuel System Troubleshooting.

If electrical and fuel systems operate--contact Direct Support.

c. ENGINE STARTS, BUT WILL NOT KEEP RUNNING.

Check the fuel system. Refer to Fuel System Troubleshooting.

If fuel system operates--contact Direct Support.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

# d. LOW ENGINE OIL PRESSURE.

Step 1. Check lubrication oil for proper weight.

Drain improper weight oil. Fill with correct weight oil. Replace oil filter. Refer to LO 5-3805-261-12 and check Daily Log Book, DA 2408-1.

Step 2. Check condition of oil filter element.

If engine oil filter is damaged or defective--replace. Refer to paragraph 6-5.

Step 3. Check oil gage for diesel fuel contamination in lubrication oil (Figure 6-1).

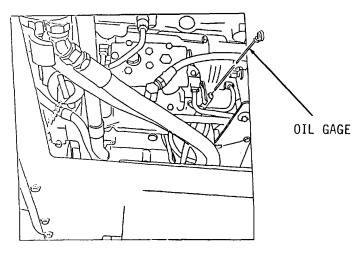


Figure 6-1.

If lubrication oil is contaminated by diesel fuel--notify Direct Support.

Step 4. Check condition of turbocharger. Refer to Fuel System Troubleshooting.

If turbocharger is damaged or defective--replace. Refer to paragraph 6-20.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

# e. ENGINE USES TOO MUCH OIL.

Step 1. Check lubrication oil for proper weight.

Drain improper weight oil. Fill with correct weight oil. Replace oil filter. Refer to LO 5-3805-261-12.

Step 2. Check for oil leaks at the engine oil filter and oil drain plug. Refer to LO 5-3805-261-12.

If oil leaks are found at the oil filter or oil drain plug, tighten and/or replace gaskets.

For oil leaks in other areas, notify Direct Support.

# f. ENGINE WILL NOT SHUT DOWN.

Step 1. Manually actuate governor control lever (Figure 6-2). Check for loose, binding or incorrectly adjusted governor control linkage. Notify Direct Support.

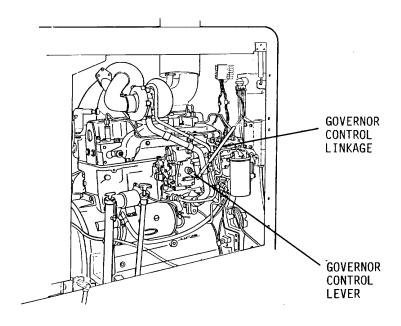


Figure 6-2.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

# f. ENGINE WILL NOT SHUT DOWN. (cont.)

Step 2. If engine does not stop, turn off fuel shut-off valve (Figure 6-3). Notify Direct Support.

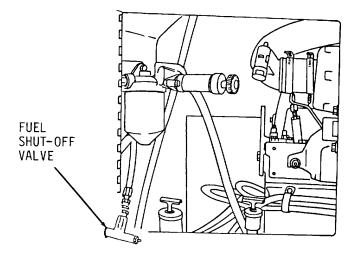


Figure 6-3.

# g. ENGINE KNOCKS.

Knocking is usually caused by loose or damaged internal parts.

Notify Direct Support.

h. ENGINE MISFIRES, RUNS ROUGH OR STALLS.

Refer to Fuel System Troubleshooting.

# **ENGINE TROUBLESHOOTING PROCEDURES.**

# 6-3. Engine STE/ICE Tests.

# a. TEST 10. ENGINE RPM (AVERAGE)

1. Refer to VTM General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

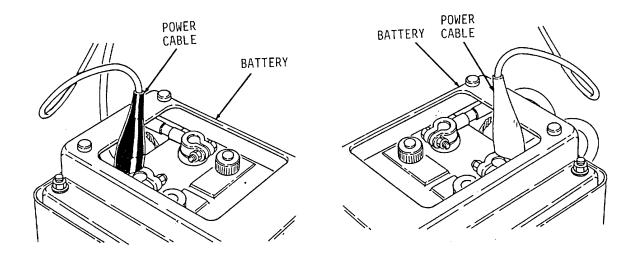


Figure 6-4.

2. Remove cap from tachometer drive (Figure 6-5).

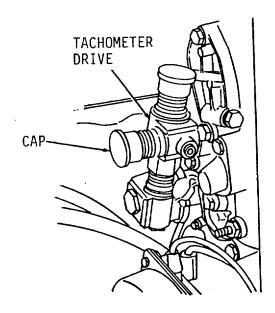


Figure 6-5.

## **ENGINE TROUBLESHOOTING PROCEDURES**. (cont.)

- 6-3. Engine STE/ICE Tests. (cont.)
  - a. TEST 10. ENGINE RPM (AVERAGE) (cont.)
    - **3.** Install pulse tachometer and connect cable (Figure 6-6).

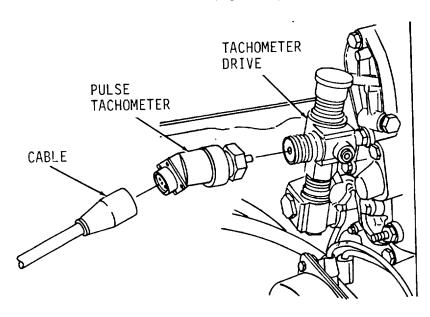


Figure 6-6.

- 4. Perform test using procedure TEST 10 as instructed in TM 9-4910-571-12 & P.
- **5.** At low idle engine should run between 960-980 rpm. At high idle engine should run between 2310-2370 rpm.
- 6. Return vehicle to its original condition.

## **ENGINE TROUBLESHOOTING PROCEDURES.**

## 6-3. Engine STE/ICE Tests.

## b. TEST 11. ENGINE RPM (CRANKING)

1. Refer to VTM General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

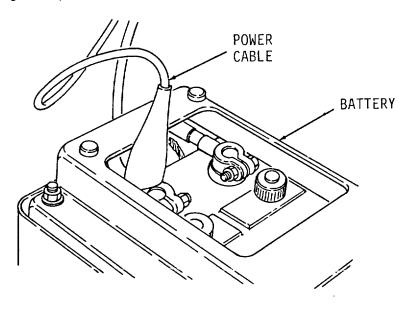


Figure 6-4.

2. Remove cap from tachometer drive (Figure 6-5).

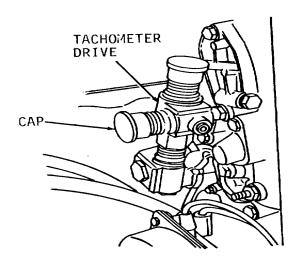


Figure 6-5.

## **ENGINE TROUBLESHOOTING PROCEDURES.** (cont.)

## 6-3. Engine STE/ICE Tests. (cont.)

## b. TEST 11. ENGINE RPM (CRANKING) (cont.)

**3.** Install pulse tachometer and connect cable (Figure 6-6).

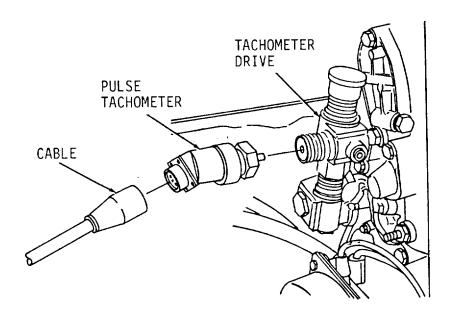


Figure 6-6.

- 4. With fuel shutoff, perform test using procedure TEST 10 as instructed in TM 9-4910-571-12 & P.
- **5.** Minimum cranking speed is 100 rpm.
- **6.** Return vehicle to its original condition.

## **ENGINE TROUBLESHOOTING PROCEDURES.**

## 6-3. Engine STE/ICE Tests.

## c. TEST 12. POWER TEST

1. Refer to VTM General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

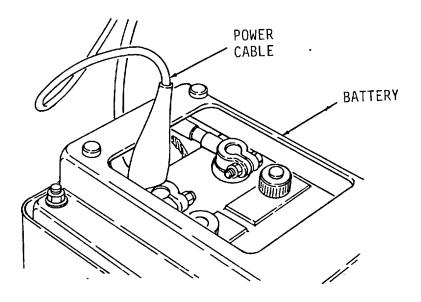


Figure 6-4.

2. Remove cap from tachometer drive (Figure 6-5).

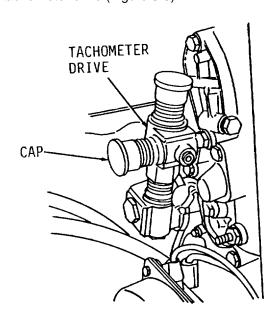


Figure 6-5.

## **ENGINE TROUBLESHOOTING PROCEDURES.** (cont)

## **6-3.** Engine STE/ICE Tests. (cont)

## c. TEST 12. POWER TEST (cont)

**3.** Install pulse tachometer and connect cable (Figure 6-6).

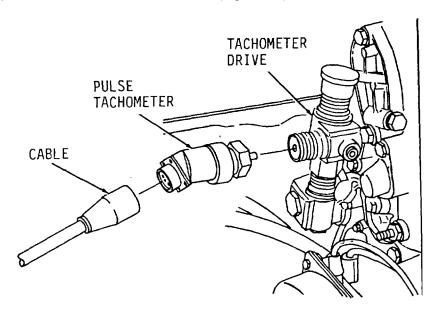


Figure 6-6.

- 4. Perform test using procedure TEST 12 as instructed in TM 9-4910-571-12 & P.
- **5.** Parameters for this test are not available.
- **6.** Return vehicle to its original condition.

## **ENGINE TROUBLESHOOTING PROCEDURES.**

## 6-3. Engine STE/ICE Tests.

## d. TEST 14. COMPRESSION UNBALANCE

1. Refer to VTM General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

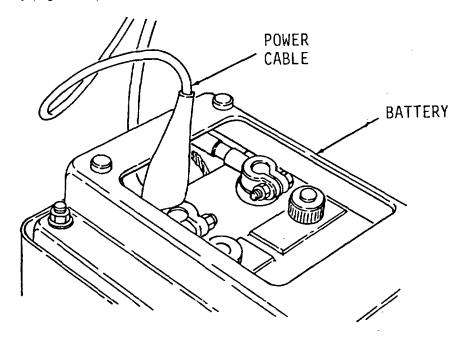


Figure 6-4.

- 2. Perform test using procedure TEST 14 as instructed in TM 9-4910-571-12 & P.
- **3.** Parameters for this test are not available.
- 4. Return vehicle to its original condition.

## **ENGINE TROUBLESHOOTING PROCEDURES.** (cont)

## 6-3. Engine STE/ICE Tests. (cont)

## e. TEST 50. ENGINE OIL PRESSURE

1. Refer to VTM General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

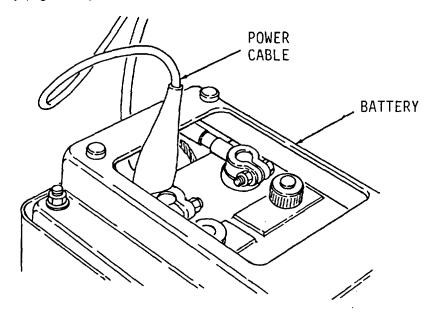


Figure 6-4.

2. Remove wire leads and oil pressure sender (Figure 6-7).

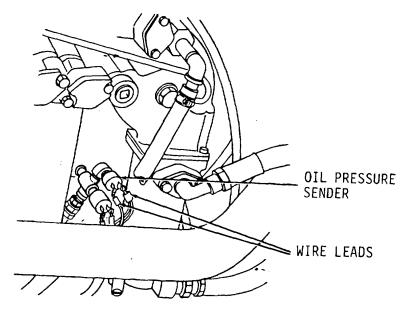


Figure 6-7.

## **ENGINE TROUBLESHOOTING PROCEDURES.**

## 6-3. Engine STE/ICE Tests.

## e. TEST 50. ENGINE OIL PRESSURE (cont)

3. Install reducer TK 20 and blue transducer and connect cable (Figure 6-8).

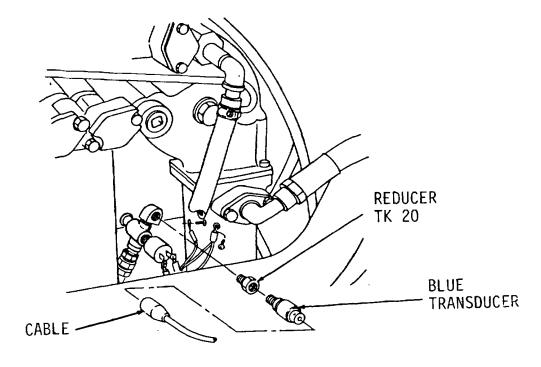


Figure 6-8.

- **4.** Perform test using procedure TEST 50 as instructed in TM 9-4910-571-12 & P.
- 5. Engine oil pressure should read between 49-71 psi.
- **6.** Return vehicle to its original condition.

#### Section II. ENGINE MAINTENANCE.

## 6-4. ENGINE MAINTENANCE PROCEDURES.

- **a.** The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the engine and its components in good repair.
- **b.** This section is arranged by functional group code and provides a list of engine components to be maintained and step-by-step maintenance procedures.

## **INDEX**

<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
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Oil Filler and Cap	6-7	6-22
Engine Oil Sampling Valve and Line	6-8	6-25
Valve Cover Breather	6-9	6-28
Turbocharger Oil Lines	6-10	6-31

#### **6-5. Oil Filter.** (Sheet 1 of 2)

This task covers: a. Removal b. Installation

#### **INITIAL SETUP**

**Applicable Configurations** 

ΑII

**Tools** 

Strap style pipe wrench NSN 5120-01-081-1922

**Test Equipment** 

None

Materials/Parts

Engine lubricating oil, Item 31, Appendix C

Oil filter Oil filter seal

Personnel Required

Construction equipment repairer MOS 62B

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

## **6-5. Oil Filter**. (Sheet 2 of 2)

#### **REMOVAL**

1. Open left side engine door.

#### **WARNING**

Exercise care when working with hot oil or components saturated with hot oil. Allow to cool before handling. Injury may result if you fail to follow this procedure.

2. Remove and discard oil filter from left side of engine. Remove old oil filter seal from oil filter base (Figure 6-9).

#### **INSTALLATION**

- Using clean engine oil, lubricate new oil filter seal.
- 2. Install new oil filter (Figure 6-9). Hand tighten oil filter an additional 3/4 turn after new oil filter seal makes contact with oil filter base (Figure 6-10).
- **3.** Refill engine oil to proper level. Refer to LO 5-3805-261-12.
- **4.** Turn Master disconnect switch on and start engine. Refer to TM 5-3805-261-10.
- **5.** Check oil filter for leaks. Stop engine. If leakage is evident, tighten filter.
- 6. Close left side engine door.

#### NOTE

Return 130G Grader to original equipment condition.

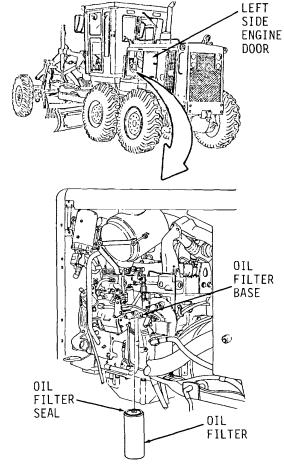


Figure 6-9.

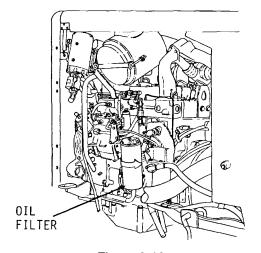


Figure 6-10.

**End of Task** 

## 6-6. Oil Level Gage. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033) Pan, drain

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Caps

Plugs Sleeve, Item 7 Personnel Required

Construction equipment repairer MOS 62B

<u>References</u>

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

·

#### **Troubleshooting References**

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground.
Parking/emergency brake applied.

Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-5 Left engine compartment door removed.

Go to Sheet 2

6-6. Oil Level Gage. (Sheet 2 of 3)

#### **REMOVAL**

**1.** Pull out oil level gage (1, Figure 6-11) from left side of engine.

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 2. Loosen two nuts on tube assembly (2) in lower left side of engine and remove.
- **3.** Remove two elbows (3, Figure 6-12).
- 4. Remove bolt (4).

### **WARNING**

Air tank is under high pressure and must be drained. Failure to do so can result in INJURY OR BLINDNESS from flying particles.

- **5.** Disconnect air line (5).
- **6.** Remove bolt (6) securing clamp on air line (5).
- **7.** Loosen nut (8, Figure 6-13).
- **8.** Remove tube assembly (7).

#### **NOTE**

Remove nut and sleeve only if inspection indicates leakage around sleeve.

**9.** Remove nut (8) and cut and discard sleeve (9). Cut damaged sleeve (9) from tube assembly (7).

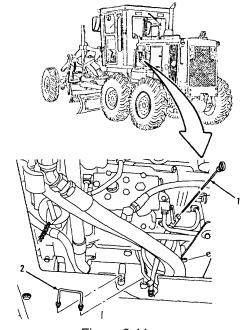


Figure 6-11.

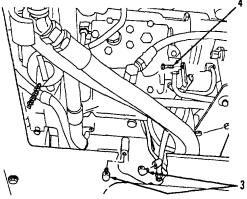


Figure 6-12.

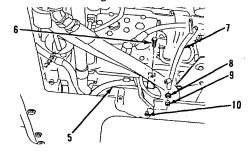


Figure 6-13.

Go to Sheet 3

## 6-6. Oil Level Gage. (Sheet 3 of 3)

## **REMOVAL** (cont)

10. Remove connector (10) from cylinder

block.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- Install connector (10, Figure 6-13) in cylinder block on lower left side of engine.
- 2. If removed, install sleeve (9) and nut (8) on tube assembly (7).
- **3.** Position tube assembly (7) on left side of engine.
- **4.** Install bolt (4, Figure 6-12).
- 5. Tighten nut (8).
- **6.** Install bolt (6) that secures hose.
- 7. Connect air line (5).
- 8. Install two elbows (3).
- **9.** Install tube assembly (2, Figure 6-11).
- 10. Install oil level gage (1).

#### **NOTE**

## Return 130G Grader to original condition.

- 11. Install oil level gage (1).
- **12.** Check tube assemblies (2 and 7) in lower left side of engine for leaks.
- 13. Stop engine.

End of Task

#### Oil Filler and Cap. (Sheet 1 of 3) 6-7.

This task covers: b. Cleaning a. Removal c. Inspection

d. Installation

#### **INITIAL SETUP**

Applicable Configurations Personnel Required

Construction equipment ΑII repairer MOS 62B

Tools General Mechanic's Tool Kit:

References Automotive (NSN 5180-00-177-TM 5-3805-261-10

7033) Special Environmental Conditions

**Test Equipment** None None

**General Safety Instructions** Materials/Parts None

Dry cleaning solvent, Item 14, Appendix C **Torques** 

Clean cloths, Item 39, All fasteners are tightened to Appendix C standard torques. Refer to Gasket, Item 4 Appendix E.

Rivet. Item 5 

## <u>Troubleshooting References</u>

None

**Equipment Condition** TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Left engine side door opened.

Go to Sheet 2

## **6-7.** Oil Filler and Cap. (Sheet 2 of 3)

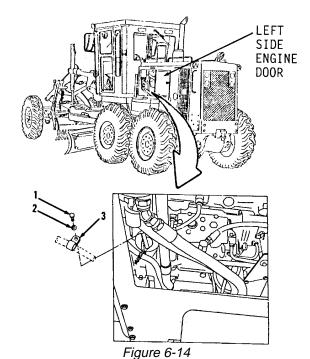
#### **REMOVAL**

- **1.** Open left side engine door.
- 2. Remove two bolts (1), washers (2) and clip (3, Figure 6-14) from front, left side of engine.
- 3. Remove items 5 thru 8 as an assembly (Figure 6-15) from engine front cover.
- Remove and discard gasket (4).
   Remove all gasket material from mounting surfaces.

#### **NOTE**

Remove rivet and washer only if inspection indicates replacement is necessary.

- **5.** If necessary, remove rivet (5) and washer (6, Figure 6-16). Discard rivet (5).
- **6.** Remove cap assembly (7) from pipe (8).



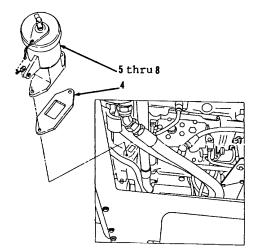


Figure 6-15

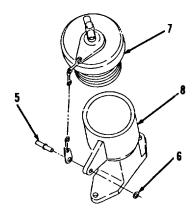


Figure 6-16

## **6-7.** Oil Filler and Cap. (Sheet 3 of 3)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- **1.** Install cap assembly (7) in pipe (8, Figure 6-16).
- 2. If removed, install washer (6) and new rivet (5).
- 3. Position items 8 thru 5 as an assembly and new gasket (4, Figure 6-15) on front, left side of engine cover.
- **4.** Install clip (3, Figure 6-14) on hose.
- 5. Install two washers (2) and bolts (1).
- 6. Close left side engine door.

#### NOTE

Return 130G Grader to original equipment condition.

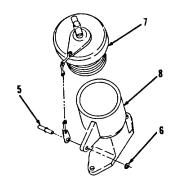


Figure 6-16.

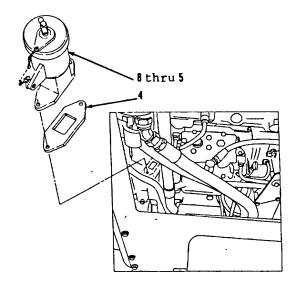


Figure 6-15.

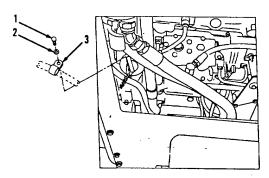


Figure 6-14.

End of Task

## 6-8. Engine Oil Sampling Valve and Line. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP**

Applicable Configurations
All Construction equipment

repairer MOS 62B

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Detergent, Item 8, Appendix C Small tags, Item 41,

Appendix C Preformed packing, Item 2

Caps Plugs Personnel Required

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground.

Parking/emergency brake applied.

Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-5 Left side engine panel assembly

removed.

Go to Sheet 2

#### 6-8. Engine Oil Sampling Valve and Line. (Sheet 2 of 3)

#### **REMOVAL**

1. Remove valve (1), preformed packing (2) and adapter (3) as an assembly unless inspection shows leakage.

#### **NOTE**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open oil ports to prevent contamination.

2. Remove reducer (5), locknut (6) and connector (7) from hose assembly (8).

#### **NOTE**

Do not remove nut (4) unless inspection shows need for replacement.

- 3. Remove hose assembly (8), elbow (9) and bushing (10, Figure 6-19) from bottom, left side of engine.
- 4. Remove two bolts (11) and bracket (12) from top, left side of engine.

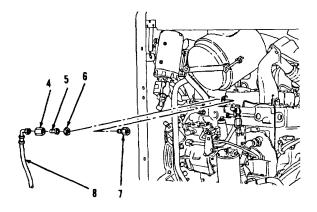


Figure 6-18.

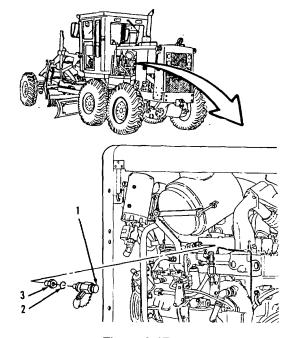
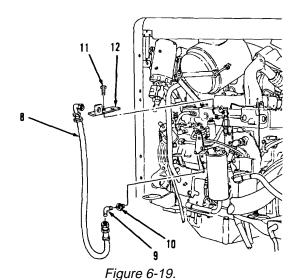


Figure 6-17.



Go to Sheet 3

**6-8. Engine Oil Sampling Valve and Line.** (Sheet 3 of 3)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- **1.** Install bracket (12) and two bolts (11, Figure 6-19) to top, left side of engine.
- 2. Install bushing (10), elbow (9) and hose assembly (8) to bottom, left side of engine.
- 3. Install connector (7), locknut (6), reducer (5, Figure 6-18) to top, left side of engine.
- **4.** Connect hose assembly (8) with nut (4) to reducer (5).
- 5. Install adapter (3), new preformed packing (2) and valve (1, Figure 6-17). If inspection showed no leaks install items 1 thru 3 as an assembly.

### **NOTE**

Return 130G Grader to original equipment condition.

End of Task

6-27

#### 6-9. Valve Cover Breather. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP**

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Detergent, Item 8, Appendix C

Small tags, Item 41, Appendix C

Preformed packing, Item 10

Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied.

Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-5 Left side engine door assembly removed.

Go to Sheet 2

6-28

## **6-9.** Valve Cover Breather. (Sheet 2 of 3)

#### **REMOVAL**

- Remove bolt (1), two washers (2) and clip (3, Figure 6-20) from air compressor in front, left side of engine.
- **2.** Loosen two clamps (5) from top, front of engine.

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- **3.** Remove tube (4).
- **4.** Remove two clamps (5) and hose (6) from breather (9).
- 5. Remove bolt (7) and washer (8, Figure 6-21).
- **6.** Remove breather (9) from valve cover.
- Remove and discard preformed packing (10)

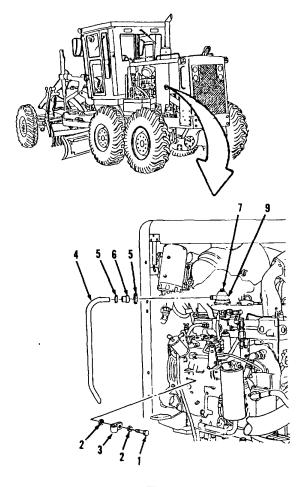


Figure 6-20.

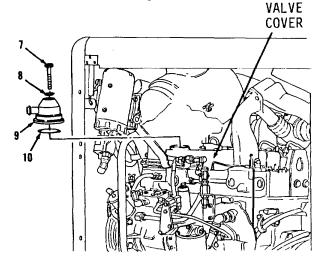


Figure 6-21.

## **6-9. Valve Cover Breather**. (Sheet 3 of 3)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- **1.** Install new preformed packing (10) and breather (9, Figure on valve cover.
- **2.** Install breather (9) on valve cover.
- **3.** Install washer (8) and bolt (7) loosely.
- **4.** Install hose (6) on breather (9, Figure 6-20).
- **5.** Install two clamps (5), but do not tighten.
- **6.** Install tube (4) in hose (6).
- 7. Install clip (3), two washers (2) and bolt (1) in front, left side of engine.
- **8.** Tighten two clamps (5) to top, front of engine.
- 9. Tighten bolt (7) to 12 ft-lb torque.

## **NOTE**

Return 130G Grader to original equipment condition.

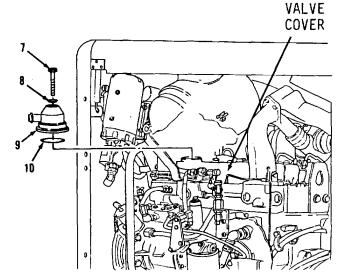


Figure 6-21.

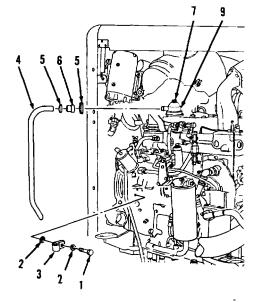


Figure 6-20.

End of Task

#### Turbocharger Oil Lines. (Sheet 1 of 4) 6-10.

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP**

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Lubricating oil, Item 31, Appendix C Small tags, Item 41, Appendix C Gaskets, Items 8, 13 Preformed packings, Items 10,

Caps Plugs

14, 17

Personnel Required Construction equipment

repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

.....

Paragraph 13-5

Right side engine panel assembly

removed.

Go to Sheet 2

#### 6-10. Turbocharger Oil Lines. (Sheet 2 of 4)

#### **REMOVAL**

- 1. Remove two nuts (1), four washers (2), two bolts (3) and four clips (4, Figure 6-22) from right side of engine.
- **2.** Remove bolts (5 and 6) from top of turbocharger.

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open oil ports to prevent contamination.

- **3.** Disconnect tube assembly (7) nut from connector (11, Figure 6-23) under injection pump support.
- **4.** Remove cotter pin (8) and pin (9) from throttle linkage.
- 5. Remove tube assembly (7) and gasket (10) from vehicle. Discard gasket (10) and remove all gasket material from mounting surfaces.
- Remove connector (11) and preformed packing (12) from injection pump support. Discard preformed packing (12).
- **7.** Remove two bolts (13, Figure 6-24) from under turbocharger.

#### **NOTE**

Remove items 14 thru 19 as an assembly then disassemble.

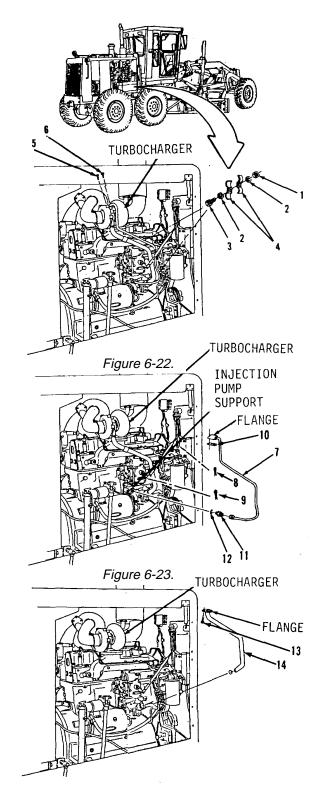


Figure 6-24.

### 6-10. Turbocharger Oil Lines. (Sheet 3 of 4)

#### **REMOVAL**

- **8.** Remove two bolts (17) and elbow (18, Figure 6-25) from injection pump support.
- **9.** Remove and discard preformed packing (19).
- **10.** Remove tube assembly (14) and gasket (15) from elbow (18). Discard gasket (15) and remove all gasket material from mounting surfaces.
- **11.** Remove and discard preformed packing (16).



Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- **1.** Install new preformed packing (19) elbow (18) and two bolts (17, Figure 6-25) in injection pump support.
- 2. Install new preformed packing (16) on tube assembly (14, Figure 6-24). Lubricate outer face with clean oil.
- Install tube assembly (14) into elbow (18) under turbocharger.
- Install new gasket (15) between flange of tube assembly (14) and under turbocharger.
- **5.** Install two bolts (13).

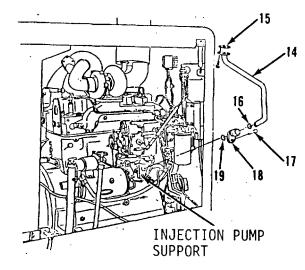


Figure 6-25.

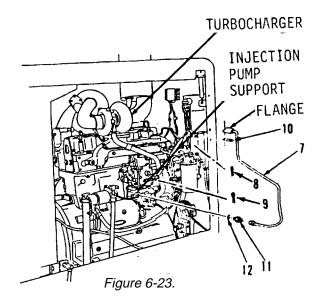
## 6-10. Turbocharger Oil Lines. (Sheet 4 of 4)

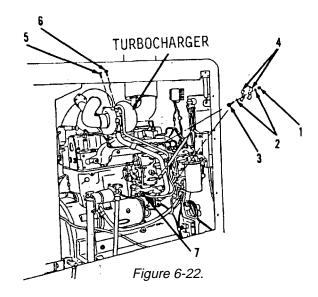
## **INSTALLATION** (cont)

- **6.** Install new preformed packing (12) and connector (11, Figure 6-23) into injection pump support.
- 7. Install tube assembly (7).
- **8.** Connect tube assembly (7) nut. Do not tighten tube assembly (7) nut.
- **9.** Install pin (9) and cotter pin (8) into throttle linkage.
- **10.** Install new gasket (10) between flange of tube assembly (7) and top of turbocharger.
- **11.** Install bolts (6 and 5, Figure 6-22).
- **12.** Tighten tube assembly (7) nut on injection pump support.
- **13.** Install four clips (4), two bolts (3), four washers (2) and two nuts (1) on right side of engine.

#### **NOTE**

Return 130G Grader to original equipment condition.





End of Task

#### Section III. FUEL SYSTEM TROUBLESHOOTING.

- **6-11. GENERAL INFORMATION**. This section lists the common fuel system malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **6-12. FUEL SYSTEM TROUBLESHOOTING PROCEDURES**. This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### FUEL SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

## MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

- a. ENGINE CRANKS, BUT DOES NOT START.
  - Step 1. Listen for slow engine cranking speed. Refer to electrical system troubleshooting.
  - Step 2. Check for fuel in fuel injection pump housing. Refer to paragraph 6-15.

Bleed injection lines. Refer to paragraph 6-15.

Step 3. Look for bent or twisted fuel lines (Figure 6-26).

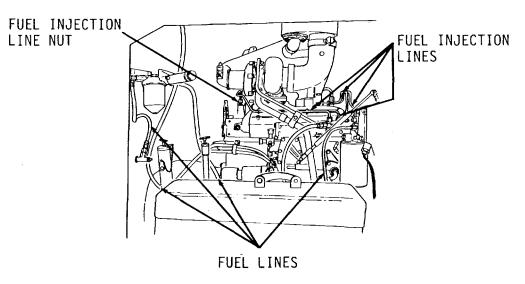


Figure 6-26.

Replace defective injection lines. Bleed injection lines. Refer to paragraphs 6-15 and 6-22.

## a. ENGINE CRANKS, BUT DOES NOT START. (cont)

Step 4. Check for clogged primary fuel filter (Figure 6-28).

Disconnect fuel line between fuel filter and fuel injection pump housing at fuel injection pump housing.

Place start switch in ON position and crank engine. Refer to TM 5-3805-261-10.

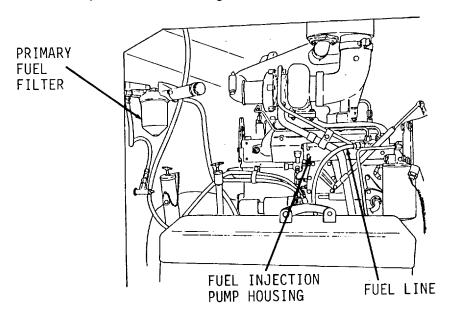


Figure 6-28.

If fuel does not shoot out from disconnected line--replace primary fuel filter. Refer to paragraph 6-25.

#### FUEL SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

- a. ENGINE CRANKS, BUT DOES NOT START.
  - Step 5. Check for bad fuel. If bad, fuel will have a milky-white color. Refer to TM 5-3805-261-10.

Drain bad fuel. Refer to TM 5-3805-261-10. Bleed injection lines. Refer to paragraph 6-15. Replace fuel filters. Refer to paragraphs 6-25 and 6-26.

Step 6. Check if fuel "cloud point" is correct for weather conditions. ("Cloud point" is temperature at which wax forms in fuel.) Refer to TM 5-3805-261-10.

If fuel is clouded, drain fuel tank. Refer to paragraph 6-24. Bleed injection lines. Refer to paragraph 6-15.

Replace fuel filters. Refer to paragraph 6-25 and 6-26.

Fill tank with fuel having the correct "cloud point." Refer to TM 5-3805-261-10.

Bleed injection lines again. Refer to paragraph 6-15.

Step 7. Contact Direct Support.

#### b. ENGINE MISFIRES OR RUNS ROUGHLY.

Step 1. Check for air in fuel system. Refer to paragraph 6-15.

Bleed injection lines. Refer to paragraph 6-15.

Step 2. Check fuel pressure with fuel pressure gage (Figure 6-27) or use STE/ICE Test 50. Refer to paragraph 6-13.

Remove fuel pressure switch from fuel injection pump. Refer to paragraph 7-94.

Install fuel pressure gage.

Start engine and run at high idle. Pressure should read at least 15 psi. Refer to TM 5-3805-261-10.

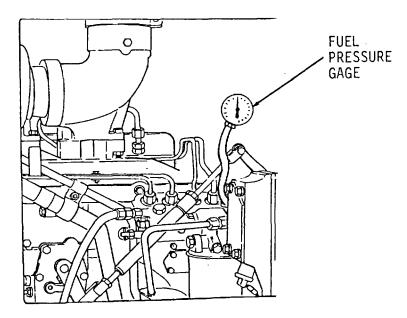


Figure 6-27.

If pressure is low, proceed with steps 3 and 4.

## FUEL SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

## b. ENGINE MISFIRES OR RUNS ROUGHLY.

Step 3. Look for bent or twisted fuel lines (Figure 6-26).

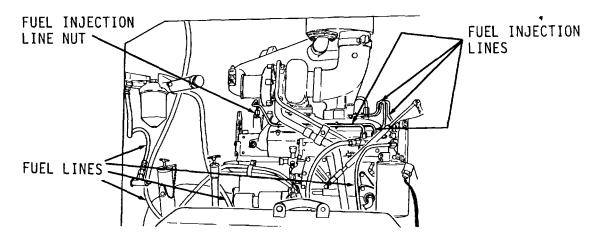


Figure 6-26.

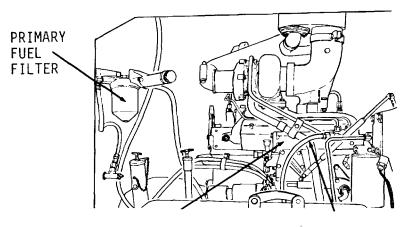
Replace defective injection lines. Bleed injection lines. Refer to paragraphs 6-15 and 6-22.

## b. ENGINE MISFIRES OR RUNS ROUGHLY. (cont)

Step 4. Check for clogged primary fuel filter (Figure 6-28).

Disconnect fuel line between fuel filter and fuel injection pump housing at fuel injection pump housing.

Place start switch in the ON position and crank engine. Refer to TM 5- 3805-261-10.



FUEL INJECTION PUMP HOUSING FUEL LINE

Figure 6-28.

If fuel does not shoot out from disconnected--replace primary fuel filter. Refer to paragraph 6-25.

#### b. ENGINE MISFIRES OR RUNS ROUGHLY.

Step 5. Check engine cylinders. Loosen injection lines, one at a time to find which cylinder is misfiring (Figure 6-26).

#### **CAUTION**

When fuel injection lines are loosened or tightened on fuel injection nozzles, two wrenches must be used. Nozzle must be held with wrench or damage to nozzle may result.

Start and run engine at a speed which gives maximum misfiring. Refer to TM 5-380-261-10.

Loosen a fuel injector line nut at fuel injection pump. This will stop flow of fuel to that cylinder.

Repeat for each fuel injector line.

When a cylinder is found where loosened fuel injector line nut does not make a difference in how engine runs, contact Direct Support.

FUEL INJECTION LINE NUT

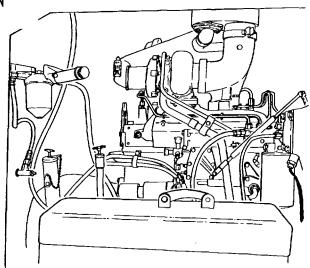


Figure 6-26.

#### c. ENGINE GALLOPS.

- Step 1. Inspect connections on accelerator in the cab. Refer to Chapter 2.
- Step 2. Inspect connections on fuel injection pump (Figure 6-29).

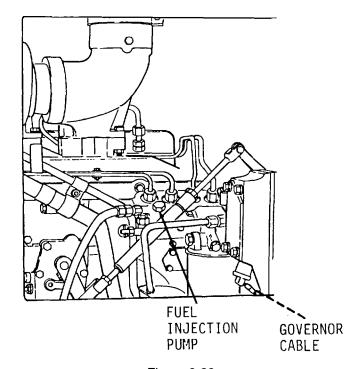


Figure 6-29.

Tighten connections on fuel injection pump. Refer to paragraph 6-15.

Step 3. Check to see that governor cable is intact.

If governor cable is not intact--contact Direct Support (Figure 6-29).

Step 4. Inspect cables and connectors. Refer to Chapter 2.

Replace defective cables or connectors. Refer to paragraph 7-116.

Step 5. Contact Direct Support.

#### FUEL SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

## MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

#### d. ENGINE HAS LOW FUEL SUPPLY/LOW FUEL PRESSURE.

Step 1. Check for fuel in fuel injection pump housing. Refer to paragraph 6-15.

Bleed injection lines. Refer to paragraph 6-15.

Step 2. Check for problems causing low fuel pressure.

Check level of fuel in tank. Check to see that vent hole in tank cap is clean. Refer to TM 5-3805-261-10.

Fill fuel tank and clean vent hole in tank cap. Refer to TM 5-3805-261-10.

Remove and inspect fuel filters.

Replace filters and gaskets if necessary. Refer to paragraphs 6-25 and 6-26.

Look for broken or leaking fuel lines.

Replace defective fuel lines. Refer to paragraphs 6-15 and 6-22.

Step 3. Check for bad fuel. If bad, fuel will have a milky-white color. Refer to TM 5-3805-261-10.

Drain bad fuel. Refer to TM 5-3805-261-10. Replace fuel filters. Refer to paragraphs 6-25 and 6-26.

Bleed injection lines. Refer to paragraph 6-15.

Step 4. Check if fuel "cloud point" is correct for weather conditions. ("Cloud point" is temperature at which wax forms in fuel.) Refer to TM 5-3805-261-10.

If fuel is clouded, drain. Refer to paragraph 6-24. Bleed injection lines. Refer to paragraph 6-15. Replace fuel filters. Refer to paragraphs 6-25 and 6-26.

Fill tank with fuel having the correct "cloud point." Refer to TM 5-3805-261-10.

Bleed injection lines. Refer to paragraph 6-15.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

#### e. ENGINE LACKS POWER.

Step 1. Check for air in fuel system. Refer to paragraph 6-15.

Bleed injection lines. refer to paragraph 6-15.

Step 2. Check for bad fuel. If bad, fuel will have milky-white color. Refer to TM 10-3805-261-10.

Drain bad fuel. Refer to TM 5-3805-261-10. Replace fuel filters. Refer to paragraphs 6-25 and 6-26. Bleed injection lines. Refer to paragraph 6-15.

Step 3. Inspect air cleaner. Check to see if red "service" indicator is showing. Refer to TM 5-3805-261-10.

Clean primary element. Refer to Chapter 2. Replace primary element after six cleanings, or at least once a year.

Step 4. Inspect turbocharger (Figure 6-30). Check for carbon deposits or other causes of friction.

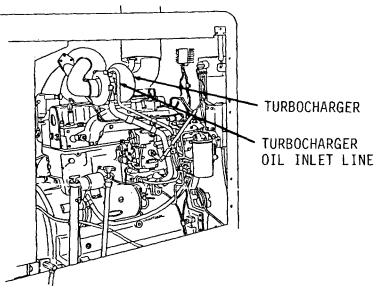


Figure 6-30.

Replace the entire unit if defective. Refer to paragraph 6-20.

Step 5. Contact Direct Support.

### FUEL SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

### f. ENGINE MAKES TOO MUCH BLACK OR GREY SMOKE.

Step 1. Inspect air cleaner. Check to see if red "service" indicator is showing. Refer to TM 5- 3805-261-10.

Clean primary element. Refer to Chapter 2. Replace primary element after six cleanings, or at least once a year.

Step 2. Contact Direct Support.

### g. ENGINE MAKES TOO MUCH WHITE OR BLUE SMOKE.

Step 1. Check for excess lubrication oil in engine. Refer to TM 5-3805-261-10.

Drain excess lubrication. Refer to TM 5-3805-261-12.

Step 2. Note if engine runs roughly or misfires. Refer to MALFUNCTION b.

Step 3. Inspect turbocharger (Figure 6-30). Check inlet line for oil.

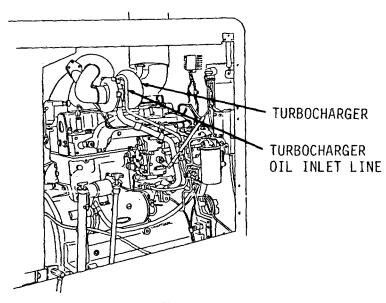


Figure 6-30.

If no oil is found in inlet line--replace turbocharger oil lines. Refer to paragraph 6-10.

Step 4. Contact Direct Support.

# FUEL SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cont.)

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

# h. FUEL CONSUMPTION TOO HIGH.

Step 1. Inspect fuel system for leaks.

Replace defective lines. Bleed injection lines. Refer to paragraphs 6-15 and 6-22.

Step 2. Contact Direct Support.

# ENGINE, FUEL, EXHAUST AND EXHAUST.

# 6-13. Fuel STE/ICE Tests.

# **TEST 50. FUEL SUPPLY PRESSURE**

**1.** Refer to VTM-General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cables to battery (Figure 6-4).

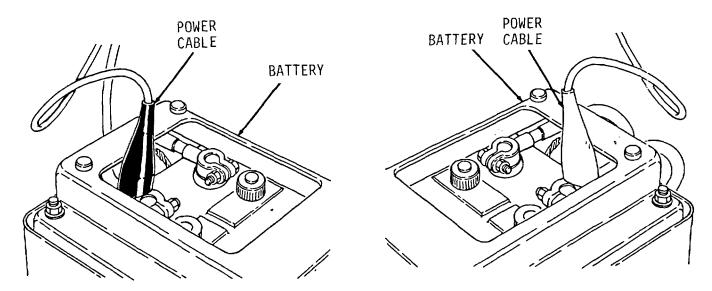


Figure 6-4.

2. Remove fuel pressure switch (Figure 6-31).

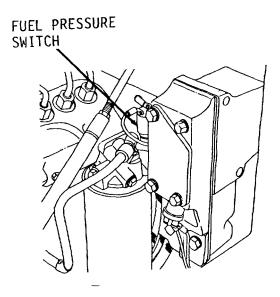


Figure 6-31.

# ENGINE, FUEL, EXHAUST AND EXHAUST. (cont.)

# 6-13. Fuel STE/ICE Tests. (cont.)

# TEST 50. FUEL SUPPLY PRESSURE (cont.)

3. Install reducer item TK 20. Install blue transducer and connect cable (Figure 6-32).

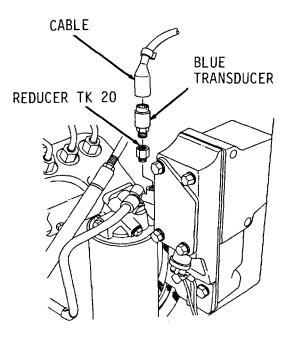


Figure 6-32.

- 4. Perform test using procedure TEST 50 as instruction in TM 9-4910-571-12 & P.
- **5.** At high idle fuel pressure should read between 25-45 psi. Parameters for minimum fuel pressure at low idle are 15 psi.
- **6.** Return vehicle to its original condition.

### Section IV. FUEL SYSTEM MAINTENANCE.

# 6-14. FUEL SYSTEM MAINTENANCE PROCEDURES.

- **a.** The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the fuel system and its components in good repair.
- **b.** This section is arranged by functional group code and provides a list of fuel system components to be maintained and step-by-step maintenance procedures.

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#### **6-15.** Injection Lines. (Sheet 1 of 6)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation e. Bleeding

#### **INITIAL SETUP**

<u>Applicable Configurations</u> <u>Personnel Required</u>

All Construction equipment repairer MOS 62B

Tools
General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177- TM 5-3805-261-10

7033)

Test Equipment Special Environmental Conditions
None

None <u>General Safety Instructions</u>

Materials/Parts None

Dry cleaning solvent,
Item 14, Appendix C Torques

Clean cloths, Item 39,
Appendix C

All fasteners are tightened to standard torques. Refer to

Caps Appendix E.

<u>Troubleshooting References</u>

None

Equipment Condition
TM 5-3805-261-10
Vehicle parked on level ground.

Parking/emergency brake applied.
Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-5 Engine compartment side panels and

doors removed.

Go to Sheet 2

# 6-15. Injection Lines. (Sheet 2 of 6)

#### **REMOVAL**

#### **CAUTION**

Injection nozzles must not be allowed to turn when disconnecting injection line assemblies. Hold injection nozzle with a wrench to prevent damage to nozzles.

- 1. Remove two screws (1) and four clamps (2) from injection line assemblies (5 and 6, Figure 6-33) in top of engine.
- 2. Remove screw (7) and two clamps (8).

#### NOTE

Cap all injection nozzles and injection pump ports to prevent contamination. Tag and cap all injection lines.

- **3.** Remove bolt (3), washer (4), and bracket (9) from cylinder head.
- **4.** Disconnect injection line assemblies (5 and 6) from injection nozzles.
- **5.** Remove injection line assemblies (5 and 6) from injection pump.
- **6.** Remove two screws (10) and four clamps (11) from injection line assemblies (14 and 15, Figure 6-35) on top of engine.

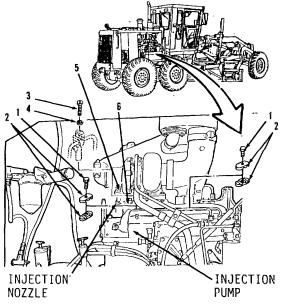


Figure 6-33.

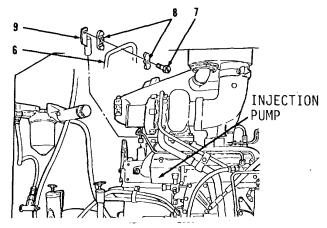


Figure 6-34.

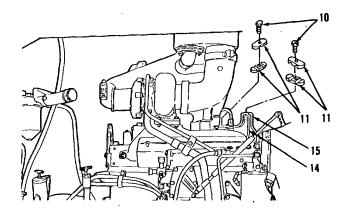


Figure 6-35.

# 6-15. Injection Lines. (Sheet 3 of 6)

#### **REMOVAL** (cont.)

- 7. Remove screw (12) and two clamps (13) from bracket (18) and injection line assembly (14, Figure 6-36).
- **8.** Disconnect injection line assemblies (14 and 15) from injection nozzles.
- **9.** Remove injection line assemblies (14 and 15) from injection pump.
- **10.** Remove bolt (16), washer (17) and bracket (18) from top of engine.

### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2

#### **INSTALLATION**

- 1. Install bracket (18), washer (17) and bolt (16, Figure 6-36) to top of engine.
- 2. Connect injection line assemblies (15 and 14) to injection nozzles on top of engine. Do not tighten injection line assemblies (15 and 14).
- 3. Install two clamps (13) on injection line assembly (14) and bracket (18).
- 4. Install screw (12).

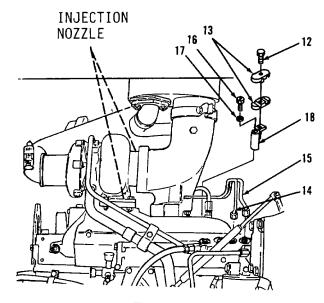


Figure 6-36.

# 6-15. <u>Injection Lines</u>. (Sheet 4 of 6)

### **INSTALLATION**

- **5.** Install four clamps (11) on injection line assemblies (15 and 14, Figure 6-35).
- 6. Install two screws (10).
- 7. Tighten injection line assemblies (15 and 14) at injection pump only.
- 8. Install bracket (9) and two clamps (8, Figure 6-34).
- 9. Install screw (7).
- **10.** Connect and tighten injection line assemblies (6 AND 5, Figure 6-33) to injection nozzles.
- 11. Install washer (4) and bolt (3).
- **12.** Tighten injection line assemblies (6 and 5) at injection pump.
- **13.** Install four clamps (2) and two screws (1) on injection line assemblies (6 and 5).

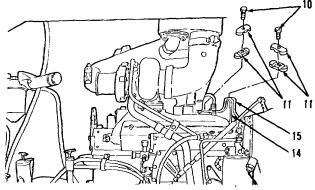


Figure 6-35.

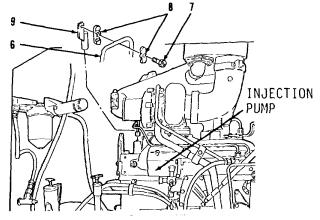
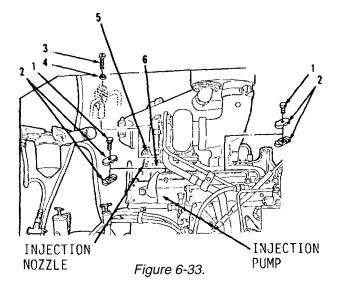


Figure 6-34.



Go to Sheet 5

## **6-15. Injection Lines.** (Sheet 5 of 6)

#### **BLEEDING**

#### NOTE

Injection lines must be bled one at a time in order, starting with line 1.

- 1. Loosen injection line assembly at injection nozzle.
- **2**. Turn knob on primary pump counterclockwise and pull out.
- 3. Pump until diesel fuel, free of air bubbles, flows from injection lines at injection nozzles.
- **4**. Tighten injection line I assembly at injection nozzle.
- 5. Repeat steps I thru 4 for the other three injection line assemblies making sure to bleed the lines in order.
- Push in on primary pump and turn knob clockwise to close.

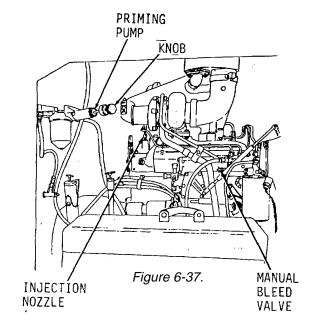
### NOTE

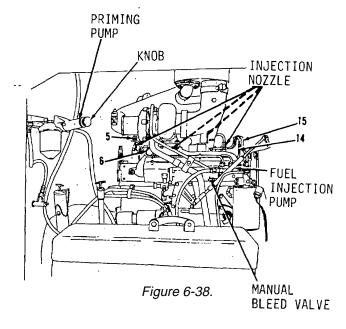
Return 130G Grader to original equipment condition.

#### **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

**7.** Start engine, Refer to TM 5-3805-261-10.





# 6-15. <u>Injection Lines.</u> (Sheet 6 of 6)

#### **BLEEDING**

**8.** Check injection line assemblies on right side of engine for leaks at fuel injection pump and injection nozzles.

# NOTE

If engine runs roughly after installing injection lines, perform steps 9 thru 11.

- **9.** Loosen injection line assemblies (5, 6, 14 and 15, Figure 6-38) from top of engine. Hold injection nozzle with a wrench when loosening line fittings.
- **10.** Bleed each injection line assembly one at a time by loosening fitting at injection nozzle. Repeat steps 1 thru 5.
- 11. Tighten line connection. Repeat procedure on remaining three line connections, one at a time. Do each injection line assembly two or three times or until no air is present.

End of Task

#### 6-16. Air Precleaner. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation 

#### **INITIAL SETUP**

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped.

Master disconnect switch off.

# 6-16. Air Precleaner. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Loosen nut (1) and bolt (2) from clamp (4) on hood (3, Figure 6-39) of air precleaner on top of engine compartment hood.
- 2. Remove hood (3) and clamp (4) from body (9).
- 3. Loosen two clamps (6, Figure 6-40).

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- **4.** Remove hose (5) and two clamps (6) from tube and body (9).
- 5. Loosen nut (7) and bolt (8).
- 6. Remove body (9) and clamp (10).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

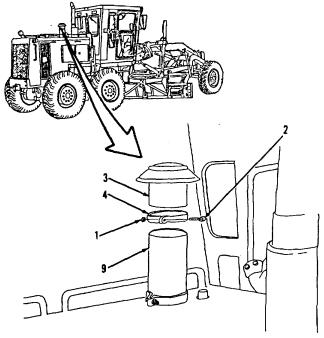


Figure 6-39.

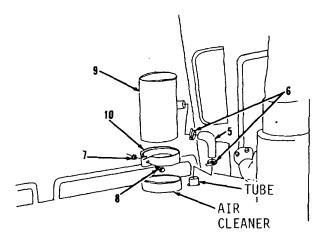


Figure 6-40.

Go to Sheet 3

# 6-16. Air Precleaner. (Sheet 3 of 3)

### **INSTALLATION**

- **1.** Install two clamps (6) and hose (5) on body (9, Figure 6-40).
- **2.** Install body (9) on air cleaner and connect hose (5) on tube.
- 3. Tighten bolt (8) and nut (7) in clamp (10). Tighten nut (7) to 18 ft-lb torque.
- **4.** Install clamp (4) and hood (3) on body (9, Figure 6-39).
- **5.** Tighten bolt (2) and nut (1). Tighten nut (1) to 18 ft-lb torque.

# NOTE

Return 130C Grader to original equipment condition.

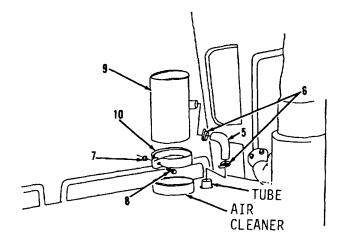


Figure 6-40.

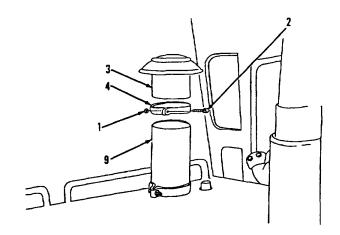


Figure 6-39.

End of Task

# 6-17. Primary and Secondary Element. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Detergent, Item 8, Appendix C Gasket cement, Item 61, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

Paragraph 6-12e.

Gasket, Item 3

**Equipment Condition** 

TM 5-3805-261-10

Engine lacks power.

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Left side engine door opened.

## **6-17. Primary Element.** (Sheet 2 of 4)

#### **REMOVAL**

- **1.** Open side engine compartment doors.
- 2. Loosen two eyebolts (1) from left side of engine compartment. Swing out eyebolts (1) and separate from clips on cover (2, Figure 6-41).
- 3. Remove cover (2) from air cleaner (5).

#### NOTE

Do not remove gasket unless inspection indicates replacement is necessary.

- **4.** Remove and discard gasket (3, Figure 6-42), if necessary. Remove all gasket material from mounting surfaces.
- **5.** Remove primary filter element (4) from center secondary element in air cleaner (5, Figure 6-43).
- **6.** Remove six nuts (6).
- **7.** Remove filter element (7) and gasket (8) from air cleaner (5).



Figure 6-42.

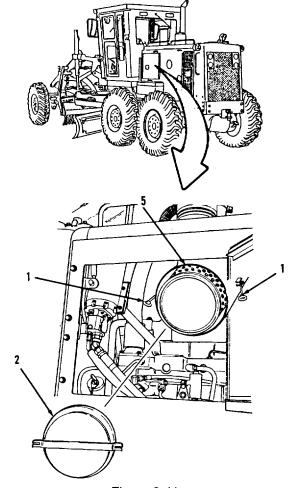


Figure 6-41.

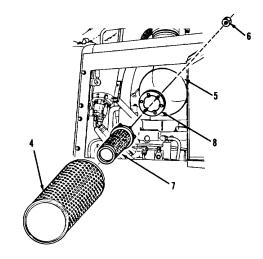


Figure 6-43.

## **6-17. Primary Element**. (Sheet 3 of 4)

### **CLEANING**

#### **WARNING**

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.)

- Clean filter element (4). Use compressed air. Directing the air pressure away from you, blow dirt outward from center and then direct air inward through filter screen to remove dirt.
- **2.** Clean all other parts. Refer to Chapter 2.

#### **INSPECTION**

#### **NOTE**

Manufacturer's specifications call for replacement of filter element after six cleanings and replacement of secondary filter after three cleanings of filter element. Refer to paragraph 6-12e.

Inspect all parts. Refer to Chapter 2.

Go to Sheet 4

# **6-17. Primary Element**. (Sheet 4 of 4)

#### **INSTALLATION**

- 1. Install gasket (8) and filter element (7) into air cleaner (5).
- 2. Install six nuts (6).'
- 3. Install filter element (4) in air cleaner (5, Figure 6-43) in left side of engine compartment.
- **4.** If removed, apply thin strip of gasket cement to new gasket (3, Figure 6-42) and install.
- 5. Install cover (2, Figure 6-41).
- **6.** Swing two eyebolts (1) over clips on cover (2).
- 7. Tighten two eyebolts (1) by hand only.
- **8.** Reset air cleaner indicator (6) by pushing in button on bottom of air cleaner indicator (6, Figure 6-44).

#### NOTE

- If air cleaner indicator shows red after performing this procedure, then replacement of primary and/or secondary filters may be necessary.
- Return 130G Grader to original equipment condition.

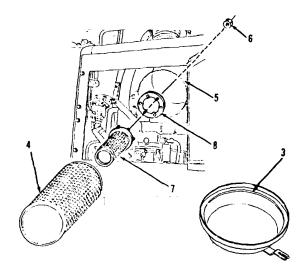


Figure 6-43.

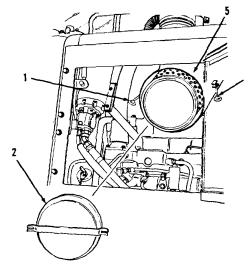


Figure 6-41.

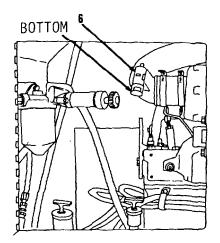


Figure 6-44.

#### 6-18. Air Cleaner Body (Sheet I of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP**

Applicable Configurations Personnel Required

Construction equipment repairer MOS 62B

Tools

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177-TM 5-3805-261-10

7033)

Test Equipment

None

**General Safety Instructions** None

Materials/Parts

Dry cleaning solvent,

Item 14, Appendix C

Clean cloths, Item 39, Appendix C

Gasket cement, Item 61, Appendix C

Gaskets, Items 2, 4

**Torques** 

None

Except for special torques shown, all fasteners are tightened to

standard torques. Refer to

Special Environmental Conditions

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-16 Air precleaner removed.

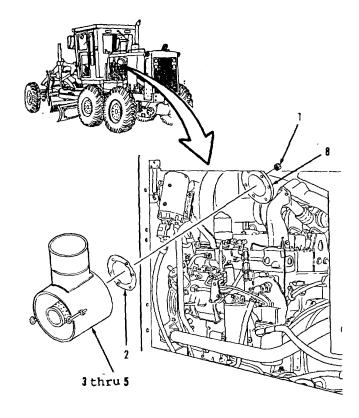
Paragraph 6-17 Primary and Secondary filter element removed.

Paragraph 13-5 Engine compartment side doors opened.

# **6-18. Air Cleaner**. (Sheet 2 of 3)

### **REMOVAL**

- **1.** Open engine side compartment door (Paragraph 13-5)
- **2.** Support items 3 thru 5 as an assembly (Figure 6-45) in top of engine.
- 3. Remove items 3 thru 5 as an assembly and gasket (2) from pipe (8). Discard gasket (2). Remove all gasket material from mounting surfaces.
- **4.** Remove two eyebolts (5) and nuts (6) from body (7).



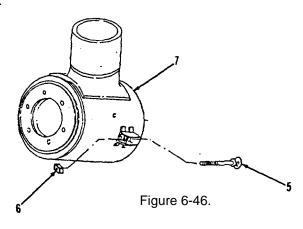
### **CLEANING**

Clean all parts. Refer to Chapter 2.

### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

Figure 6-45.



# **6-18. Air Cleaner.** (Sheet 3 of 3)

# **INSTALLATION**

- 1. Install two eyebolts (5) and nuts (6) in body (7).
- 2. Install new gasket (2, Figure 6-45).
- 3. Install items 5 thru 3 as an assembly on pipe (8).
- **4.** Install six nuts (1). Tighten six nuts (1) to 20 ft-lb torque.

# NOTE

Return 130G Grader to original equipment condition.

End of Task

#### 6-19. Turbocharger Air Lines. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Wood blocks Hoist and sling

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Detergent, Item 8, Appendix C Anti-seize compound, Item 59, Appendix C Gaskets, Items 6, 12 Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer *to* 

Appendix E.

Troubleshooting References

None

Caps

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied.

Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-5 Engine compartment side panels and

doors removed.

Paragraph 16-4 Air cleaner indicator removed.

# 6-19. Turbocharger Air Lines. (Sheet 2 of 4)

#### **REMOVAL**

- **1.** Remove bolt (1, Figure 6-47) from top, left side of engine.
- 2. Remove clamp (2) from elbow (5).
- 3. Remove three bolts (3).

#### **WARNING**

Use adequate hoist and sling to perform this task. Failure to do so may cause INJURY. If you are injured, seek medical aid immediately.

- **4.** Support air cleaner using wood blocks or suspend with hoist and sling.
- **5.** Remove three bolts (4).
- 6. Loosen two clamps (7).
- 7. Remove elbow (5) from turbocharger.
- **8.** Remove and discard gasket (6). Remove all gasket material from mounting surfaces.

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 9. Remove two clamps (7) and hose (8).
- 10. Remove plug (9) from elbow (5).

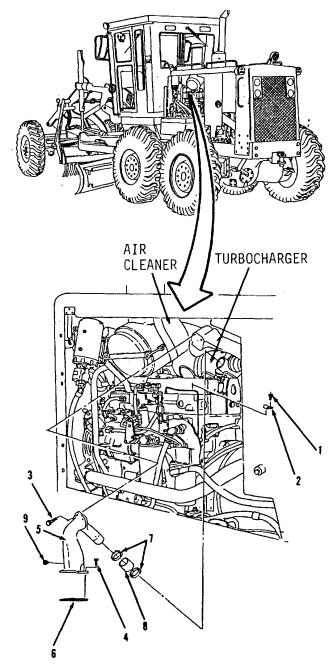


Figure 6-47.

# **6-19.** Turbocharger Air Lines. (Sheet 3 of 4)

# **REMOVAL** (cont.)

- **11.** Remove six nuts (10, Figure 6-48) from right side of air cleaner.
- 12. Loosen two clamps (13).
- **13.** Remove pipe (11) and gasket (12) from turbocharger. Discard gasket (12). Remove all gasket material from mounting surfaces.
- **14.** Remove two clamps (13) and hose (14).

### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- **1.** Install hose (14, Figure 6-48) in turbocharger.
- 2. Install two clamps (13).
- **3.** Install new gasket (12) and pipe (11) on air cleaner.
- **4.** Install six nuts (10). Tighten six nuts (10) to 20 ft-lb torque.
- 5. Tighten two clamps (13).

Go to Sheet 4

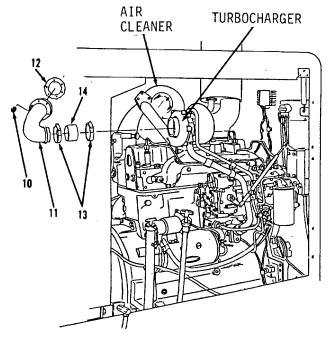


Figure 6-48.

# **6-19.** Turbocharger Air Lines. (Sheet 4 of 4)

#### **INSTALLATION**

- **6.** Using anti-seize compound, coat threads of plug (9, Figure 6-47) and install in elbow (5).
- 7. Install hose (8) on turbocharger.
- **8.** Install *two* clamps (7). Do not tighten.
- 9. Install new gasket (6) and elbow (5) in hose (8).
- **10.** Install three bolts (4).
- 11. Install three bolts (3) in elbow (5).
- **12.** Install clamp (2) with tube assembly on elbow (5).
- **13.** Install bolt (1).
- **14.** Tighten two clamps (7).

### NOTE

Return 130G Grader to original equipment condition.

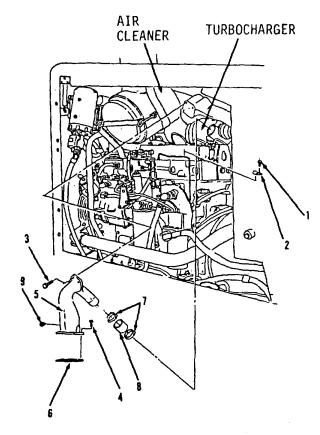


Figure 6-47.

End of Task

#### **6-20.** Turbocharger. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP**

**Applicable Configurations** 

All

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033) Torch

Test Equipment

None

Materials/Parts

Dry cleaning solvent,
Item 14, Appendix C
Clean cloths, Item 39,
Appendix C
Small tags, Item 41, Appendix C
Detergent, Item 8, Appendix C
Anti-seize compound,
Item 59, Appendix C

Gasket, Item 6 Caps

Caps Plugs Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

.....

# Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied.

Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-10 Turbocharger oil lines removed.

Paragraph 6-19 Turbocharger air lines removed.

Paragraph 6-21 Turbocharger exhaust elbow removed.

Paragraph 13-5 Engine compartment side panels and

doors removed.

# **6-20.** Turbocharger. (Sheet 2 of 3)

#### **REMOVAL**

1. Remove three nuts (1), bolts (2), bolt (3) and nut (4, Figure 6-50).

### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

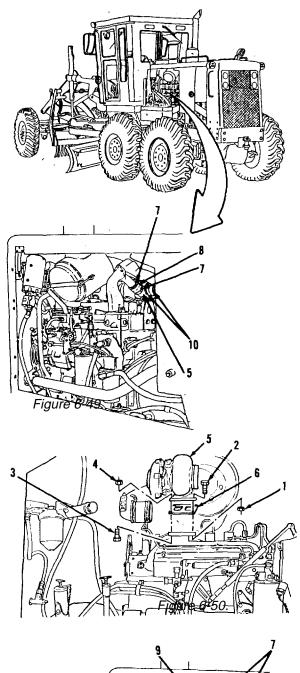
- 2. Remove turbocharger (5) and gasket (6). Discard gasket (6). Remove all gasket material from mounting surfaces.
- 3. Remove two clamps (7) and hose (8) from elbow (9, Figure 6-51).
- 4. Remove two clamps (10) and hose (11) from pipe (12).

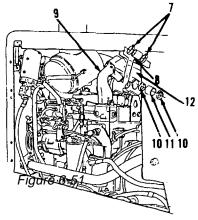
#### **CLEANING**

Clean all parts. Refer to Chapter 2.

# **INSPECTION**

Inspect all parts. Refer to Chapter 2.





# **6-20. Turbocharger**. (Sheet 3 of 3)

# **INSTALLATION**

- 1. Install hose (11) on pipe (12, Figure 6-51) on top, right side of engine.
- 2. Install two clamps (10).
- 3. Install elbow (9), hose (8) and two clamps (7).
- 4. Install new gasket (6) and turbocharger (5). Slide turbocharger (5) into hose (11, Figure 6-50).
- Coat threads of nut (4), bolt (3), three bolts
   (2) and nuts (1) with anti-seize compound and install. Tighten bolts (3 and 2) to 40 ft-lb torque.

### **NOTE**

Return 130G Grader to original equipment condition.

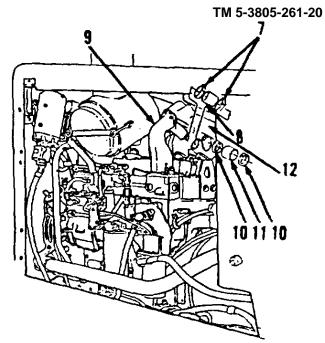


Figure 6-51.

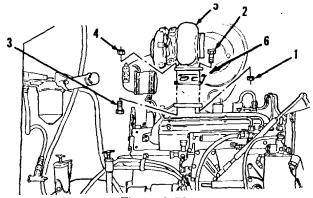


Figure 6-50.

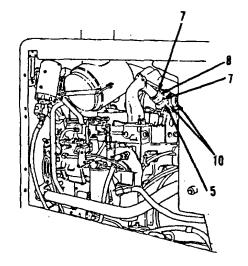


Figure 6-49.

End of Task

## 6-21. Turbocharger Exhaust Elbow. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

All

Personnel Required

Construction equipment
repairer MOS 62B

**Tools** 

General Mechanic's Tool Kit: References
Automotive (NSN 5180-00-177- TM 5-3805-261-10

7033)

Test Equipment

None

General Safety Instructions

Special Environmental Conditions

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39,

Appendix C Anti-seize compound, Item 59,

Appendix C

**Torques** 

None

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-32 Exhaust pipe and muffler removed.

Go to Sheet 2

# **6-21. Turbocharger Exhaust Elbow.** (Sheet 2 of 2)

#### **REMOVAL**

- 1. Remove three nuts (1), two bolts (2) and bolt (3, Figure 6-52) from upper, right side of engine.
- 2. Remove elbow (4) from turbocharger.
- 3. Remove ring (5), coupling (6) and ring (7) from turbocharger.

### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

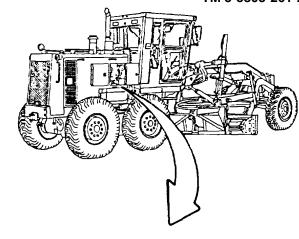
Inspect all parts. Refer to Chapter 2.

### **INSTALLATION**

- 1. Install ring (7), coupling (6) and ring (5, Figure 6-52) in turbocharger.
- 2. Install elbow (4) on turbocharger.
- 3. Coat threads of bolt (3) and two bolts (2) with anti-seize compound.
- Install bolt (3), two bolts (2) and three nuts (1). Tighten bolt (3) and two bolts (2) to 32 ft-lb torque.

# **NOTE**

Return 130G Grader to original equipment condition.



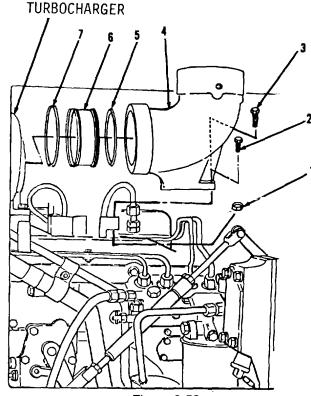


Figure 6-52.

End of Task

# 6-22. Fuel Tank Hoses, Lines and Fittings. (Sheet 1 of 6)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41,

Small tags, Item 41, Appendix C

Preformed packings, Items 8,

10, 12, 28, 30 Strap, Item 13 Caps

Caps Plugs Diesel fuel Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-24

Paragraph 13-5

Fuel tank drained.

Right engine side door assembly

removed.

Go to Sheet 2

# 6-22. Fuel Tank Hoses, Lines and Fittings. (Sheet 2 of 6)

#### **REMOVAL**

# WARNING FUEL UNDER PRESSURE

Wear safety goggles to protect eyes when disconnecting fuel lines. If fuel makes contact with eyes or skin, flush with large amounts of cold water and seek medical aid immediately.

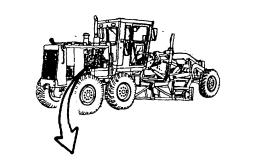
1. Remove nut (1), washer (2), bolt (3), washer (4) and two clips (5) from tube assembly (6, Figure

6-53).

#### **NOTE**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open fuel ports to prevent contamination.

- 2. Remove tube assembly (6).
- 3. Disconnect hose assembly (20) from elbow (9).
- 4. Remove elbow (7), preformed packing (8), elbow (9) and preformed packing (10, Figure 6-54). Discard preformed packings (8 and 10).
- 5. Disconnect hose assembly (23) from elbow (11).
- 6. Remove elbow (11) and preformed packing (12) from fuel transfer pump. Discard preformed packing (12).



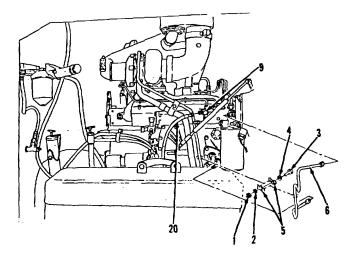


Figure 6-53.

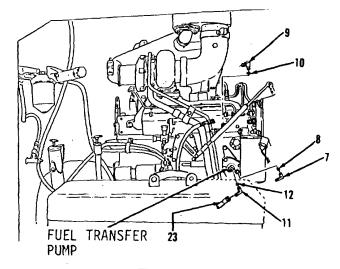


Figure 6-54.

# 6-22. Fuel Tank Hoses, Lines and Fittings. (Sheet 3 of 6)

#### **REMOVAL**

- 7. Remove and discard strap (13) from hose assemblies (20 and 23, Figure 6-55).
- 8. Remove bolt (14), washer (15) and clip (16) from hose assembly (17).
- 9. Remove hose assembly (17, Figure 6-56).
- 10. Remove elbow (18) and bushing (19) from fuel tank.
- 11. Remove hose assembly (20).
- 12. Remove elbow (21).
- 13. Remove hose assembly (22) and connector (23).

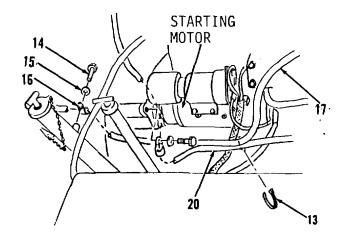


Figure 6-55.

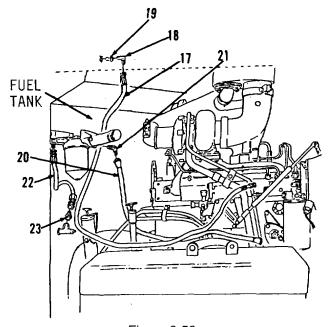


Figure 6-56.

# **6-22** Fuel Tank Hoses, Lines and Fittings. (Sheet 4 of 6)

#### **REMOVAL** (cont)

- 14. Remove elbow (24), preformed packing (25), adapter (26) and preformed packing (27, Figure 6-57). Discard preformed packings (25 and 27).
- 15. Remove valve (28) from fuel tank.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### INSPECTION

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install valve (28, Figure 6-57) in fuel tank.
- 2. Lubricate threaded bore in fuel filter with clean diesel fuel before installing adapter (26). Install new preformed packing (27), adapter (26), new preformed packing (25) and elbow (24).
- 3. Install connector (23) in valve (28, Figure 6-56).
- 4. Install hose assembly (22).
- 5. Install elbow (21).
- 6. Install hose assembly (20) on elbow (21).
- 7. Install bushing (19) and elbow (18) in fuel tank.
- 8. Install hose assembly (17).

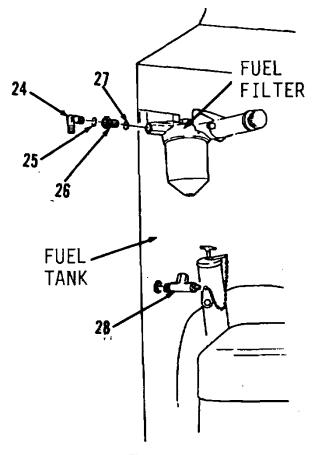


Figure 6-57.

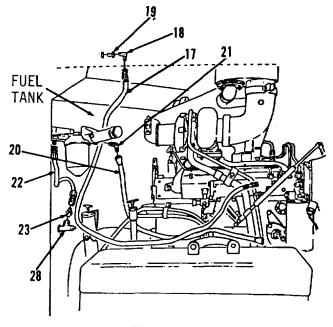


Figure 6-56.

# 6-22. Fuel Tank Hoses, Lines and Fittings. (Sheet 5 of 6)

### **FUEL SYSTEM MAINTENANCE.**

#### **INSTALLATION**

- 9. Install clip (16), washer (15) and bolt (14, Figure 6-55).
- 10 Install new strap (13) around hose assemblies (20 and 17).
- 11. Lubricate threaded bores of fuel transfer pump with clean diesel fuel before installing elbows (11 and 7, Figure 6-54).
- 12. Install new preformed packing (12), elbow (11), new preformed packing (8) and elbow (7) in fuel transfer pump.
- 13. Lubricate threaded bore of fuel injection pimp with clean diesel fuel before installing elbow (9).
- 14. Install new preformed packing (10) and elbow (9) in fuel injection pump.
- 15. Connect hose assembly (20) to elbow (11) in fuel transfer pump.

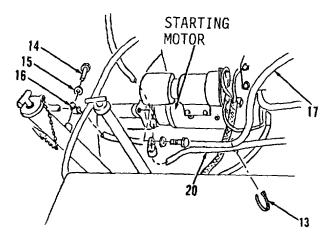


Figure 6-55.

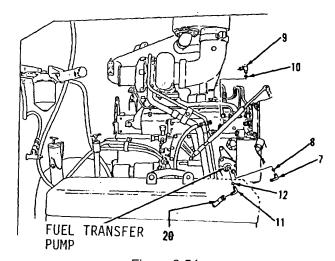


Figure 6-54.

Go to Sheet 6

## **6-22.** Fuel Tank Hoses, Lines and Fittings. (Sheet 6 of 6)

## **INSTALLATION** (cont)

- 16. Connect hose assembly (17) on elbow (9, Figure 6-53).
- 17. Install tube assembly (6).
- 18. Install two clips (5), washer (4), bolt (3), washer (2) and nut (1).
- 19. Bleed all lines. Refer to paragraph 6-15.

# NOTE Return 130G Grader to original equipment condition.

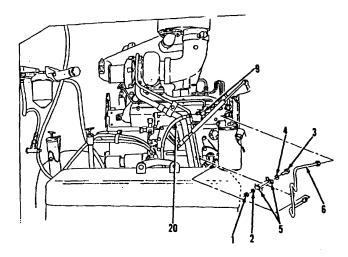


Figure 6-53.

End of Task

## **6-23.** Fuel Tank Cap Assembly. (Sheet 1 of 3)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

.....

**INITIAL SETUP:** 

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Two gaskets, Items 2 and

Two gaskets, Items 2 and 6 Two elements, Item 7

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

## 6-23. Fuel Tank Cap Assembly. (Sheet 2 of 3)

#### **REMOVAL**

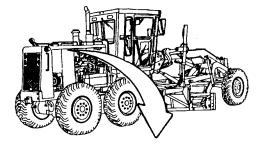
- 1. Remove items 1 thru 7 as an assembly (Figure 6-58) from filler neck of tank on top, left rear of vehicle.
- Remove cap (1) and gasket (2, Figure 6-59). Discard gasket (2). Remove all gasket material from mounting surfaces.
- 3. Remove screw (3).
- 4. Remove washer (4).
- 5. Remove baffle (5).
- 6. Remove and discard gasket (6). Remove all gasket material from mounting surfaces.
- 7. Remove and discard elements (7).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.



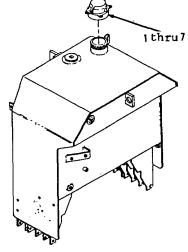


Figure 6-58.

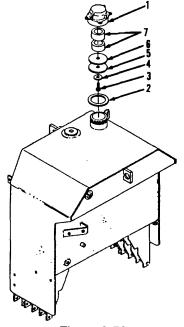


Figure 6-59.

## **6-23.** Fuel Tank Cap Assembly. (Sheet 3 of 3)

#### **INSTALLATION**

- 1. Turn cap (1) upside down on level surface and install two new elements (7, Figure 6-59).
- 2. Install new gasket (6) and baffle (5).
- 3. Install washer (4) and screw (3).
- 4. Install new gasket (2) inside cap (1).
- 5. Install items 7 thru 1 (Figure 6-58) as an assembly on filler neck of tank on top left rear of vehicle.

NOTE
Return 1300 Grader to original equipment condition.

End of Task

#### 6-24. Fuel Tank. (Sheet 1 of 8)

a. Removal This task covers: b. Cleaning c. Inspection

d. Installation 

#### **INITIAL SETUP:**

Applicable Configurations

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033) Hoist and sling Wood blocks

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Detergent, Item 8, Appendix C

Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

Go to Sheet 2

## **6-24. Fuel Tank**. (Sheet 2 of 8)

## **Troubleshooting References**

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-25 Primary fuel filter/primary pump and

mounting removed.

Paragraph 6-28 Ether aid start assembly removed.

Paragraph 7-6 Alternator mounting removed.

Paragraph 13-4 Engine hood assembly removed.

Paragraph 13-5 Engine compartment side panels removed.

Go to Sheet 3

## **6-24. Fuel Tank**. (Sheet 3 of 8)

#### **REMOVAL**

#### **WARNING**

Diesel fuel is a highly flammable liquid. Do not smoke or allow open flames or sparks near work area. Perform this procedure in a well ventilated area. Failure to follow this warning may cause INJURY. Wear protective goggles and clothing when working with diesel fuel. If contact with eyes or skin is made, flush with large amounts of cold water and seek medical aid immediately.

#### NOTE

A large suitable container will be necessary for the draining of diesel fuel from the tank.

- 1. Drain fuel tank (28, Figure 6-60).
- 2. Drain coolant in radiator (29). Refer to paragraph 6-49.
- 3. Remove plunger (1), ring (2) and strainer (3) from top, left side of fuel tank.
- 4. Remove plug (4).

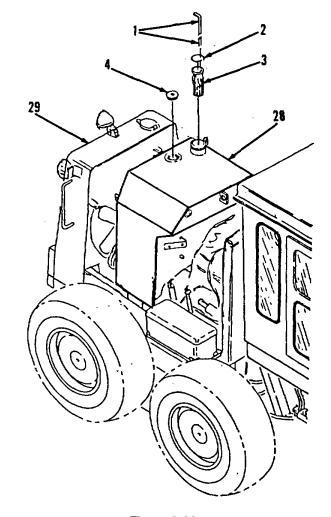


Figure 6-60.

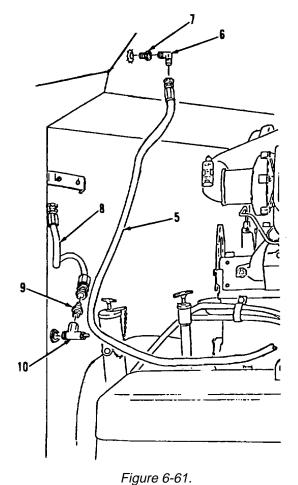
## 6-24. Fuel Tank. (Sheet 4 of 8)

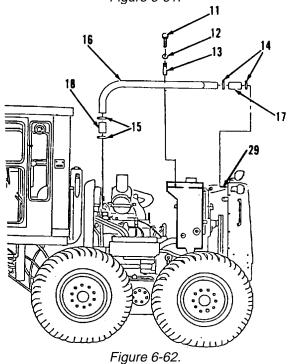
#### **REMOVAL**

#### **NOTE**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 5. Disconnect hose assembly (5, Figure 6-61) in front, upper right side of fuel tank.
- 6. Remove elbow (6) and bushing (7).
- 7. Remove hose assembly (8) from lower, right side of fuel tank.
- 8. Remove connector (9) and valve (10).
- 9. Remove bolt (11), washer (12) and clip (13, Figure 6-62) from tube (16) in front, top left side of fuel tank.
- Loosen two clamps (14) in front, top left side of radiator.
- 11. Disconnect hose (17) by sliding off neck of radiator (29).
- 12. Remove two clamps (14).
- 13. Loosen two clamps (15) from front, top of engine.
- 14. Disconnect hose (18) by sliding off neck of temperature regulator housing.
- 15. Remove two clamps (15).
- 16. Remove tube (16) from vehicle.
- 17. Remove hoses (17 and 18) from tube (16).





## **6-24. Fuel Tank**. (Sheet 5 of 8)

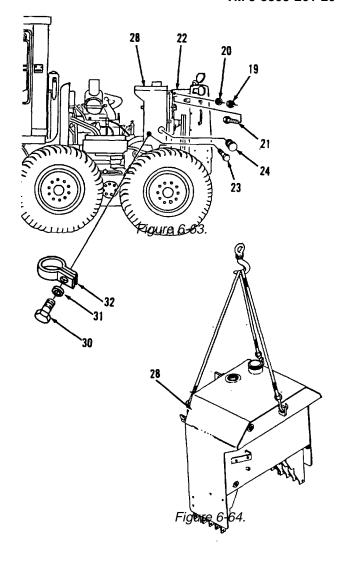
#### **REMOVAL** (cont)

- 18. Remove two nuts (19), washers (20) and bolts (21) from center, top rear of fuel tank (28, Figure 6-63).
- 19. Remove nut (19), washer (20), bolt (21) and plate (22) from front, upper inside of radiator support.
- 20. Remove bolt (23) and plug (24) from left side of fuel tank (28).

#### **WARNING**

Weight of fuel tank is approximately 325 lbs. Use adequate hoist and sling to perform this task. Failure to do so could result in SEVERE INJURY. If you are injured, seek medical aid immediately.

- 21. Remove bolt (30), washer (31) and clamp (32) from fuel tank (28).
- 22. Attach hoist and sling to fuel tank (28, Figure 6-64). Tank up slack on sling.
- 23. Remove three nuts (25), six washers (26) and three bolts (27, Figure 6-65) from lower sides of fuel tank (28).
- 24. Using hoist and sling, lift fuel tank (28) up six inches and remove from vehicle.
- 25. Support fuel tank (28) on suitable wood blocks.
- 26. Remove hoist and sling.



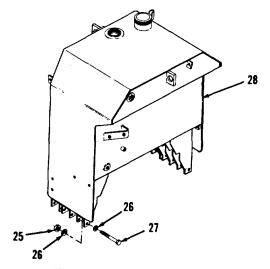


Figure 6-65.

## **6-24. Fuel Tank**. (Sheet 6 of 8)

#### **CLEANING**

- Steam clean fuel tank (28). Dry thoroughly with compressed air.
- 2. Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

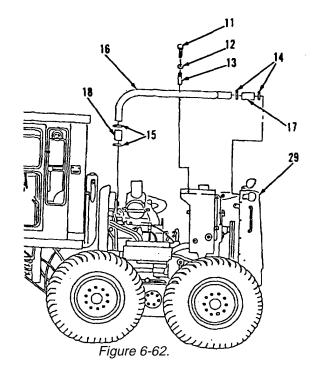
- 1 Attach hoist and sling to fuel tank (28, Figure 6-64) and position on vehicle.
- 2. Install fuel tank (28) on mounting, aliening mounting holes with prybar.
- 3. Remove hoist and sling.
- 4. Install three bolts (27), six washers (26) and three nuts (25, Figure 6-65) on lower, left and right sides of fuel tank.
- 5. Install clamp (32), washer (31) and bolt (30) to fuel tank (28).
- 6. Install plug (24) and bolt (23, Figure 6-63) on left side of fuel tank (28). Tighten bolt (23) to 15 ft-lb torque.
- 7. Position plate (22) on front, upper inside of radiator support.
- 8. Install bolt (21), washer (20) and nut (19).
- 9. Install two bolts (21), washers (20) and nuts (19) on center, top rear of fuel tank securing plate (22) to fuel tank (28).

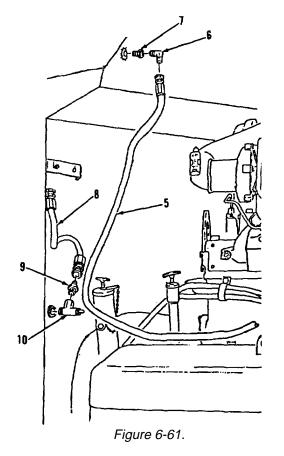
Go to Sheet 7

## **6-24. Fuel Tank**. (Sheet 7 of 8)

## **INSTALLATION** (cont)

- 10. Install hoses (18 and 17, Figure 6-62) on tube (16) in top of engine compartment.
- 11. Position two clamps (15 and 14) on tube (16).
- 12. Position tube (16) from radiator to temperature regulator housing.
- 13. Install hose (18) in front, top of engine, sliding over temperature regulator housing.
- 14. Tighten two clamps (15).
- 15. Install hose (17) in front, left top of radiator, sliding over neck of radiator (29).
- 16. Tighten two clamps (14).
- 17. Install clip (13), washer (12) and bolt (11) in front, left top of engine, securing tube (16) to fuel tank (28).
- 18. Install valve (10) and connector (9, Figure 6-61) in front, lower right side of fuel tank (28).
- 19. Connect hose assembly (8).
- 20. Install bushing (7) and elbow (6) in front, upper right side of fuel tank (28).
- 21. Install hose assembly (5).





# **6-24. Fuel Tank**. (Sheet 8 of 8)

## **INSTALLATION**

- 22. Install plug (4, Figure 6-60) in top of fuel tank (28).
- 23. Install strainer (3), ring (2) and plunger (1).

## NOTE

Return 130G Grader to original equipment condition.

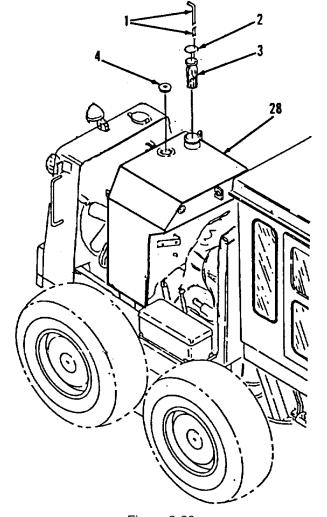


Figure 6-60.

End of Task

#### Primary Fuel Filter/Priming Pump and Mounting. (Sheet 1 of 5) 6-25.

a. Removal b. Cleaning This task covers: c. Inspection

d. Installation 

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

Pan, Drain Pliers, Snap Ring

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Preformed packings, Items 5, 8, 10

Gaskets, Items 15, 27

Element, Item 14 Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to Appendix E.

## Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

## 6-25. Primary Fuel Filter/Priming Pump and Mounting. (Sheet 2 of 5)

#### **REMOVAL**

#### **WARNING**

Diesel fuel is a highly flammable liquid. Do not smoke or allow open flames or sparks near work area. Perform this procedure in a well ventilated area. Failure to follow this warning may cause INJURY. Wear protective goggles and clothing when working with diesel fuel. If contact with eyes or skin is made, flush with large amounts of cold water and seek medical aid immediately.

#### NOTE

If changing filter do only steps 1-3.

 Turn valve (1, Figure 6-66) in front, lower right side of fuel tank, clockwise to shut off fuel.

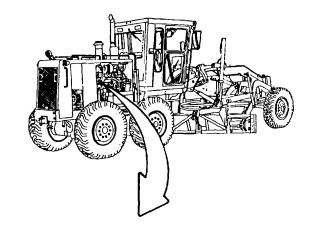
#### **NOTE**

Put pan underneath fittings when breaking a connection.

#### **NOTE**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 2. Hold nut (20).
- 3. Loosen case (13, Figure 6-68) by turning counterclockwise and remove.
- Disconnect hose assembly (2) in front, side of fuel tank.



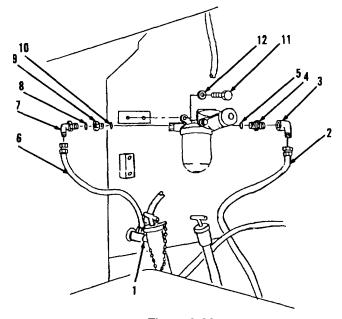
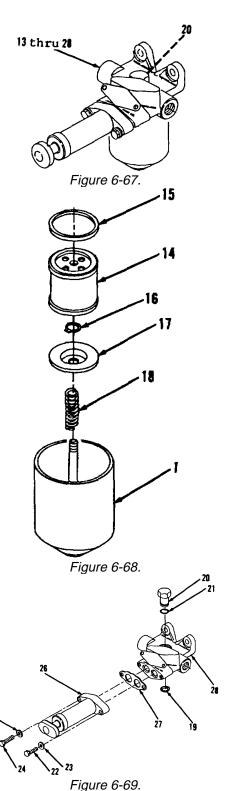


Figure 6-66.

## 6-25. Primary Fuel Filter/Priming Pump and Mounting. (Sheet 3 of 5)

#### **REMOVAL** (cont)

- 5. Remove elbow (3), connector (4) and preformed packing (5). Discard preformed packing (5).
- 6. Disconnect hose assembly (6).
- 7. Remove two bolts (11) and washers (12).
- 8. Remove items 13 thru 28 as an assembly (Figure 6-67) from front, right side of fuel tank.
- 9. Drain fuel left in filter into pan.
- 10. Remove elbow (7), preformed packing (8), adapter (9) and preformed packing (10). Discard preformed packings (8 and 10).
- 11. Remove and discard element (14) and gasket (15) from case (13). Remove all gasket material from mounting surfaces.
- 12. Compress spring (13) pressing on retainer (17).
- 13. Remove ring (16).
- 14. Remove retainer (17) and spring (18).
- 15. Remove ring (19) from nut (20), Figure 6-69).
- 16. Remove nut (20) and preformed packing (21). Discard preformed packing (21).
- 17. Remove bolts (22), washer (23), bolt (24) and washer (25).
- Separate priming pump (26) and gasket (27) from base (28). Discard gasket (27). Remove all gasket material from mounting surfaces.



## 6-25. Primary Fuel Filter/Priming Pump and Mounting. (Sheet 4 of 5)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Position new gasket (27) and priming pump (26) on base (28, Figure 6-69).
- 2. Install washer (25), bolt (24), washer (23) and bolt (22).
- 3. Install new preformed packing (21) and nut (20).
- 4. Install ring (19) in groove of nut (20).
- 5. Install spring (18) and retainer (17, Figure 6-68).
- 6. Compress spring (18) pressing on retainer (17).
- 7. Install ring (16) in groove of case (13) stub.
- 8. Install new gasket (15) in case (13).
- 9. Install new element (14) in case (13).

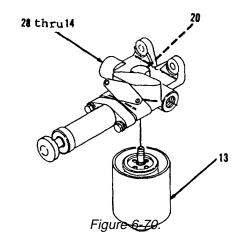
## 6-25. Primary Fuel Filter/Priming Pump and Mounting. (Sheet 5 of 5)

## **INSTALLATION** (cont)

- Install new preformed packing (10), adapter
   new preformed packing (8) and elbow
   (7).
- 11. Install items 28 thru 13 as a assembly (Figure 6-67) in front, right side of fuel tank.
- 12. Install two washers (12) and bolts (11, Figure 6-66).
- 13. Connect hose assembly (2).
- 14. Install new preformed packing (5), connector (4) and elbow (3).
- 15. Connect hose assembly (6).
- 16. Install case (13) on items 28 thru 14 as an assembly (Figure 6-70).
- 17. Tighten nut (20) to 18 ft-lb torque.
- 18. Turn valve (1) in front, lower right side of fuel tank counter-clockwise to open.
- 19. Bleed air from fuel line system and check for leaks, refer to paragraph 6-15.

#### NOTE

Return 130G Grader to original equipment condition.



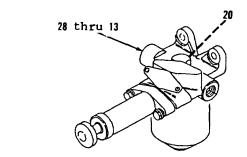


Figure 6-67.

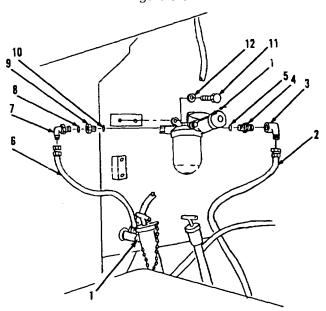


Figure 6-66.

End of Task

## 6-26. Secondary Fuel Filter and Mounting. (Sheet 1 of 5)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Pan, Drain Strap Style, Pipe Wrench

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39,

Appendix C Small tags, Item 41, Appendix C

Thread sealant, Item 60,

Appendix C

Preformed packings, Items 4,

10

Gasket, Item 8 Filter, Item 5

Caps Plugs Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

-

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-94 Fuel pressure switch removed.

(Not necessary if just replacing element)

Go to Sheet 2

## **6-26.** Secondary Fuel Filter and Mounting. (Sheet 2 of 5)

#### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open fuel ports to prevent contamination.

- Turn valve on lower right side of fuel tank clockwise to shut off fuel.
- 2. Remove and discard filter (5).
- 3. Disconnect tube assembly (1, Figure 6-71) from rear, right side of engine.
- 4. Loosen elbow (3) from base.
- 5. Remove elbow (2) from elbow (3).
- 6. Remove elbow (3) and preformed packing (4). Discard preformed packing (4).
- 7. Remove two bolts (6) and washers (7, Figure 6-72).
- Remove items 9 thru 13 as an assembly and gasket (8). Discard gasket (8). Remove all gasket material from mounting surfaces.
- Remove plug (9) and preformed packing (10, Figure 6-73) from items 11 thru 13 as an assembly. Discard preformed packing (10).

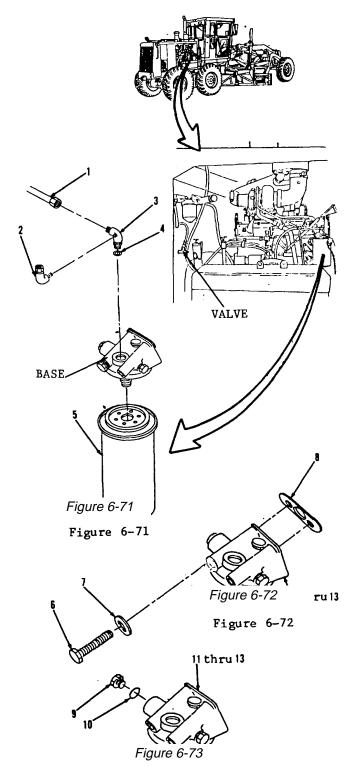


Figure 6-73

#### 6-26. Secondary Fuel Filter and Mounting. (Sheet 3 of 5)

#### **REMOVAL**

10. Remove plug (11, Figure 6-74).

#### NOTE

Remove stud only if inspection indicates replacement is necessary.

11. Remove stud (12), if necessary from base (13).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Coat threads of stud (12) with thread sealant and install in base (13, Figure 6-75), if removed. Tighten stud (12) to 50 ft-lb torque.
- 2. Install plug (11).
- Install new preformed packing (10) and plug 3. (9)to items 11 thru 13 as an assembly.
- 4. Install new gasket (8) and items 13 thru 9 as an assembly (Figure 6-76).

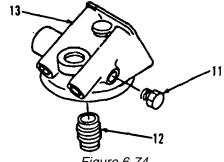


Figure 6-74.

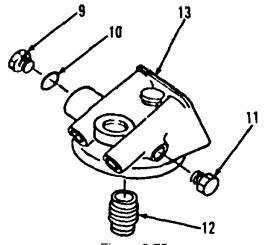


Figure 6-75.

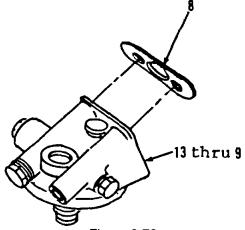


Figure 6-76.

## **6-26.** Secondary Fuel Filter and Mounting. (Sheet 4 of 5)

## **INSTALLATION** (cont)

- 5. Install two washers (7) and bolts (6, Figure 6-77).
- 6. Lubricate new filter (5) with clean diesel fuel and install, turning until contact between filter seal and base (13) is made. Tighten an additional 3/4 turn.
- 7. Lubricate bore of base (13) with clean diesel fuel.
- 8. Install new preformed packing (4) and elbow (3) loosely.
- 9. Install elbow (2).
- 10. Tighten elbow (3).
- 11. Install tube assembly (1).
- 12. Install fuel pressure switch. Refer to paragraph 7-94.
- 13. Turn priming pump knob on rear, right side of fuel tank counter-clockwise to release pump knob.
- 14. Pump until pressure makes knob hard to pump.
- 15. Turn knob clockwise to lock in place.
- 16. Turn fuel injection pump valve on rear, right side of engine counterclockwise to open allowing air to release thru hose outlet at lower part of engine. Close valve.

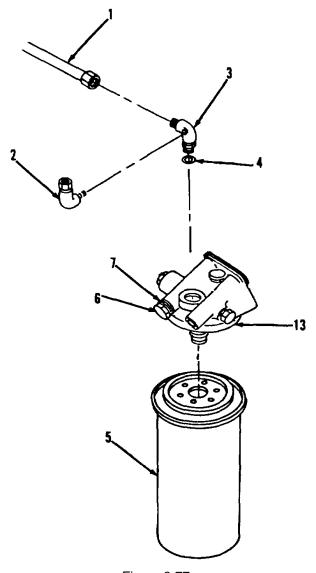


Figure 6-77.

Go to Sheet 5 **6-100** 

## **6-26.** Secondary Fuel Filter and Mounting. (Sheet 5 of 5)

#### **INSTALLATION**

#### NOTE

Repeat steps 15 thru 17 until fuel, flowing thru drain hose, is free of all air bubbles.

- 17. Start engine. Refer to TM 5-3805-261-10.
- 18. Check filter, lines and fittings on front, right side of engine for leaks.

#### **NOTE**

If engine is running roughly, proceed to the next step.

19. Bleed air from fuel injection pump lines in top of fuel injection pump. Refer to paragraph 6-15.

#### NOTE

Return 130G Grader to original equipment condition.

End of Task

## **6-27.** Ether Starting Aid Cylinder. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations
All
Personnel Required
Construction equipment

repairer MOS 62B Tools

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177- TM 5-3805-261-10 7033)

Test Equipment Special Environmental Conditions
None

None
General Safety Instructions

Materials/Parts None

Dry cleaning solvent,
Item 14, Appendix C Torques

Clean cloths, Item 39,
Appendix C
Appendix C
Appendix C
All fasteners are tightened to standard torques. Refer to

Ether starting aid cylinder Appendix E.

## Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-49 Right screen door removed.

Go to Sheet 2

## **6-27.** Ether Starting Aid Cylinder. (Sheet 2 of 2)

#### **REMOVAL**

#### WARNING

Starting fluid is toxic and highly flammable. Container is pressurized to act as an expellent. Do not heat container. Do not discharge ether in confined areas or near an open flame. Failure to follow this procedure may cause INJURY.

- 1. Loosen wing nut and clamp (Figure 6-78) behind right fan guard.
- Remove and discard ether starting aid cylinder by turning counter-clockwise.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### INSPECTION

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install new ether starting aid cylinder (Figure 6-78) by turning clockwise.
- 2. Tighten clamp and wing nut.

#### NOTE

Return 130G Grader to original equipment condition.

End of Task

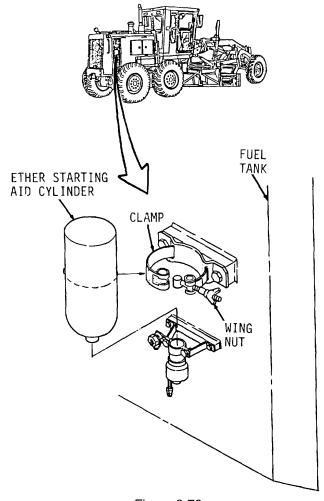


Figure 6-78.

#### Ether Starting Aid Assembly. (Sheet 1 of 4) 6-28.

a. Removal This task covers: b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations Construction equipment

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Detergent, Item 8, Appendix C Small tags, Item 41, Appendix C

Personnel Required

repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

Caps

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-27 Ether starting aid cylinder removed.

Paragraph 6-49 Right screen door removed.

Go to Sheet 2

#### Ether Starting Aid Assembly. (Sheet 2 of 4) 6-28.

#### **REMOVAL**

Remove two bolts (1), washers (2) and clamp (3, Figure 6-79) in rear, right side of fuel tank.

#### NOTE

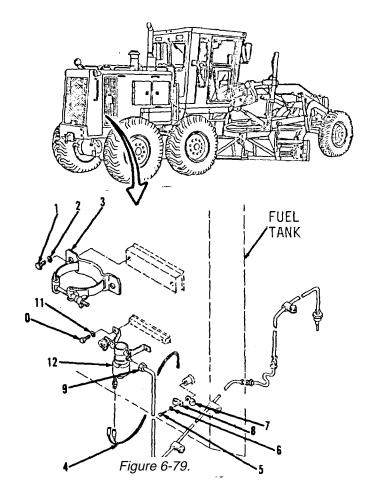
ΑII wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- Disconnect harness assembly (4) from valve (12).
- 3. Remove bolt (5), washer (6) and clips (7 and 8) from tube (19).
- Remove connector (9) and tube (19) from valve (12).

#### NOTE

Do not remove connector from tube unless inspection shows need for replacement.

- 5. Remove connector (9) from tube (19).
- 6. Remove two bolts (10), washers (11) and valve (12).
- Remove bolt (13), washer (14) and clip (15, Figure 6-80) from right rear, under fuel tank.
- Remove bolt (16), washer (17) and clip (18) from left front, under fuel tank.



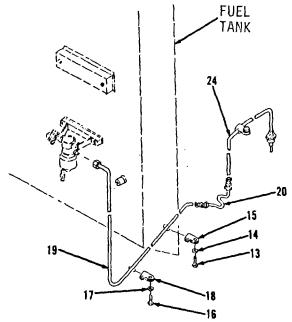


Figure 6-80.

Go to Sheet 3

## **6-28.** Ether Starting Aid Assembly. (Sheet 3 of 4)

## **REMOVAL** (cont)

## **NOTE**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 9. Disconnect tube assembly (20, Figure 6-80) from rear, left of engine compartment.
- 10. Remove tube (19).
- 11. Disconnect tube assembly (20) from tube (24) and remove.
- 12. Remove bolt (21), washer (22) and clip (23, Figure 6-81) from base of turbocharger air pipe on left side, top of engine.
- 13. Disconnect tube (24) from atomizer (25) and remove.
- 14. Remove atomizer (25) from cylinder head.

#### **CLEANING**

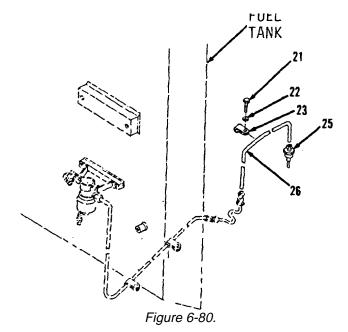
Clean all parts. Refer to Chapter 2.

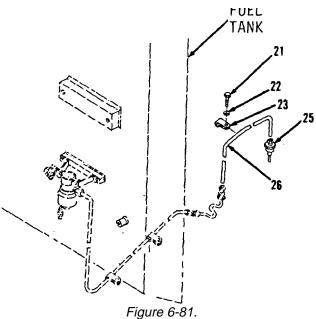
## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- Install atomizer (25, Figure 6-81) in cylinder head.
- 2. Connect tube (24) to atomizer (25).





Go to sheet 4

## 6-28. Ether Starting Aid Assembly. (Sheet 4 of 4)

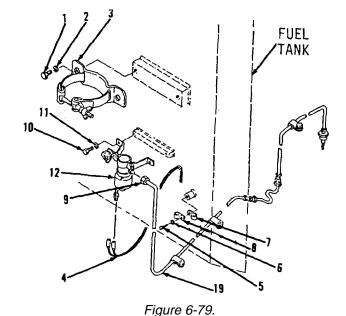
#### **INSTALLATION**

- 3. Install clip (23), washer (22) and bolt (21) securing tube (24) to base of turbocharger air pipe.
- 4. Connect tube assembly (20) to tube (24, Figure 6-80) in rear, left side of engine compartment.
- 5. Position tube (19) in vehicle and connect to tube assembly (20).
- Install clip (18), washer (17) and bolt (16) securing tube (19) in left front, under fuel tank.
- Install clip (15), washer (14) and bolt (13) securing tube (19) to right rear, under fuel tank.
- 8. Install valve (12), two washers (11) and bolts (10, Figure 6-79) on right rear of fuel tank.
- 9. Install connector (9) on tube (19), if removed.
- 10. Install tube (19) and connector (9) on valve (12).
- 11. Install clips (8 and 7), washer (6) and bolt (5) securing tube (19) and harness assembly (4) to fuel tank.
- 12. Connect harness assembly (4) to valve (12).
- 13. Install clamp (3), two washers (2) and bolts (1).

#### NOTE

Return 130G Grader to original equipment condition.

End of Task



#### Section V. EXHAUST SYSTEM TROUBLESHOOTING.

- **6-29. GENERAL INFORMATION**. This section lists the common exhaust system malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **6-30. EXHAUST SYSTEM TROUBLESHOOTING PROCEDURES**. This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

EXHAUST SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

- a. EXHAUST SYSTEM TEMPERATURE IS TOO HIGH.
  - Step 1. Check for leaks or restrictions in air inlet system.

Repair or replace parts as necessary. Refer to paragraphs 6-16, 6-18, 9-5 and 9-6.

Step 2. Check for leaks or restrictions in exhaust system.

Repair or replace parts as necessary. Refer to paragraph 6-32.

Step 3. Contact Direct Support.

- b. EXCESSIVE NOISE FROM EXHAUST SYSTEM.
  - Step 1. Check for leaks, holes, rust and loose connections in the exhaust system.

Repair or replace parts as necessary. Refer to paragraph 6-32.

Step 2. Contact Direct Support.

## Section VI. EXHAUST SYSTEM MAINTENANCE.

## 6-31. EXHAUST SYSTEM MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the exhaust system and its components in good repair.
- b. This section is arranged by functional group code and provides a list of exhaust system components to be maintained and step-by-step maintenance procedures.

**INDEX** 

<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
Muffler and Exhaust Pipes	6-32	6-110

## **EXHAUST SYSTEM MAINTENANCE.** (cont)

## **6-32.** Muffler and Exhaust Pipes. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Anti-seize compound, Item 59, Appendix C

Small tags, Item 41, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

Paragraph 6-16

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. Air precleaner removed.

Paragraph 6-18 Air cleaner body removed.

Paragraph 13-5 Engine compartment side panels and

doors removed.

Go to Sheet 2

## **EXHAUST SYSTEM MAINTENANCE.**

## **6-32.** Muffler and Exhaust Pipes. (Sheet 2 of 4)

#### **REMOVAL**

#### **WARNING**

Allow engine to cool off before you perform maintenance on the muffler, exhaust pipe, exhaust manifold or turbocharger. If necessary, use insulated pads and gloves. If you burn yourself, seek medical aid immediately.

- 1. Using clean oil, lubricate threads of bolt (2, Figure 6-82).
- 2. Remove nut (1) and bolt (2).
- 3. Loosen clamp (4).
- 4. Separate pipe (3) from muffler (10).
- 5. Remove clamp (4).

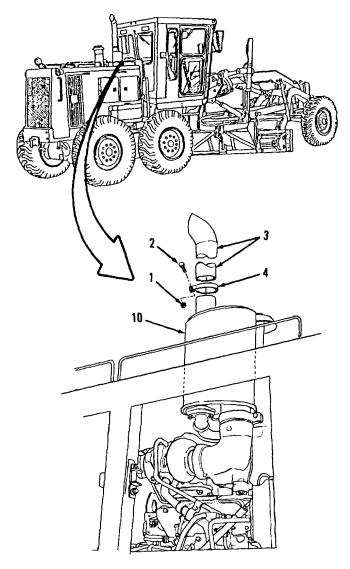


Figure 6-82.

Go to Sheet 3

## **EXHAUST SYSTEM MAINTENANCE.** (cont)

## **6-32.** Muffler and Exhaust Pipes. (Sheet 3 of 4)

## **REMOVAL** (cont)

- 6. Using clean oil, lubricate threads of two studs (14) on muffler (10, Figure 6-83).
- 7. Remove two nuts (5) and washers (6).
- 8. Using clean oil, lubricate threads of bolt (9).
- 9. Remove nut (7), two washers (8) and bolt (9).
- 10. Loosen clamp (11).

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation.

- 11. Separate muffler (10) from tube assembly (12) and elbow (13) and remove.
- 12. Remove two studs (14) only if damaged.

## **CLEANING**

Clean all parts. Refer to Chapter 2.

# INSPECTION

Inspect all parts. Refer to Chapter 2.

Go to Sheet 4

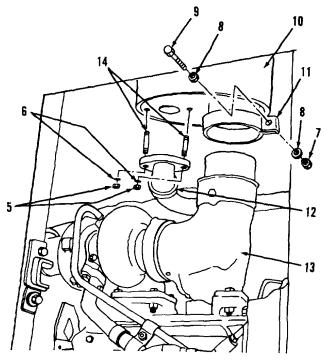


Figure 6-83.

#### **EXHAUST SYSTEM MAINTENANCE.**

## **6-32.** Muffler and Exhaust Pipes. (Sheet 4 of 4)

#### **INSTALLATION**

- 1. Coat threads of two studs (14) on muffler (10, Figure 6-83) with anti-seize compound and install, if removed.
- 2. Position clamp (11) on muffler (10).
- 3. Position muffler (10) on elbow (13) and on tube assembly (12).
- 4. Install bolt (9), two washers (8) and nut (7). Tighten nut (7) to 20 ft-lb torque.
- 5. Install two washers (6) and nuts (5). Tighten nuts (5) to 20 ft-lb torque.
- 6. Position clamp (4) on pipe (3, Figure 6-82).
- 7. Install pipe (3) on muffler (10).
- 8. Install bolt (2) and nut (1). Tighten bolt (2) to 20 ft-lb torque.

NOTE
Return 130G Grader to original equipment condition.

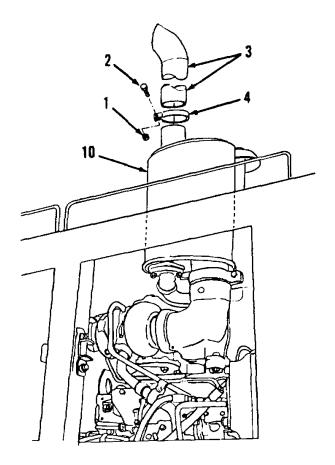


Figure 6-82.

End of Task

#### Section VII. COOLING SYSTEM TROUBLESHOOTING.

- **6-33. GENERAL INFORMATION.** This section lists the common cooling system malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **6-34. COOLING SYSTEM TROUBLESHOOTING PROCEDURES.** This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### COOLING SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

- a. ENGINE OVERHEATS.
  - Step 1. Check for debris blocking radiator grille.

Refer to TM 5-3805-261-10.

Step 2. Check the coolant level of the cooling system.

Refer to TM 5-3805-261-10.

Step 3. Check for restrictions to air flow. Inspect fan blades, fan shields, baffles and plates.

Replace damaged or missing parts. Refer to paragraphs 6-37 and 6-46.

Step 4. Check for loss of pressure.

Tighten radiator cap. Replace radiator cap if necessary. Refer to paragraph 6-48.

Step 5. Inspect and test temperature regulator. Refer to paragraph 6-42.

Replace temperature regulator if necessary. Refer to paragraph 6-42.

Step 6. Check coolant pump operation.

Replace pump if necessary. Refer to paragraph 6-43.

## COOLING SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

#### a. ENGINE OVERHEATS.

Step 7. Check for proper belt tension and wear. Refer to paragraph 6-44.

Replace belts, if necessary. Refer to paragraph 6-44.

Step 8. Check hoses, lines and fittings for leakage. Tighten loose connections.

Replace hoses and clamps, if necessary. Refer to paragraph 6-40.

Step 9. Check for free flow of coolant through the radiator.

Flush the radiator. Refer to paragraph 6-48.

Replace radiator, if necessary. Refer to paragraph 6-36.

Step 10. Contact Direct Support.

#### b. ENGINE DOES NOT REACH OPERATING TEMPERATURE.

Step 1. Check condition of radiator cap.

Tighten radiator cap. Replace radiator cap, if necessary. Refer to paragraph 6-48.

Step 2. Inspect and test temperature regulator. Refer to paragraph 6-42.

Replace temperature regulator, if necessary. Refer to paragraph 6-42.

Step 3. Contact Direct Support.

## MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

## c. COOLING SYSTEM NOT PRESSURIZED.

Step 1. Check condition of radiator cap.

Tighten radiator cap. Replace radiator cap, if necessary. Refer to paragraph 6-48.

Step 2. Check hoses and connections.

Tighten loose connections. Replace hoses or clamps, if necessary. Refer to paragraph 6-40.

Step 3. Contact Direct Support.

## d. PRESSURE OF OIL IN COOLING SYSTEM.

Step 1. Check for proper oil weight. Refer to LO 5-3805-261-12.

Drain improper weight oil. Refer to LO 5-3805-261-12. Fill with correct oil. Refer to LO 5-3805-261-12.

Step 2. Check oil for contamination. Refer to LO 5-3805-261-12.

Drain dirty oil. Refer to LO 5-3805-261-12. Fill with clean oil. Refer to LO 5-3805-261-12.

Step 3. Check for oil leaks. Refer to LO 5-3805-261-12.

Replace parts as necessary. Refer to paragraph 6-6.

Step 4. Check oil pressure gage operation.

Replace gage, if necessary. Refer to paragraph 6-6.

Step 5. Contact Direct Support.

## Section VIII. COOLING SYSTEM MAINTENANCE.

## 6-35. COOLING SYSTEM MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the cooling system and its components in good repair.
- b. This section is arranged by functional group code and provides a list of cooling system components to be maintained and step-by-step maintenance procedures.

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#### 6-36. Radiator and Support. (Sheet 1 of 8)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation 

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033) Hoist and sling Wood blocks Four link brackets

Four 3/8-16 x 5-1/2 inch bolts

Four 3/8-16 inch nuts

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Caps

Seal, Item 27

Mounts, Item 21

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to

standard torques. Refer to Appendix E.

Go to Sheet 2

## 6-36. Radiator and Support. (Sheet 2 of 8)

.....

## **Troubleshooting References**

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-37 Shields, baffles and plates removed.

Paragraph 6-38 Grille removed.

Paragraph 6-39 Radiator vandalism guard removed (if

necessary).

Paragraph 6-41 Radiator drain line removed.

Paragraph 6-49 Side screen doors removed.

Paragraph 7-84 Rear brake and signal lights removed.

Paragraph 7-85 Blackout stop/taillights removed.

Paragraph 7-86 Rear floodlamp removed.

Paragraph 13-4 Engine hood removed.

Paragraph 13-25 Rear bumper removed.

Paragraph 15-34 Hydraulic oil cooler removed.

Go to Sheet 3

## **6-36.** Radiator and Support. (Sheet 3 of 8)

#### **REMOVAL**

- 1. Loosen two clamps (3, Figure 6-84). Slide hose (1) back on tube (2).
- 2. Remove two clamps (3).
- 3. Remove nut (4), washer (5) and bolt (6) from upper support plate (7).
- 4. Loosen two clamps (8, Figure 6-85). Slide clamps (8) and hose (9) back on tube (12).
- 5. Remove bolt (29), washer (30) and clamp (31) from tube (12) and fuel tank (32).

#### **NOTE**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. CLIP all hose and tube ends to prevent contamination.

- 6. Loosen two clamps (10) and disconnect hose (11).
- 7. Remove two clamps (10) and hose (11).
- 8. Remove tube (12).

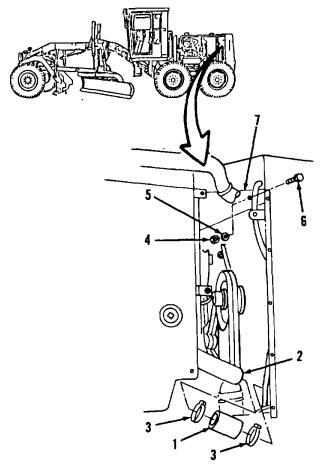


Figure 6-84.

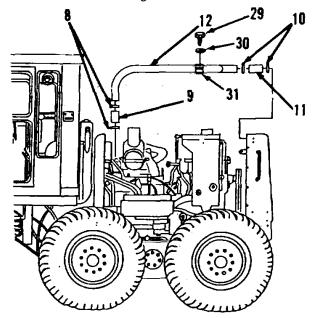


Figure 6-85.

## **6-36.** Radiator and Support. (Sheet 4 of 8)

#### **REMOVAL**

#### **WARNING**

Weight of radiator and support assembly is approximately 310 lbs. Use adequate hoist and sling. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 9. Attach hoist and sling to grabirons (Figure 6-86) and take up slack.
- 10. Remove ten bolts (13) and washers (14).
- 11. Using a hoist and sling, remove items 18 thru 28 as an assembly.
- 12. Remove baffle (33) (see Figure 6-95).
- 13. Remove four bolts (15) and washers (16 and 17).
- 14. Remove eight bolts (18), washers (19), four brackets (20) and mounts (21) from sides of support (22). Discard mounts (21) if cracked, broken, distorted or deteriorated.
- 15. Place radiator in upright position.
- 16. Remove hoist and sling.
- 17. Install four link brackets, 3/8-16 x 5-1/2 inch bolts, 3/8-16 inch nuts and hoist and sling (Figure 6-88).

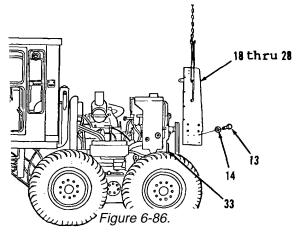


Figure 6-86

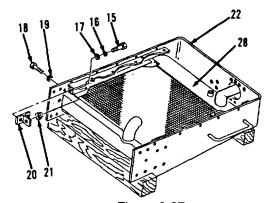


Figure 6-87.

HOIST AND SLING

3/8-16 BY 5-1/2 INCH BOLT

Figure 6-88.

## **6-36.** Radiator and Support. (Sheet 5 of 8)

**REMOVAL** (cont)

#### **WARNING**

Weight of radiator is 135 lbs. Use adequate hoist and sling. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 18. Using a hoist and sling, separate support (22) and radiator (28, Figure 6-89). Slide radiator (28) out from bottom of support (22).
- 19. Support radiator (28) on suitable backing.
- 20. Remove hoist and sling, four 3/8-16 inch nuts, 3/8-16 x 5-1/2 inch bolts and link brackets (Figure 6-88).
- 21. Remove two plates (23), four bolts (24), washers (25) and brackets (26, Figure 6-90).

#### **NOTE**

Remove seal only if inspection indicates replacement is necessary.

22. Remove and discard seal (27), if necessary. Remove all old seal (27) material from mounting surfaces of radiator (28).

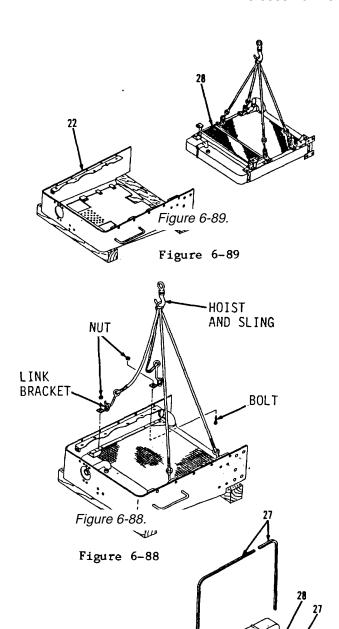


Figure 6-90.

## **6-36.** Radiator and Support. (Sheet 6 of 8)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

1. If removed, install new seal (27, Figure 6-90). Cut bulk seal to size. Install seal (27) on top and sides of radiator (28).

#### NOTE

Do not cover overfill tube on top of radiator.

- 2. Position four brackets (26).
- 3. Install four washers (25), bolts (24) and two plates (23). Do not tighten bolts (24) or plates (23).
- 4. Install four link brackets, 3/8-16 x 5-1/2 inch bolts, 3/8-16 inch nuts and hoist and sling (Figure 6-88).
- 5. Using a hoist and sling, install radiator (28, Figure 6-89). Carefully slide radiator (28) into support (22).
- 6. Remove hoist and sling, four 3/8-16 inch nuts, 3/8-16 x 5-1/2 inch bolts and link brackets (Figure 6-88).

Go to Sheet 7

## **6-36.** Radiator and Support. (Sheet 7 of 8)

## **INSTALLATION** (cont)

- 7. Position four mounts (21) and brackets (20, Figure 6-87).
- 8. Install eight washers (19) and bolts (18). Do not tighten bolts (18).
- 9. Install four washers (17 and 16), bolts (15) and mounts (21) and secure to brackets (20).
- 10. Tighten eight bolts (18).
- 11. Install baffle (33).
- 12. Install hoist and sling. Attach sling to left and right side of grabirons (Figure 6-86).13. Lift items 28 thru 18 as an assembly and slowly stand on end with hoist and sling and set into position.
- 14. Install hose (1).
- 15. Install ten washers (14) and bolts (13).
- 16. Position tube (12, Figure 6-85) on top of fuel tank.
- 17. Install hose (11) on tube (12).
- 18. Position two clamps (10 and 8).
- 19. Install clamp (31), washer (30) and bolt (29) on tube (12) and fuel tank (32).
- 20. Install hose (9) at tube (12) and temperature regulator housing.
- 21. Install two clamps (10 and 8).

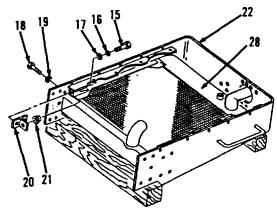
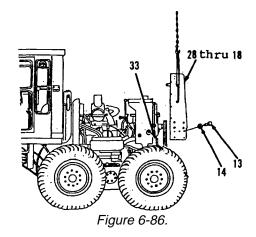
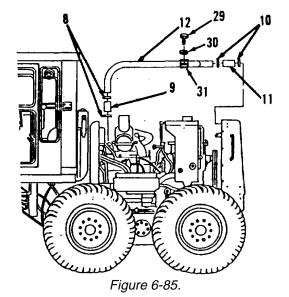


Figure 6-87.





## **6-36.** Radiator and Support. (Sheet 8 of 8)

## **INSTALLATION**

- 22. Install bolt (6), washer (5) and nut (4) in center support securing plate (7, Figure 6-84).
- 23. Tighten four bolts (24, Figure 6-90).
- 24. Install hose (11, Figure 6-85) in side of radiator neck.
- 25. Install two clamps (3, Figure 6-84) on hose (1).

# NOTE Return 130G Grader to original equipment condition.

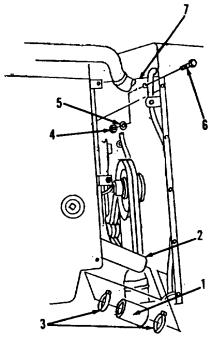


Figure 6-84.

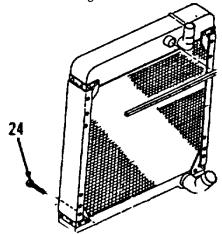


Figure 6-90.

End of Task

## **6-37.** Shields, Baffles and Plates. (Sheet 1 of 6)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations
All
Personnel Required
Construction equipment

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39,

Appendix C

repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

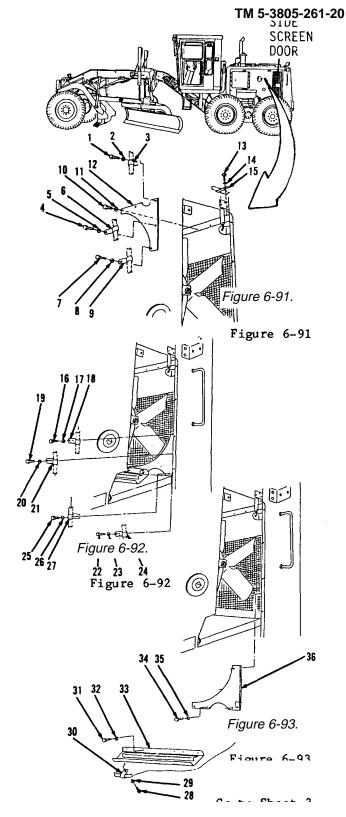
Paragraph 6-4 Side screen doors open.

Go to Sheet 2

## **6-37.** Shields, Baffles and Plates. (Sheet 2 of 6)

#### **REMOVAL**

- 1. Open side screen doors. Refer to paragraph 6-49, steps 1 and 2.
- 2. Remove bolt (1), washer (2) and clip (3, Figure 6-91) from front, upper left side of radiator and support.
- 3. Remove bolt (4), washer (5) and clip (6).
- 4. Remove bolt (7), washer (8) and clip (9).
- 5. Remove two bolts (10), washers (11) and shield (12).
- 6. Remove bolt (13), washer (14) and clip (15).
- 7. Remove bolt (16), washer (17) and clip (18, Figure 6-92) from lower, left side of radiator and support.
- 8. Remove bolt (19), washer (20) and clip (21).
- 9. Remove bolt (22), washer (23) and clip (24).
- 10. Remove bolt (25), washer (26) and clip (27).
- 11. Remove three bolts (28), washers (29) and clips (30, Figure 6-93) from under plate (33).
- 12. Remove five bolts (31), washers (32) and plate (33) from front, lower left side of radiator and support.
- 13. Remove bolt (34), washer (35) and shield (36).



## **6-37.** Shields, Baffles and Plates. (Sheet 3 of 6)

## **REMOVAL** (cont)

- 14. Remove bolt (37), washer (38) and clip (39, Figure 6-94) from front, upper right side of radiator and support.
- 15. Remove bolt (40), washer (41) and clip (42).
- 16. Remove three bolts (43), washers (44) and shield (45).
- 17. Remove bolt (46), washer (47) and baffle (48).
- 18. Remove bolt (49), washer (50) and clip (51, Figure 6-95) on front, lower right side of radiator and support.
- 19. Remove bolt (52), washer (53) and clip (54).
- 20. Remove two bolts (55), washers (56), shield (57) and baffle (58).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

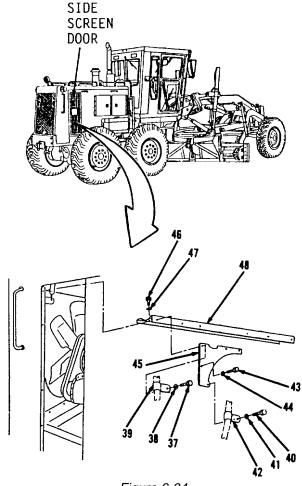


Figure 6-94.

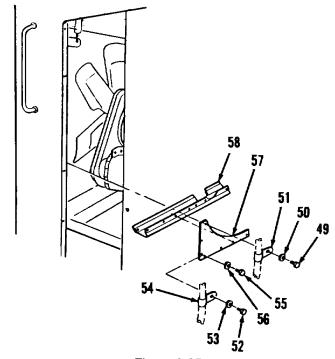


Figure 6-95.

## **6-37.** Shields, Baffles and Plates. (Sheet 4 of 6)

#### **INSTALLATION**

- Position baffle (58) and shield (57, Figure 6-95) on front, lower right side of radiator and support.
- 2. Install two washers (56) and bolts (55). Do not tighten bolts (55).
- 3. Install clip (54), washer (53) and bolt (52) securing harness assembly.
- 4. Install clip (51), washer (50) and bolt (49) securing hydraulic oil cooler hose.
- 5. Tighten two bolts (55).
- 6. Position baffle (48, Figure 6-94) on front, upper right side of radiator and support.
- 7. Install washer (47) and bolt (46) on front, upper right side of radiator and support.
- 8. Position shield (45).
- 9. Install three washers (44) and bolts (43).
- 10. Install clip (42), washer (41) and bolt (40) securing hydraulic oil cooler hose.
- 11. Install clip (39), washer (38) and bolt (37) securing harness assembly.

Go to Sheet 5

## **6-37.** Shields, Baffles and Plates. (Sheet 5 of 6)

## **INSTALLATION** (cont)

- 12. Position shield (36, Figure 6-93) on front, lower left side of radiator and support.
- 13. Install two washers (35) and bolts (34).
- 14. Position plate (33).
- 15. Install five washers (32) and bolts (31).
- 16. Install three clips (30), washers (29) and bolts (28) under plate (33) securing two harness assemblies.
- 17. Install clip (27), washer (26) and bolt (25, Figure 6-92) on front, lower left side of radiator and support securing harness assembly.
- 18. Install clip (24), washer (23) and bolt (22) securing harness assembly.
- 19. Install clip (21), washer (20) and bolt (19) securing harness assembly.
- 20. Install clip (18), washer (17) and bolt (16) securing hydraulic oil cooler hose.

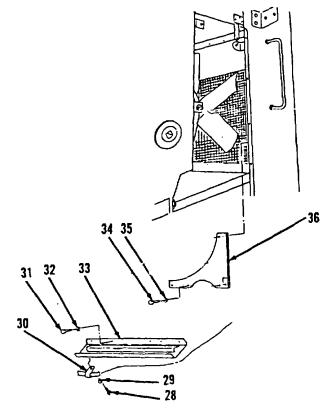
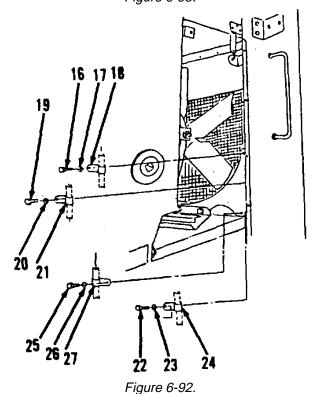


Figure 6-93.

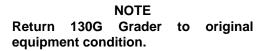


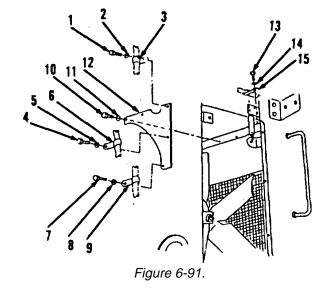
Go to Sheet 6

## **6-37.** Shields, Baffles and Plates. (Sheet 6 of 6)

#### **INSTALLATION**

- 21. Install clip (15), washer (14) and bolt (13, Figure 6-91) on front, upper left side of radiator and support securing harness assembly.
- 22. Position shield (12).
- 23. Install two washers (11) and bolts (10).
- 24. Install clip (9), washer (8) and bolt (7) securing hydraulic oil cooler hose.
- 25. Install clip (6), washer (5) and bolt (4) securing harness assembly.
- 26. Install clip (3), washer (2) and bolt (1) securing harness assembly.
- 27. Close side screen doors. Refer to paragraph 6-49, steps 4 thru 7.





End of Task

6-38. Grille. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

All

<u>Tools</u>

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

**6-38. Grille.** (Sheet 2 of 2)

#### **REMOVAL**

Remove nine bolts (1), washers (2) and grille (3) from radiator support (4, Figure 6-96) on rear of vehicle.

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

Install grille (3), nine washers (2) and bolts (1) on radiator support (4, Figure 6-96).

NOTE Return 130G Grader to original equipment condition.

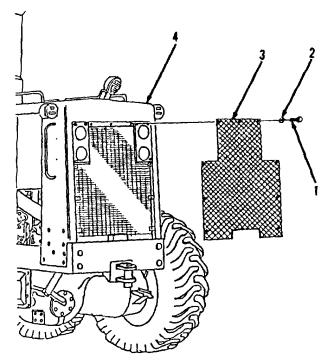


Figure 6-96.

End of Task

## **6-39. Vent Guard**. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033) Drill, power Bit, drill 1/4 inch Rivet gun

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Rivets, Items 1, 4, 6 Strip, Item 3 Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

Torques

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

## 6-39. Vent Guard. (Sheet 2 of 3)

#### **REMOVAL**

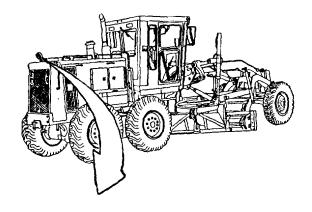
- 1. Remove and discard rivet (1, Figure 6-97) by drilling out from top of radiator and support.
- 2. Remove cap (2).
- Remove and discard strip (3) if torn or deteriorated.
- 4. Remove and discard two rivets (4) by drilling out.
- 5. Remove plate (5).
- 6. Remove and discard three rivets (6) by drilling out.
- 7. Remove bracket (7).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.



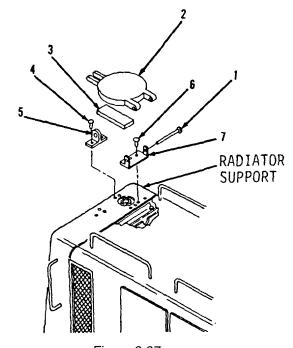


Figure 6-97.

Go to Sheet 3

## **6-39. Vent Guard**. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Position bracket (7, Figure 6-97).
- 2. Install three new rivets (6).
- 3. Position plate (5).
- 4. Install two new rivets (4).
- 5. Install new strip (3), if removed, on inside of cap (2).
- 6. Position cap (2).
- 7. Install new rivet (1).

## NOTE Return 130G Grader to original equipment condition.

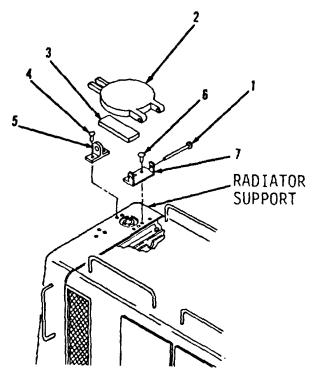


Figure 6-97.

End of Task

## 6-40. Radiator Hoses, Lines and Fittings. (Sheet 1 of 6)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Gasket, Item 22

Caps Plugs Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-5 Left side engine panel assembly

removed.

Paragraph 6-48 Radiator drained.

Paragraph 9-5 Air compressor removed. (If necessary)

Paragraph 6-6 Oil level gage removed.

Go to Sheet 2

## **6-40.** Radiator Hoses, Lines and Fittings. (Sheet 2 of 6)

#### **REMOVAL**

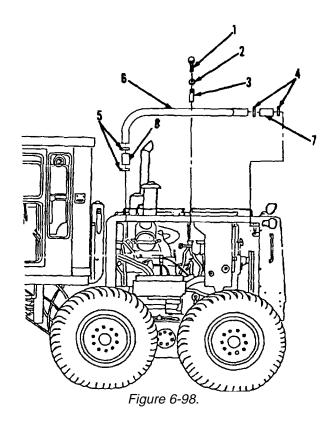
- 1. Remove bolt (1), washer (2) and clip (3, Figure 6-98) from front, upper left of fuel tank.
- 2. Loosen two clamps (4).

## NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open ports to prevent contamination.

- 3. Disconnect hose (7) from temperature regulator housing and slide up on tube (6).
- 4. Remove two clamps (4).
- 5. Loosen two clamps (5).
- 6. Disconnect hose (8) and slide up on tube (6).
- 7. Remove two clamps (5).
- 8. Remove tube (6) with hoses (7 and 8) connecting radiator to temperature regulator housing.
- 9. Remove hoses (7 and 8) from tube (6).

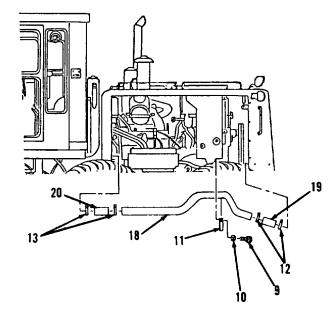
Go to Sheet 3



## 6-40. Radiator Hoses, Lines and Fittings. (Sheet 3 of 6)

#### **REMOVAL**

- 10. Remove bolt (9), washer (10) and clip (11, Figure 6-99).
- 11. Loosen two clamps (12).
- 12. Disconnect hose (15) and slide up on tube (14).
- 13. Remove two clamps (12).
- 14. Loosen two clamps (13).
- Disconnect hose (16) and slide up on tube (14).
- 16. Remove two clamps (13).
- 17. Remove bolt (14), clamp (15) and spacer (16) from transmission to engine adapter housing (17).
- 18. Remove tube (18) with hoses (19) and (20) connecting water pump to radiator.
- 19. Remove hoses (19 and 20) from tube (18).
- 20. Remove four bolts (21, Figure 6-100).
- 21. Separate oil gage tube from pipe (25).
- 22. Remove bolt (22).
- 23. Loosen two clamps (24).
- 24. Disconnect and remove hose (23) from pipe (25) and water pump.
- 25. Remove two clamps (24).
- 26. Remove pipe (25) and gasket (26). Discard gasket (26) and remove all gasket material from mounting surfaces.



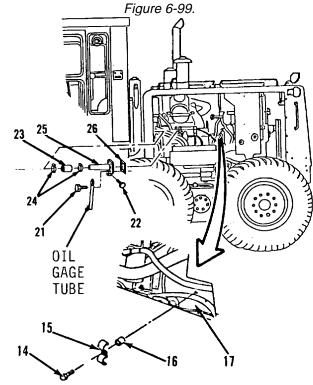


Figure 6-100.

## 6-40. Radiator Hoses, Lines and Fittings. (Sheet 4 of 6)

## **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install new gasket (22) and pipe (21, Figure 6-100).
- 2. Position two clamps (20).
- 3. Install hose (19) on pipe (21) and water pump.
- 4. Tighten two clamps (20).
- 5. Install bolt (18). Do not tighten bolt (18).
- 6. Install two bolts (17) in upper mounting holes of pipe (21). Do not tighten bolt (17).
- 7. Position oil gage tube.
- 8. Install two bolts (17).
- 9. Tighten bolt (18) and two bolts (17).

Go to Sheet 5

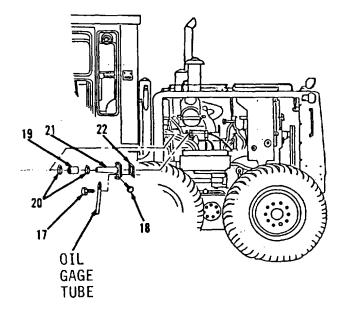


Figure 6-100.

## 6-40. Radiator Hoses, Lines and Fittings. (Sheet 5 of 6)

#### **INSTALLATION**

- 10. Install hoses (20 and 19) on tube (14, Figure 6-99).
- 11. Position spacer (16), clamp (15) on engine adapter housing (17, Figure 6-100).
- 12. Install bolt (14) and tighten.
- 13. Position tube (18) with hoses (20 and 19) under fuel tank, connecting water pump to radiator.
- 14. Position two clamps (13).
- 15. Connect hose (20) to water pump.
- 16. Tighten two clamps (13).
- 17. Position two clamps (12).
- 18. Connect hose (19).
- 19. Tighten two clamps (12).
- 20. Install clip (11), washer (10) and bolt (9).

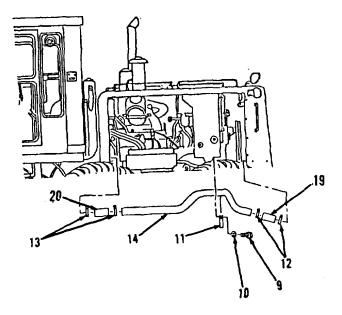


Figure 6-99.

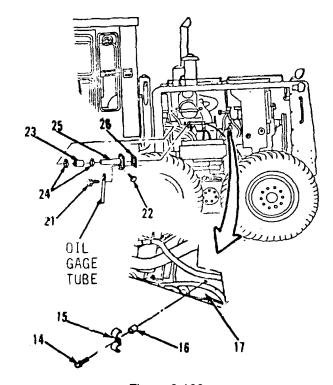


Figure 6-100.

## 6-40. Radiator Hoses, Lines and Fittings. (Sheet 6 of 6)

## **INSTALLATION** (cont)

- 21. Install hoses (8 and 7) on tube (6, Figure 6-98).
- 22. Position tube (6) with hoses (8 and 7) on top of fuel tank.
- 23. Position two clamps (5) in front, top of engine.
- 24. Connect hose (8) to temperature regulator housing.
- 25. Tighten two clamps (5).
- 26. Position two clamps (4) in upper, left side of radiator.
- 27. Connect hose (7) to radiator.
- 28. Tighten two clamps (4).
- 29. Install clip (3), washer (2) and bolt (1) in front, upper left side of fuel tank.

## NOTE Return 130C Grader to original equipment condition.

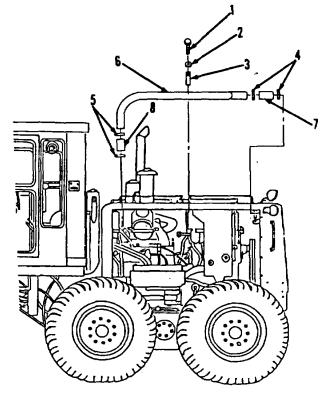


Figure 6-98.

End of Task

## **6-41.** Radiator Drain Line. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Caps Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-48 Radiator Drained.

Paragraph 13-25 Rear bumper removed.

Go to Sheet 2

## **6-41.** Radiator Drain Line. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Loosen two clamps (6) from hose (7).
- 2. Remove hose (6) from fitting (8).

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

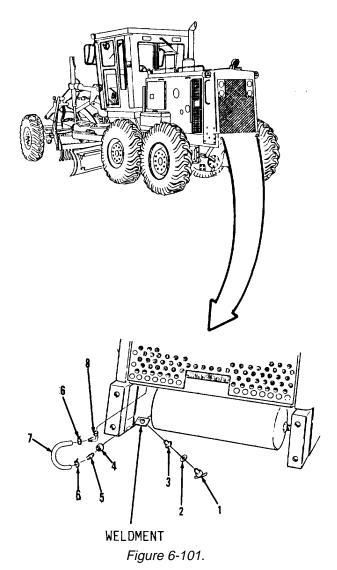
- 3. Remove hose (7) and clamp (6) from connector (5).
- 4. Remove fitting (4) and connector (5) from fitting (3).
- 5. Remove valve (1), washer (2) and fitting (3).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.



Go to Sheet 3

## **6-41.** Radiator Drain Line. (Sheet 3 of 3)

#### **INSTALLATION**

- 1. Install fitting (3), washer (2) and valve (1).
- 2. Install connector (5) and fitting (4) to fitting (3).
- 3. Position clamp (6) on connector (5) and install hose (7).
- 4. Install hose (6) and one of two clamps (5) on fitting (8).
- 5. Install one of two clamps (5) and connector (4) on hose (6).
- 6. Tighten two clamps (5).

NOTE
Return 130G Grader to original equipment condition.

End of Task

#### 6-42. Temperature Regulator. (Sheet 1 of 3)

a. Removal This task covers: b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

Pan

Thermometer

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Gasket, Item 6 Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

Plugs

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-5 Left side engine panel removed.

Paragraph 6-48 Radiator drained.

Go to Sheet 2

## **6-42.** Temperature Regulator. (Sheet 2 of 3)

#### **REMOVAL**

1. Loosen two clamps (2, Figure 6-102) in front left, top of engine.

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open ports to prevent contamination.

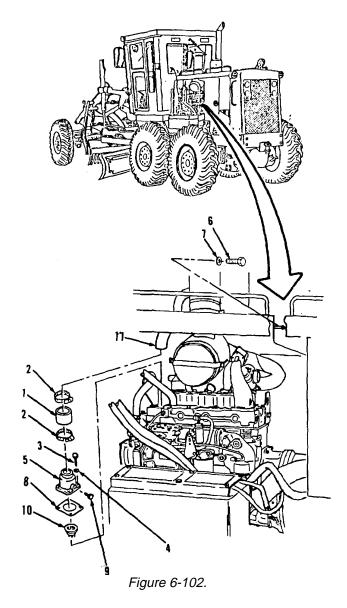
- 2. Disconnect hose (1) from housing (5) by sliding up on tube (11).
- 3. Remove bolt (6) and washer (7) from fuel tank clip weldment.
- 4. Remove four bolts (3) and washers (4).
- 5. Remove gasket (8) and housing (5) from cylinder head. Discard gasket (8). Remove all gasket material from mounting surfaces.
- 6. Remove plug (9) from housing (5).
- 7. Remove regulator(10).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.



Go to Sheet 3

## 6-42. Temperature Regulator. (Sheet 3 of 3)

#### **TESTING**

#### NOTE

Water must be kept at a constant temperature of 190 degrees F or ten minutes and regulator cannot touch the bottom or sides of the pan.

Submerge regulator (8, Figure 6-103) in water. After ten minutes, remove regulator (8) and measure distance regulator (8) has opened. If distance is less than 0.375 inch, replace regulator (8).

#### **INSTALLATION**

- Install regulator (10, Figure 6-102).
   Pyramid part of regulator (12) faces up.
- 2. Install plug (9) in housing (5).
- 3. Install housing (5) and new gasket (8).
- 4. Install four washers (4) and bolts (3).
- Install washer (7) and bolt (6) to fuel tank clip weldment.
- 6. Connect hose (1) by sliding down from tube (9) onto housing (5).
- 7. Tighten two clamps (2).

## NOTE

Return 130C Grader to original equipment condition.

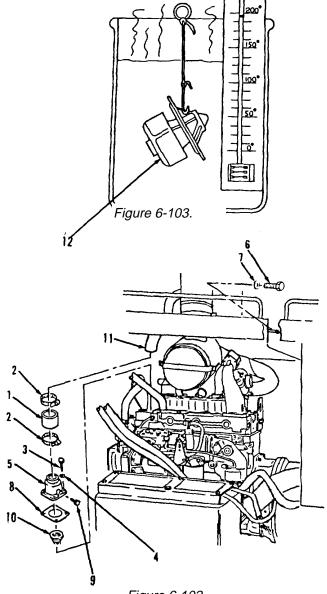


Figure 6-102.

End of Task

## 6-43. Coolant Pump. (Sheet 1 of 5)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

All

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Gaskets, Items 10, 17 Preformed packing, Item 11 Caps Personnel Required
Construction equipment

repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Go to Sheet 2

## **6-43.** Coolant Pump. (Sheet 2 of 5)

.....

## **Troubleshooting References**

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-48 Cooling system drained.

Paragraph 7-93 Coolant temperature switch removed.

Paragraph 7-97 Ether starting aid temperature switch

removed.

Paragraph 13-6 Engine compartment front dash plate

removed.

Go to Sheet 3

## 6-43. Coolant Pump. (Sheet 3 of 6)

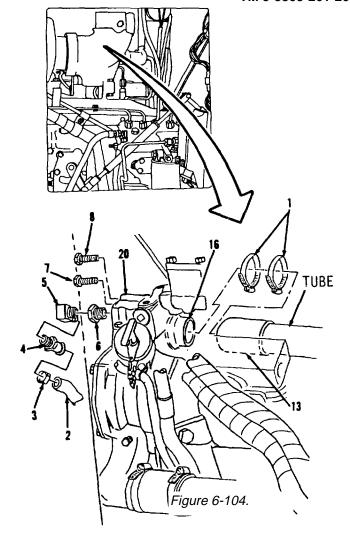
#### **REMOVAL**

1. Loosen two clamps (1, Figure 6-104) from front, left side of engine.

#### **NOTE**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 2. Disconnect hose (13) from elbow (16) and slide up on tube.
- 3. Remove two clamps (1).
- 4. Loosen clamp (3) in front of coolant pump (20).
- 5. Disconnect hose (2).
- 6. Remove clamp (3).
- 7. Remove connector (4), elbow (5) and bushing (6).
- 8. Remove bolts (7 and 8).
- 9. Support coolant pump (20, Figure 6-105).
- 10. Remove two bolts (9).
- 11. Remove two clamps (12) and hose (14) from pipe.
- 12. Remove items 15 thru 20 as an assembly, gasket (10) and preformed packing (11) by disconnecting from hose (14). Discard gasket (10) and preformed packing (11). Remove all gasket material from mounting surfaces.
- 13. Remove hose (13) from tube.



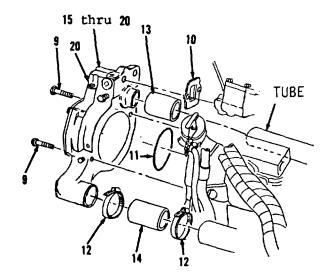


Figure 6-105.

#### 6-43. Coolant Pump. (Sheet 4 of 6)

#### REMOVAL (cont)

- 14. Remove two bolts (15, Figure 6-106) from coolant pump (20).
- Separate elbow (16) and gasket (17) from coolant pump (20). Discard gasket (17). Remove all gasket material from mounting surfaces.
- 16. Remove plugs (18 and 19) from elbow (16).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install plugs (19 and 18) in elbow (16, Figure 6-106).
- 2. Position new gasket (17) and elbow (16) in coolant pump (20).
- 3. Install two bolts (15).

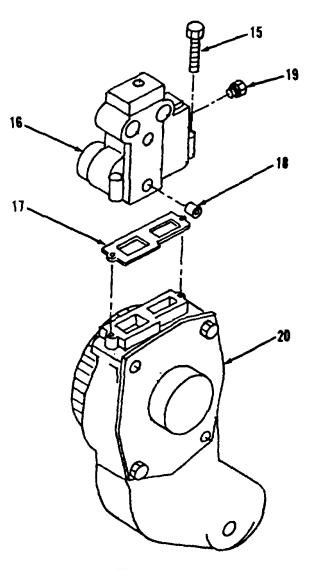


Figure 6-106.

Go to Sheet 5

#### 6-43. Coolant Pump. (Sheet 5 of 6)

#### **INSTALLATION**

- 4. Connect hose (14, Figure 6-107) to pipe on front, left side of engine.
- 5. Position new gasket (10) and items 20 thru 15 as an assembly. Engage coolant pump (20) drive gear and connect hose (14).
- 6. Position two clamps (12).
- 7. Connect hose (13) to tube.
- 8. Position two clamps (1).
- 9. Position new preformed packing (11) on coolant pump (20).

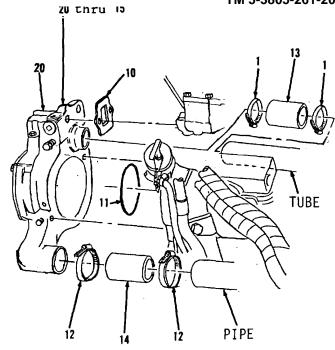


Figure 6-107.

Go to Sheet 6

#### 6-43. Coolant Pump. (Sheet 6 of 6)

#### **INSTALLATION** (cont)

- 10. Install two bolts (9) and bolts (8 and 7, Figure 6-108).
- 11. Install two clamps (12).
- 12. Install bushing (6), elbow (5) and connector (4) in front of coolant pump (20).
- 13. Position clamp (3).
- 14. Connect hose (2).
- 15. Install clamp (3).
- 16. Connect hose (13) to elbow (16) on front, left side of engine.
- 17. Install two clamps (1).

# NOTE Return 130G Grader to original equipment condition.

- 18. Start engine. Refer to TM 5-3805-261-10.
- 19. Check coolant pump (20) and hoses on front, left side of engine, for leaks. Refer to paragraph 6-41.
- 20. Stop engine.

End of Task

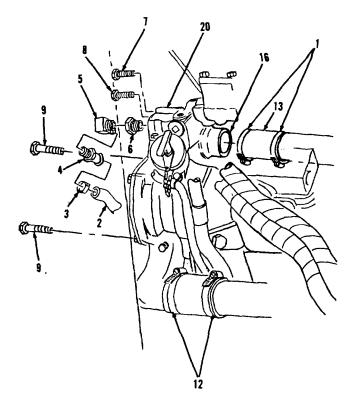


Figure 6-108.

#### **6-44. Fan Belts**. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Belt tension gage

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Detergent, Item 8, Appendix C

Two belts, Item 3

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

#### **6-44. Fan Belts**. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Open left side screen door. Refer to paragraph 6-49, steps 1 and 2.
- Loosen three bolts (6, 7 and 8, Figure 6-109).
- 3. Push in alternator (1) on bracket (2) to relieve belt tension.
- 4. Remove two belts (3) from pulleys (4 and 5). Discard two belts (3) if cracked, worn, broken, frayed or oil soaked.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

#### CAUTION

When installing belts use care to avoid cutting belts on fan blades.

#### NOTE

Belts must be replaced as a matched set.

- 1. Install two new belts (3) on pulleys (4 and 5, Figure 6-109), if necessary.
- 2. Pull out alternator (1) on bracket (2) until two belts (3) are tight.
- 3. Hand tighten three bolts (8, 7 and 6).
- 4. Close left side screen door. Refer to paragraph 6-49, steps 4 thru 7.

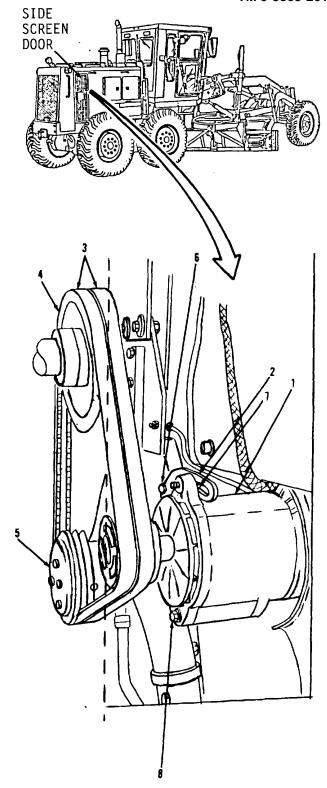


Figure 6-109.

Go to Sheet 3

#### **6-44. Fan Belts**. (Sheet 3 of 3)

#### **ADJUSTMENT**

#### NOTE

Only one belt is used to adjust belt tension.

- 1. Position belt tension gage on belt farthest from engine.
- 2. Check tension of two new belts (3) with belt tension gage. New belts should be tightened to 120 + 5 ft-lb. Used belts should be tightened to 90 + 10 ft-lb.
- 3. Loosen three bolts (6, 7 and 8).
- 4. Move alternator (1) on bracket (2) in, to decrease tension; out, to increase tension on two belts (3).
- 5. Tighten three bolts (8, 7 and 6).

#### **WARNING**

Close screen and fasten before performing next procedure. Failure to do so may cause INJURY. If injured, seek medical aid immediately.

- Start engine. Refer to TM 5-3805-261-10.
   Operate at high idle for a minimum of 30 minutes.
- 7. Stop engine.
- 8. Check tension of two belts (3) with belt tension gage. Make adjustment to correct tension if needed using procedure in steps 1 thru 7.

#### NOTE

Return 130G Grader to original equipment condition.

End of Task

#### **6-45.** Fan Lubrication Line. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

Caps

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

#### **6-45.** Fan Lubrication Line. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Open left side screen door. Refer to paragraph 6-49, steps 1 and 2.
- 2. Remove union (2).

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

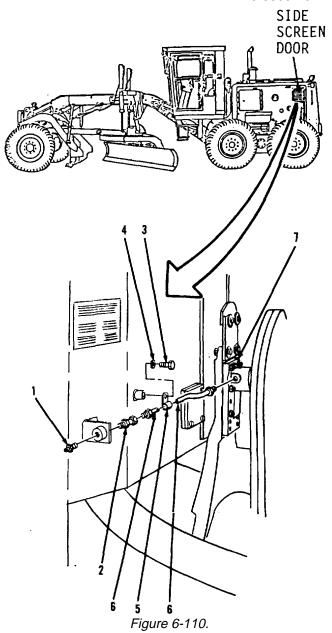
- 3. Remove bolt (4), washer (5) and clip (6).
- 4. Disconnect hose assembly (3) from bracket (7).
- 5. Remove hose assembly (3).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.



Go to Sheet 3

#### **6-45. Fan Lubrication Line**. (Sheet 3 of 3)

#### **INSTALLATION**

- 1. Install fitting (1).
- 2. Install union (2).
- 3. Install clip (5), washer (4) and bolt (3, Figure 6-110).
- 4. Connect hose assembly (6) to bracket (7).
- 5. Install hose assembly (6).

#### **NOTE**

Return 130G Grader to original equipment condition.

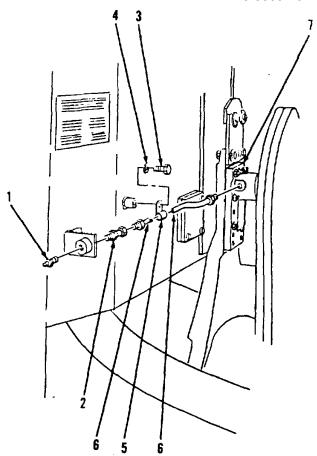


Figure 6-110.

End of Task

#### 6-46. Fan and Fan Drive. (Sheet 1 of 7)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

A11

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033) Gun, grease

Puller, Jaw type, four inch

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Detergent, Item 8, Appendix C Multi-purpose grease, Item 20

Appendix C

Preformed packing, Item 17

Seal, Item 23 Pin, Item 25 Personnel Required

Two construction equipment repairers MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

Torques

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-44 Fan belts removed.

Paragraph 6-45 Fan drive lubrication line removed.

Go to Sheet 2

Change 1 6-161

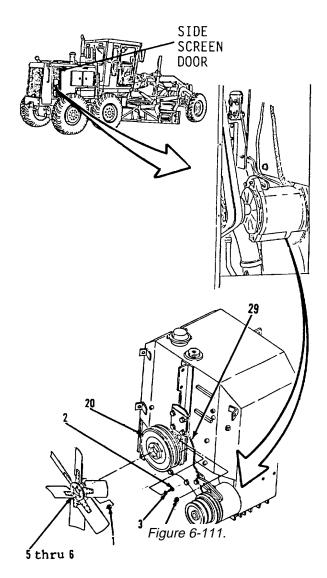
#### **6-46.** Fan and Fan Drive. (Sheet 2 of 7)

#### **REMOVAL**

- 1. Open side screen doors. Refer to paragraph 6-49, steps 1 and 2.
- 2. Hold six bolts (2, Figure 6-111) on back of pulley (20) in rear of fuel tank.
- 3. Remove six nuts (1).
- 4. Remove items 5 and 6 as an assembly from bolts (2). Position on radiator baffle. Do not lean fan blades into radiator.
- 5. Remove six bolts (2) and washers (3).
- 6. Remove four of six nuts (4) from lower four mounting bolts (11) only, in bracket (29).

## NOTE Step 6 requires two mechanics.

- 7. Support items 15 thru 27 as an assembly (Figure 6-112).
- 8. Remove two of six nuts (4).
- Remove items 15 thru 27 as an assembly from vehicle.
- 10. Remove fan (5) and adapter (6) from vehicle.



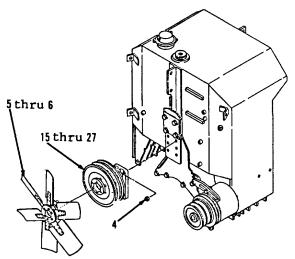


figure 6-112.

Go to sheet 3

#### **6-46.** Fan and Fan Drive. (Sheet 3 of 7)

#### **REMOVAL**

#### **NOTE**

Remove bolts and washers only if inspection indicates replacement is necessary.

- 11. Loosen four bolts (28, Figure 6-113).
- 12. Remove two bolts (7), washers (8) and mountings (9) and plate (10) from fuel tank.
- 13. Lean bracket (29) forward.
- 14. Remove six bolts (11) and washers (12) between bracket (29) and fuel tank.
- 15. Remove six bolts (13) and washers (14).
- 16. Separate fan (5) and adapter (6).
- 17. Remove two bolts (15) and retainer (16).
- 18. Remove and discard preformed packing (17) from hub (19).
- 19. Position items 18 thru 27 as an assembly. Stand on end of bracket (27) with hub (19) pointing upward.
- 20. Separate hub (19) and bearing (18). Using soft hammer, drive down on hub (19) to expose bearing (18, Figure 6-114).
- 21. Remove bearing (18) and hub (19).
- 22. Separate items 20 thru 27 as an assembly.

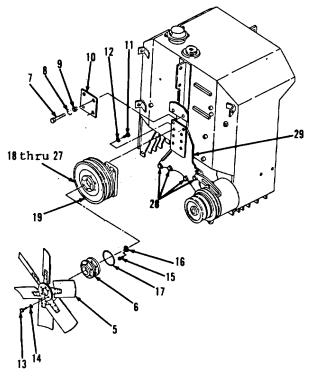


Figure 6-113.

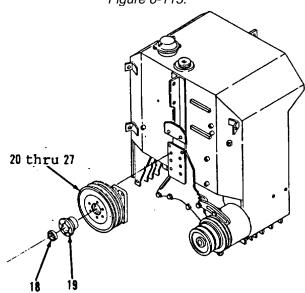


Figure 6-114.

Go to Sheet 4

#### **6-46.** Fan and Fan Drive. (Sheet 4 of 7)

#### **REMOVAL** (cont)

- 23. Remove pulley (20) from shaft (26, Figure 6-115).
- 24. Remove spacers (21 and 22).
- 25. Using a suitable driver and hammer, remove seal (23) and bearing (24). Discard seal (23).
- 26. Using a hammer and punch, remove and discard pin (25).
- 27. Remove shaft (26) from bracket (27).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install shaft (26) in bracket (27). Align pin (25) hole in shaft (26) with hole in bracket (27, Figure 6-116).
- 2. Using a hammer and punch install new pin (25).
- 3. Using a suitable driver and hammer, install new seal (23). Drive new seal in flush with small end of hub (19). Lip of new seal (23) must face outward.

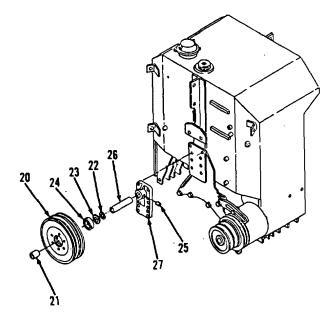
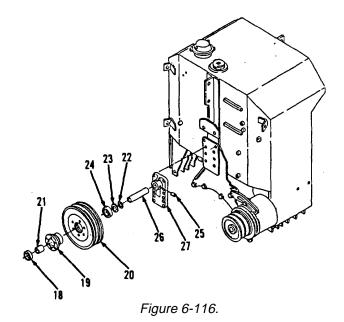


Figure 6-115.



Go to Sheet 5

#### **6-46.** Fan and Fan Drive. (Sheet 5 of 7)

#### **INSTALLATION**

- 4. Lubricate new seal (23) by applying a light coat of clean grease to lip of new seal (23) in hub (19).
- 5. Install bearing (24)- through opposite end of hub (19) until contact with new seal (23) is made.
- 6. Install spacer (22) in hub (19).
- 7. Fill cavity between bearings of hub (19) with clean grease.
- 8. Install bearing (18).
- 9. Position hub (19) with assembled parts (22, 23, 24) on shaft (26).
- 10. Position pulley (20).
- 11. Install items 27 thru 18 as an assembly (Figure 6-117).
- 12. Install new preformed packing (17) on hub (19).
- 13. Install retainer (16) and two bolts (15).
- 14. Position adapter (6) on fan (5).
- 15. Install six washers (14) and bolts (13).

Go to Sheet 6

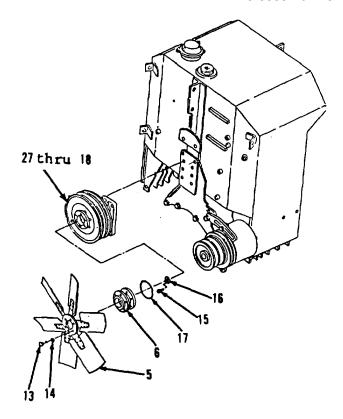


Figure 6-117.

#### **6-46.** Fan and Fan Drive. (Sheet 6 of 7)

#### **INSTALLATION** (cont)

- 16. Position six washers (12) and bolts (11) in rear of fuel tank, through back of bracket (29, Figure 6-118).
- 17. Position bracket (29) on fuel tank, keeping six bolts (11) in place.
- 18. Install two mountings (9), washers (8) and bolts (7) securing plate (10).
- 19. Tighten four bolts (28).

#### NOTE

#### Step 20 requires two mechanics.

- 20. Position items 6 and 5 as an assembly on radiator baffle.
- 21. Position items 27 thru 13 as an assembly on six bolts (11) in bracket (29).
- 22. Install six nuts (4).
- 23. Position six washers (3) and bolts (2) through back of pulley (20).
- 24. Position items 6 and 5 as an assembly on six bolts (2).

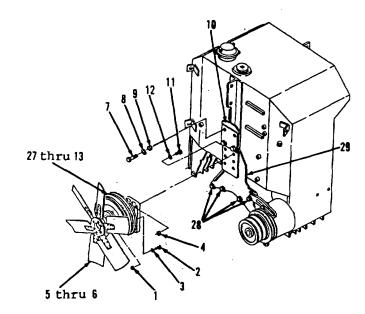


Figure 6-118.

Go to Sheet 7

#### **6-46.** Fan and Fan Drive. (Sheet 7 of 7)

#### **INSTALLATION**

- 25. Install six nuts (1).
- 26. Install fan drive lubrication line, refer to paragraph 6-45.
- 27. Lubricate fan drive assembly, refer to LO 5-3805-261-12.
- 28. Close side screen doors. Refer to paragraph 6-49, steps 4 thru 7.

#### NOTE

Return 130G Grader to original equipment condition.

End of Task

#### 6-47. Transmission Oil Pump Pulley. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations Personnel Required Construction equipment

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Seal, Item 4

repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-44 Fan belts removed.

Paragraph 7-5 Alternator removed (if necessary).

Go to Sheet 2

#### **6-47.** Transmission Oil Pump Pulley. (Sheet 2 of 2)

#### **REMOVAL**

- 1. Remove five bolts (1), washers (2) and plate (3, Figure 6-119) from lower portion of radiator.
- 2. Remove four bolts (4) and washers (5) from pulley (6).
- 3. Remove pulley (6).
- 4. Remove and discard seal (7).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install new seal (7, Figure 6-119).
- 2. Position pulley (6).
- 3. Install four washers (5) and bolts (4).to pulley (6).
- 4. Position plate (3), install five washers (2) and bolts (]).

# NOTE Return 130G Grader to original equipment condition.

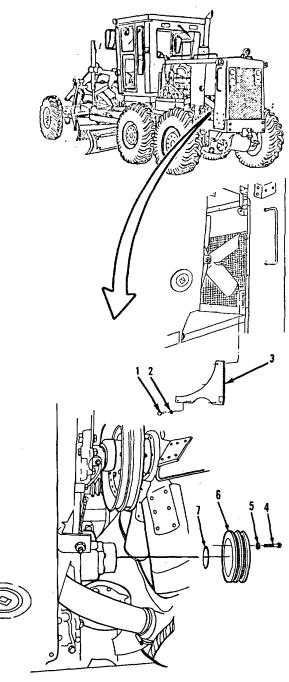


Figure 6-119.

End of Task

#### **6-48.** Radiator Servicing. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Detergent, Item 8, Appendix C Anti-freeze, Item 6,

Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

#### **6-48.** Radiator Servicing. (Sheet 2 of 4)

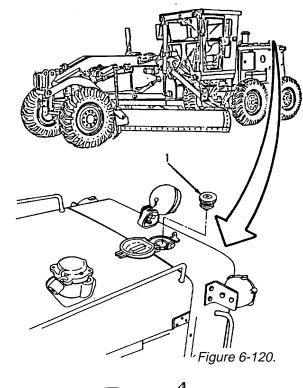
#### **DRAINING**

#### WARNING STEAM UNDER PRESSURE

Loosen radiator cap slowly to relieve pressure before completely removing when the engine is hot. Failure to follow this procedure may cause INJURY. If you are scalded by steam, seek medical aid immediately.

#### **CAUTION**

- If machine is to be stored in, or shipped to an area with below freezing temperatures, the cooling system must either be protected to the lowest expected ambient temperature, or drained completely.
- When permanent antifreeze and water solutions are used in the cooling system, the solution should be drained and replaced every 2000 service hours or one year, whichever comes first.
  - 1. Loosen radiator cap (1, Figure 6-120) slowly to relieve pressure and remove.
  - 2. Open drain cock (2, Figure 6-121) under radiator and drain coolant in suitable container.
  - 3. Close drain cock (2).



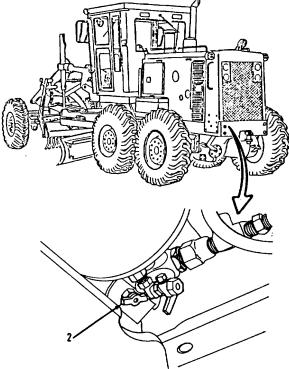


Figure 6-121.

Go to Sheet 3

#### **6-48.** Radiator Servicing. (Sheet 3 of 4)

#### **DRAINING** (cont)

- 4. Remove plug (3, Figure 6-122) from water pump inlet and drain coolant.
- 5. Install plug (3).
- 6. Remove plug (4, Figure 6-123) from engine block and drain coolant.
- 7. Install plug (4).
- 8. Remove plug (5) and washer (6) from transmission oil cooler and drain coolant.
- 9. Install washer (6) and plug (5).

#### **FLUSHING**

- 1. Fill radiator with clean water.
- 2. Run engine for 15 minutes.
- 3. Drain cooling system. Refer to steps 1 thru

#### **WARNING**

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.)

4. Clean radiator using compressed air to clean exterior and to remove obstructions.

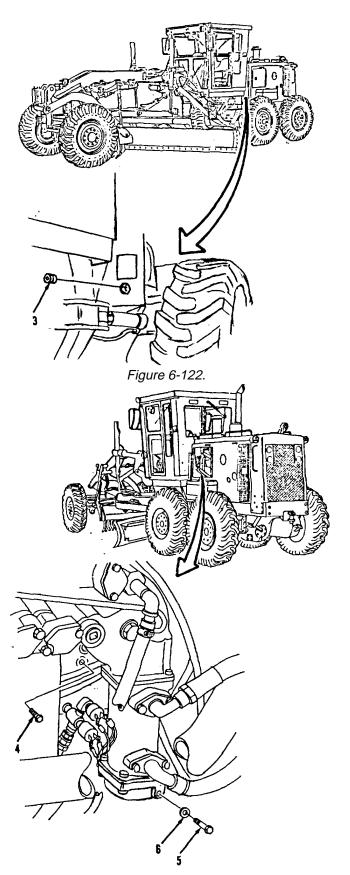


Figure 6-123.

#### **6-48.** Radiator Servicing. (Sheet 4 of 4)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **FILLING**

- 1. Fill radiator with 50 percent water and 50 percent anti-freeze. Capacity is 10 gallons.
- 2. Install radiator cap (1, Figure 6-120).
- 3. Operate engine for 15 minutes and check drain cock (2, Figure 6-121), plug (3, Figure 6-122) and plugs (4 and 5, Figure 6-123) for leaks.
- 4. Remove radiator cap (1, Figure 6-120) slowly.
- 5. Check coolant level.
- 6. Install radiator cap (1).

NOTE
Return 130G Grader to original equipment condition.

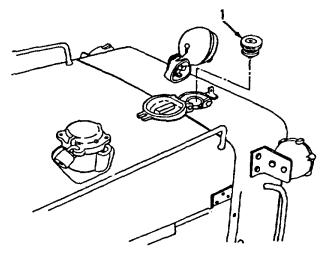


Figure 6-120.

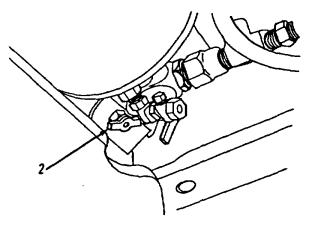


Figure 6-121.

End of Task

#### 6-49. Side Screen Door Assembly. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΔII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

Equipment Condition

TM 5-3805-261-10

Vehicle parked on level ground.
Parking/emergency brake applied.
Equipment lowered to the ground.
Engine stopped.
Master disconnect switch off.

Go to Sheet 2

#### 6-49. Side Screen Door Assembly. (Sheet 2 of 3)

#### **REMOVAL**

#### **WARNING**

The following is a maintenance procedure for the right side screen door assembly. The maintenance procedure for the left side screen door assembly is identical.

- 1. Remove two bolts (1) and washers (2, Figure 6-124).
- 2. Open screen door (5).

#### **WARNING**

Bar is heavy and will slide out when bolts are removed. Support bar to prevent injury.

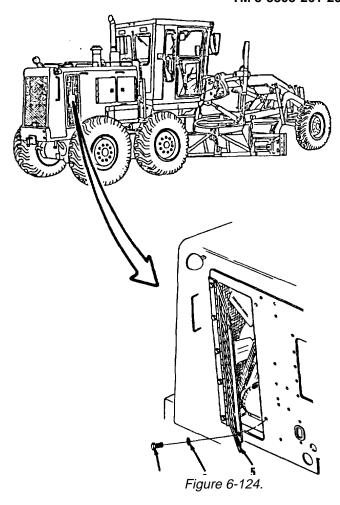
- 3. Support screen door (5) and bar (6, Figure 6-125).
- 4. Remove five bolts (3) and washers Figure 6-124 (4).
- 5. Remove screen door (5) and bar (6).

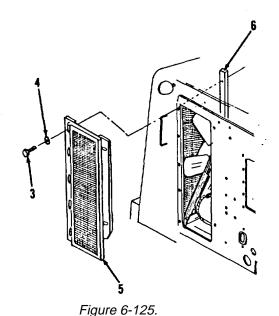
#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.





Go to Sheet 3

#### Side Screen Door Assembly. (Sheet 3 of 3) 6-49.

#### **INSTALLATION**

- Position bar (6, Figure 6-125). 1.
- 2. Position screen door (5).
- 3. Install five washers (4) and bolts (3). Do not tighten bolts (3).
- 4. Close screen door (5).
- Install two washers (2) and bolts (1, Figure 5. 6-126). Do not tighten bolts (1).
- Align screen door (5, Figure 6-127). 6.
- Tighten five bolts (3) and two bolts (1). 7.

**NOTE** Return 130G Grader to original equipment condition.

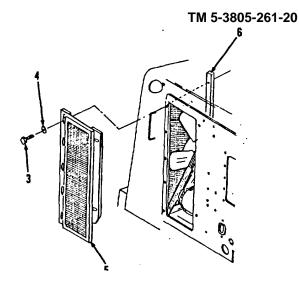


Figure 6-125.

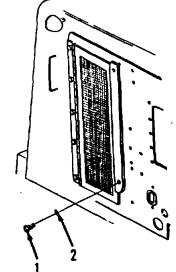


Figure 6-126.

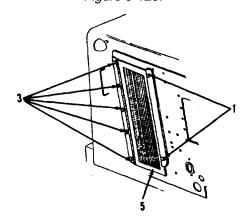


Figure 6-127.

End of Task

#### **CHAPTER 7**

# ELECTRICAL SYSTEM TROUBLESHOOTING AND MAINTENANCE

#### **CHAPTER OVERVIEW**

The purpose of this chapter is to help the technician efficiently troubleshoot and repair malfunctioning equipment and to perform authorized organizational support level maintenance procedures on the 130G Grader.

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#### Section I. CHARGING SYSTEM TROUBLESHOOTING.

- **7-1. GENERAL INFORMATION**. This section lists the common charging system malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **7-2. CHARGING SYSTEM TROUBLESHOOTING PROCEDURES**. This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### CHARGING SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

#### NOTE

Condition of battery will indicate if charging system is operating properly. An adjustment or replacement is necessary if the battery is consistently low or requires excess fluid (more than one ounce per cell, per week).

#### BATTERY LOW OR REQUIRES TOO MUCH FLUID.

Step 1. Check the battery electrolyte level. Refer to TM 5-3805-261-10.

Fill batteries if necessary. Refer to TM 5-3805-261-10.

Step 2. Check the battery cables between the starter motor, battery and engine ground for corrosion or damage. Refer to paragraph 7-112.

Replace cables as necessary. Refer to paragraph 7-112.

Step 3. Check alternator. Refer to paragraph 7-5.

Replace alternator if necessary. Refer to paragraph 7-5.

#### **ELECTRICAL SYSTEM.** (cont)

#### 7-3. Charging System STE/ICE Test.

#### a. TEST 89. ALTERNATOR/GENERATOR OUTPUT VOLTAGE

1. Refer to VTM-General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

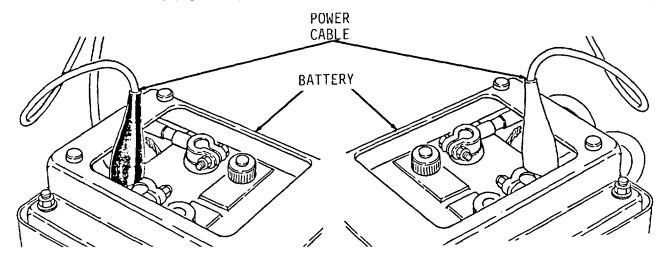


Figure 6-4.

2. Attach red lead clip to output terminal of alternator. Ground black lead clip (Figure 7-1). Make sure that electrical connections are clean.

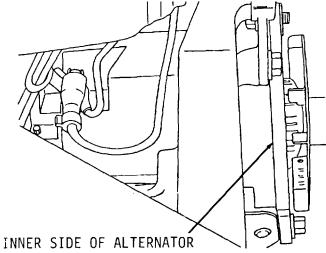


Figure 7-1.

- 3. Perform test using procedure TEST 89 as instructed in TM 9-4910-571-12 & P.
- 4. Voltage should be between 26.5 29.5 volts.
- 5. Return vehicle to its original condition.

#### 7-3. Charging System STE/ICE Test.

#### b. TEST 90. ALTERNATOR OUTPUT CURRENT SENSE

1. Refer to VTM-General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

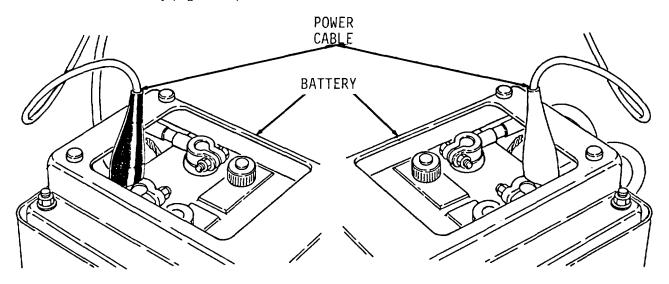


Figure 6-4.

2. Attach current probe to battery positive cable (Figure 7-2).

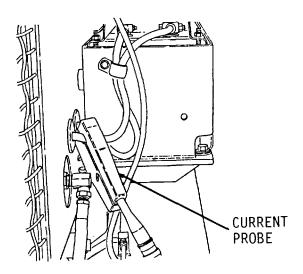


Figure 7-2.

- 3. Perform test using procedure TEST 90 as instructed in TM 9-4910-571-12 & P.
- 4. Compare test results with parameters. Parameters for this test are TO BE DETERMINED.
- 5. Return vehicle to its original condition.

#### Section II. CHARGING SYSTEM MAINTENANCE.

#### 7-4. CHARGING SYSTEM MAINTENANCE PROCEDURES.

- **a.** The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the charging system and its components in good repair.
- **b.** This section is arranged by functional group code and provides a list of charging components to be maintained and step-by-step maintenance procedures.

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#### **CHARGING SYSTEM MAINTENANCE.**

#### 7-5. Alternator. (Sheet 1 of 5)

a. Removal This task covers: b. Cleaning c. Inspection This task covers: a. Removal b. Cleaning c. Inspection d. Installation e. Testing

#### **INITIAL SETUP:**

Applicable Configurations Personnel Required Construction equipment repairer MOS 62B

Tools

General Mechanic's Tool Kit: References Automotive (NSN 5180-00-177-TM 5-3805-261-10

Alternator pulley tool p/n 98S6129

Test Equipment Multimeter

7033)

Materials/Parts

Small tags, Item 41, Appendix C Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

> Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-137 Alternator radio interference

suppression capacitor removed.

Paragraph 7-112 Disconnect positive cable on

right side.

Go to Sheet 2

## **CHARGING SYSTEM MAINTENANCE.** (cont)

## **7-5.** Alternator. (Sheet 2 of 5)

#### **REMOVAL**

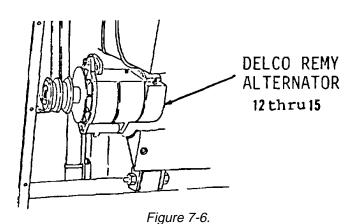
#### **NOTE**

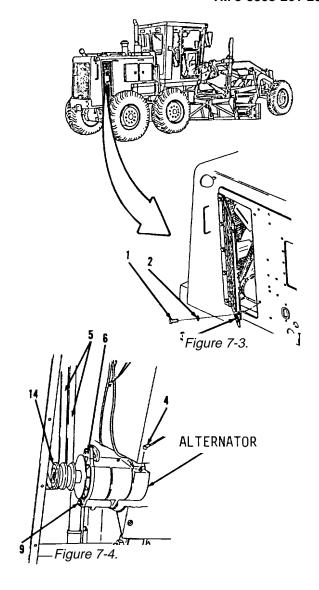
All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

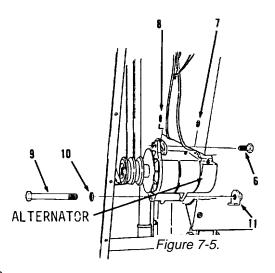
- 1. Loosen bolts (6 and 9), but do not remove.
- 2. Move alternator to release tension on two fan belts (5).
- 3. Remove two fan belts (5) from alternator pulley (14).
- 4. Remove bolt (6) and washers (7 and 8, Figure 7-5).
- 5. Support alternator with one hand and remove bolt (9), washer (10) and nut (11).

## **Delco Remy Alternator**

6. Remove items 12 thru 15 as an assembly (Figure 7-6).







Go to Sheet 3

## **CHARGING SYSTEM MAINTENANCE.**

## **7-5.** Alternator. (Sheet 3 of 5)

#### **REMOVAL**

## **Delco Remy Alternator**

- 10. Remove nut (12) and washer (13, Figure 7-7).
- 11. Using an alternator pulley tool, remove pulley (14) from alternator (15).

## **Robert Bosch Alternator**

- 12. Remove items 16 thru 21 as an assembly (Figure 7-8).
- 13. Remove nut (16), washers (17 and 18) and pulley (19, Figure 7-9).
- 14. Remove key (20) from alternator (21).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

## **Robert Bosch Alternator**

- 1. Install key (20) and pulley (19) on alternator (21, Figure 7-9).
- 2. Install washers (18 and 17) and nut (16). Tighten nut (16) to 75 ft-lb torque.
- 3. Position items 21 thru 16 as an assembly (Figure 7-8) in rear, right side of vehicle.

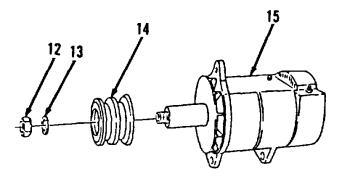


Figure 7-7.

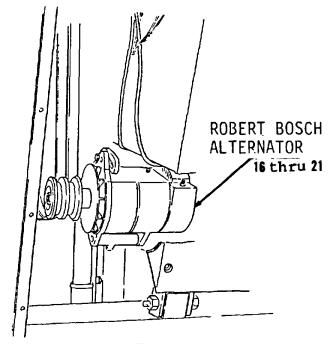


Figure 7-8.

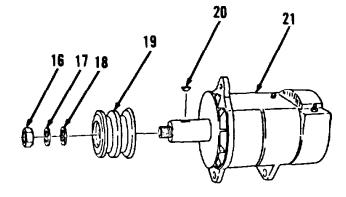


Figure 7-9.

Go to Sheet 4

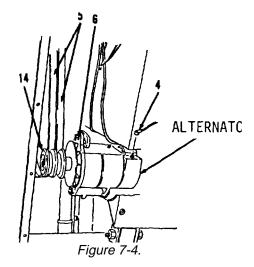
## **CHARGING SYSTEM MAINTENANCE.** (cont)

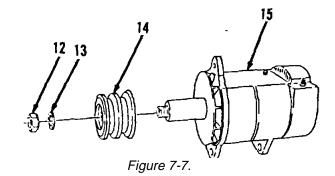
## **7-5.** Alternator. (Sheet 4 of 5)

## **INSTALLATION** (cont)

## **Delco Remy Alternator**

- 4. Install pulley (14), washer (13) and nut (12) on alternator (15, Figure 7-7). Tighten nut (12) to 79 ft-lb torque.
- 5. Position items 15 thru 12 as an assembly (Figure 7-6) in rear, right side of vehicle.
- 6. Install nut (11), washer (10) and bolt (9, Figure 7-5). Do not tighten bolt (9).
- 7. Install washers (8 and 7) and bolt (6). Do not tighten bolt (6).
- 8. Position two fan belts (5, Figure 7-4) on pulley (14).
- 9. Connect terminal assembly (4) to small terminal on alternator.
- 10. Adjust alternator. Refer to paragraph 6-44.





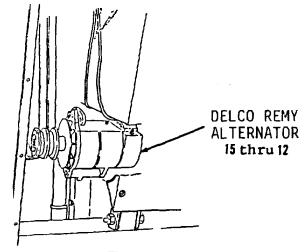
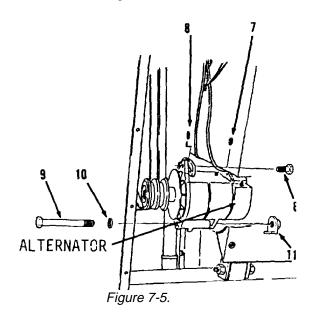


Figure 7-6.



Go to Sheet 5

## **CHARGING SYSTEM MAINTENANCE.**

## **7-5.** Alternator. (Sheet 5 of 5)

#### **TESTING**

- 1. Install radio interference capacitor. Refer to paragraph 7-137.
- 2. Connect multimeter voltage leads to output terminal and ground terminal on alternator.

#### **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 3. Start engine. Refer to TM 5-3805-261-10.
- Observe multimeter voltage in right rear engine compartment. If voltage is not 27.5 + 1, contact Direct Support.
- 5. Install two washers (2) and bolts (1) in door (3, Figure 7-3).
- 6. Stop engine.

## **NOTE**

Return 130G Grader to original equipment condition.

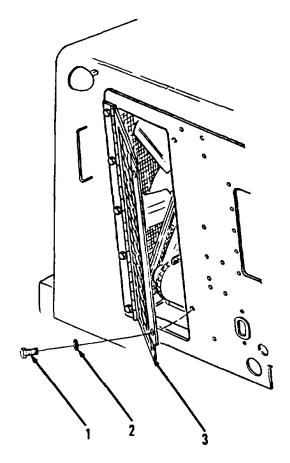


Figure 7-3.

End of Task

## CHARGING SYSTEM MAINTENANCE. (cont)

#### 7-6. Alternator Mountings. (Sheet 1 of 3)

This task covers: b. Cleaning a. Removal c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations Personnel Required Construction equipment

repairer MOS 62B

Tools

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177-7033) TM 5-3805-261-10

Special Environmental Conditions

Test Equipment None None

**General Safety Instructions** 

Materials/Parts Dry cleaning solvent,

Item 14, Appendix C **Torques** Clean cloths, Item 39, All fasteners are tightened to Appendix C standard torques. Refer to

Appendix E.

None

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-5 Alternator removed.

Paragraph 6-46 Fan and fan drive removed.

Go to Sheet 2

## **CHARGING SYSTEM MAINTENANCE.**

## **7-6.** Alternator Mountings. (Sheet 2 of 3)

#### **REMOVAL**

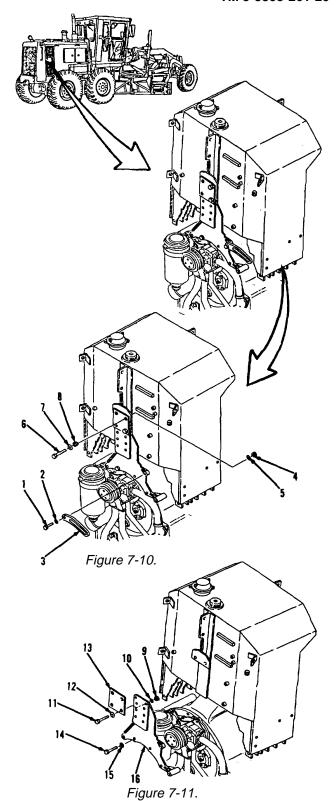
- 1. Remove bolt (1), washer (2) and strap (3, Figure 7-10).
- 2. Remove two nuts (4), washers (5), bolts (6), washers (7) and mountings (8).
- 3. Remove two nuts (9), washers (10), bolts (11), washers (12) and plate (13, Figure 7-11).
- 4. Support bracket (16).
- 5. Remove four bolts (14), washers (15) and bracket (16).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.



Go to Sheet 3

## **CHARGING SYSTEM MAINTENANCE.** (cont)

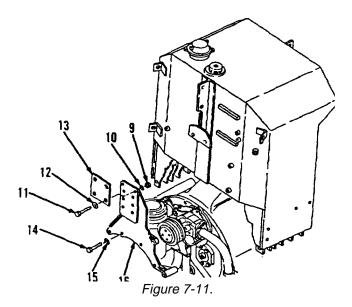
## **7-6.** Alternator Mountings. (Sheet 3 of 3)

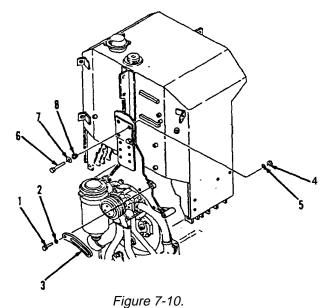
## **INSTALLATION**

- 1. Position bracket (16, Figure 7-11).
- 2. Install four washers (15) and bolts (14).
- 3. Position plate (13).
- 4. Install two washers (12), bolts (11), washers (10) and nuts (9).
- 5. Instill two mountings (8), washers (7), bolts (6), washers (5) and nuts (4, Figure 7-10).
- 6. Install strap (3), washer (2) and bolt (1).

## NOTE

Return 130G Grader to original equipment condition.





End of Task

#### Section III. STARTING MOTOR TROUBLESHOOTING.

- **7-7. GENERAL INFORMATION.** This section lists the common starting malfunctions which may occur during the operation of the 130C Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **7-8. STARTING MOTOR TROUBLESHOOTING PROCEDURES**. This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### STARTING TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

- a. ENGINE WILL NOT START.
  - Step 1. Check solenoid operation. The solenoid switching action can be heard if operation is normal.
  - Step 2. Check battery connection for continuity. Connect one lead of multimeter to battery terminal on solenoid and the other lead to ground.

Replace wire assembly on solenoid. Refer to paragraphs 7-12, 7-13 and 7-14.

Step 3. Check the engine connection for continuity. Connect one lead of multimeter to solenoid terminal and one lead to ground.

Replace solenoid wire assembly if needle does not move. Refer to paragraphs 7-12, 7-13 and 7-14.

Contact Direct Support if needle does move.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

- a. ENGINE WILL NOT START. (cont)
  - Step 4. Check the start switch at battery wire connection for continuity. Connect one lead of multimeter to battery terminal and the other to ground.

Replace start switch wire assembly if needle does not move. Refer to paragraph 7-34. Replace circuit breaker. Refer to paragraph 7-61.

Replace start switch. Refer to paragraph 7-34.

- Step 5. Contact Direct Support.
- b. STARTING MOTOR CRANKS TOO SLOWLY.
  - Step 1. Check all connections and wire assemblies for corrosion or damage.

Replace starter motor wire assemblies if necessary. Refer to paragraph 7-11.

Step 2. Check for an overload from engine with too much friction.

Contact Direct Support if engine is dirty or there is too much friction.

Step 3. Contact Direct Support.

## **ELECTRICAL SYSTEM.**

## 7-9. Starting System STE/ICE Tests.

## a. TEST 89. STARTER MOTOR VOLTAGE

1. Refer to VTM-General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

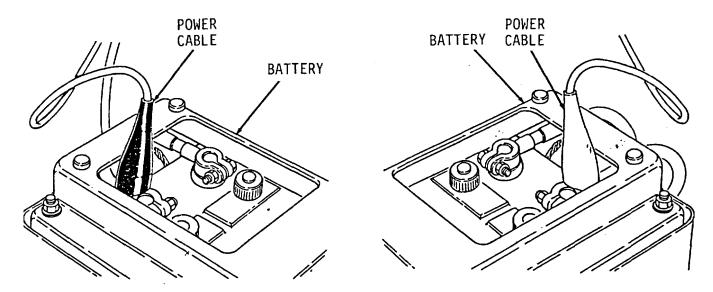
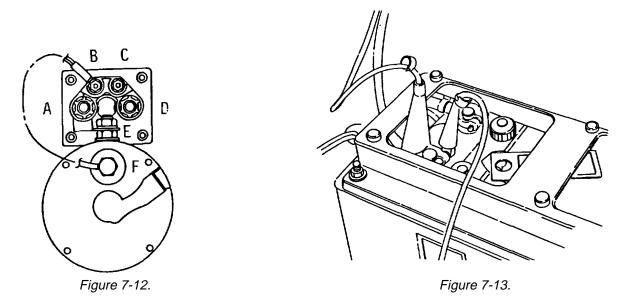


Figure 6-4.

2. Attach red lead clip to terminal E (Figure 7-12). Attach black lead clip to battery negative terminal (Figure 7-13). Make sure that electrical connections are clean.



3. Perform test using procedure TEST 89 as instructed in TM 9-4910-571-12 & P.

## 7-9. Starting System STE/ICE Tests. (cont)

- a. TEST 89. STARTER MOTOR VOLTAGE (cont)
  - 4. Starter motor voltage should be a minimum of 17 volts (Figure 7-14).

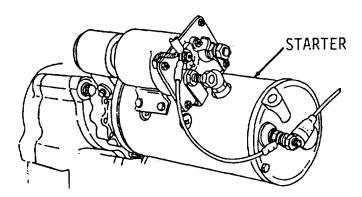


Figure 7-14.

5. Return vehicle to its original condition.

## **ELECTRICAL SYSTEM.**

## 7-9. Starting System STE/ICE Tests.

## b. TEST 89. STARTER NEGATIVE CABLE VOLTAGE DROP

1. Refer to VTM-General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

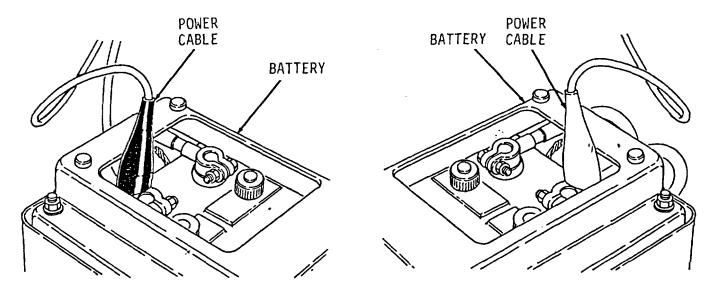
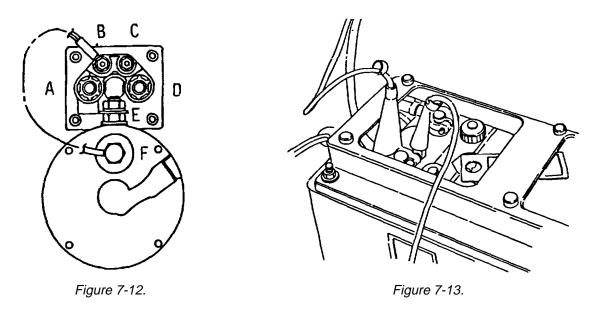


Figure 6-4.

2. Attach red lead clip to ground terminal F (Figure 7-12). Attach black lead clip to battery negative terminal (Figure 7-13). Make sure that electrical contacts are clean.



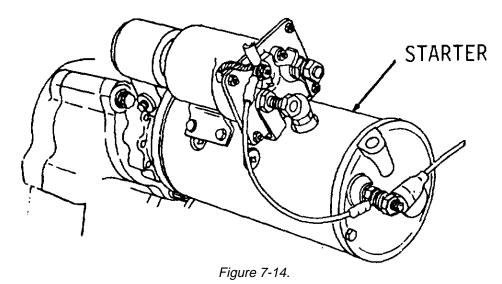
3. Perform test using procedure TEST 89 as instructed in TM 9-4910-571-12 & P.

# **ELECTRICAL SYSTEM.** (cont)

# 7-9. Starting System STE/ICE Tests. (cont)

# b. TEST 89. STARTER NEGATIVE CABLE VOLTAGE DROP (cont)

4. Voltage drop should not be more than 0.1 volts (Figure 7-14).



5. Return vehicle to its original condition.

## 7-9. Starting System STE/ICE Test.

## c. TEST 89. STARTER SOLENOID VOLTAGE

1. Refer to VTM-General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

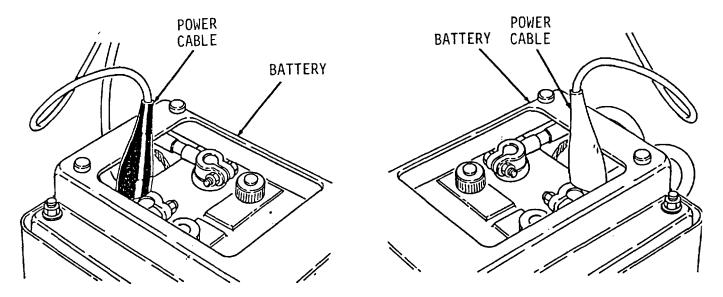
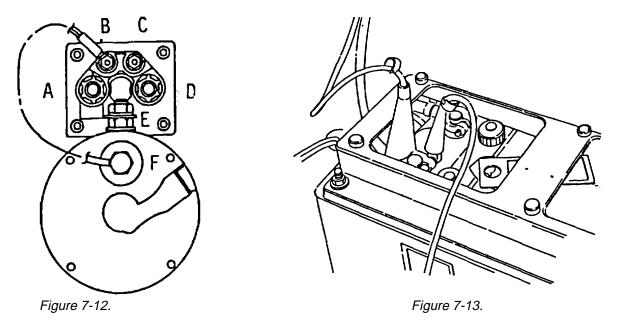


Figure 6-4.

2. Attach red lead clip to positive terminal C on starter solenoid (Figure 7-12). Attach black lead clip to battery negative terminal (Figure 7-13). Make sure that electrical contacts are clean.



# **ELECTRICAL SYSTEM.** (cont)

# 7-9. Starting System STE/ICE Test. (cont)

- c. TEST 89. STARTER SOLENOID VOLTAGE (cont)
  - 3. Perform test using procedure TEST 89 as instructed in TM 9-4910-571-12 & P.
  - 4. Starter solenoid voltage should be 18 volts.
  - 5. Return vehicle to its original condition.

## **ELECTRICAL SYSTEM.**

## 7-9. Starting System STE/ICE Test.

## d. TEST 90. TARTER CURRENT (AVERAGE)

1. Refer to VTM-General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

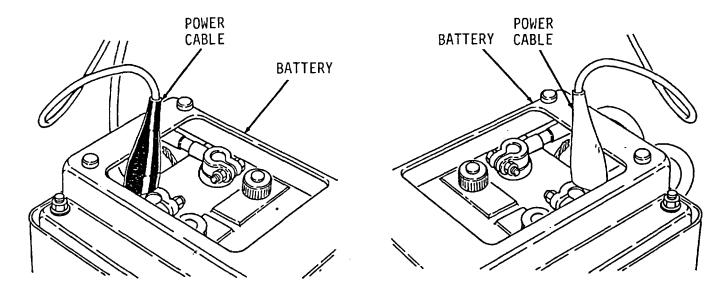


Figure 6-4.

2. Attach current probe to the positive battery cable connected to the starter (Figure 7-15).

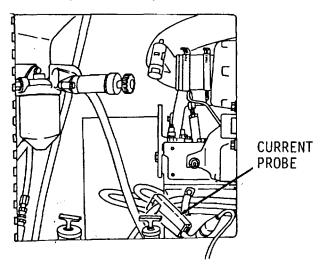


Figure 7-15.

- 3. Perform test using procedure TEST 90 as instructed in TM 9-4910-571-12 & P.
- 4. Starter current should be a minimum of 100 amps. 7-27
- 5. Return vehicle to its original condition.

## 7-9. Starting System STE/ICE Tests. (cont)

## e. TEST 72. STARTER CURRENT (FIRST PEAK)

 Refer to VTM-General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

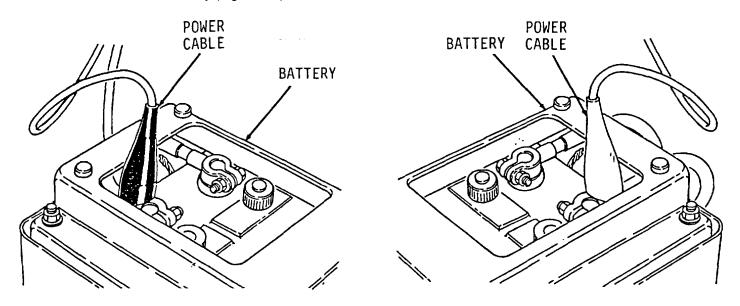


Figure 6-4.

2. Attach current probe to the positive battery cable connected to the starter (Figure 7-15).

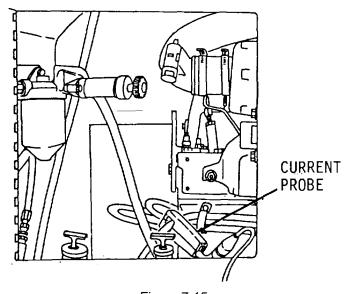


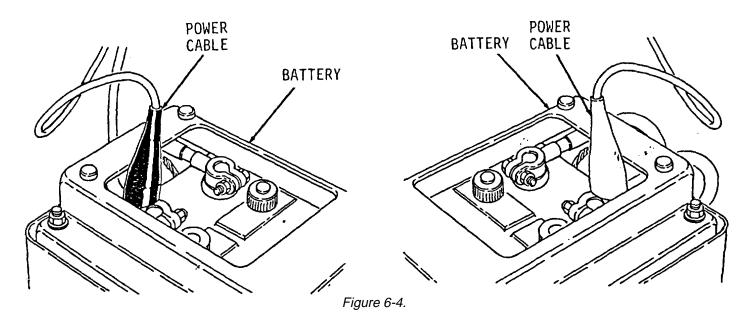
Figure 7-15.

- 3. Perform test using procedure TEST 72 as instructed in TM 4910-571-12 & P.
- 4. Parameters in this test are TO BE DETERMINED.
- 5. Return vehicle to its original condition.

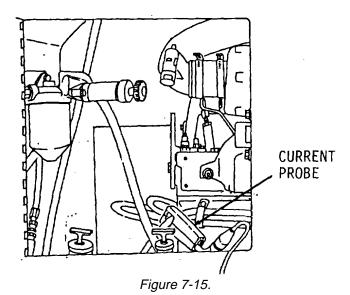
## 7-9. Starting System STE/ICE Tests.

## f. TEST 74. STARTER CIRCUIT RESISTANCE

1. Refer to VTM-General Setup and Checkout Instructions in TM 9-4910-571-12 &P. Connect power cable to battery (Figure 6-4).



2. Attach current probe (Figure 7-15)



- 3. Perform test using procedure TEST 74 as instructed in TM 9-4910-571-12 & P.
- 4. Starter circuit resistance should be between 0.8 to 2.0 millions.
- 5. Return vehicle to its original condition.

## **ELECTRICAL SYSTEM.** (cont)

## 7-9. Starting System STE/ICE Tests. (cont)

## g. TEST 89.0-45 VOLTS

Test 89 is a general electrical test to determine voltage. In the following procedures TEST 89 is used to read positive and negative voltage drop across various starting related connections.

- 1. Positive Voltage Drop
  - (a) STARTER MOTOR
    - (1) Refer to VTM-General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

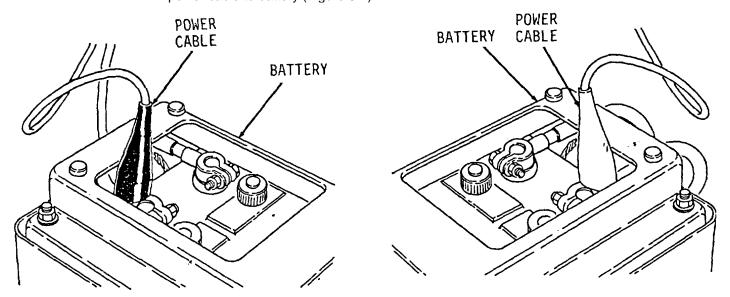


Figure 6-4.

(2) Attach black lead clip to terminal E (Figure 7-12). Attach red lead clip to battery positive terminal (Figure 7-16). Make sure that all electrical contacts are clean.

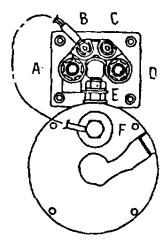


Figure 7-12.

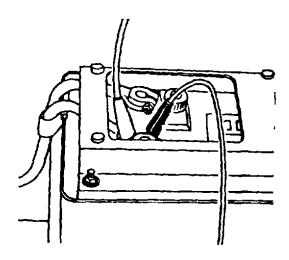


Figure 7-16.

## **ELECTRICAL SYSTEM.**

# 7-9. Starting System STE/ICE Tests.

## g. TEST 89.0-45 VOLTS

- 1. Positive Voltage Drop
  - (a) STARTER MOTOR
    - (3) Perform test using procedures TEST 89 as instructed in TM 9-4910-571-12 & P.
    - (4) Maximum voltage drop allowable is 0.1 volts.
    - (5) Return vehicle to its original condition.

## **ELECTRICAL SYSTEM.** (cont)

## 7-9. Starting System STE/ICE Tests. (cont)

- g. TEST 89.0-45 VOLTS (cont)
  - 1. Positive Voltage Drop (cont)
    - (b) STARTER SOLENOID
      - (1) Refer to VTM-General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

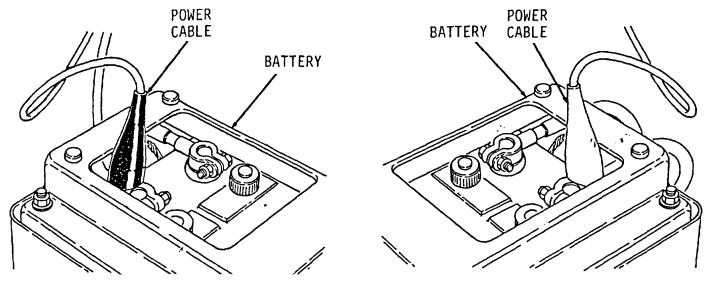
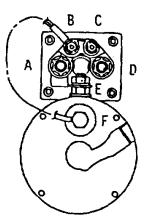


Figure 6-4.

(2) Attach black lead clip to terminal C (Figure 7-12). Attach red lead clip to battery positive terminal (Figure 7-16). Make sure that all electrical contacts are clean.





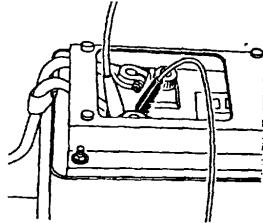


Figure 7-16.

- (3) Perform test using procedure TEST 89 as instructed in TM 9-4910-571-12 & P.
- (4) Maximum voltage drop allowable is 1.0 volts.
- (5) Return vehicle to its original condition.

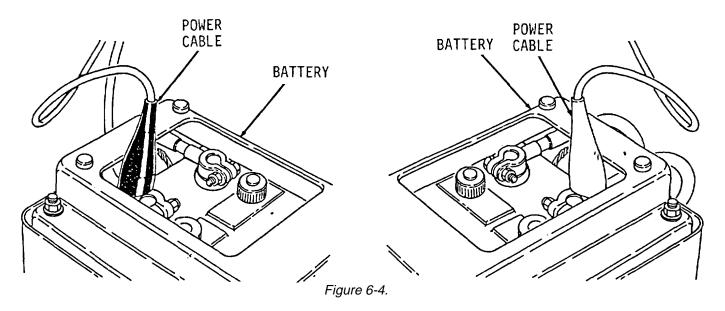
## 7-9. Starting System STE/ICE Tests.

## g. TEST 89. 0-45 VOLTS

- 2. Negative Voltage Drop
  - (a) MASTER DISCONNECT SWITCH
    - (4) Perform test using procedure TEST 89 as instructed in TM 9-4910-571-12 & P.
    - (5) Voltage drop should be no more than 1.0 volts.
    - (6) Return vehicle to its original condition.

## 7-9. Starting System STE/ICE Tests. (cont)

- g. TEST 89.0-45 VOLTS (cont)
  - 2. Negative Voltage Drop
    - (a) MASTER DISCONNECT SWITCH
      - (1) Refer to VTM-General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect a power cable to battery (Figure 6-4).



- (2) Remove cover to operator panel on right side of seat to expose master disconnect switch.
- (3) Attach red lead clip and black lead clip across switch (Figure 7-17).

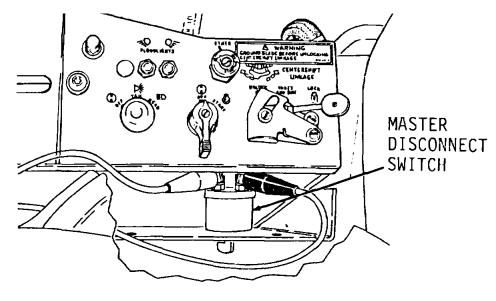


Figure 7-17.

## 7-9. Starting System STE/ICE Tests.

## g. TEST 89.0-45 VOLTS

- 2. Negative Voltage Drop
  - (b) STARTER GROUND TO FRAME
    - (1) Refer to VTM-General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

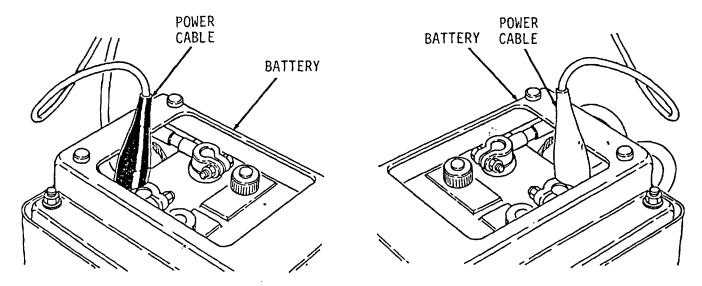


Figure 6-4.

(2) Attach red lead clip to starter (Figure 7-14). Ground black lead clip to frame. Make sure that all electrical contacts are clean.

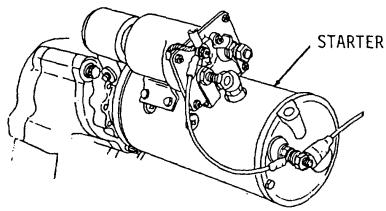


Figure 7-14.

- (3) Perform test using procedure TEST 89 as instructed in TM 9-4910-571-12 & P.
- (4) Voltage drop should be no more than 0.2 volts.
- (5) Return vehicle to its original condition.

## Section IV. STARTING MOTOR.

## 7-10. STARTING MOTOR MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the starting motor and its components in good repair.
- b. This section is arranged by functional group code and provides a list of starting motor components to be maintained and step-by-step maintenance procedures.

#### **INDEX**

<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
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Solenoid (Delco-Remy) Solenoid (Prestolite)	7-12 7-13	7-41 7-44
Solenoid (Bosch)	7-14	7-48

#### STARTING MOTOR MAINTENANCE.

## **7-11.** Starting Motor. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Personnel Required
Construction equipment
repairer MOS 62B

Tools

General Mechanic's Tool Kit:

Automotive (NSN 5180-00-177-7033)

References

TM 5-3805-261-10

Test Equipment

None

Special Environmental Conditions

None

Materials/Parts

Cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C **General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

Gasket, Item 23

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112

Disconnect positive cable on right side.

Paragraph 13-5

Right side engine panel removed.

Go to Sheet 2

## **STARTING MOTOR MAINTENANCE.** (cont)

## 7-11. Starting Motor. (Sheet 2 of 4)

#### **REMOVAL**

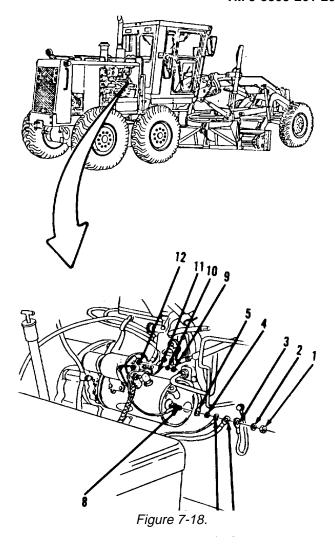
 Remove nut (1) and lockwasher (2) from terminal stud (8, Figure 7-18) on left side of engine.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect wire assembly (3) cable assembly (6), and wire assembly (7).
- 3. Remove lockwasher (4).
- 4. Disconnect cable assembly (5).
- 5. Remove nut (9) and lockwasher (10) from terminal stud (12).
- 6. Disconnect wire assembly (11).
- 7. Remove nut (13) and lockwasher (14) from terminal stud (18, Figure 7-19).
- 8. Disconnect wire assemblies (15, 16 and 17).
- 9. Remove three bolts (19), washers (20) and clip (21) from starting motor drive housing.

Go to Sheet 3



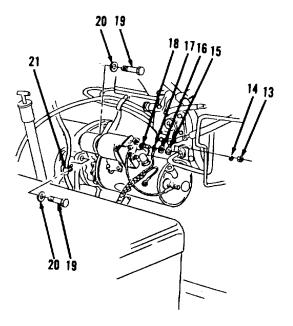


Figure 7-19.

## STARTING MOTOR MAINTENANCE.

## **7-11. Starting Motor**. (Sheet 3 of 4)

#### **REMOVAL**

 Remove starting motor (22) and gasket (23, Figure 7-20). Pull starting motor (22) back and turn solenoid to right to clear solenoid of turbocharger oil line. Discard gasket (23) and remove all gasket material from mounting surfaces.

## **CLEANING**

Clean all parts. Refer to Chapter 2.

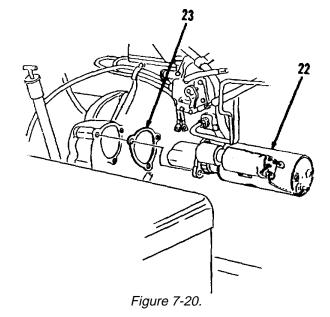
#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Position new gasket (23) and starting motor (22, Figure 7-20) on flywheel housing in right side of engine.
- 2. Install clip (21), three washers (20) and bolts (19, Figure 7-19).
- 3. Position wire assemblies (17, 16 and 15) on terminal stud (18) in starting motor solenoid.
- 4. Install lockwasher (14) and nut (13). Tighten nut (13) to 22 ft-lb torque.

Go to Sheet 4



## **STARTING MOTOR MAINTENANCE.** (cont)

## **7-11.** Starting Motor. (Sheet 4 of 4)

## **INSTALLATION** (cont)

- 5. Position wire assembly (11) on terminal stud (12, Figure 7-18).
- 6. Install lockwasher (10) and nut (9). Tighten nut (9) to 36 ft-lb torque.
- 7. Position cable assembly (5) on terminal stud (8) in starting motor.
- 8. Install lockwasher (4).
- 9. Position wire assembly (7), cable assembly (6) and wire assembly (3).
- 10. Install lockwasher (2) and nut (1). Tighten nut (1) to 22 ft-lb torque.

## NOTE

Return 130C Grader to original equipment condition.

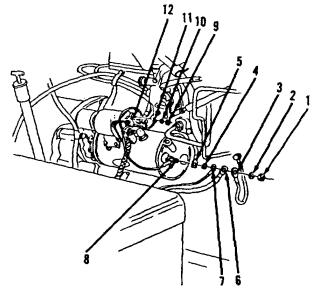


Figure 7-18.

End of Task

## STARTING MOTOR MAINTENANCE.

## **7-12.** Solenoid (Delco-Remy). (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit:

Automotive (NSN 5180-00-177-7033)

Torque wrench

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41,

Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-5 Right side panel assembly removed.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## **STARTING MOTOR MAINTENANCE.** (cont)

## **7-12.** Soleniod (Delco-Remy). (Sheet 2 of 3)

#### **REMOVAL**

1. Remove nut (1) add lockwasher (2) from solenoid (8, Figure 7-21).

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect wire assembly (3) at terminal.
- 3. Remove two nuts (4), lockwashers (5) and connector (6).
- 4. Remove four screws (7).
- 5. Remove solenoid (8). Carefully pull solenoid (8) off plunger mounted in starting motor (9) housing.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

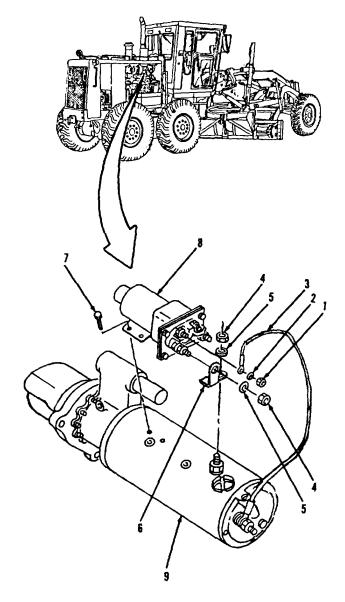


Figure 7-21.

Go to Sheet 3

## STARTING MOTOR MAINTENANCE.

## **7-12.** Solenoid (Delco-Remy). (Sheet 3 of 3)

#### **INSTALLATION**

- 1. Position solenoid (8). Slide plunger into solenoid (8) and aline mounting holes on starting motor (9, Figure 7-21).
- 2. Install four screws (7).
- 3. Install connector (6), two lockwashers (5) and nuts (4) Tighten two nuts (4) to 22 ft-lb torque.
- 4. Position wire assembly (3) on G terminal stud of solenoid (8).
- 5. Install lockwasher (2) and nut (1).

#### NOTE

Return 130G Grader to original equipment condition.

End of Task

## **STARTING MOTOR MAINTENANCE.** (cont)

#### **7-13.** Solenoid (Prestolite). (Sheet 1 of 4)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation
e. Adjustment
f. Testing

#### **INITIAL SETUP:**

## **Applicable Configurations**

ΑII

#### Tools

General Mechanic's Tool Kit:
Automotive (NSN 5180-00-177-7033)
Two 12-volt batteries
Three jumper wires
Adapter tool, Appendix D
Interference block, Appendix D

## Test Equipment

12-volt test lamp Switch

## Materials/Parts

Small tags, Item 41,
Appendix C
Dry cleaning solvent,
Item 14, Appendix C
Clean cloths, Item 39,
Appendix C
Preformed packing, Item 8
Lock nut, Item 9

## Personnel Required

Construction equipment repairer MOS 62B

#### References

TM 5-3805-261-10

#### **Special Environmental Conditions**

None

#### **General Safety Instructions**

None

#### **Torques**

Except for special torques shown, all fasteners are tightened to standard torques. Refer to Appendix E.

## **Troubleshooting References**

None

#### **Equipment Condition**

TM 5-3805-261-10

Paragraph 13-5 Paragraph 7-11 Paragraph 7-112 Vehicle parked on level ground.
Parking/emergency brake applied.
Equipment lowered to the ground.
Engine stopped.
Master disconnect switch off.
Right side panel assembly removed.
Starting motor removed (if necessary).

Disconnect positive cable on right side.

Go to Sheet 2

Change 1 7-44

#### STARTING MOTOR MAINTENANCE.

## 7-13. Solenoid (Prestolite). (Sheet 2 of 4)

#### NOTE

#### **REMOVAL**

Use Prestolite Solenoids only on Prestolite Starters.

1. Remove two nuts (1), lockwashers (2), connector (3) and screw (4, Figure 7-22).

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect wire assembly (5) at terminal.
- 3. Remove screw (6).
- 4. Remove plug (7) and preformed packing (8) from starting motor (14) in lever housing. Discard preformed packing (8).

#### **NOTE**

An adapter tool must be fabricated to aid in removal, replacement and adjustment of lock nut. Refer to Appendix 0.

- Remove and discard lock nut (9, Figure 7-23). Insert fabricated adapter tool in 1/2 inch-3/8 inch drive socket. Insert 5/32 inch hex key through hole in fabricated adapter tool. Hold shaft with hex key and turn lock nut (9) with 3/8 inch wrench on fabricated adapter tool.
- 6. Remove four screws (10), lockwashers (11) and washers (12).
- Separate solenoid (13) from starting motor (14). Pull solenoid (13) with attaching shaft, from lever housing.

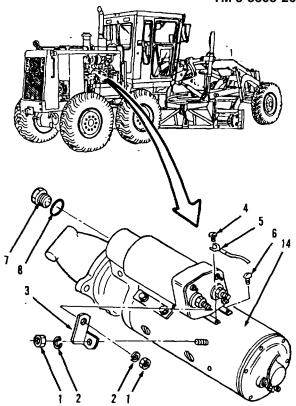


Figure 7-22.

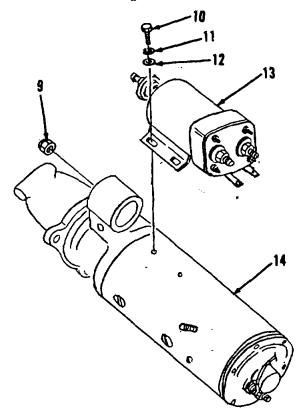


Figure 7-23.

Go to Sheet 3

## **STARTING MOTOR MAINTENANCE**. (cont)

## **7-13.** Solenoid (Prestolite). (Sheet 3 of 4)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Position and install solenoid (13) shaft into starting motor (14, Figure 7-23) lever housing.
- 2. Install four washers (12), lockwashers (11) and screws (10).
- 3. Using fabricated adapter tool, install new lock nut (9). Do not tighten lock nut (9).
- 4. Install screw (6, Figure 7-22).
- Position wire assembly (5) and install screw
   (4).
- 6. Install connector (3), two lockwashers (2) and nuts (1). Tighten two nuts (1) to 22 ft-lb torque.

#### **ADJUSTMENT**

 Measure pinion clearance on starting motor (14). Connect starting motor (14, Figure 7-24) to 12-volt battery. Momentarily touch jumper wire "A" to shift drive pinion into cranking position.

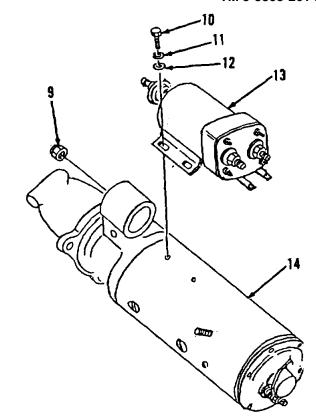


Figure 7-23.

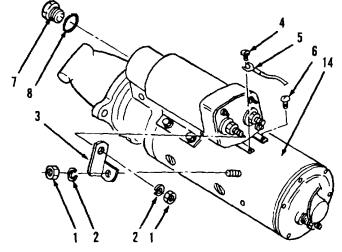


Figure 7-22.

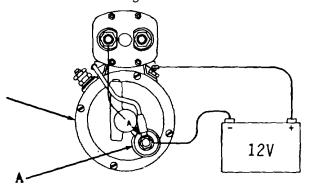


Figure 7-24.

## STARTING MOTOR MAINTENANCE.

## 7-13. Solenoid (Prestolite). (Sheet 4 of 4)

- 2. Push pinion back to eliminate slack. Clearance must be 0.020 to 0.50 inch (Figure 7-25).
- Adjust pinion clearance. Turn lock nut (9) with fabricated adapter tool until specified tolerance is made.

## **TESTING**

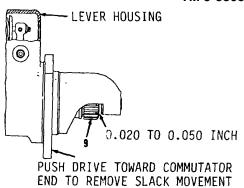
## **NOTE**

An interference block must be fabricated to test the solenoid. Refer to Appendix D.

- 1. Connect solenoid (13, Figure 7-26).
- 2. Install interference block (Figure 7-27).
- 3. Close switch. Replace solenoid (13, Figure 7-26) if test lamp lights.
- 4. Install new preformed packing (8) and plug (7, Figure 7-28).

#### **NOTE**

Return 130G Grader to original equipment condition.



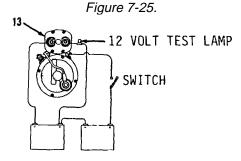


Figure 7-26.

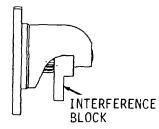


Figure 7-27.

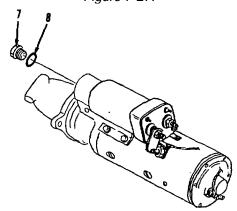


Figure 7-28.

End of Task

# **STARTING MOTOR MAINTENANCE.** (cont)

#### **7-14.** Solenoid (Bosch). (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Seal, Item 15 Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

Torques

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-5 Right side panel assembly removed.

Paragraph 7-11 Starting motor removed. (If necessary).

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

Change 1 7-48

# STARTING MOTOR MAINTENANCE.

# 7-14. Solenoid (Bosch). (Sheet 2 of 3)

#### NOTE

#### **REMOVAL**

Use Bosch Solenoids only with Bosch Starters.

1. Remove nut (1) and lockwasher (2, Figure 7-29).

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

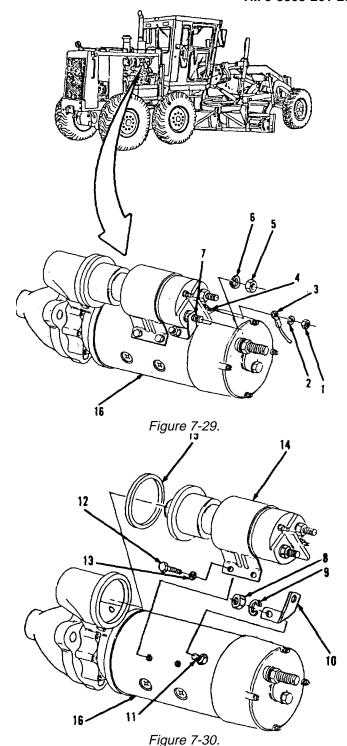
- 2. Disconnect wire assembly (3) from solenoid terminal (4) on starting motor (16).
- 3. Remove nut (5) and lockwasher (6) from solenoid terminal (7).
- 4. Remove nut (8), lockwasher (9) and connector (10) from starting motor terminal (11, Figure 7-30).
- 5. Remove four screws (12), washers (13), solenoid (14) and seal (15) from starting motor (16). Raise solenoid (14) slightly before removing. Discard seal (15).

# **CLEANING**

Clean all parts. Refer to Chapter 2.

### **INSPECTION**

Inspect all parts. Refer to Chapter 2.



Go to Sheet 3

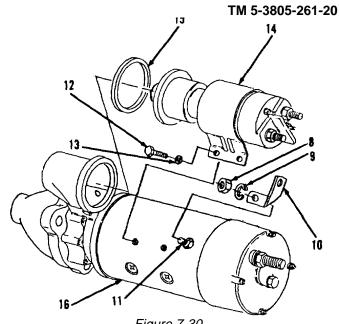
# STARTING MOTOR MAINTENANCE. (cont)

# 7-14. Solenoid (Bosch). (Sheet 3 of 3)

#### **INSTALLATION**

- Install new seal (15), solenoid (14), four washers (13) and screws (12) on starting motor (16, Figure 7-30). Make sure solenoid (14) input shaft engages with internal starting motor (16) lever.
- 2. Install connector (10), lockwasher (9) and nut (8) on starting motor terminal (11).
- 3. Install lockwasher (6) and nut (5) on solenoid terminal (7, Figure 7-29). Tighten nut (5) to 22 ft-lb torque.
- 4. Position wire assembly (3) on solenoid terminal (4).
- 5. Install lockwasher (2) and nut (1).

NOTE
Return 130G Grader to original equipment condition.





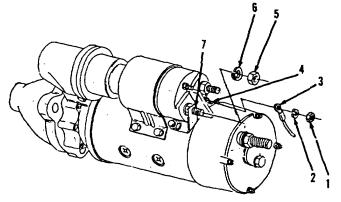


Figure 7-29.

End of Task

#### Section V. STEERING CONTROL CONSOLE TROUBLESHOOTING.

- **7-15. GENERAL INFORMATION**. This section lists the common steering control console malfunctions which may occur during the operation of the 1300 Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **7-16. STEERING CONTROL CONSOLE TROUBLESHOOTING PROCEDURES**. This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

STEERING CONTROL CONSOLE TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

a. STEERING CONTROL CONSOLE SUPPORT MOVES WITHOUT LEVER DISENGAGEMENT (Figure 7-31).

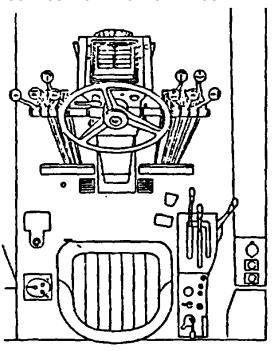


Figure 7-31.

Check the steering control console support.

If the support is damaged or defective--replace. Refer to paragraph 7-33.

b. STEERING CONTROL CONSOLE SUPPORT SLIPS OUT OF POSITION.

Check the steering control console cover assembly.

If the steering control console assembly is damaged or defective--replace. Refer to paragraph 7-24.

# Section VI. STEERING CONTROL CONSOLE MAINTENANCE.

# 7-17. STEERING CONTROL CONSOLE MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the steering control console and its components in good repair.
- b. This section is arranged by functional group code and provides a list of steering control console components to be maintained and step-by-step maintenance procedures.

# **INDEX**

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# 7-18. Electrical Monitor System Panel. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Small tags, Item 41, Appendix C

Dry cleaning solvent,

Item 14, Appendix C

Clean cloths, Item 39,

Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-18 Hood removed from steering control

console.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# **7-18.** <u>Electrical Monitor System Panel</u>. (Sheet 2 of 3)

#### **REMOVAL**

1. Remove steering console hood. Refer to paragraph 13-18, step 1.

#### NOTE

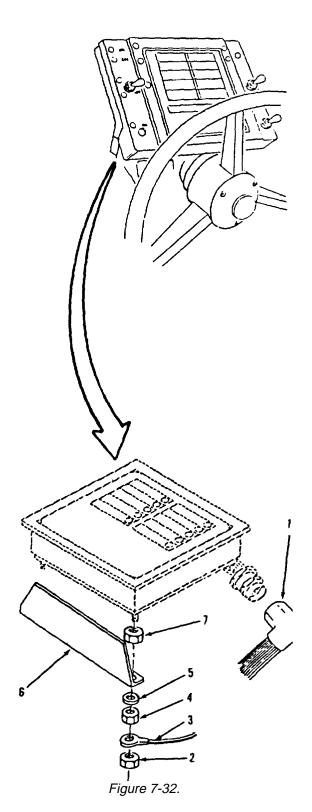
All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- Disconnect harness assembly (1, Figure 7-32) from steering control console. Unscrew connector. Pull to separate.
- 3. Remove nut (2) and wire assembly (3).
- 4. Remove two nuts (4), washers (5) and bracket (6).
- 5. Remove two nuts (7).
- 6. Remove two nuts (8), washers (9) and bracket (10).
- 7. Remove two nuts (11) and bracket (12).

#### **NOTE**

Remove electrical monitor system panel and film only if inspection indicates replacement is necessary.

- 8. Remove electrical monitor system panel (13), if necessary.
- 9. Remove film (14), if necessary.



Go to Sheet 3

# **7-18.** Electrical Monitor System Panel. (Sheet 3 of 3)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

# **INSTALLATION**

- 1. Apply film (14) to electrical monitor system panel (13, Figure 7-33), if removed.
- 2. Position electrical monitor system panel (13) in steering control console, if removed.
- 3. Install bracket (12) and two nuts (11).
- 4. Install bracket (10), two washers (9) and nuts (8).
- 5. Install two nuts (7).
- 6. Install bracket (6), two washers (5) and nuts (4).
- 7. Install wire assembly (3) and nut (2).
- 8. Connect harness assembly (1). Tighten connector to 12 ft-lb torque.
- 9. Install steering console hood. Refer to paragraph 13-18, step 7.

# NOTE

Return 130G Grader to original equipment condition.

End of Task

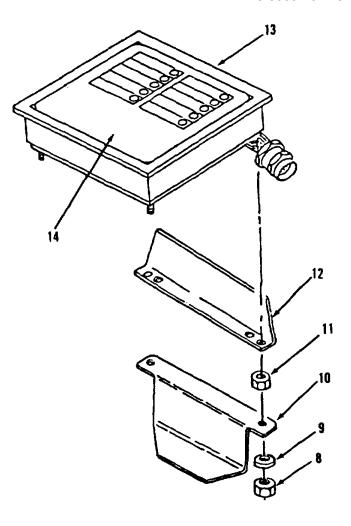


Figure 7-33.

# STEERING CONTROL CONSOLE SYSTEM MAINTENANCE. (cont)

# 7-19. Electrical Monitor System Panel Switches. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Lock nut, Item 1 Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# 7-19. Electrical Monitor System Panel Switches. (Sheet 2 of 3)

#### **REMOVAL**

#### WARNING

Always disconnect the positive battery cable on the right side before working on electrical components. Failure to follow this procedure may cause INJURY. If you receive an electrical shock, seek medical attention immediately.

#### **NOTE**

This procedure covers removal and installation of one switch. Follow these instructions for the MS test switch, the supplemental steering function switch, the blade float function switch, and the differential unlock switch.

- 1. Remove steering console hood. Refer to paragraph 13-18, step 1.
- 2. Remove lock nut (1), lockwasher (2) and items 3 thru 7 as an assembly from electrical monitor system panel (8, Figure 7-34). Discard lock nut (1).
- 3. Disconnect two wire leads (3) at terminals (6, Figure 7-35).
- 4. Remove two screws (4), lockwashers (5) and terminals (6) from switch (7).

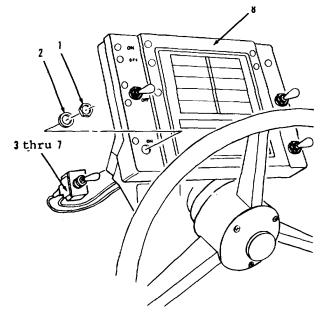


Figure 7-34.

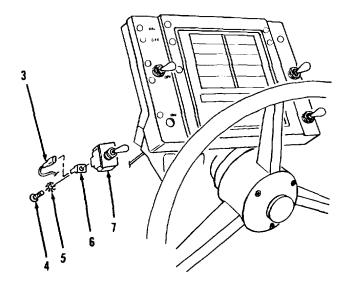


Figure 7-35.

Go to Sheet 3

# STEERING CONTROL CONSOLE SYSTEM MAINTENANCE. (cont)

# 7-19. Electrical Monitor System Panel Switches. (Sheet 3 of 3)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

# **INSPECTION**

Inspect all parts. Refer to Chapter 2.

# **INSTALLATION**

1. Install two terminals (6), lockwashers (5) and screws (4) on switch (7, Figure 7-35).

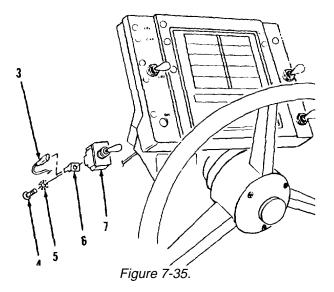
#### NOTE

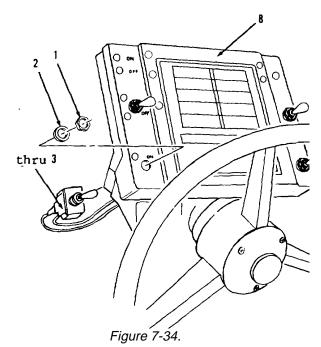
All connections must be clean and free of corrosion.

- 2. Connect two wire leads (3) to terminals (6).
- Install items 7 thru 3 as an assembly, lockwasher (2) and new lock nut (1) in electrical monitor system panel (8, Figure 7-34). Tighten lock nut (1) to 1.5 ft-lb torque.
- 4. Install steering console hood. Refer to paragraph 13-18, step 7.

#### **NOTE**

Return 130G Grader to original equipment condition.





End of Task

#### Electrical Monitor System Function Lights. (Sheet 1 of 3) 7-20.

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation 

#### **INITIAL SETUP:**

Applicable Configurations Personnel Required

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 13-18 Cover removed from steering control

console.

Go to Sheet 2

# **7-20.** Electrical Monitor System Function Lights. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

The following is a maintenance procedure for one function light. The maintenance procedure for the remaining function lights is identical.

1. Remove steering console hood. Refer to paragraph 13-18, step 1.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect wire assembly (1, Figure 7-36) from electrical monitor system panel (4).
- 3. Remove miniature lamp (2).
- 4. Remove lamp housing (3) from electrical monitor system panel (4).

# **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

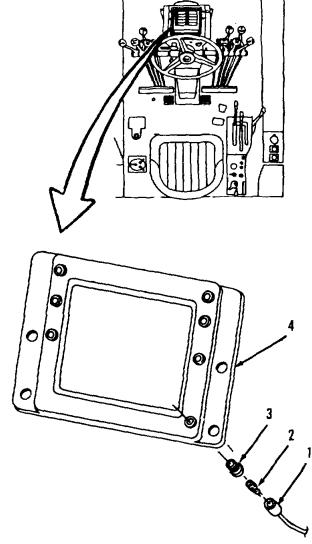


Figure 7-36.

Go to Sheet 3

# **7-20.** Electrical Monitor System Function Lights. (Sheet 3 of 3)

# **INSTALLATION**

- 1. Install lamp housing (3) in electrical monitor system panel (4, Figure 7-36).
- 2. Install miniature lamp (2).
- 3. Install wire assembly (1).
- 4. Install steering console hood. Refer to paragraph 13-18, step 7.

NOTE
Return 130G Grader to original equipment condition.

End of Task

#### Electrical Monitor System Fault Light. (Sheet 1 of 3) 7-21.

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation 

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C

Personnel Required Construction equipment repairer MOS 62B

References TM 5-3805-261-10

**Special Environmental Conditions** 

**General Safety Instructions** 

None

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

# <u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 13-18 Cover removed from steering control

console.

Go to Sheet 2

# **7-21.** Electrical Monitor System Fault Light. (Sheet 2 of 3)

#### **REMOVAL**

1. Remove steering console hood. Refer to paragraph 13-18, step 1.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect two wire assemblies (1) from rear on panel (10, Figure 7-37) of steering control console.
- 3. Remove lock nut (2), washer (3) and items 4 thru 9 as an assembly from rear of panel (10).
- 4. Remove lens (5) and lamp (6) from lamp base (4).
- 5. Remove two screws (7), lockwashers (8) and terminals (9).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

# **INSPECTION**

Inspect all parts. Refer to Chapter 2.

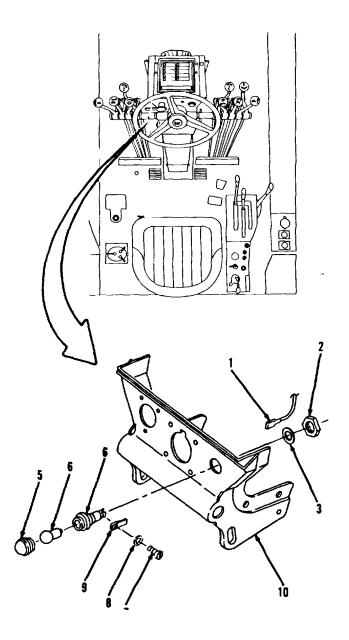


Figure 7-37.

Go to Sheet 3

# 7-21. <u>Electrical Monitor System Fault Light</u>. (Sheet 3 of 3)

# **INSTALLATION**

- Install two terminals (9), lockwashers (8) and screws (7) on lamp base (4, Figure 7-37).
- 2. Install lamp (6) and lens (5).
- 3. Install items 9 thru 4 as an assembly, washer (3) and lock nut (2) on rear of panel (10).
- 4. Connect two wire assemblies (1) to rear of panel (10) of steering control console.
- 5. Install steering console hood. Refer to paragraph 3-18, step 7.

# NOTE Return 130G Grader to original equipment condition.

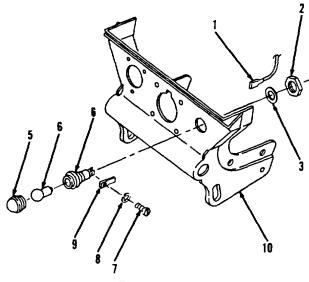


Figure 7-37.

End of Task

# **7-22.** Turn Signal Switch. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-18 Cover removed from steering control

console.

Go to Sheet 2

# **7-22.** Turn Signal Switch. (Sheet 2 of 2)

#### **REMOVAL**

1. Remove steering console hood. Refer to paragraph 13-18, step 1.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect three wire assemblies (1, Figure 7-38) from steering control console.
- Remove three nuts (2), washers (3), bolts
   (4) and switch (5) from steering control console (6).

# **CLEANING**

Clean all parts. Refer to Chapter 2.

#### INSPECTION

Inspect all parts. Refer to Chapter 2.

# **INSTALLATION**

- 1. Install switch (5), three bolts (4), washers (3) and nuts (2) in steering control console (6, Figure 7-38).
- 2. Connect three wire assemblies (1). Make sure connections are clean and free of corrosion.
- 3. Install steering console hood. Refer to paragraph 3-18, step 7.

#### NOTE

Return 1300 Grader to original equipment condition.

End of Task

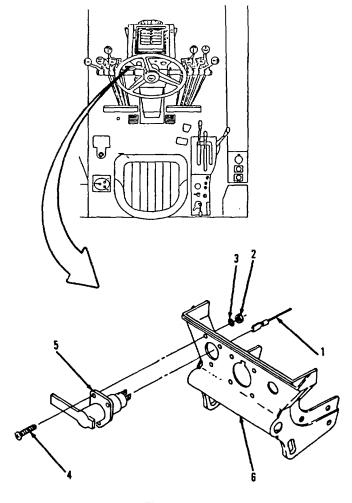


Figure 7-38.

# **7-23.** Articulation Indicator Light. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Small tags, Item 41, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-24 Cover removed from steering control

console.

Go to Sheet 2

# 7-23. Articulation Indicator Light. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Remove lens (1, Figure 7-39) from monitor system panel.
- 2. Remove miniature bulb (2).

# NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 3. Disconnect wire assembly (3).
- 4. Remove lock nut (4), lockwasher (5) and spacer (6).
- 5. Remove base (7) from bracket (8).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

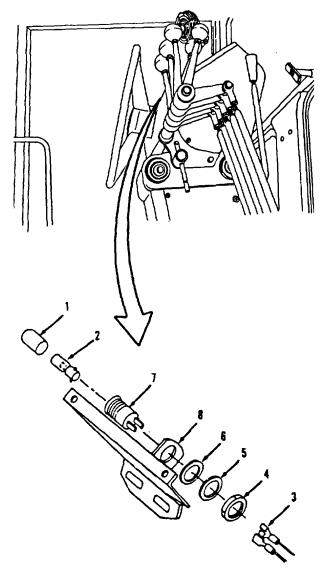


Figure 7-39.

Go to Sheet 3

# **7-23.** Articulation Indicator Light. (Sheet 3 of 3)

# **INSTALLATION**

- 1. Install base (7) on bracket (8, Figure 7-39).
- 2. Install spacer (6), lockwasher (5) and lock nut (4).
- 3. Connect wire assembly (3).
- 4. Install miniature bulb (2).
- 5. Install lens (1) on monitor system panel.

NOTE
Return 130G Grader to original equipment condition.

End of Task

# STEERING CONTROL CONSOLE SYSTEM MAINTENANCE. (cont)

# **7-24.** Steering Control Console Cover. (Sheet 1 of 3)

This task covers: a. Disassembly b. Cleaning c. Inspection

d. Assembly

**INITIAL SETUP:** 

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

PVC Adhesive MIL-A-22010A,

Item 3, Appendix C

Seal

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

Torques

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-19 Panel switches removed.

Paragraph 7-20 Function lights removed.

Paragraph 7-23 Articulation indicator light removed.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# **7-24.** Steering Control Console Cover. (Sheet 2 of 3)

#### **DISASSEMBLY**

- 1. Separate items 1 thru 2 as an assembly from items 3 thru 7 as an assembly (Figure 7-40).
- 2. Remove four nuts (2) from panel (1).
- 3. Remove two green lenses (3) four amber lenses (4) and red lens (5) from cover (7, Figure 7-41).

#### NOTE

Remove seal from back of cover only if inspection proves removal is necessary.

 Remove and discard seal (6). Replace if torn, distorted or deteriorated. Remove all seal and adhesive material from mounting surfaces.



Clean all parts. Refer to Chapter 2.

# **INSPECTION**

Inspect all parts. Refer to Chapter 2.

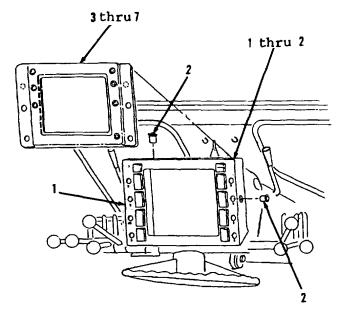


Figure 7-40.

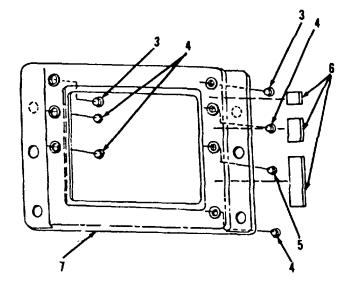


Figure 7-41.

Go to Sheet 3

# STEERING CONTROL CONSOLE SYSTEM MAINTENANCE. (cont)

# **7-24.** Steering Control Console Cover. (Sheet 3 of 3)

# **ASSEMBLY**

- 1. Install new seal (6) to cover (7, Figure 7-41), if removed. Cut to size from bulk seal.
- Install red lens (5), four amber lenses (4) and two green lenses (3) on cover (7).
   Apply a light thin coat of PVC adhesive to outer diameter of lens holes in cover (7).
   Apply to backside of cover only.
- 3. Install four nuts (2) in panel (1, Figure 7-40).
- 4. Position and install items 7 thru 3 as an assembly on items 2 thru 1 as an assembly.

NOTE
Return 130G Grader to original equipment condition.

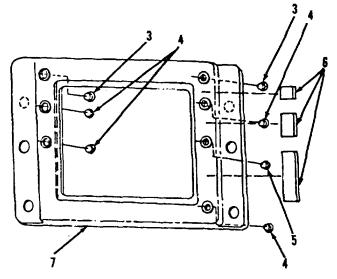


Figure 7-41.

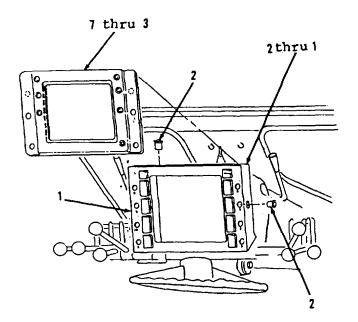


Figure 7-40.

End of Task

# Section VII. OPERATOR'S PANEL CONSOLE TROUBLESHOOTING.

- **7-25. GENERAL INFORMATION**. This section lists the common operator's panel console malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **7-26. OPERATOR'S PANEL CONSOLE TROUBLESHOOTING PROCEDURES.** This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

# OPERATOR'S PANEL CONSOLE TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

a. OPERATOR'S PANEL VIBRATES.

Check the operator's panel mounting bolt (Figure 7-42).

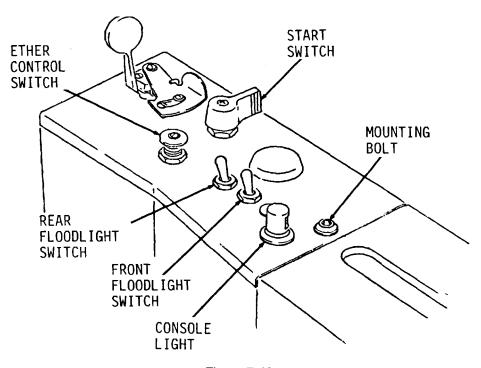


Figure 7-42

If the mounting bolt is loose--tighten. If the mounting bolt is stripped, damaged or defective--replace. Refer to paragraph 7-33.

# OPERATOR'S PANEL CONSOLE TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cont)

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

#### b. CONSOLE LIGHT DOES NOT OPERATE.

Step 1. Check the console lamp bulb filament.

If the filament is defective--replace bulb. Refer to paragraph 7-30.

Step 2. Check the main circuit breaker.

Reset or replace circuit breaker. Refer to paragraph 7-31.

Step 3. Test the continuity of the console light switch. Connect one lead to the back of switch and the other lead to ground.

If the multimeter needle does not move, the circuit does not have continuity. Replace switch. Refer to paragraph 7-30.

#### c. FLOODLIGHT SWITCH DOES NOT OPERATE.

Step 1. Test the continuity of the floodlight switch. Connectone lead of multimeter to switch and one lead to ground.

If the multimeter needle does not move--the circuit does not have continuity. Replace floodlight switch. Refer to paragraph 7-28.

Step 2. Test the continuity of the wire assemblies. Connect multimeter to each end of wire assembly.

If the multimeter needle does not move, the circuit does not have continuity. Replace wire assembly. Refer to paragraphs 7-28 and 7-117.

Step 3. Repeat step 2 for remaining wire assembly.

# OPERATOR'S PANEL CONSOLE TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

#### d. ETHER CONTROL SWITCH DOES NOT OPERATE.

Step 1. Test the continuity of the ether control switch. Connect one lead of multimeter to switch and one lead to ground.

If the multimeter needle does not move, the circuit does not have continuity. Replace ether control switch. Refer to paragraph 7-29.

Step 2. Test the continuity of the wire assemblies. Connect multimeter to each end of wire assembly.

If the multimeter needle does not move, the circuit does not have continuity. Replace wire assembly. Refer to paragraphs 7-29 and 7-117.

Step 3. Repeat step 2 for remaining wire assembly.

#### e. DISCONNECT SWITCH DOES NOT OPERATE.

Step 1. Test the continuity of the disconnect switch. Connect one lead of multimeter to switch and one lead to ground.

If the multimeter needle does not move, the circuit does not have continuity. Replace disconnect switch. Refer to paragraph 7-32.

Step 2. Test the continuity of the wire assemblies. Connect multimeter to each end of wire assembly.

If the multimeter needle does not move, the circuit does not have continuity. Replace wire assembly. Refer to paragraphs 7-32 and 7-117.

Step 3. Repeat step 2 for remaining wire assembly.

# OPERATOR'S PANEL CONSOLE TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cont)

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

# f. START SWITCH DOES NOT OPERATE.

Step 1. Test the continuity of the start switch. Connect one lead of multimeter to switch and one lead to ground.

If the multimeter needle does not move, the circuit does not have continuity. Replace start switch. Refer to paragraph 7-34.

Step 2. Test the continuity of the wire assemblies. Connect multimeter to each end of wire assembly.

If the multimeter needle does not move, the circuit does not have continuity. Replace wire assembly. Refer to paragraphs 7-34 and 7-117.

Step 3. Repeat step 2 for remaining wire assemblies.

# Section VIII. OPERATOR'S PANEL CONSOLE MAINTENANCE.

# 7-27. OPERATOR'S PANEL CONSOLE MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the operator's panel console and its components in good repair.
- b. This section is arranged by functional group code and provides a list of operator's panel console components to be maintained and step-by-step maintenance procedures.

#### **INDEX**

<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
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Ether Control Switch	7-29	7-81
Control Console Light	7-30	7-84
Main Circuit Breaker	7-31	7-87
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Control Console	7-33	7-91
Start Switch	7-34	7-95

# **OPERATOR'S PANEL CONSOLE MAINTENANCE. (cont)**

#### 7-28. Floodlight Switches. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41,

Appendix C Lock nut, Item 1 Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 13-15 Side plate removed from operator's

panel console.

Go to Sheet 2 **7-78** 

# **OPERATOR'S PANEL CONSOLE MAINTENANCE.**

# 7-28. Floodlight Switches. (Sheet 2 of 3)

# **REMOVAL**

#### NOTE

- The following is a maintenance procedure for the rear floodlight switch. The maintenance procedure for the front floodlight switch is identical.
- All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.
- Remove lock nut (1), lockwasher (2) and switch (3, Figure 7-43). Discard lock nut (1).
- 2. Disconnect two wire assemblies (4) from terminals (7).
- 3. Remove two screws (5), washers (6) and terminals (7) from switch (3).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

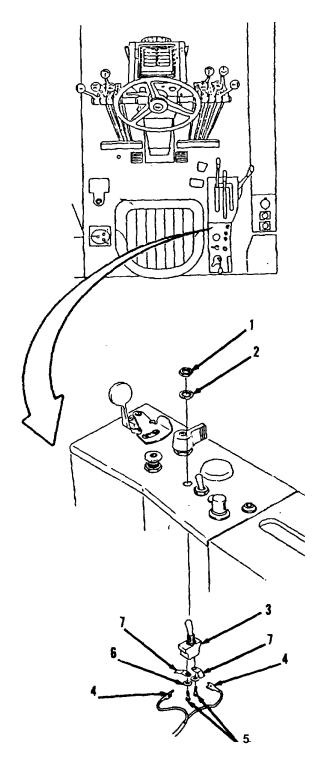


Figure 7-43

Go to Sheet 3

# **OPERATOR'S PANEL CONSOLE MAINTENANCE. (cont)**

# 7-28. Floodlight Switches. (Sheet 3 of 3)

# **INSTALLATION**

- 1. Install two terminals (7), washers (6) and screws (5) on switch (3, Figure 7-43).
- 2. Connect two wire assemblies (4) to terminals (7).
- 3. Install switch (3), lockwasher (2) and new lock nut (1) in operator's panel console.

# **NOTE**

Return 130G Grader to original equipment condition.

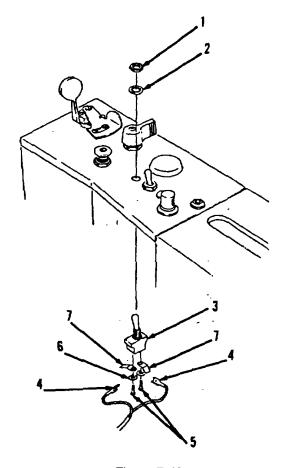


Figure 7-43

End of Task

#### **OPERATOR'S PANEL CONSOLE MAINTENANCE.**

# 7-29. Ether Control Switch. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

<u>Applicable Configurations</u> <u>Personnel Required</u>

II Construction equipment

repairer MOS 62B

None

<u>Tools</u>

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177- TM 5-3805-261-10

7033)

Test Equipment

None

General Safety Instructions

Materials/Parts None

Dry cleaning solvent,
Item 14, Appendix C Torques

Clean cloths, Item 39,
Appendix C
Appendix C
Appendix C
All fasteners are tightened to standard torques. Refer to

Small tags, Item 41, Appendix E.
Appendix C

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

**Special Environmental Conditions** 

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 13-15 Side plate removed from operator's

panel console.

Go to Sheet 2 **7-81** 

# **OPERATOR'S PANEL CONSOLE MAINTENANCE. (cont)**

# 7-29. Ether Control Switch. (Sheet 2 of 3)

# **REMOVAL**

- 1. Remove screw (1), lockwasher (2), and knob (3, Figure 7-44).
- 2. Remove lock nut (4), lockwasher (5) and switch (6).
- 3. Remove lock nut (7) from switch (6).
- 4. Remove two screws (8) and lockwashers (9).

# NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

5. Disconnect wire assemblies (10 and 11).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

# **INSPECTION**

Inspect all parts. Refer to Chapter 2.

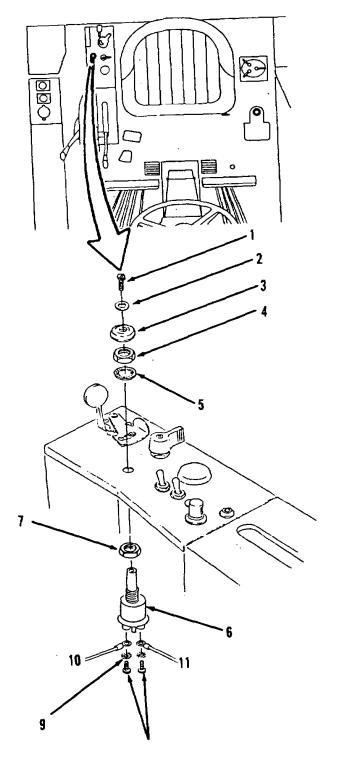


Figure 7-44

Go to Sheet 3

# **OPERATOR'S PANEL CONSOLE MAINTENANCE.**

# 7-29. Ether Control Switch. (Sheet 3 of 3)

# **INSTALLATION**

- 1. Connect wire assemblies (11 and 10, Figure 7-44).
- 2. Install two lockwashers (9) and screws (8).
- 3. Install lock nut (7) on switch (6).
- 4. Install switch (6), lockwasher (5) and lock nut (4).
- 5. Install knob (3), lockwasher (2) and screw (1).

# NOTE

Return 130C Grader to original equipment condition.

End of Task

### **OPERATOR'S PANEL CONSOLE MAINTENANCE. (cont)**

#### 7-30. Control Console Light. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

References

d. Installation

**INITIAL SETUP:** 

Applicable Configurations
All
Personnel Required
Construction equipment

repairer MOS 62B

Tools
General Mechanic's Tool Kit:

Automotive (NSN 5180-00-177- TM 5-3805-261-10

7033)

Test Equipment Special Environmental Conditions
None

<u>st Equipment</u> No None

General Safety Instructions

Materials/Parts None

Appendix C standard torques. Refer to

Small tags, Item 41, Appendix E.
Appendix C

<u>Troubleshooting References</u>

None

Equipment Condition
TM 5-3805-261-10
Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 13-15 Side plate removed from operator's

panel console.

Go to Sheet 2 **7-84** 

### **OPERATOR'S PANEL CONSOLE MAINTENANCE.**

# 7-30. Control Console Light. (Sheet 2 of 3)

# **REMOVAL**

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 1. Disconnect two wire assemblies (1, Figure 7-45).
- 2. Remove lock nut (2), lockwasher (3) and spacer (4).
- 3. Remove switch (5).
- 4. Remove lens (6).
- 5. Remove miniature bulb (7).

### **CLEANING**

Clean all parts. Refer to Chapter 2.

### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

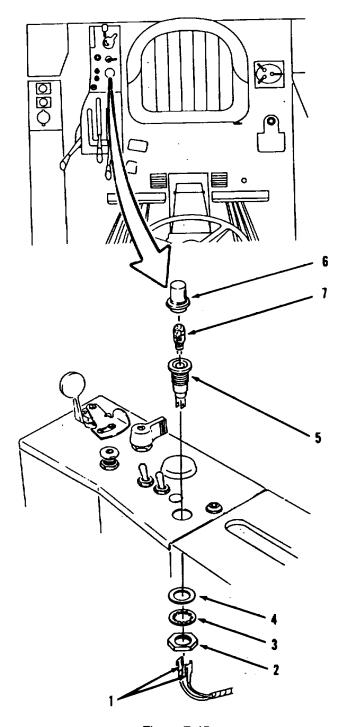


Figure 7-45

# **OPERATOR'S PANEL CONSOLE MAINTENANCE. (cont)**

# 7-30. Control Console Light. (Sheet 3 of 3)

### **INSTALLATION**

- 1. Install miniature bulb (7, Figure 7-45).
- 2. Install lens (6).
- 3. Position switch (5) in control console with lens window in direction of switches.
- 4. Install spacer (4), lockwasher (3) and lock nut (2).
- 5. Connect two wire assemblies (1).

### **NOTE**

Return 130G Grader to original equipment condition.

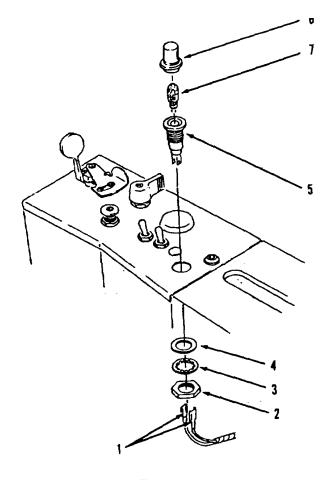


Figure 7-45

End of Task

### **OPERATOR'S PANEL CONSOLE MAINTENANCE.**

#### 7-31. Main Circuit Breaker. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 13-15 Left side plate removed from operator's

panel console.

Go to Sheet 2 7-87

# OPERATOR'S PANEL CONSOLE MAINTENANCE. (cont)

# 7-31. Main Circuit Breaker. (Sheet 2 of 2)

#### **REMOVAL**

1. Remove two lock nuts (1) and washers (2) from main circuit breaker (4, Figure 7-46).

# NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

2. Disconnect two wire assemblies (3).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Connect two wire assemblies (3) to main circuit breaker (4, Figure 7-46).
- 2. Install two washers (2) and lock nuts (1).

# **NOTE**

Return 130G Grader to original equipment condition.

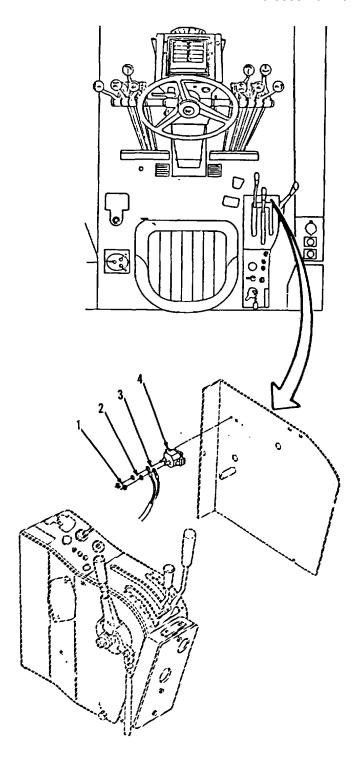


Figure 7-46

End of Task

### **OPERATOR'S PANEL CONSOLE MAINTENANCE.**

### 7-32. Disconnect Switch. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

<u>Applicable Configurations</u>
All

<u>Personnel Required</u>
Construction equipment

repairer MOS 62B

Tools
General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177- TM 5-3805-261-10

7033)
Special Environmental Conditions

Test Equipment None None

General Safety Instructions
None

Materials/Parts None
Dry cleaning solvent,

Item 14, Appendix C
Clean cloths, Item 39,

All fasteners are tightened to

Appendix C standard torques. Refer to

Small tags, Item 41, Appendix E. Appendix C

Troubleshooting References

None

Equipment Condition
TM 5-3805-261-10
Vehicle parked on level ground.

Parking/emergency brake applied.
Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 13-15 Left side plate removed from operator's

panel console.

Go to Sheet 2 **7-89** 

# **OPERATOR'S PANEL CONSOLE MAINTENANCE. (cont)**

# 7-32. Disconnect Switch. (Sheet 2 of 2)

### **REMOVAL**

1. Remove two nuts (1) and washers (2) from disconnect switch (4, Figure 7-47).

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

2. Disconnect two wire assemblies (3).

### **CLEANING**

Clean all parts. Refer to Chapter 2.

### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Connect two wire assemblies (3) to disconnect switch (4, Figure 7-47).
- 2. Install two washers (2) and nuts (1).

# NOTE

Return 130G Grader to original equipment condition.

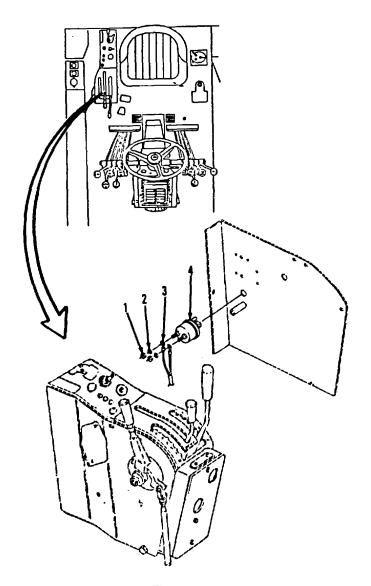


Figure 7-47

End of Task

### **OPERATOR'S PANEL CONSOLE MAINTENANCE.**

### 7-33. Control Console. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations Personnel Required Construction equipment

repairer MOS 62B

Special Environmental Conditions

**Tools** 

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177-TM 5-3805-261-10

7033)

Test Equipment

None

**General Safety Instructions** 

None

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39,

Appendix C Small tags, Item 41, Appendix C

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

> Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-28 Floodlight switch removed.

Paragraph 7-29 Ether control switch removed.

Paragraph 7-30 Control console light removed.

Paragraph 7-34 Start switch removed.

Paragraph 7-112 Disconnect positive cable on right side.

> Go to Sheet 2 7-91

# **OPERATOR'S PANEL CONSOLE MAINTENANCE. (cont)**

### 7-33. Control Console. (Sheet 2 of 4)

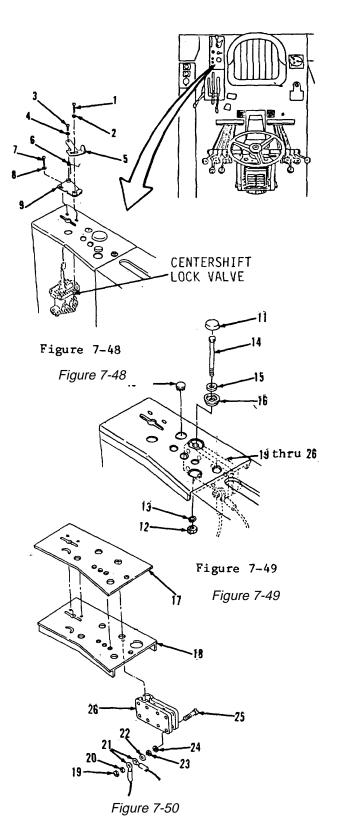
### **REMOVAL**

- Remove screw (1), washer (2), screw (3), washer (4), lever (5), spring (6), screw (7), washer (8) and base (9, Figure 7-48) from centershift lock valve.
- 2. Remove plug (10, Figure 7-49).
- 3. Remove cap (11), nut (12) and washer (13).
- 4. Remove bolt (14) and washers (15 and 16).
- 5. Remove plate (17) and cover (18, Figure 7-50).
- 6. Remove four nuts (19) and lockwashers (20).

### **NOTE**

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 7. Disconnect eight wire assemblies (21).
- 8. Remove four washers (22), nuts (23), washers (24) and screws (25). Separate two block halves (26).



### **OPERATOR'S PANEL CONSOLE MAINTENANCE.**

# 7-33. Control Console. (Sheet 3 of 4)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

### **INSTALLATION**

- 1. Position two block halves (26, Figure 7-50) together.
- 2. Install four screws (25), washers (24) and nuts (23).
- 3. Install four washers (22).
- 4. Position eight wire assemblies (21) on screws (25).
- 5. Install four lockwashers (20) and nuts (19).
- 6. Position cover (18) and plate (17) on operator's panel console.
- 7. Install washers (16 and 15) and bolt (14, Figure 7-49).
- 8. Install items 26 thru 19 as an assembly, washer (13) and nut (12) on bolt (14).
- 9. Install cap (13) and plug (10).

Go to Sheet 4 **7-93** 

# **OPERATOR'S PANEL CONSOLE MAINTENANCE. (cont)**

# 7-33. Control Console. (Sheet 4 of 4)

# **INSTALLATION (cont)**

11. Install base (9), washer (8), screw (7), spring (6), lever (5), washer (4), screw (3), washer (2) and screw (1, Figure 7-48) into centershift lock valve.

# **NOTE**

Return 130C Grader to original equipment condition.

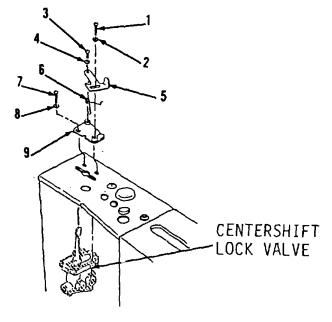


Figure 7-48

End of Task

#### OPERATOR'S PANEL CONSOLE MAINTENANCE.

### 7-34. Start Switch. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

<u>Applicable Configurations</u>
All

Personnel Required
Construction equipment

repairer MOS 62B

<u>Tools</u>

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177- TM 5-3805-261-10

7033)

Special Environmental Conditions
Test Equipment None

Test Equipment None

General Safety Instructions

<u>Materials/Parts</u> None

Dry cleaning solvent,
Item 14, Appendix C Toro

Item 14, Appendix CTorquesClean cloths, Item 39,All fasteners are tightened to<br/>standard torques. Refer to

Small tags, Item 41, Appendix E.

Smail tags, item 41, Appendix E.

Appendix C

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 13-15 Side plates removed from operator's

panel console.

Go to Sheet 2 **7-95** 

# **OPERATOR'S PANEL CONSOLE MAINTENANCE. (cont)**

# 7-34. Start Switch. (Sheet 2 of 2)

### **REMOVAL**

- 1. Remove screw (1), knob (2), lock nut (3) and washer (4, Figure 7-51).
- 2. Remove two screws (5) and washers (6).

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

3. Disconnect three wire assemblies (7) from start switch (8).

### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

# **INSTALLATION**

- 1. Connect three wire assemblies (7) to start switch (8, Figure 7-51).
- 2. Install two washers (6) and screws (5).
- 3. Install washer (4), lock nut (3), knob (2) and screw (1).

### **NOTE**

Return 130G Grader to original equipment condition.

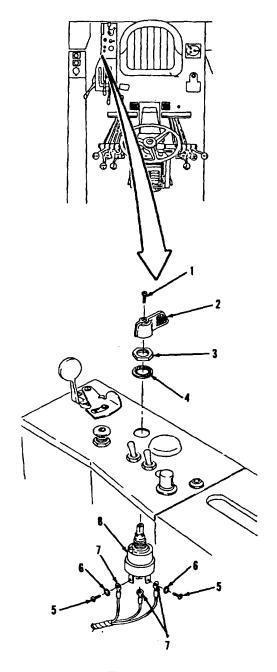


Figure 7-51

End of Task

# Section IX. MISCELLANEOUS ELECTRICAL TROUBLESHOOTING.

- **7-35. GENERAL INFORMATION**. This section lists the common miscellaneous electrical malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **7-36. MISCELLANEOUS ELECTRICAL TROUBLESHOOTING PROCEDURES.** This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

### MISCELLANEOUS ELECTRICAL TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

#### HOURMETER DOES NOT OPERATE.

Step 1. Test the continuity of the hourmeter switch (Figure 7-52). Connect one lead of multimeter to switch and one lead to ground.

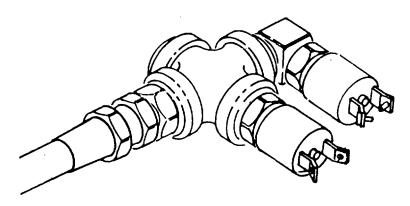


Figure 7-52

If the multimeter needle does not move, the circuit does not have continuity. Replace hourmeter switch. Refer to paragraph 7-92.

# MISCELLANEOUS ELECTRICAL TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cont)

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

HOURMETER DOES NOT OPERATE. (cont)

Step 2. Test the continuity of the hourmeter (Figure 7-53). Connect one lead of multimeter to the back of gage and one lead to ground.

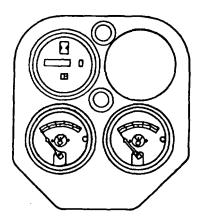


Figure 7-53

If the multimeter needle does not move, the circuit does not have continuity. Replace hourmeter. Refer to paragraph 7-38.

### Section X. MISCELLANEOUS ELECTRICAL MAINTENANCE.

# 7-37. MISCELLANEOUS ELECTRICAL MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the hourmeter and panel lamp and its components in good repair.
- b. This section is arranged by functional group code and provides a list of miscellaneous electrical components to be maintained and step-by-step maintenance procedures.

#### **INDEX**

<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
Hourmeter	7-38	7-100
Panel Lamps	7-39	7-102

# **MISCELLANEOUS ELECTRICAL MAINTENANCE. (cont)**

### 7-38. Hourmeter. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

<u>Applicable Configurations</u>
All
Personnel Required
Construction equipment

repairer MOS 62B

Tools
General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177- TM 5-3805-261-10

Special Environmental Conditions

Test Equipment None None

Dry cleaning solvent,
Item 14, Appendix C Torques

Clean cloths, Item 34,
Appendix C

Appendix C

All fasteners are tightened to standard torques. Refer to

Small tags, Item 41, Appendix E. Appendix C

Troubleshooting References

None

7033)

Equipment Condition
TM 5-3805-261-10
Vehicle parked on level ground.

Parking/emergency brake applied.
Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2 **7-100** 

### MISCELLANEOUS ELECTRICAL MAINTENANCE.

### 7-38. Hourmeter. (Sheet 2 of 2)

#### **REMOVAL**

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 1. Disconnect wire assemblies (1 and 2, Figure 7-54).
- 2. Remove two nuts (3) from hourmeter assembly (5).
- 3. Remove clamp (4).
- 4. Remove hourmeter assembly (5) from instrument panel (6).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

# **INSTALLATION**

- 1. Install hourmeter assembly (5) in instrument panel (6, Figure 7-54).
- 2. Install clamp (4).
- 3. Install two nuts (3) in hourmeter assembly (5).
- 4. Connect wire assemblies (2 and 1).

### **NOTE**

Return 130G Grader to original equipment condition.

End of Task

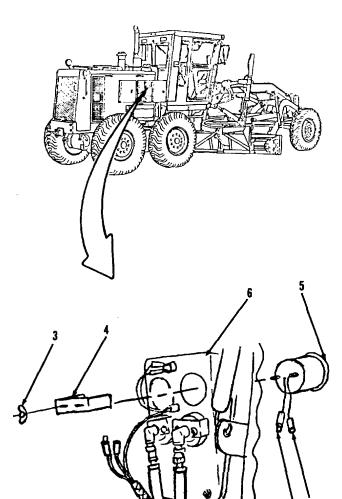


Figure 7-54

# **MISCELLANEOUS ELECTRICAL MAINTENANCE. (cont)**

#### 7-39. Panel Lamps. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation 

**INITIAL SETUP:** 

Applicable Configurations

Personnel Required

Construction equipment repairer MOS 62B

**Tools** 

General Mechanic's Tool Kit:

Automotive (NSN 5180-00-177-

7033)

References

TM 5-3805-261-10

Test Equipment

None

Special Environmental Conditions

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Small tags, Item 41, Appendix C

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112

Disconnect positive cable on right side.

Go to Sheet 2 7-102

# MISCELLANEOUS ELECTRICAL MAINTENANCE.

# 7-39. Panel Lamps. (Sheet 2 of 3)

# **REMOVAL**

- 1. Remove two lenses (1, Figure 7-55).
- 2. Remove two bulbs (2).

# NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 3. Disconnect four wire assemblies (3).
- 4. Remove two lock nuts (4), lockwashers (5) and spacers (6).
- 5. Remove two sockets (7) from instrument panel (8).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

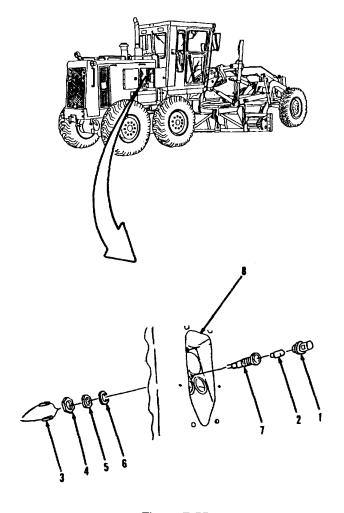


Figure 7-55

Go to Sheet 3

# **MISCELLANEOUS ELECTRICAL MAINTENANCE. (cont)**

# 7-39. Panel Lamps. (Sheet 3 of 3)

### **INSTALLATION**

- 1. Install two sockets (7) in instrument panel (8, Figure 7-55).
- 2. Install two spacers (6), lockwashers (5) and lock nuts (4).
- 3. Connect four wire assemblies (3).
- 4. Install two bulbs (2).
- 5. Install two lenses (1).

# NOTE

Return 130G Grader to original equipment condition.

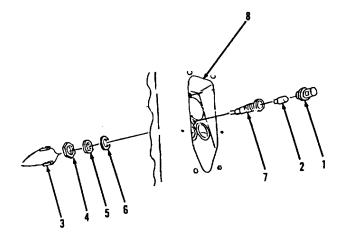


Figure 7-55

End of Task

#### Section XI. CAB SWITCH PANEL TROUBLESHOOTING.

- **7-40. GENERAL INFORMATION.** This section lists the common cab switch panel malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **7-41. CAB SWITCH PANEL TROUBLESHOOTING PROCEDURES.** This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### CAB SWITCH PANEL TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

- a. WINDSHIELD WIPERS DO NOT OPERATE.
  - Step 1. Check fuse number 4A.

If the fuse is blown--replace. Refer to paragraph 7-62.

Step 2. Test the continuity of the windshield wiper switch. Connect one lead of multimeter to back of switch and one lead to ground (Figure 7-56).

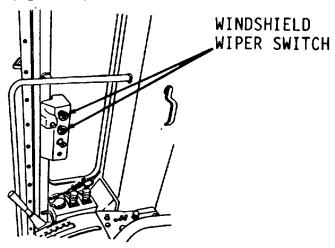


Figure 7-56

If the multimeter needle does not move, the circuit does not have continuity. Replace windshield wiper switch. Refer to paragraph 7-43.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

### b. CIGAR LIGHTER DOES NOT OPERATE.

Step 1. Check fuse number 15A.

If the fuse is blown--replace. Refer to paragraph 7-62.

Step 2. Check the cigar lighter.

If the cigar lighter is damaged or defective--replace. Refer to paragraph 7-43.

# c. PANEL LAMP DOES NOT OPERATE.

Step 1. Check the filament.

If the filament is defective--replace. Refer to paragraph 7-39.

Step 2. Test the continuity of the panel lamp switch. Connect one lead of multimeter to the back of switch and one lead to ground.

If the multimeter needle does not move, the circuit does not have continuity. Replace panel lamp switch. Refer to paragraph 7-39.

### Section XII. CAB SWITCH PANEL MAINTENANCE.

# 7-42. CAB SWITCH PANEL MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the cab switch panel and its components in good repair.
- b. This section is arranged by functional group code and provides a list of cab switch panel components to be maintained and step-by-step maintenance procedures.

#### **INDEX**

<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
Switch Panel and Mounting	7-43	7-108

# **CAB SWITCH PANEL MAINTENANCE. (cont)**

#### 7-43. Switch Panel and Mounting. (Sheet 1 of 3)

a. Removal This task covers: b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39,

Appendix C Small tags, Item 41, Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

#### CAB SWITCH PANEL MAINTENANCE.

# 7-43. <u>Switch Panel and Mounting</u>. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Remove two knobs (1), lamp hood (2), lamp (3), lighter knob (4) and two screws (5) from switch panel (6, Figure 7-57) on right side of cab.
- 2. Remove switch panel (6).

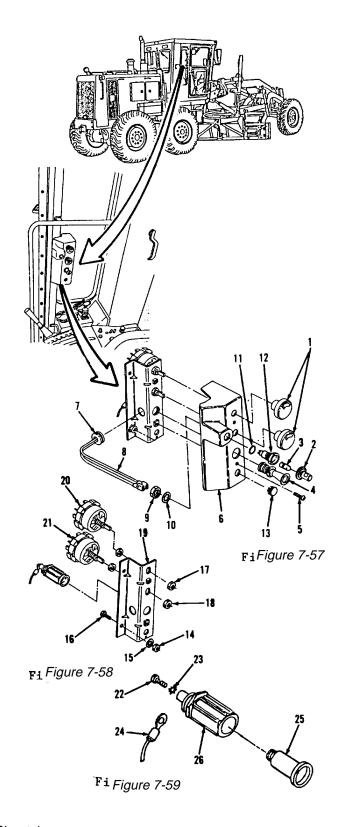
### **NOTE**

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 3. Disconnect two wire assemblies (8) at grommet (7).
- 4. Remove grommet (7).
- 5. Remove two wire assemblies (8) from lamp housing (12).
- 6. Remove nut (9), washer (10), sea (11), lamp housing (12) and plug (13).
- 7. Remove two nuts (14), washers (15), bolts (16), nuts (17 and 18) and bracket, (19, Figure 7-58).
- 8. Remove switches (20 and 21).
- 9. Remove screw (22) and washer (23, Figure 7-59).
- 10. Disconnect wire assembly (24).
- 11. Remove barrel (25) from lighter housing (26).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.



Go to Sheet 4 7-109

# **CAB SWITCH PANEL MAINTENANCE. (cont)**

# 7-43. Switch Panel and Mounting. Sheet 3 of 3)

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install barrel (25) in lighter housing (26, Figure 7-59).
- 2. Connect wire assembly (24).
- 3. Install washer (23) and screw (22).
- 4. Install switches (21 and 20, Figure 7-58).
- 5. Install bracket (19), nuts (18 and 17), two bolts (16), washers (15) and nuts (14).
- 6. Install plug (13), lamp housing (12), seal (11), washer (10) and nut (9) on switch panel (6, Figure 7-57).
- 7. Connect two wire assemblies (8) to lamp housing (12).
- 8. Install grommet (7).
- 9. Connect two wire assemblies (8) at grommet (7).
- 10. Install two screws (5), lighter knob (4), lamp (3), lamp hood (2) and two knobs (1) on switch panel (6) on right side of cab.

# **NOTE**

Return 130G Grader to original equipment condition.

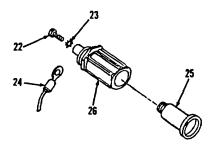


Figure 7-59

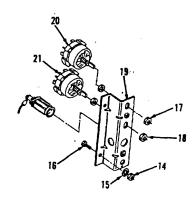


Figure 7-58

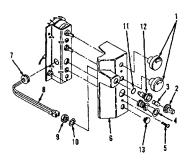


Figure 7-57

End of Task

### Section XIII. SUPPLEMENTAL STEERING MAINTENANCE.

# 7-44. SUPPLEMENTAL STEERING MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the supplemental steering and its components in good repair.
- b. This section is arranged by functional group code and provides a list of supplemental steering components to be maintained and step-by-step maintenance procedures.

#### **INDEX**

<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
Supplemental Steering Dump Valve Switch	7-45	7-112
Hydraulic Pressure Switch	7-46	7-115
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Electronic Control	7-48	7-120
Magnetic Switch	7-49	7-123
Pump Motor	7-50	7-126
Pump Motor Mounting	7-51	7-129

# SUPPLEMENTAL STEERING MAINTENANCE. (cont)

#### 7-45. Supplemental Steering Dump Valve Switch. (Sheet 1 of 3)

a. Removal This task covers: b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations Personnel Required

Construction equipment repairer MOS 62B

Tools

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177-TM 5-3805-261-10

7033)

Special Environmental Conditions None

Test Equipment

Multimeter

Materials/Parts

Dry cleaning solvent,

Item 14, Appendix C

Clean cloths, Item 39 Appendix C

Small tags, Item 41,

Appendix C

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to

standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

> Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

### SUPPLEMENTAL STEERING MAINTENANCE.

# 7-45. Supplemental Steering Dump Valve Switch. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Remove hydraulic hose. (Ref. paragraph 11-8, step 15).
- 2. Remove nut (4), switch (5) and retainer (6) from bracket (7).
- 3. Remove two screws (1) and washers from switch (5) (2, Figure 7-60) under left side of cab.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

4. Disconnect two wire assemblies (3) at terminals from switch (5).

#### **CLEANING**

Clean all parts. Refer To Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

# **INSTALLATION**

 Install retainer (6), switch (5) and nut (4) on bracket (7, Figure 7-60). Do not tighten nut (4).

#### NOTE

Installation continued after adjustment has been completed.

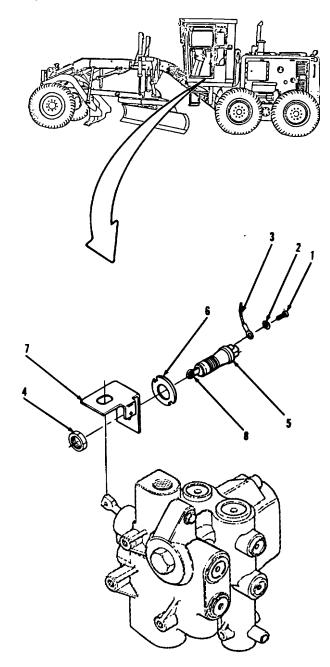


Figure 7-60

Go to Sheet 3

# **SUPPLEMENTAL STEERING MAINTENANCE. (cont)**

# 7-45. Supplemental Steering Dump Valve Switch. (Sheet 3 of 3)

#### **ADJUSTMENT**

- 1. Move switch (5) up or down to locate roller (8) in lower half of slot (9) in pin (10, Figure 7-60).
- 2. Install nut (4) finger tight.
- 3. Move bracket (7) to lightly touch lower half of slot (9) in pin (10).
- 4. Tighten nut (4) to 15 ft-lb torque.
- 5. Depress pin (10) on left side of cab floor. Multimeter must indicate no continuity.
- 6. Release pin (10).

# **INSTALLATION** (cont)

- 2. Connect two wire assemblies (3) to switch (5).
- 3. Install two washers (2) and screws (1) on switch (5).

# NOTE

Return 130G Grader to original equipment condition.

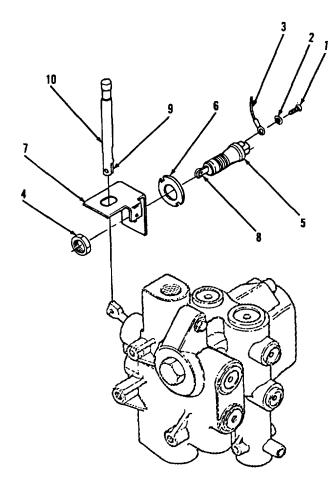


Figure 7-60

End of Task

### SUPPLEMENTAL STEERING MAINTENANCE.

#### 7-46. Hydraulic Pressure Switch. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

**Torques** 

LO 5-3805-261-12

d. Installation

**INITIAL SETUP:** 

Applicable Configurations Personnel Required Construction equipment ΑII repairer MOS 62B

Tools

General Mechanic's Tool Kit: References Automotive (NSN 5180-00-177-TM 5-3805-261-10

7033)

Test Equipment Special Environmental Conditions

None None

Materials/Parts **General Safety Instructions** None

Dry cleaning solvent, Item 14, Appendix C

Clean cloths, Item 39,

Appendix C All fasteners are tightened to Two preformed packings, standard torques. Refer to Appendix E.

Item 4

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

LO 5-3805-261-12 Hydraulic system vented.

Go to Sheet 2

# **SUPPLEMENTAL STEERING MAINTENANCE. (cont)**

# 7-46. <u>Hydraulic Pressure Switch</u>. (Sheet 2 of 2)

#### **REMOVAL**

- 1. Remove connector assembly (1) from switch (2, Figure 7-61) under left side of cab.
- 2. Remove switch (2).
- 3. Remove connector (3) and two preformed packings (4) from combination valve. Discard two preformed packings (4).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install two new preformed packings (4) on connector (3, Figure 7-61).
- 2. Install connector (3) into combination valve.
- 3. Install switch (2).
- 4. Install connector assembly (1) to switch (2).

#### **NOTE**

Return 130G Grader to original equipment condition.

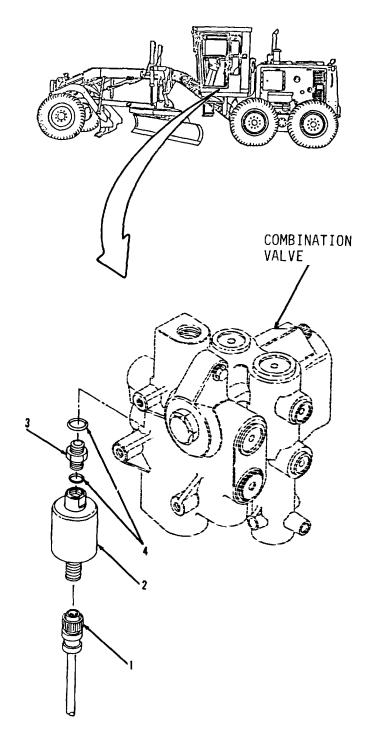


Figure 7-61

End of Task

### SUPPLEMENTAL STEERING MAINTENANCE.

# 7-47. Governor Switch. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177

7033)

Test Equipment Multimeter

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C

Preformed packing, Item 5

Gasket, Item 11

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

Torques

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on

right side.

Go to Sheet 2

# **SUPPLEMENTAL STEERING MAINTENANCE. (cont)**

### 7-47. Governor Switch. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Open right side engine door.
- 2. Remove two screws (1) and washers (2, Figure 7-62) from front, right side of engine compartment.

#### **NOTE**

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 3. Disconnect wire assembly (3) at terminals.
- 4. Loosen lock nut (7).
- 5. Remove switch (4) from housing (6).
- 6. Remove and discard preformed packing (5).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

# INSPECTION

Inspect all parts. Refer to Chapter 2.

# **INSTALLATION**

- 1. Install new preformed packing (5) and switch (4) in housing (6, Figure 7-62) with distance of 0. 75 in.
- 2. Tighten lock nut (7) to 15 ft-lb torque.

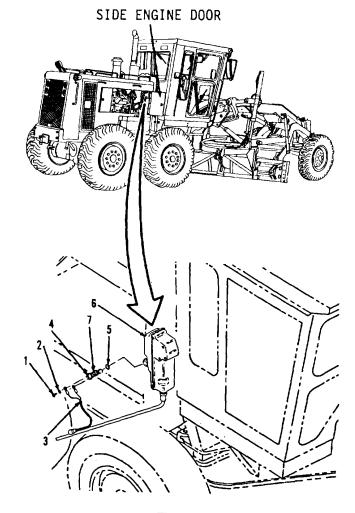


Figure 7-62

Go to Sheet 3

### SUPPLEMENTAL STEERING MAINTENANCE.

# 7-47. Governor Switch. (Sheet 3 of 3)

#### **INSTALLATION**

- 3. Connect wire assembly (3) at terminals.
- 4. Install two washers (2) and screws (1).
- 5. Close right side engine door.

### **ADJUSTMENT**

- Remove three bolts (8), washers (9), plate (10) and gasket (11) from housing (6, Figure 7-63) on front, right side of engine. Discard gasket (11). Remove all gasket material from mounting surfaces.
- 2. Pull accelerator pedal upward from cab floor to engine shutoff position. Refer to TM 5-3805- 261-10.
- 3. Loosen lock nut (12) on adjusting screw (13).
- 4. Test switch (4). Connect multimeter leads.
- 5. Turn adjusting screw (13) inward until multimeter shows continuity. Then rotate one more turn.
- 6. Tighten lock nut (12) on adjusting screw (13).
- 7. Position new gasket (11) and plate (10) on housing (6).
- 8. Install three washers (9) and bolts (8) through plate (10) in housing (6).

# **NOTE**

Return 130G Grader to original equipment condition.

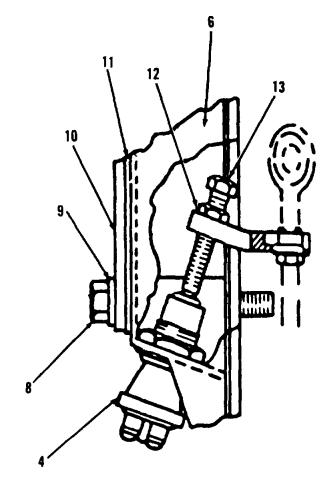


Figure 7-63

End of Task

# **SUPPLEMENTAL STEERING MAINTENANCE. (cont)**

# 7-48. Electronic Control. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41,

Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

Torques

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on

right side.

Go to Sheet 2

## SUPPLEMENTAL STEERING MAINTENANCE.

# 7-48. Electronic Control. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Open right side engine door.
- 2. Remove items 1 and 2 as an assembly from two brackets (7, Figure 7-64) on inner, right side of engine compartment.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

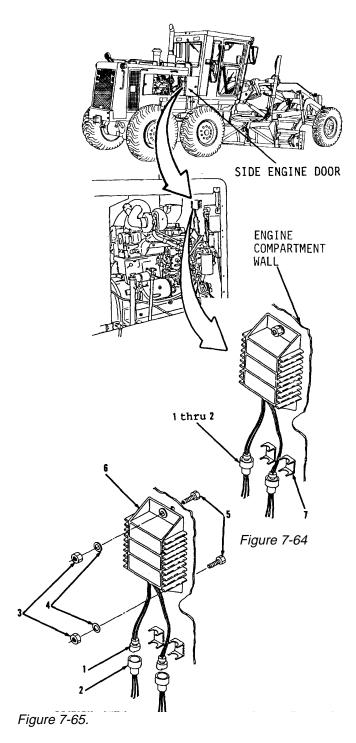
- 3. Disconnect two wire assemblies (1) from sockets (2, Figure 7-65).
- 4. Remove two nuts (3), washers (4) and bolts (5).
- 5. Remove control (6).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

# **INSPECTION**

Inspect all parts. Refer to Chapter 2.



Go to Sheet 3

# **SUPPLEMENTAL STEERING MAINTENANCE. (cont)**

# 7-48. Electronic Control. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Install control (6, Figure 7-65) in inner, right side of engine compartment.
- 2. Install two bolts (5), washers (4) and nuts (3).
- 3. Connect two wire assemblies (1) to sockets (2).
- 4. Install items 2 and 1 as an assembly in two brackets (7, Figure 7-64).
- 5. Close right side engine door.

## NOTE

Return 130G Grader to original equipment condition.

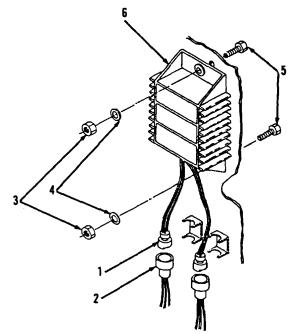
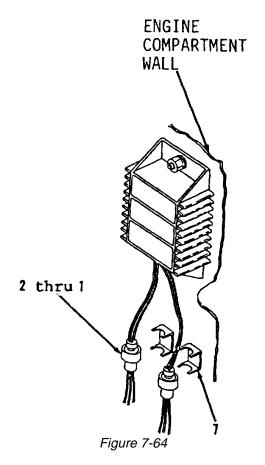


Figure 7-65



End of Task

## SUPPLEMENTAL STEERING MAINTENANCE.

#### 7-49. Magnetic Switch. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations Personnel Required

Construction equipment repairer MOS 62B

Tools

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177-TM 5-3805-261-10

7033)

**Special Environmental Conditions** 

Test Equipment None

None

**General Safety Instructions** None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C **Torques** Clean cloths, Item 39,

All fasteners are tightened to Appendix C standard torques. Refer to

Small tags, Item 41, Appendix E. Appendix C

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground. Parking/emergency brake applied.

Equipment lowered to the ground.

.....

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# **SUPPLEMENTAL STEERING MAINTENANCE. (cont)**

# 7-49. Magnetic Switch. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Open right side engine door.
- 2. Remove two nuts (1), lockwashers (2) and washers (3, Figure 7-66) from front, left side of engine compartment. Access is from right side of engine compartment.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 3. Disconnect cable assemblies (4 and 5) at terminals.
- 4. Remove two nuts (6) and lockwashers (7).
- 5. Disconnect two wire assemblies (8) at terminals.
- 6. Remove four nuts (9), washers (10) and bolts (11).
- 7. Remove switch (12).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

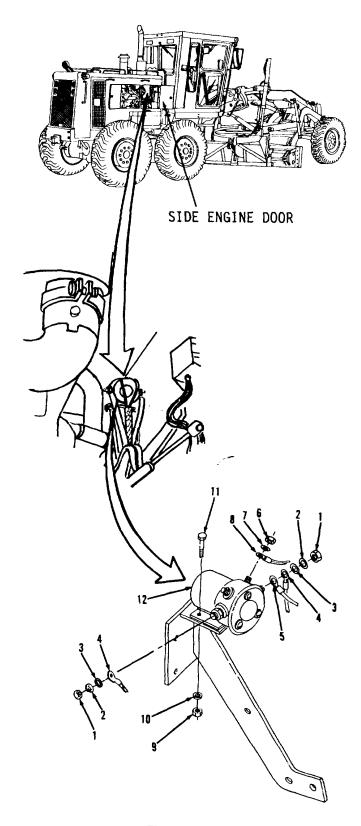


Figure 7-66

Go to Sheet 3

## SUPPLEMENTAL STEERING MAINTENANCE.

# 7-49. Magnetic Switch. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Position switch (12, Figure 7-66) on front, inside of engine compartment.
- 2. Install four bolts (11), lockwashers (10) and nuts (9).
- 3. Connect two wire assemblies (8) at terminals.
- 4. Install two lockwashers (7) and nuts (6).
- 5. Connect two cable assemblies (5 and 4) at terminals.
- 6. Install two washers (3), lockwashers (2) and nuts (1).
- 7. Close right side engine door.

## **NOTE**

Return 130G Grader to original equipment condition.

End of Task

# **SUPPLEMENTAL STEERING MAINTENANCE. (cont)**

#### 7-50. Pump Motor. (Sheet 1 of 3)

This task covers: b. Cleaning a. Removal c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations Personnel Required

Construction equipment repairer MOS 62B

Tools

General Mechanic's Tool Kit: References

automotive (NSN 5180-00-177-TM 5-3805-261-10

7033)

Test Equipment

None

**General Safety Instructions** 

Materials/Parts None Dry cleaning solvent,

Item 14, Appendix C

Clean cloths, Item 39, Appendix C Small tags, Item 41,

Appendix C

Detergent, Item 8, Appendix C

Gasket, Item 8

**Torques** 

None

All fasteners are tightened to standard torques. Refer to

Special Environmental Conditions

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground. Parking/emergency brake applied.

Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. Hydraulic pressure relieved.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 13-5 Engine hood doors assembly open.

Go to Sheet 2

## SUPPLEMENTAL STEERING MAINTENANCE.

# 7-50. Pump Motor. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Open left side engine door.
- Remove two nuts (1) and lockwashers (2, Figure 7-67) from front, left side of engine compartment.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 3. Disconnect wire assemblies (3 and 4).
- 4. Remove four bolts (5) and lock- washers (6, Figure 7-68).
- Remove pump assembly (7) from motor assembly (15) along with attached hose assemblies. Position pump assembly (7) out of the way.
- 6. Remove gasket (8) and coupler (9). Discard gasket (8). Remove all gasket material from mounting surfaces.

#### **NOTE**

Support motor assembly while removing attaching hardware. Weight of motor assembly is 42 lbs.

7. Remove four nuts (10), three washers (11), bolts (12), bolt (13), washer (14) and motor assembly (15) from bracket (16, Figure 7-69).

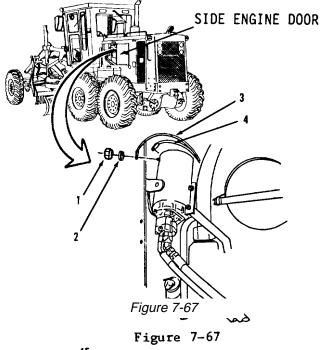


Figure 7-67

15

Figure 7-68

Figure 7-68

10

11

11

12

13

Figure 7-69

Go to Sheet 3

# **SUPPLEMENTAL STEERING MAINTENANCE. (cont)**

# 7-50. Pump Motor. (Sheet 3 of 3)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- Position motor assembly (15) on bracket (16, Figure 7-69) in front, left side of engine compartment.
- 2. Install washer (14), bolt (13), three bolts (12), washers (11) and four nuts (10).
- 3. Position coupler (9), new gasket (8) and pump assembly (7) on motor assembly (15, Figure 7-68).
- 4. Install four lockwashers (6) and bolts (5).
- 5. Connect wire assemblies (4 and 3, Figure 7-67).
- 6. Install two lockwashers (2) and nuts (1).
- 7. Close left side engine door.

#### NOTE

Return 130G Grader to original equipment condition.

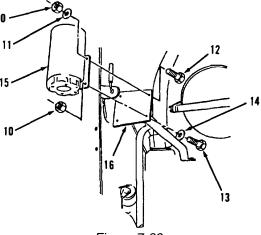


Figure 7-69

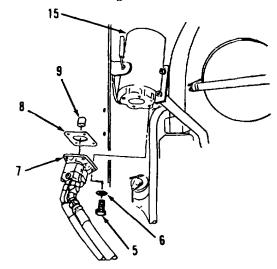


Figure 7-68

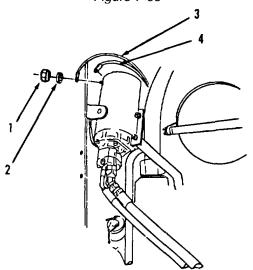


Figure 7-67

End of Task

#### SUPPLEMENTAL STEERING MAINTENANCE.

#### 7-51. Pump Motor Mounting. (Sheet 1 of 3)

b. Cleaning This task covers: a. Removal c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C

Detergent, Item 8, Appendix C

Caps

Personnel Required

Construction equipment

repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

# **Troubleshooting References**

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-49 Supplemental steering magnetic switch

removed.

Paragraph 7-50 Supplemental steering pump motor

removed.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 13-5 Engine hood door assemblies open.

Go to Sheet 2

# **SUPPLEMENTAL STEERING MAINTENANCE. (cont)**

# 7-51. Pump Motor Mounting.

#### **REMOVAL**

- 1. Open left side engine door.
- 2. Remove nut (1), washer (2) and bolt (3) from bracket (10, Figure 7-70) in front, left side of engine.

## **NOTE**

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

3. Remove clip (4) from two wire assemblies (5).

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 4. Remove clip (6) from hose assembly (7).
- 5. Remove two bolts (8), washers (9), bracket (10) and plate (11, Figure 7-71).
- 6. Remove bolt (12), washer (13) and brace (14).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

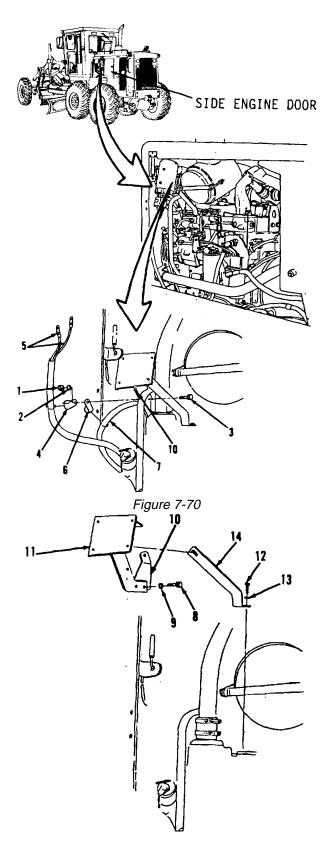


Figure 7-71

Go to Sheet 3

## SUPPLEMENTAL STEERING MAINTENANCE.

# 7-51. Pump Motor Mounting. (Sheet 3 of 3)

#### **INSTALLATION**

- 1. Install brace (14), washer (13) and bolt (12, Figure 7-71) on front, left side of engine.
- 2. Install plate (11), bracket (10), two washers (9) and bolts (8).
- 3. Install clip (6) on hose assembly (7, Figure 7-70).
- 4. Install clip (4) on two wire assemblies (5).
- 5. Install bolt (3), washer (2) and nut (1) on bracket (10).
- 6. Close left side engine door.

#### NOTE

Return 130G Grader to original equipment condition.

End of Task

#### Section XIV. ELECTRICAL SYSTEM TROUBLESHOOTING.

- **7-52. GENERAL INFORMATION.** This section lists the common blade float limit switch malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **7-53. ELECTRICAL SYSTEM TROUBLESHOOTING PROCEDURES.** This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### ELECTRICAL SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

#### BLADE FLOAT LIMIT SWITCH DOES NOT OPERATE.

Step 1. Check fuse number 10A.

If fuse is blown--replace. Refer to paragraph 7-62.

Step 2. Test the continuity of the blade float limit switch. Connect one lead on multimeter to switch and one lead to ground (Figure 7-72).

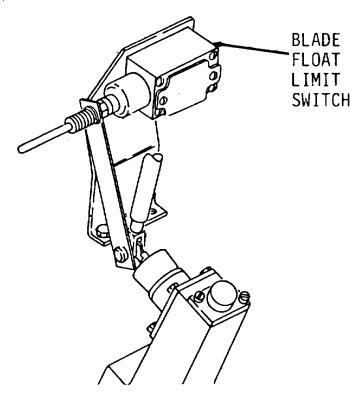


Figure 7-72

If the multimeter does not move, the circuit does not have continuity. Replace blade float limit switch. Refer to paragraphs 7-55 and 7-56.

## Section XV. ELECTRICAL SYSTEM MAINTENANCE.

# 7-54. ELECTRICAL SYSTEM MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the blade float electrical system and its components in good repair.
- b. This section is arranged by functional group code and provides a list of blade float electrical components to be maintained and step-by-step maintenance procedures.

# **INDEX**

<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
Blade Float Limit Switch Blade Float Limit Switch Mounting	7-55	7-134
and Linkage	7-56	7-137

# **ELECTRICAL SYSTEM MAINTENANCE. (cont)**

#### Blade Float Limit Switch. (Sheet 1 of 3) 7-55.

a. Removal This task covers: b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033) Pliers, snap ring 7/32 inch wrench

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Gasket, Item 9

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

#### **ELECTRICAL SYSTEM MAINTENANCE.**

#### 7-55. Blade Float Limit Switch. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

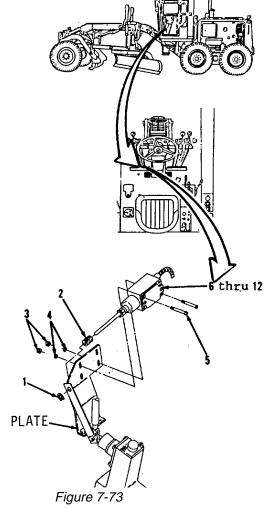
The following is a maintenance procedure for the left blade float limit switch. The maintenance procedure for the right blade float limit switch is identical.

- Remove clip (1, Figure 7-73) from plate on front lower left of cab interior.
- 2. Remove spring (2).
- Remove two nuts (3), lockwashers (4) and 3. bolts (5).
- Remove items 6 thru 12 as an assembly. 4.
- Remove clip (6, Figure 7-74). 5.
- Remove two screws (7), plate (8) and 6. gasket (9). Discard gasket (9). Remove all gasket material from mounting surfaces.
- Loosen two screws (10).

#### NOTE

ΑII wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

Disconnect two wire assemblies (11) from switch (12).



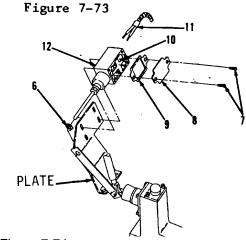


Figure 7-74

Go to Sheet 3

# **ELECTRICAL SYSTEM MAINTENANCE. (cont)**

# 7-55. Blade Float Limit Switch. (Sheet 3 of 3)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

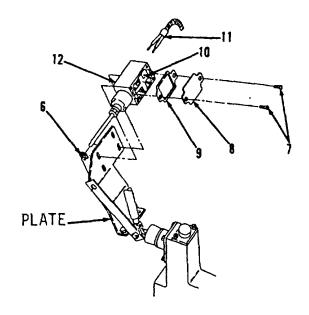
Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Connect two wire assemblies (11, Figure 7-74) to switch (12) on front lower left cab.
- 2. Tighten two screws (10).
- 3. Install new gasket (9), plate (8) and two screws (7).
- 4. Install clip (6).
- 5. Install items 12 thru 6 as an assembly, two bolts (5), lockwashers (4) and nuts (3, Figure 7-73).
- 6. Install spring (2).
- 7. Install clip (1) on plate.

# **NOTE**

Return 130G Grader to original equipment condition.



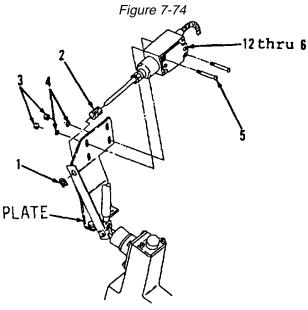


Figure 7-73

End of Task

## **ELECTRICAL SYSTEM MAINTENANCE.**

#### Blade Float Limit Switch Mounting and Linkage. (Sheet 1 of 2) 7-56.

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation 

**INITIAL SETUP:** 

Applicable Configurations Personnel Required Construction equipment ΑII repairer MOS 62B

Tools

General Mechanic's Tool Kit: References Automotive (NSN 5180-00-177-TM 5-3805-261-10

7033)

Special Environmental Conditions Test Equipment None

None

Materials/Parts None

Dry cleaning solvent,

Item 14, Appendix C

.....

Clean cloths, Item 39, Appendix C

**General Safety Instructions** 

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

> Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-55 Blade float limit switch removed.

Go to Sheet 2

# **ELECTRICAL SYSTEM MAINTENANCE. (cont)**

# 7-56. Blade Float Limit Switch Mounting and Linkage. (Sheet 2 of 2)

#### **REMOVAL**

#### **NOTE**

The following is a maintenance procedure for the left blade float limit switch mounting and linkage. The maintenance procedure for the right blade float limit switch mounting and linkage is identical.

- 1. Remove cotter pin (1), pin (2) and plate (3, Figure 7-75) from front, lower left side of cab.
- 2. Remove two nuts (4) and bolts (5).
- 3. Remove bracket (6).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

# **INSTALLATION**

- 1. Position bracket (6, Figure 7-75) on front, lower left side of cab.
- 2. Install two bolts (5) and nuts (4).
- 3. Install plate (3), pin (2) and cotter pin (1).

#### NOTE

Return 130G Grader to original equipment condition.

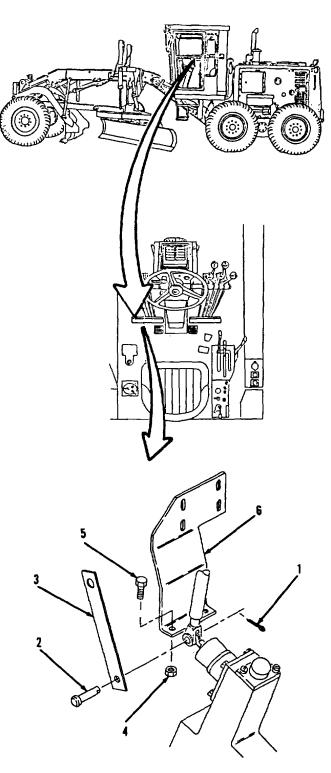


Figure 7-75

End of Task

# Section XVI. FUSE BOX TROUBLESHOOTING.

- **7-57. GENERAL INFORMATION.** This section lists the common fuse box malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **7-58. FUSE BOX TROUBLESHOOTING PROCEDURES.** This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### FUSE BOX TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

a. FUSE BOX LOOSE.

Check the fuse box mounting bolts (Figure 7-76).

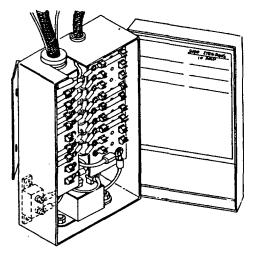


Figure 7-76

If the fuse box mounting bolts are loose--tighten. If the fuse box mounting bolts are damaged or defective--replace. Refer to paragraph 7-62.

b. FUSE BOX DOOR WILL NOT CLOSE.

Check fuse box hinges for binding.

If the hinges are damaged or defective--replace. Refer to paragraph 7-62.

# FUSE BOX TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cont)

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

## c. FUSES WILL NOT STAY IN FUSE BOX.

## Step 1. Check fuses.

If the fuses are distorted, damaged or defective--replace. Refer to paragraph 7-62.

## Step 2. Check fuse box brackets.

If the brackets are distorted or broken--replace. Refer to paragraph 7-62.

# d. FLASHER WILL NOT OPERATE.

Test the continuity of the flasher unit. Connect one lead on multimeter to flasher unit and one lead to ground.

If the multimeter needle does not move, the circuit does not have continuity. Replace flasher unit. Refer to paragraph 7-60.

## Section XVII. FUSE BOX MAINTENANCE.

# 7-59. FUSE BOX MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the fuse box system and its components in good repair.
- b. This section is arranged by functional group code and provides a list of fuse box components to be maintained and step-by-step maintenance procedures.

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Cab Fuse Box and Cover	7-63	7-152
NATO Slave Receptacle	7-64	7-155

# **FUSE BOX MAINTENANCE. (cont)**

#### 7-60. Flasher Unit. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations
All
Personnel Required
Construction equipment

repairer MOS 62B

Tools
General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177- TM 5-3805-261-10

7033)

Special Environmental Conditions

Test Equipment None None

General Safety Instructions

<u>Materials/Parts</u> None

Detergent, Item 8, Appendix C
Clean cloths, Item 39, Torques

Appendix C
Small tags, Item 41,
All fasteners are tightened to standard torques. Refer to

Appendix C Appendix E.

<u>Troubleshooting References</u>

None

Equipment Condition
TM 5-3805-261-10
Vehicle parked on level ground.

Parking/emergency brake applied.
Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## **FUSE BOX MAINTENANCE.**

# 7-60. Flasher Unit. (Sheet 2 of 2)

#### **REMOVAL**

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 1. Disconnect wire assemblies (1 and 2) from flasher unit (6, Figure 7-77).
- 2. Remove two nuts (3), lockwashers (4), screws (5) and flasher unit (6) from fuse box (7).

# **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

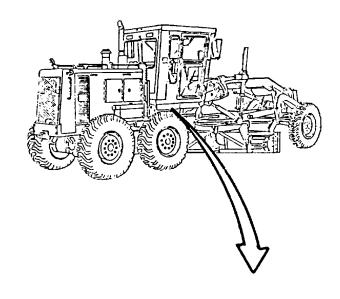
Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install flasher unit (6), two screws (5), lockwashers (4) and nuts (3) in fuse box (7, Figure 7-77).
- 2. Connect wire assemblies (2 and 1) to flasher unit (6).

#### NOTE

Return 130C Grader to original equipment condition.



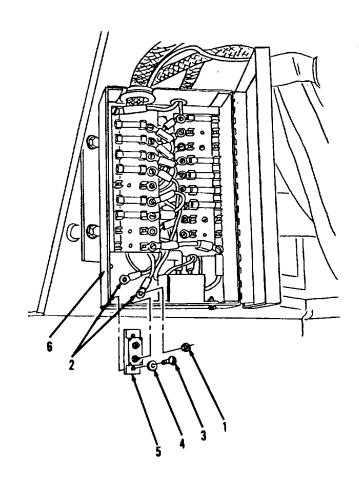


Figure 7-77

End of Task

# **FUSE BOX MAINTENANCE. (cont)**

#### 7-61. Circuit Breaker. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations Personnel Required Construction equipment ΑII

repairer MOS 62B

Tools

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177-TM 5-3805-261-10

7033)

Special Environmental Conditions None

Test Equipment

None

**General Safety Instructions** Materials/Parts None

Detergent, Item 8, Appendix C

Clean cloths, Item 39, **Torques** 

All fasteners are tightened to Appendix C Small tags, Item 41, standard torques. Refer to

Appendix C Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

> Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## **FUSE BOX MAINTENANCE.**

## 7-61. Circuit Breaker. (Sheet 2 of 2)

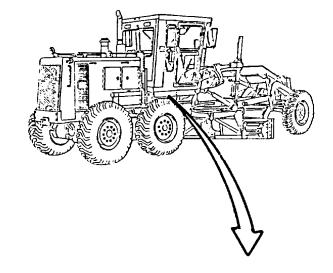
#### **REMOVAL**

1. Remove two nuts (1) from circuit breaker (5, Figure 7-78).

## NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect wire assemblies (2) at terminals.
- 3 Remove two screws (3), lockwashers (4) and circuit breaker (5) from fuse box (6).



#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

# **INSTALLATION**

- 1. Position circuit breaker (5) in fuse box (6, Figure 7-78).
- 2. Install two lockwashers (4) and screws (3).
- 3. Connect two wire assemblies (2) at terminals to circuit breaker (5).
- 4. Install two nuts (1).

#### **NOTE**

Return 130G Grader to original equipment condition.

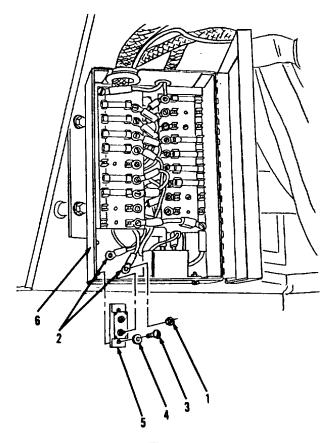


Figure 7-78

End of Task

## **FUSE BOX MAINTENANCE. (cont)**

#### 7-62. Main Fuse Box and Mounting. (Sheet 1 of 6)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations Personnel Required Construction equipment ΑII

repairer MOS 62B

Tools

7033)

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177-TM 5-3805-261-10

Special Environmental Conditions

Test Equipment None None

**General Safety Instructions** 

Materials/Parts None

Dry cleaning solvent, Item 14, Appendix C **Torques** Clean cloths, Item 39, All fasteners are tightened to

Appendix C standard torques. Refer to

Detergent, Item 8, Appendix C Appendix E. Small tags, Item 41,

Troubleshooting References

Appendix C

None

**Equipment Condition** TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied.

Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-60 Flasher unit removed.

Paragraph 7-63 Circuit breaker removed.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 7-129 Cab signal light wire removed.

Go to Sheet 2

## **FUSE BOX MAINTENANCE.**

# 7-62. Main Fuse Box and Mounting. (Sheet 2 of 6)

#### **REMOVAL**

- 1. Remove four fuses (1), six fuses (2) and fuse (3, Figure 7-79). Note amperage ratings to aid in installation.
- 2. Remove screw (4, Figure 7-80).

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 3. Disconnect main blackout light wiring harness (16).
- 4. Remove screw (5).
- 5. Disconnect supplemental steering main wiring harness (12).
- 6. Remove screw (6).
- 7. Disconnect monitor main wiring harness (13).
- 8. Remove screw (7).
- 9. Disconnect main wiring harness (14) and main blackout wiring harness (16).

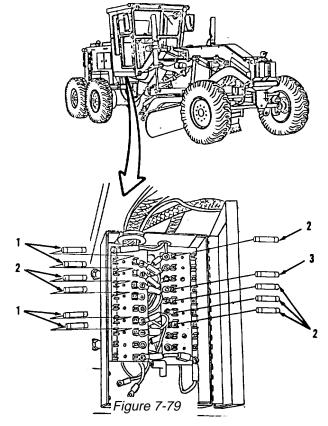


Figure 7-79

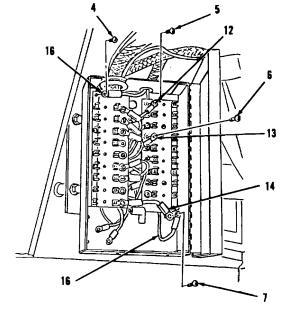


Figure 7-80

Go to Sheet 3

# **FUSE BOX MAINTENANCE. (cont)**

# 7-62. Main Fuse Box and Mounting. (Sheet 3 of 6)

# **REMOVAL** (cont)

- 10. Remove 12 screws (8, Figure 7-81).
- 11. Disconnect main wiring harness (14).
- 12. Remove four screws (9) and two fuse blocks (10) from fuse box (19, Figure 7-82).
- 13. Remove items 11 thru 14 as an assembly from fuse box (19, Figure 7-83).
- 14. Remove items 15 thru 16 as an assembly from fuse box (19).
- 15. Remove grommet (11) from supplemental steering main wiring harness (12), monitor main wiring harness (13) and main wiring harness (14, Figure 7-84).
- 16. Remove grommet (15) from main blackout light wiring harness (16).

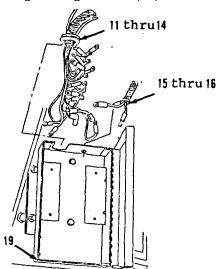
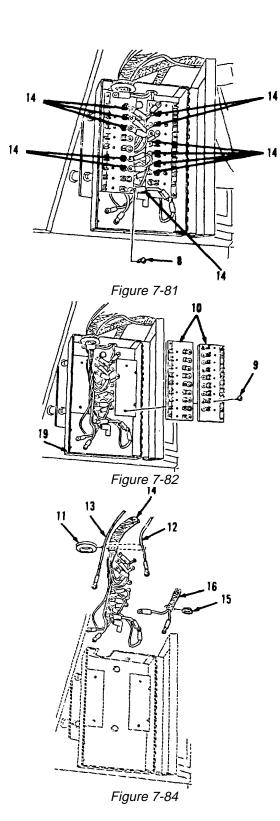


Figure 7-83



Go to Sheet 4

## **FUSE BOX MAINTENANCE.**

# 7-62. Main Fuse Box and Mounting. (Sheet 4 of 6

- 17. Remove two bolts (17), lockwashers (18) and fuse box (19, Figure 7-85).
- 18. Remove two bolts (20), lockwashers (21) and bracket (22).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install bracket (22), two lockwashers (21) and bolts (20, Figure 7-85).
- 2. Install fuse box (19), two lockwashers (18) and bolts (17).
- 3. Install grommet (15) on main blackout wiring harness (16, Figure 7-84).
- 4. Install grommet (11) on main wiring harness (14), monitor main wiring harness (13) and supple mental steering main wiring harness (12).

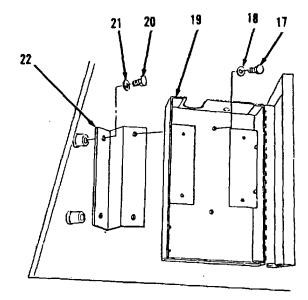


Figure 7-85

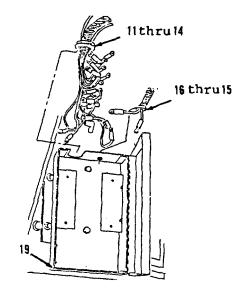
Go to Sheet 5 **7-149** 

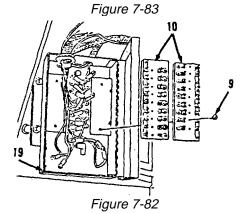
# **FUSE BOX MAINTENANCE. (cont)**

# 7-62. Main Fuse Box and Mounting. (Sheet 5 of 6)

# **INSTALLATION** (cont)

- 5. Install items 16 thru 15 as an assembly in fuse box (19, Figure 7-83).
- 6. Install items 14 thru 11 as an assembly in fuse box (19).
- 7. Install two fuse blocks (10) and four screws (9) in fuse box (19, Figure 7-82).
- 8. Position main wiring harness (14, Figure 7-81).
- 9. Install 12 screws (8).





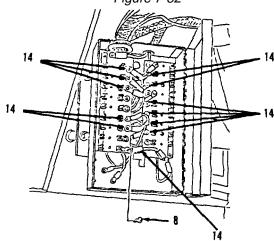


Figure 7-81

Go to Sheet 6

## **FUSE BOX MAINTENANCE.**

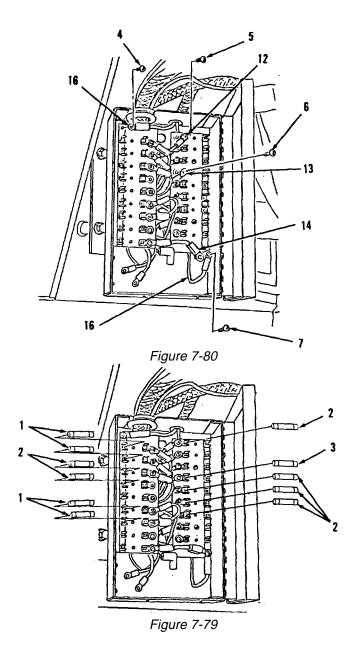
# 7-62. Main Fuse Box and Mounting. (Sheet 6 of 6)

# **INSTALLATION**

- 10. Position main blackout wiring harness (16) and main harness (14, Figure 7-80).
- 11. Install screw (7).
- 12. Position monitor main wiring harness (13).
- 13. Install *screw* (6).
- 14. Position supplemental steering main wiring harness (12).
- 15. Install screw (5).
- 16. Position main blackout light wiring harness (16).
- 17. Install screw (4).
- 18. Install fuse (3), six fuses (2) and four fuses (1, Figure 7-79).

## NOTE

Return 1300 Grader to original equipment condition.



End of Task

# **FUSE BOX MAINTENANCE. (cont)**

# 7-63. Cab Fuse Box and Cover. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Detergent, Item 8, Appendix C

Small tags, Item 41, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## **FUSE BOX MAINTENANCE.**

# 7-63. Cab Fuse Box and Cover. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Remove two knobs (1), lock nuts (2) and plate (3, Figure 7-86).
- 2. Remove three 4 amp fuses (4), 20 amp fuse (5), two 10 amp fuses (6), 5 amp fuse (7) and 15 amp fuse (8, Figure 7-87).
- 3. Remove screw (9, Figure 7-88).

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

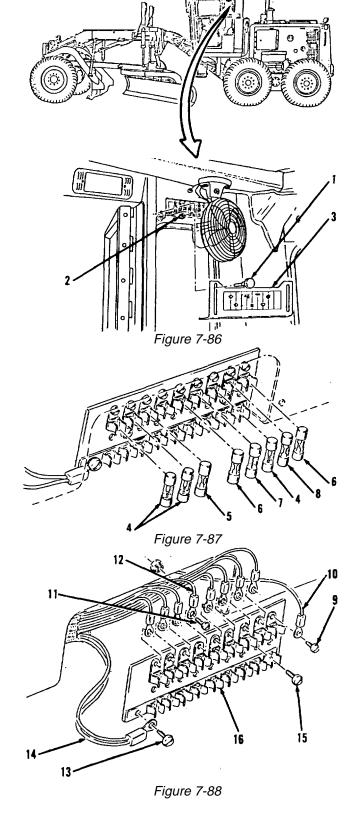
- 4. Disconnect front fan wire assembly (10).
- 5. Remove screw (11).
- 6. Disconnect rear fan wire assembly (12).
- 7. Remove eight screws (13).
- 8. Disconnect cab main harness (14).
- 9. Remove two screws (15) and fuse block (16).

# **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.



Go to Sheet 3

# **FUSE BOX MAINTENANCE. (cont)**

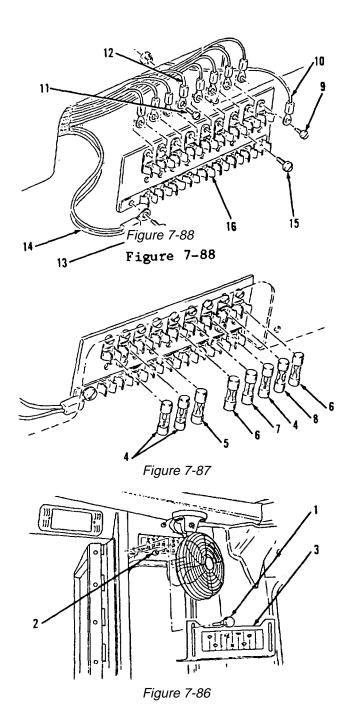
# 7-63. Cab Fuse Box and Cover. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Install fuse block (16) and two screws (15, Figure 7-88).
- 2. Position cab main harness (14).
- 3. Install eight screws (13).
- 4. Position rear fan wire assembly (12).
- 5. Install screw (11).
- 6. Position front fan wire assembly (10).
- 7. Install screw (9).
- 8. Install 15 amp fuse (8), 5 amp fuse (7), two 10 amp fuses (6), 20 amp fuse (5) and three 4 amp fuses (4, Figure 7-87).
- 9. Install plate (3), two lock nuts (2) and knobs (1, Figure 7-86).

# NOTE

Return 130G Grader to original equipment condition.



End of Task

## **FUSE BOX MAINTENANCE.**

# 7-64. NATO Slave Receptacle. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Small tags, Item 41, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## **FUSE BOX MAINTENANCE. (cont)**

## 7-64. NATO Slave Receptacle. (Sheet 2 of 4)

## **REMOVAL**

1. Remove nut (1) and washer (2) from starting motor (3, Figure 7-89).

## **NOTE**

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect wire assembly (4), cable assembly (5) and wire assembly (6).
- 3. Remove washer (7).
- 4. Disconnect cable assembly (8).
- 5. Remove nut (9) and washer (10, Figure 7-90).
- 6. Disconnect cable assembly (23) and wire assemblies (11, 12 and 13).
- 7. Remove bolt (14), washer (15) and clip (16) from cable assemblies (22 and 23, Figure 7-91).
- 8. Remove bolt (17), washer (18) and bracket (19).

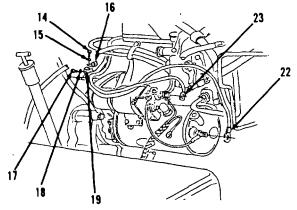
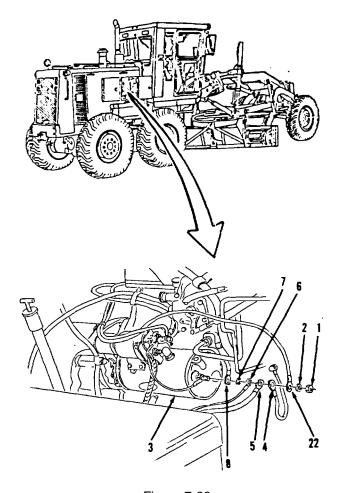


Figure 7-91



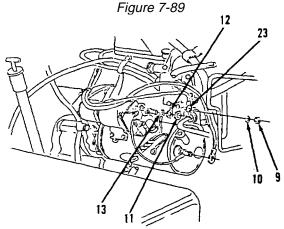


Figure 7-90

Go to Sheet 3

## **FUSE BOX MAINTENANCE.**

## 7-64. NATO Slave Receptacle. (Sheet 3 of 4)

#### **REMOVAL**

- 9. Remove two bolts (20), lockwashers (21) and cable assemblies (22 and 23, Figure 7-92) in rear, left of engine compartment.
- 10. Remove four bolts (24), lockwashers (25) and receptacle (26).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- Install receptacle (26), four lockwashers (25) and bolts (24, Figure 7-92).
- 2. Install cable assemblies (23 and 22), two lockwashers (21) and bolts (20).
- 3. Install bracket (19), washer (18) and bolt (17, Figure 7-91).
- 4. Install clip (16), washer (15) and bolt (14) on cable assemblies (23 and 22).

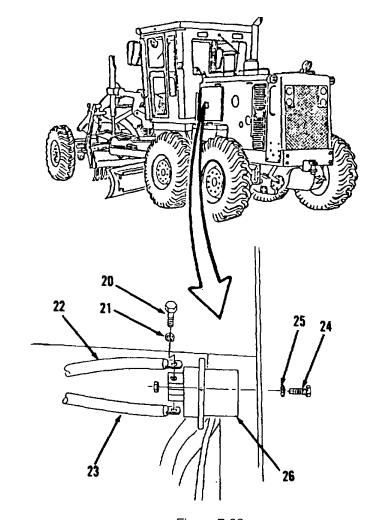


Figure 7-92

Go to Sheet 4

## **FUSE BOX MAINTENANCE. (cont)**

## 7-64. NATO Slave Receptacle. (Sheet 4 of 4)

## **INSTALLATION** (cont)

- 5. Position wire assemblies (13, 12 and 11) and cable assembly (23, Figure 7-90).
- 6. Install washer (10) and nut (9).
- 7. Position cable assembly (8, Figure 7-89).
- 8. Install washer (7).
- 9. Position wire assembly (6), cable assembly (5), wire assembly (4) and cable assembly (22).
- 10. Install washer (2) and nut (1) on starting motor (3).

## NOTE

Return 130G Grader to original equipment condition.

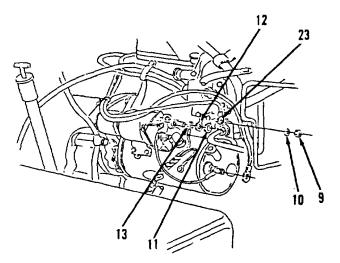


Figure 7-90

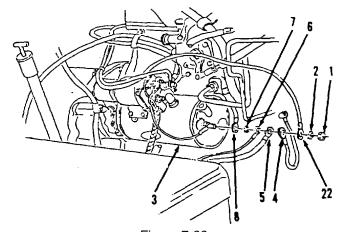


Figure 7-89

End of Task

## Section XVIII. DOME LIGHT AND SWITCH TROUBLESHOOTING.

- **7-65. GENERAL INFORMATION.** This section lists the common dome light and switch malfunctions which may occur during the operation of the 130C Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **7-66. DOME LIGHT AND SWITCH TROUBLESHOOTING PROCEDURES.** This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

DOME LIGHT AND SWITCH TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

DOME LIGHT WILL NOT OPERATE.

Step 1. Check the dome light bulb.

If the dome light bulb is burned out--replace. Refer to paragraph 7-68.

Step 2. Test the continuity of the dome light switch (Figure 7-93). Connect multimeter to the back of the switch.

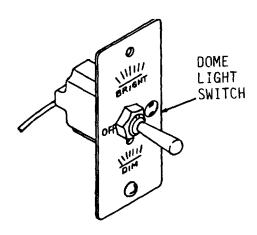


Figure 7-93

If the multimeter needle does not move, the circuit does not have continuity. Replace dome light switch. Refer to paragraph 7-68.

## DOME LIGHT AND SWITCH TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cont)

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

## **DOME LIGHT WILL NOT OPERATE. (cont)**

Step 3. Test the continuity of the dimmer register (Figure 7-94). Connect multimeter to the back of resistor.

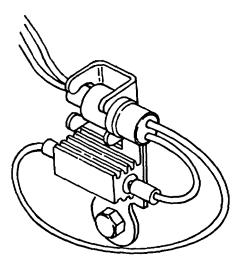


Figure 7-94

If the multimeter needle does not move, the circuit does not have continuity. Replace dimmer resistor. Refer to paragraph 7-69.

## Section XIX. DOME LIGHT MAINTENANCE.

## 7-67. DOME LIGHT MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the dome light and its components in good repair.
- b. This section is arranged by functional group code and provides a list of dome light components to be maintained and step-by-step maintenance procedures.

## **INDEX**

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Dome Light Switch	7-68	7-162
Dimmer Resistor Assembly	7-69	7-165

## **DOME LIGHT MAINTENANCE. (cont)**

#### 7-68. Dome Light Switch. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations Personnel Required Construction equipment

repairer MOS 62B

Tools

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177-TM 5-3805-261-10

7033)

Special Environmental Conditions None

Test Equipment

None

**General Safety Instructions** None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C **Torques** 

Clean cloths, Item 39, Except for special torques shown, Appendix C all fasteners are tightened to

Small tags, Item 41, standard torques. Refer to

Appendix E. Appendix C

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side

Go to Sheet 2

## DOME LIGHT MAINTENANCE.

## 7-68. Dome Light Switch. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Remove two screws (1, Figure 7-95) from front, upper right of cab storage compartment.
- 2. Remove lock nut (2).
- 3. Remove lockwasher (3).
- 4. Remove instruction plate (4).
- 5. Remove two nuts (5).
- 6. Remove ring (6) and nut (7, Figure 7-96) from switch (11).
- 7. Remove three screws (8) and lockwashers (9).

## **NOTE**

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

8. Disconnect three wire assemblies (10) from switch (11).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

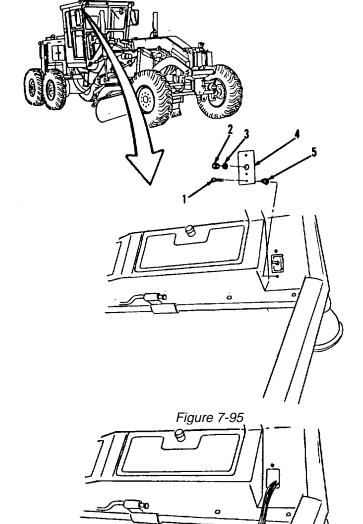


Figure 7-96

Go to Sheet 3

## **DOME LIGHT MAINTENANCE. (cont)**

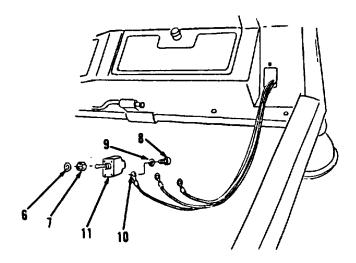
## 7-68. Dome Light Switch. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Connect three wire assemblies (10) to switch (11, Figure 7-96).
- 2. Install three lockwashers (9) and screws (8).
- 3. Install nut (7) and ring (6).
- 4. Install two nuts (5, Figure 7-95).
- 5. Position switch (11).
- 6. Install instruction plate (4), lockwasher (3) and lock nut (2). Tighten lock nut (2) to 19 lb-in torque.
- 7. Install two screws (1).

## NOTE

Return 130G Grader to original equipment condition.



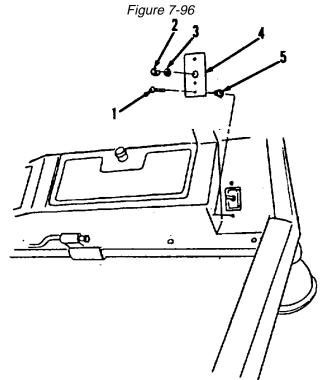


Figure 7-95

End of Task

## DOME LIGHT MAINTENANCE.

## 7-69. Dimmer Resistor Assembly. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

<u>Applicable Configurations</u>
All

<u>Personnel Required</u>
Construction equipment

repairer MOS 62B

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177- TM 5-3805-261-10 7033)

Special Environmental Conditions
Test Equipment None

None
General Safety Instructions

Materials/Parts None
Dry cleaning solvent,

Item 14, Appendix C
Clean cloths, Item 39,
Appendix C
Appendix C
Appendix C
Appendix C
Torques
All fasteners are tightened to standard torques. Refer to

Appendix C standard torq Small tags, Item 41, Appendix E.

Troubleshooting References

Appendix C

None

Equipment Condition
TM 5-3805-261-10
Vehicle parked on level ground.

Parking/emergency brake applied.
Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-68 Dome light switch removed.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## **DOME LIGHT MAINTENANCE. (cont)**

## 7-69. <u>Dimmer Resistor Assembly</u>. (Sheet 2 of 2)

#### **REMOVAL**

 Open door of right side cab storage compartment and remove right side panel. Refer to paragraph 13-11, step 5.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Remove wire assemblies (1 and 2) from clip (3) on resistor assembly (4, Figure 7-97) on front, upper right side of cab storage compartment.
- 3. Separate wire assemblies (1 and 2).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Connect wire assemblies (2 and 1, Figure 7-97).
- 2. Attach to clip (3) on resistor assembly (4).
- 3. Install right side panel in right side cab storage compartment. Refer to paragraph 13-11, step 7.
- 4. Close right side cab storage compartment door.

## NOTE

Return 130G Grader to original equipment condition.

End of Task

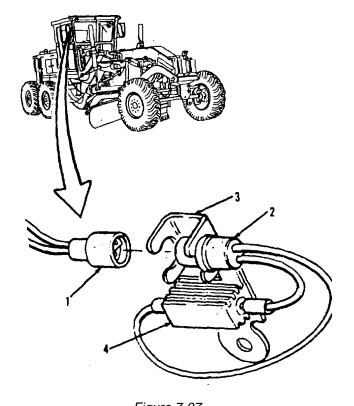


Figure 7-97

#### Section XX. LIGHT SWITCH AND DIMMER TROUBLESHOOTING.

- **7-70. GENERAL INFORMATION**. This section lists the common light switch and dimmer malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **7-71. LIGHT SWITCH AND DIMMER TROUBLESHOOTING PROCEDURES.** This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### LIGHT SWITCH AND DIMMER TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

- a. LIGHTS WILL NOT OPERATE.
  - Step 1. Check fuses.

If a fuse is blown--replace. Refer to paragraph 7-63.

Step 2. Check the wiring between lights and magnetic switch.

If the wires are corroded, damaged or defective--replace. Refer to paragraph 7-73.

Step 3. Test the continuity of the magnetic switch (Figure 7-98). Connect multimeter to the back of switch.

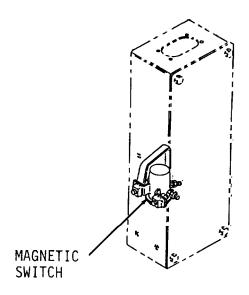


Figure 7-98

## LIGHT SWITCH AND DIMMER TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cont)

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

## a. LIGHTS WILL NOT OPERATE. (cont)

If the multimeter needle does not move, the circuit does not have continuity. Replace magnetic switch. Refer to paragraph 7-76.

## b. DIMMER SWITCH DOES NOT OPERATE.

Step 1. Test the continuity of the dimmer switch (Figure 7-99). Connect multimeter to the back of the switch.

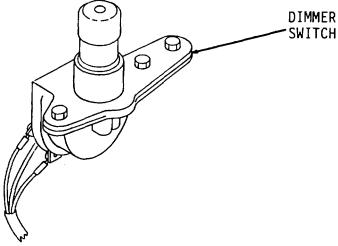


Figure 7-99

If the multimeter needle does not move, the circuit does not have continuity. Replace dimmer switch. Refer to paragraph 7-74.

## Section XXI. VEHICLE LIGHT SWITCH MAINTENANCE.

## 7-72. VEHICLE LIGHT SWITCH MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the vehicle light switch and its components in good repair.
- b. This section is arranged by functional group code and provides a list of vehicle light switch components to be maintained and step-by-step maintenance procedures.

#### INDEX

<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
Vehicle Light Switch Assembly Dimmer Switch Vehicle Light Switch Assembly Support Magnetic Switch	7-73 7-74 7-75 7-76	7-170 7-172 7-175 7-177

## **VEHICLE LIGHT SWITCH MAINTENANCE. (cont)**

#### 7-73. Vehicle Light Switch Assembly. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations Personnel Required Construction equipment repairer MOS 62B

Tools

General Mechanic's Tool Kit: References Automotive (NSN 5180-00-177-TM 5-3805-261-10 7033) TM 5-3805-261-20

Test Equipment Special Environmental Conditions None None

Materials/Parts **General Safety Instructions** None

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39,

Appendix C All fasteners are tightened to Small tags, Item 41, Appendix C standard torques. Refer to Appendix E. 

**Troubleshooting References** None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

**Torques** 

## VEHICLE LIGHT SWITCH MAINTENANCE.

## 7-73. Vehicle Light Switch Assembly. (Sheet 2 of 2)

#### **REMOVAL**

1. Remove six bolts (1), washers (2) and plate (3, Figure 7-100).

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect harness (4) from switch (7).
- 3. Remove four screws (5), washers (6) and switch (7).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install switch (7), four washers (6) and screws (5, Figure 7-100).
- 2. Connect harness (4) to switch (7).
- 3. Install plate (3), six washers (2) and bolts (1).

## NOTE

Return 130G Grader to original equipment condition.

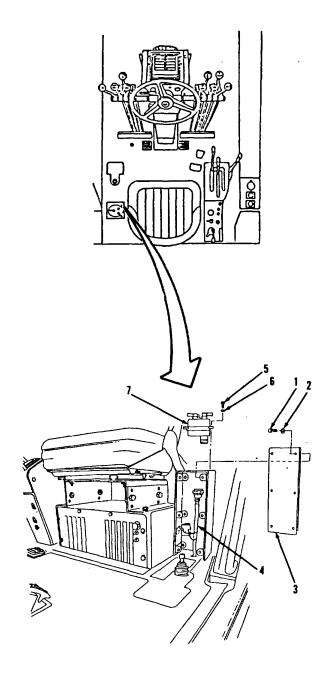


Figure 7-100

End of Task

## **VEHICLE LIGHT SWITCH MAINTENANCE. (cont)**

## 7-74. Dimmer Switch. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

All

Personnel Required

Construction equipment
repairer MOS 62B

Tools

 General Mechanic's Tool Kit:
 References

 Automotive (NSN 5180-00-177 TM 5-3805-261-10

 7033)
 TM 5-3805-261-20

Test Equipment Special Environmental Conditions
None None

<u>Materials/Parts</u> <u>General Safety Instructions</u>
Dry cleaning solvent, None

Item 14, Appendix C Clean cloths, Item 39,

Appendix C Small tags, Item 41, Appendix C Torques
All fasteners are tightened to standard torques. Refer to Appendix E.

· 'T

<u>Troubleshooting References</u>
None

Equipment Condition TM 5-3805-261-10

Vehicle parked on level ground.
Parking/emergency brake applied.
Equipment lowered to the ground.
Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## VEHICLE LIGHT SWITCH MAINTENANCE.

## 7-74. Dimmer Switch. (Sheet 2 of 3)

## **REMOVAL**

- 1. Fold back corner of floor mat from inner, left side of cab and remove two screws (1), washers (2) and switch (5, Figure 7-101).
- 2. Remove three screws (3) from switch (5, Figure 7-102) under left side of floor in cab.

## NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

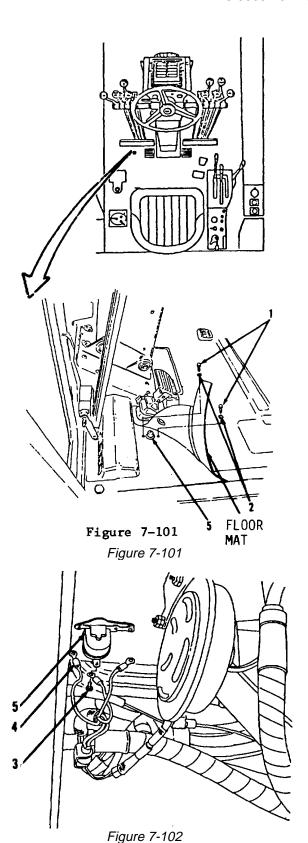
3. Disconnect three wire assemblies (4) from switch (5).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.



Go to Sheet 3

## **VEHICLE LIGHT SWITCH MAINTENANCE. (cont)**

## 7-74. Dimmer Switch. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Connect three wire assemblies (4) to switch (5, Figure 7-102).
- 2. Install three screws (3).
- 3. Install switch (5), two washers (2) and screws (1, Figure 7-101) to interior, left side of floor of cab. Reposition floor mat.

## NOTE

Return 130G Grader to original equipment condition.

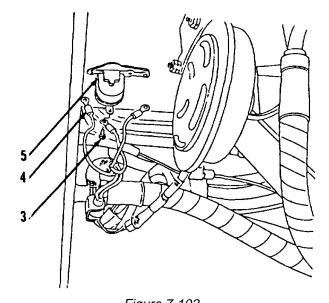


Figure 7-102

Floor
MAT

Figure 7-101

End of Task

## VEHICLE LIGHT SWITCH MAINTENANCE.

## 7-75. Vehicle Light Switch Assembly Support. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

All .

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39,

Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-73 Vehicle light switch assembly removed.

Paragraph 7-76 Magnetic switch removed.

Go to Sheet 2

## **VEHICLE LIGHT SWITCH MAINTENANCE. (cont)**

## 7-75. Vehicle Light Switch Assembly Support. (Sheet 2 of 2)

## **REMOVAL**

- 1. Remove six bolts (1), washers (2) and plate (3, Figure 7-103).
- 2. Remove four bolts (4), washers (5) and two brackets (6).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

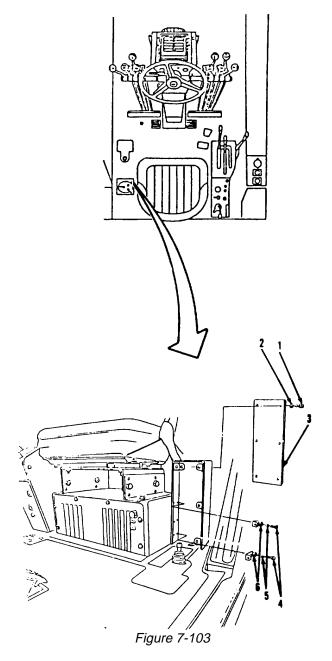
Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install two brackets (6), four washers (5) and bolts (4, Figure 7-103).
- 2. Install plate (3), six washers (2) and bolts (1).

## NOTE

Return 130G Grader to original equipment condition.



End of Task

#### VEHICLE LIGHT SWITCH MAINTENANCE.

#### 7-76. Magnetic Switch. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations Personnel Required Construction equipment

repairer MOS 62B

Tools

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177-TM 5-3805-261-10

7033)

**Special Environmental Conditions** Test Equipment None

None

**General Safety Instructions** None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C **Torques** 

Clean cloths, Item 39, All fasteners are tightened to Appendix C standard torques. Refer to

Small tags, Item 41, Appendix E.

Appendix C

## **Troubleshooting References**

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground. Parking/emergency brake applied.

Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

The state of the s

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## **VEHICLE LIGHT SWITCH MAINTENANCE. (cont)**

## 7-76. Magnetic Switch. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Remove six bolts (1), washers (2) and plate (3, Figure 7-104).
- 2. Remove four nuts (4) and washers (5) from switch (12).

## NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 3. Disconnect three wire assemblies (6).
- 4. Remove four nuts (7) and washers (8).
- 5. Remove two bolts (9) and washers (10).
- 6 Remove strap (11) and switch (12).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

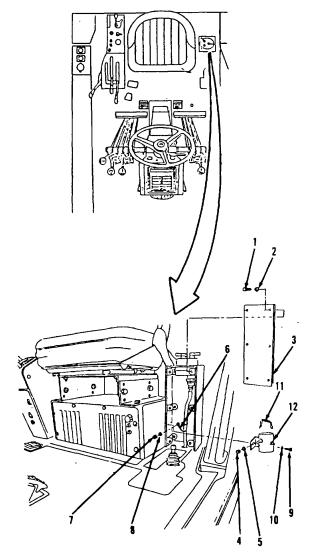


Figure 7-104

Go to Sheet 3

## VEHICLE LIGHT SWITCH MAINTENANCE.

## 7-76. Magnetic Switch. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Position switch (12) and strap (11, Figure 7-104).
- 2. Install two washers (10) and bolts (9).
- 3. Install four washers (8) and nuts (7).
- 4. Connect three wire assemblies (6) to switch (12).
- 5. Install four washers (5) and nuts (4).
- 6. Install plate (3), six washers (2) and bolts (1).

## NOTE

Return 130G Grader to original equipment condition.

End of Task

#### Section XXII. LIGHT SYSTEM TROUBLESHOOTING.

- **7-77. GENERAL INFORMATION**. This section lists the common light system malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **7-78. LIGHT SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES**. This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### LIGHT SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

## MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

- a. ALL DRIVING, TAIL AND PANEL LIGHTS FAIL TO OPERATE.
  - Step 1. Check circuit breaker number 60A.

Reset circuit breaker.

Step 2. Check the wiring harness for corrosion, cracks or breaks at circuit breaker connection.

If the wiring harness is damaged or defective--repair. Refer to paragraph 7-117. If replacement is necessary-contact Direct Support.

- b. ALL STOP/TAIL, PANEL AND ARTICULATION LIGHTS FAIL TO OPERATE.
  - Step 1. Check fuse number 10A.

If fuse is blown--replace. Refer to paragraph 7-63.

Step 2. Test the continuity of the stop light switch (Figure 7-105). Connect multimeter to the back of switch.

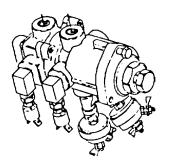


Figure 7-105

## b. ALL STOP/TAIL, PANEL AND ARTICULATION LIGHTS FAIL TO OPERATE.

If the multimeter needle does not move, the circuit does not have continuity. Replace stop light switch. Refer to paragraph 7-96.

Step 3. Check the wiring harness for corrosion, cracks or breaks.

If the wiring harness is damaged or defective--repair. Refer to paragraph 7-117. If replacement is necessary-contact Direct Support.

## c. HEADLIGHTS FAIL TO OPERATE.

Step 1. Check circuit breaker number 15A.

Reset circuit breaker.

Step 2. Test the continuity of the headlight switch (Figure 7-106).

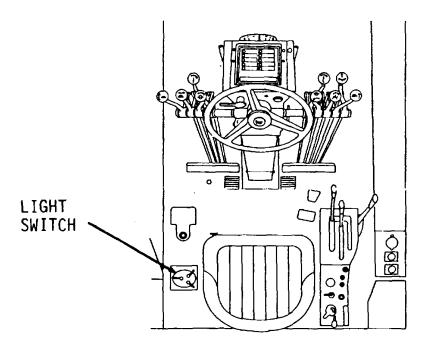


Figure 7-106

If the multimeter needle does not move, the circuit does not have continuity. Replace light switch. Refer to paragraph 7-73.

## c. HEADLIGHTS FAIL TO OPERATE.

Step 3. Test the continuity of the dimmer switch (Figure 7-107). Connect multimeter to the back of switch.

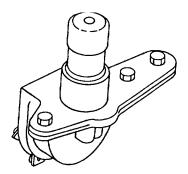


Figure 7-107

If the multimeter needle does not move, the circuit does not have continuity. Replace dimmer switch. Refer to paragraph 7-74.

Step 4. Check the wiring harness for corrosion, cracks or breaks.

If the wiring harness is damaged or defective--repair. Refer to paragraph 7-117. If replacement is necessary-contact Direct Support.

## d. INDIVIDUAL LIGHT FAILS TO OPERATE.

Step 1. Check the bulb.

If the bulb is burned out--replace.

Step 2. Check the wiring harness.

If the wiring harness is damaged or defective--repair. Refer to paragraph 7-117. If replacement is necessary-contact Direct Support.

Step 3. Check individual light socket.

If corrosion is evident, or if the socket is damaged or defective replace.

#### d. INDIVIDUAL LIGHT FAILS TO OPERATE.

Step 4. Test the continuity of the individual light assembly. Connect multimeter to terminal at the back of light.

If the multimeter needle does not move, the circuit does not have continuity. Replace light assembly. Refer to paragraph 7-73.

Step 5. Test the continuity of the wire assemblies between individual light and switch.

If an individual wire assembly is damaged or defective--replace or repair. Refer to paragraph 7-117.

Step 6. Test the continuity of the light switch.

If the multimeter needle does not move, the circuit does not have continuity. Replace light switch. Refer to paragraph 7-73.

#### e. ALL SIGNAL LIGHTS AND INDICATORS FAIL TO OPERATE.

Step 1. Check circuit breaker number 60A.

Reset circuit breaker.

Step 2. Check fuse number 10A.

If fuse is blown--replace. Refer to paragraph 7-63.

Step 3. Test the continuity of the flasher unit (Figure 7-108). Connect multimeter to the bottom of unit.

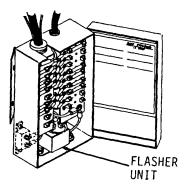


Figure 7-108

## e. ALL SIGNAL LIGHTS AND INDICATORS FAIL TO OPERATE. (cont)

If the multimeter needle does not move, the circuit does not have continuity. Replace flasher unit. Refer to paragraph 7-60.

Step 4. Test the continuity of the turn signal switch (Figure 7-109).

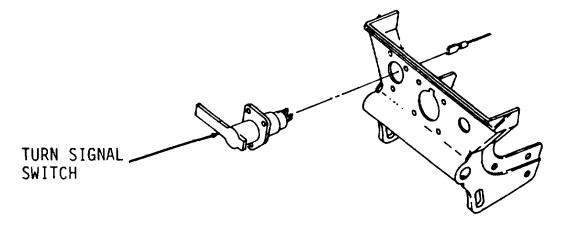


Figure 7-109

If the multimeter needle does not move, the circuit does not have continuity. Replace turn signal switch. Refer to paragraph 7-22.

Step 5. Check the wiring harness for corrosion, cracks or breaks.

If the wiring harness is damaged or defective--repair. Refer to paragraph 7-117. If replacement is necessary-contact Direct Support.

## f. TURN SIGNAL LAMPS FAIL TO BLINK.

Test the continuity of the flasher unit (Figure 7-108). Connect multimeter to the bottom of the flasher unit.

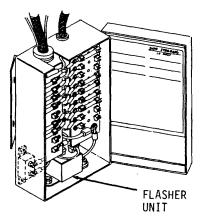


Figure 7-108

If the multimeter needle does not move, the circuit does not have continuity. Replace flasher unit. Refer to paragraph 7-60.

## g. BOTH FLOOD LIGHTS FAIL TO OPERATE.

Step 1. Check circuit breaker number 60A.

Reset circuit breaker.

Step 2. Check fuse number 15A.

If fuse is blown--replace. Refer to paragraph 7-63.

Step 3. Test the continuity of each flood light assembly. Connect one multimeter lead to the back of light housing and one to ground.

If the multimeter needle does not move, the circuit does not have continuity. Replace flood light assembly. Refer to paragraph 7-81.

## LIGHT SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cont)

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

## g. BOTH FLOOD LIGHTS FAIL TO OPERATE. (cont)

Step 4. Test the continuity of the headlight switch (Figure 7-106). Connect one multimeter lead to the back of switch and one lead to ground.

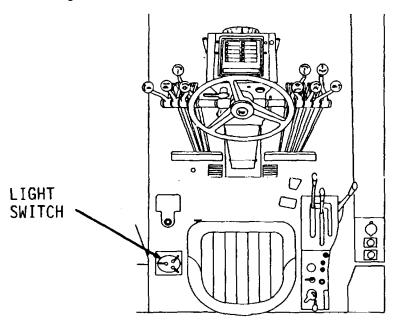


Figure 7-106

If the multimeter needle does not move, the circuit does not have continuity. Replace light switch assembly. Refer to paragraph 7-73.

Step 5. Check the wiring harness for corrosion, cracks or breaks.

If the wiring harness is damaged or defective--repair. Refer to paragraph 7-117. If replacement is necessary-contact Direct Support.

## h. BLACKOUT DRIVE LIGHTS FAIL TO OPERATE.

Step 1. Check circuit breaker number 604.

Reset circuit breaker.

Step 2. Check fuse number 15A.

f fuse is blown--replace. Refer to paragraph 7-63.

## h. BLACKOUT DRIVE LIGHTS FAIL TO OPERATE. (cont)

Step 3. Test the continuity of the headlight switch (Figure 7-106) in all blackout drive positions. Connect one multimeter lead to the back of switch and one to ground.

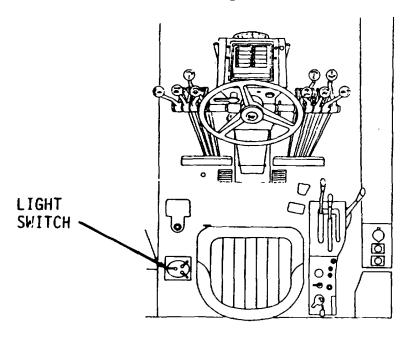


Figure 7-106

If the multimeter needle does not move, the circuit does not have continuity. Replace light switch assembly. Refer to paragraph 7-73.

Step 4. Check the wiring harness for corrosion, cracks or breaks.

If the wiring harness is damaged or defective--repair. Refer to paragraph 7-117. If replacement is necessary-contact Direct Support.

i. DOME LIGHT FAILS TO OPERATE.

Refer to Dome Light and Switch Troubleshooting, paragraphs 7-65 and 7-66.

## Section XXIII. LIGHT SYSTEM MAINTENANCE.

## 7-79. LIGHT SYSTEM MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the light system and its components in good repair.
- b. This section is arranged by functional group code and provides a list of light system components to be maintained and step-by-step maintenance procedures.

#### INDEX

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## LIGHT SYSTEM MAINTENANCE.

#### 7-80. Headlights. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41,

Appendix C . .

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## **LIGHT SYSTEM MAINTENANCE. (cont)**

## 7-80. Headlights. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

The following is a maintenance procedure for the left headlight. The maintenance procedure for the right headlight is identical.

- 1. Remove nut (1), washer (2) and two washers (3) (Figure 7-110) from top, front exterior of cab. Support items 4 thru 11 as an assembly while removing mounting hardware.
- 2. Remove two screws (4, Figure 7-111).

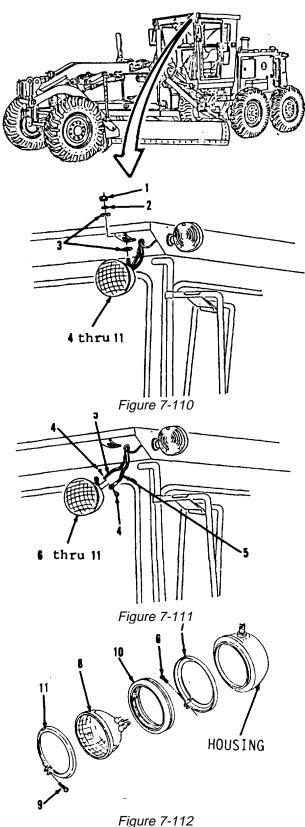
## NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 3. Disconnect two wire assemblies (5) at terminals.
- 4. Remove items 6 and 11 as an assembly.

#### **DISASSEMBLY**

- 1. Remove screw (6), ring(7) and lamp (8, Figure 7-112).
- 2. Remove screw(9), molding(10) and ring (11) from housing.



rige

Go to sheet 3

## LIGHT SYSTEM MAINTENANCE.

## 7-80. Headlights. (Sheet 3 of 3)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **ASSEMBLY**

- 1. Install ring (11), molding (10) and screw (9, Figure 7-112).
- 2. Install lamp (8), ring (7) and screw (6) on housing.

#### **INSTALLATION**

- Position items 11 thru 6 as an assembly (Figure 7-111) on top, front exterior of cab near mounting.
- 2. Connect two wire assemblies (5) at terminals.
- 3. Install two screws (4).
- 4. Install items 11 thru 4 as an assembly, two washers (3), washer (2) and nut (1, Figure 7-110).

#### NOTE

Return 130G Grader to original equipment condition.

End of Task

## 7-81. Front Floodlight. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

None

d. Installation

## **INITIAL SETUP:**

Applicable Configurations
All
Construction equipment repairer MOS 62B

Tools

General Mechanic's Tool Kit: References
Automotive (NSN 5180-00-177- TM 5-3805-261-10
7033)

<u>Test Equipment</u>

None

Materials/Parts General Safety Instructions
None

Dry cleaning solvent,

Item 14, Appendix C
Clean cloths, Item 39,
Appendix C
Small tags, Item 41,

Torques
All fasteners are tightened to standard torques. Refer to Appendix E.

<u>Troubleshooting References</u>
None

Appendix C

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied.
Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

**Special Environmental Conditions** 

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## 7-81. Front Floodlight. (Sheet 2 of 3)

## **REMOVAL**

## **NOTE**

The following is a maintenance procedure for the left front floodlight. The maintenance procedure for the right front floodlight is identical.

- 1. Remove nut (1), washer (2) and spacer (3, Figure 7-113) from front of vehicle.
- 2. Remove floodlight (4) and spacer (5). Support floodlight (4) during removal.

## **NOTE**

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 3. Remove screw (6) and wire assembly (7) at terminal from floodlight (4).
- 4. Remove two nuts (8), washers (9), bolts (10), clip (11) and bracket (12).

## **DISASSEMBLY**

- 1. Remove screw (13) and molding (14, Figure 7-114).
- 2. Remove ring (15).
- 3. Remove lamp (16).
- 4. Remove screw (17) and ring (18) from body (19).

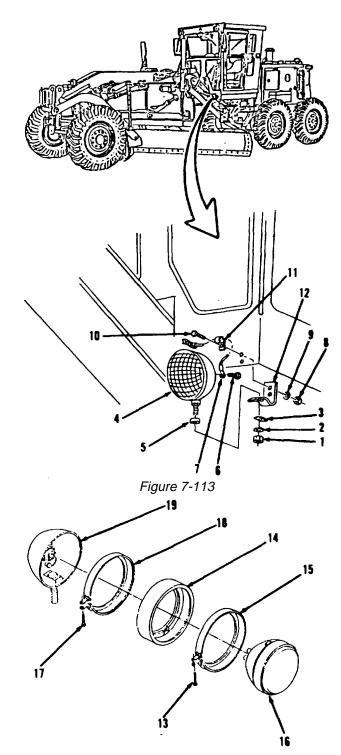


Figure 7-114

Go to Sheet 3

## 7-81. Front Floodlight. (Sheet 3 of 3)

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **ASSEMBLY**

- 1. Install ring (18) and screw (17) on body (19, Figure 7-114).
- 2. Install lamp (16).
- 3. Install ring (15).
- 4. Install molding (14) and screw (13).

## **INSTALLATION**

- 1. Install bracket (12), clip (11), two bolts (10), washers (9) and nuts (8, Figure 7-113).
- 2. Position floodlight (4) on vehicle near mounting.
- 3. Install wire assembly (7) at terminal and screw (6) on floodlight (4).
- 4. Install spacer (5), floodlight (4), spacer (3), washer (2) and nut (1).

## **NOTE**

Return 130G Grader to original equipment condition.

Figure 7-113

End of Task

## 7-82. Front Blackout Light. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

## **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Two straps, Item 1 Gasket, Item 14

Preformed packing, Item 15

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

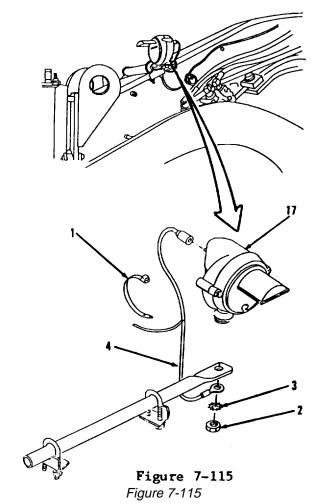
## 7-82. Front Blackout Light. (Sheet 2 of 4)

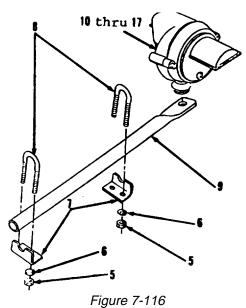
## **REMOVAL**

## NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 1. Disconnect wire assembly (4, Figure 7-115) at terminal from front of vehicle.
- 2. Remove and discard two straps (1).
- 3. Remove nut (2) and lockwasher (3).
- 4. Disconnect and remove wire assembly (4) at connector from body assembly (17).
- 5. Remove items 10 thru 17 as an assembly from tube (9, Figure 7-116).
- 6. Remove four nuts (5), washers (6), two brackets (7), U-bolts (8) and tube (9).





Go to Sheet 3

## 7-82. Front Blackout Light. (Sheet 3 of 4)

## **DISASSEMBLY**

- 1. Remove washers (10 and 11) from body assembly (17, Figure 7-117).
- 2. Loosen three screws (12). Three screws (12) cannot be removed from door assembly (13).
- 3. Remove door assembly (13).
- 4. Remove and discard gasket (14) and preformed packing (15). Remove all gasket material from mounting surfaces.
- 5. Remove lamp (16) from body assembly (17).



Clean all parts. Refer to Chapter 2.

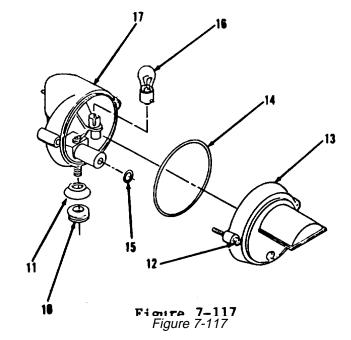
## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **ASSEMBLY**

- 1. Install lamp (16) in body assembly (17, Figure 7-117).
- 2. Position new preformed packing (15) and new gasket (14).
- 3. Position door assembly (13) on body assembly (17).
- 4. Tighten three screws (12).
- 5. Install washers (11 and 10).

Go to Sheet 4



## **LIGHT SYSTEM MAINTENANCE. (cont)**

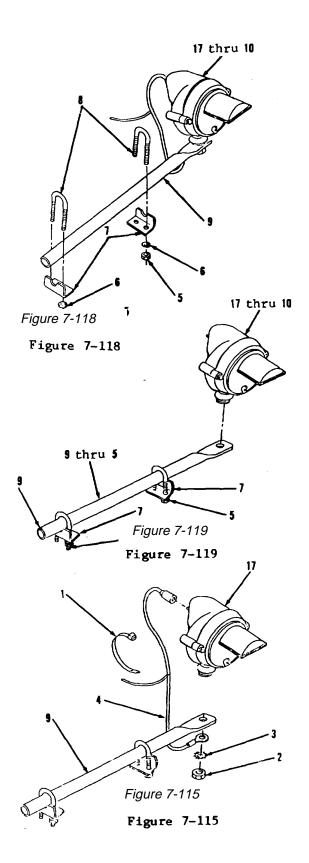
## 7-82. Front Blackout Light. (Sheet 4 of 4)

## **INSTALLATION**

- 1. Install two U-bolts (8), brackets (7), four washers (6) and nuts (5) loosely on tube (9, Figure 7-118).
- 2. Position items 9 thru 5 as an assembly (Figure 7-119) on top of front frame.
- 3. Slide two brackets (7) under lips of front frame and aline the rounded end of tube (9) flush with right edge of frame.
- 4. Tighten four nuts (5).
- 5. Position items 17 thru 10 as an assembly. Must be in straight level position.
- 6. Install wire assembly (4, Figure 7-115) at connector to body assembly (17).
- 7. Connect wire assembly (4) at terminal to tube (9).
- 8. Install lockwasher (3) and nut (2).
- 9. Install two new straps (1).

## NOTE

Return 130C Grader to original equipment condition.



End of Task

## 7-83. Cab Signal Lights. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

<u>Applicable Configurations</u>
All

Personnel Required
Construction equipment

repairer MOS 62B

<u>Tools</u>

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177- TM 5-3805-261-10

7033)

<u>Special Environmental Conditions</u>
<u>Test Equipment</u>
None

<u>st Equipment</u> None

General Safety Instructions

Materials/Parts None

Dry cleaning solvent,

Item 14, Appendix C <u>Torques</u>

Clean cloths, Item 39,

Appendix C standard torques. Refer to Small tags, Item 41, Appendix E.

Appendix C

Detergent, Item 8, Appendix C

Gasket, Item 10

Troubleshooting References

None'

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

All fasteners are tightened to

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## 7-83. Cab Signal Lights. (Sheet 2 of 3)

## **REMOVAL**

## NOTE

- The following procedure is for maintenance of the left cab signal light. The procedure for maintenance of the right cab signal light is identical.
- All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.
- 1. Disconnect wire assembly (1, Figure 7-120) at front, top of cab.
- 2. Remove grommet (2).
- 3. Remove nut (3), lockwasher (4), washer (5) and items 6 thru 12 as an assembly (Figure 7-121).
- 4. Remove washers (6 and 7) from items 8 thru 12 as an assembly (Figure 7-122).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

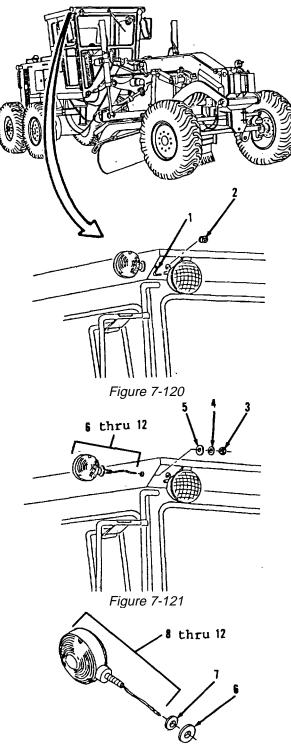


Figure 7-122

Go to Sheet 3

## 7-83. Cab Signal Lights. (Sheet 3 of 3)

## **DISASSEMBLY**

Remove six screws (8), two lenses (9), gasket (10) and lamp (11) from housing (12, Figure 7-123). Discard gasket (10). Remove all gasket material from mounting surfaces.

## **ASSEMBLY**

Install lamp (11), new gasket (10), two lenses (9) and six screws (8) on housing (12, Figure 7-123).

## **INSTALLATION**

- 1. Install washers (7 and 6) on items 12 thru 8 as an assembly (Figure 7-122).
- 2. Install items 12 thru 6 as an assembly, washer (5), lockwasher (4) and nut (3, Figure 7-121).
- 3. Install grommet (2, Figure 7-120).
- 4. Connect wire assembly (1).

## **NOTE**

Return 130G Grader to original equipment condition.

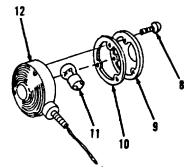


Figure 7-123

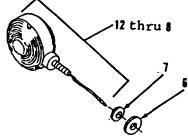


Figure 7-122

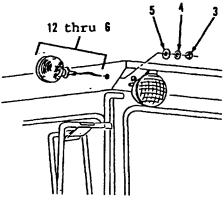


Figure 7-121

End of task

## 7-84. Vehicle Rear Signal Lights. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

## **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C

Detergent, Item 8, Appendix C

Gaskets, Items 3, 11

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

## <u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 6-38 Radiator grille removed.

Go to Sheet 2

## 7-84. Vehicle Rear Signal Lights. (Sheet 2 of 4)

## **REMOVAL**

## NOTE

The following is a maintenance procedure for the rear, right signal light. The maintenance procedure for the rear, left signal light is identical.

- Remove three screws (1), red lens (2) and gasket (3, Figure 7-124). Discard gasket (3). Remove all gasket material from mounting surfaces.
- 2. Remove lamp (4). Depress, turn and withdraw.
- 3. Remove three screws (5) and lockwashers (6).
- 4. Withdraw housing (8) from bracket (24).

## NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 5. Disconnect wire assembly (7) from wiring harness connector and remove from clip (20).
- 6. Remove housing (8).

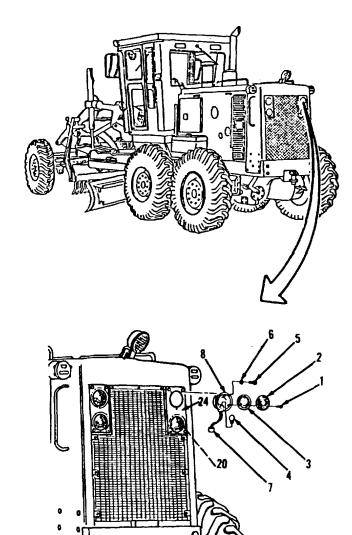


Figure 7-124

Go to Sheet 3

## **LIGHT SYSTEM MAINTENANCE. (coot)**

## 7-84. Vehicle Rear Signal Lights. (Sheet 3 of 4)

## **REMOVAL** (cont)

- 7. Remove three screws (9), amber lens (10) and gasket (11, Figure 7-125). Discard gasket (11). Remove all gasket material from mounting surfaces.
- 8. Remove lamp (12). Depress, turn and withdraw.
- 9. Remove three screws (13) and lockwashers (14).
- 10. Withdraw housing (16) from bracket (24).

## **NOTE**

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 11. Disconnect wire assembly (15) from wiring harness connector and from clip (21).
- 12. Remove housing (16).
- 13. Remove bolt (17), washer (18), nut (19) and clips (20 and 21, Figure 7-126).
- 14. Remove two bolts (22), washers (23) and bracket (24).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

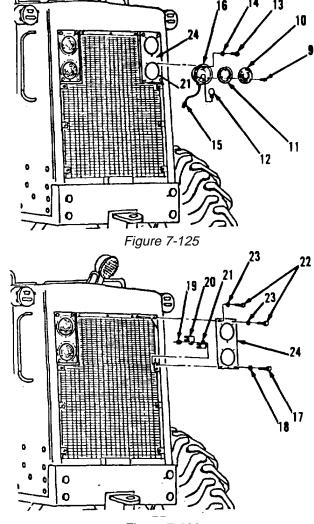


Figure 7-126

Go to Sheet 4

## 7-84. Vehicle Rear Signal Lights. (Sheet 4 of 4)

## **INSTALLATION**

- 1. Install bracket (24), two washers (23) and bolts (22, Figure 7-126) on vehicle.
- 2. Install clips (21 and 20), nut (19), washer (18) and bolt (17) on bracket (24).
- 3. Position housing (16, Figure 7-125).
- 4. Connect wire assembly (15) to wiring harness connector and attach to clip (21).
- 5. Install housing (16), three lockwashers (14) and screws (13).
- 6. Install lamp (12). Insert, depress and turn.
- 7. Install new gasket (11), amber lens (10) and three screws (9).
- 8. Position housing (8, Figure 7-124).
- 9. Connect wire assembly (7) to wiring harness connector and attach to clip (20).
- 10. Install housing (8), three lockwashers (6) and screws (5).
- 11. Install lamp (4). Insert, depress and turn.
- 12. Install new gasket (3), red lens (2) and three screws (1).

## **NOTE**

Return 130G Grader to original equipment condition.

End of Task

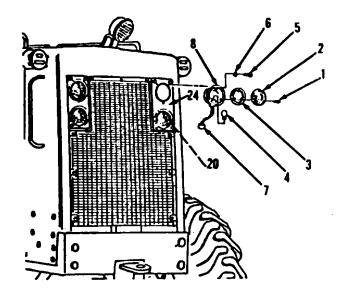


Figure 7-124

## 7-85. Blackout Stop and Taillights. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

None

d. Installation

**INITIAL SETUP:** 

Applicable Configurations
All
Personnel Required
Construction equipment

repairer MOS 62B Tools

General Mechanic's Tool Kit: References
Automotive (NSN 5180-00-177- TM 5-3805-261-10

7033)

Test Equipment

None
General Safety Instructions

Materials/Parts None

Dry cleaning solvent,
Item 14, Appendix C
Clean cloths, Item 39,

Torques
All fasteners are tightened to

Appendix C standard torques. Refer to Detergent, Item 8, Appendix C Appendix E.

Detergent, Item 8, Appendix C
Small tags, Item 41,
Appendix C
Gasket, Item 10

Troubleshooting References
None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground. Parking/emergency brake applied.

Equipment lowered to the ground.

Special Environmental Conditions

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## 7-85. Blackout Stop and Taillights. (Sheet 2 of 4)

## **REMOVAL**

## **NOTE**

The following is a maintenance procedure for the right rear blackout stop and taillights. The maintenance procedure for the left rear blackout stop and taillights is identical.

1. Open side screen door. Refer to paragraph 6-49, steps 1 and 2.

## NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect two wire assemblies (1, Figure 7-127) at connectors, from main wiring harness in engine compartment.
- 3. Remove grommet (2, Figure 7-128).
- 4. Remove two bolts (3), lockwashers (4) and items 8 thru 18 as an assembly.
- 5. Remove two bolts (5), washers (6) and bracket (7).

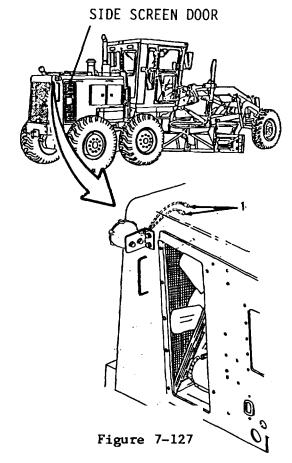


Figure 7-127

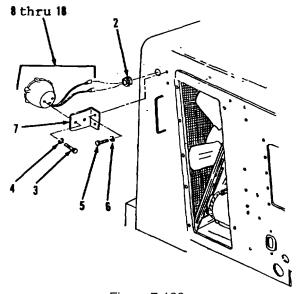


Figure 7-128

Go to Sheet 3

## LIGHT SYSTEM MAINTENANCE. (cont)

## 7-85. Blackout Stop and Taillights. (Sheet 3 of 4)

## **DISASSEMBLY**

- 1. Remove six screws (8), door (9) and gasket (10, Figure 7-129). Discard gasket (10). Remove all gasket material from mounting surfaces.
- 2. Remove two lamps (11).
- 3. Remove two screws (12), washers (13) and socket (14, Figure 7-130).
- 4. Remove three screws (15), two plates (16) and six rings (17) from body (18).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **ASSEMBLY**

- 1. Install six rings (17), two plates (16) and three screws (15) in body (18, Figure 7-130).
- 2. Install socket (14), two washers (13) and screws (12).
- 3. Install two lamps (11, Figure 7-129).
- 4. Install new gasket (10), door (9) and six screws (8).

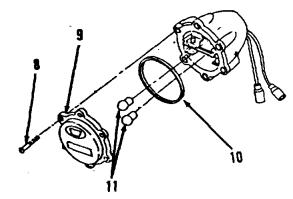


Figure 7-130

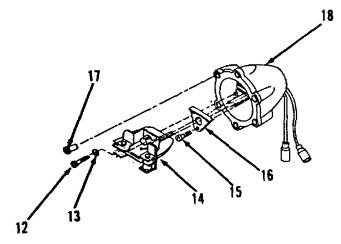


Figure 7-129

Go to Sheet 4

## 7-85. Blackout Stop and Taillights. (Sheet 4 of 4)

## **INSTALLATION**

- 1. Install bracket (7), washer (6) and two bolts (5, Figure 7-128).
- 2. Install items 18 thru 8 as an assembly, two lockwashers (4) and bolts (3).
- 3. Install grommet (2).
- 4. Connect two wire assemblies (1, Figure 7-127) to main wiring harness in engine compartment.

## **NOTE**

Return 130G Grader to original equipment condition.

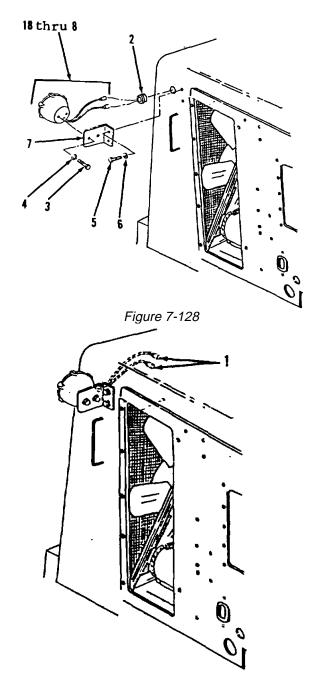


Figure 7-127

End of Task

## LIGHT SYSTEM MAINTENANCE. (cont)

#### 7-86. Rear Floodlight. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

## **INITIAL SETUP:**

Applicable Configurations

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41,

Appendix C 

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## 7-86. Rear Floodlight. (Sheet 2 of 3)

## **REMOVAL**

## NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 1. Remove screw (1) to disconnect wire assembly (2) from items 3 thru 14 as an assembly (Figure 7-131).
- 2. Remove nut (3), lockwasher (4) and spacer (5, Figure 7-132).
- 3. Remove spacer (6) and items 10 thru 14 as an assembly.
- 4. Remove two bolts (7), lockwashers (8) and bracket (9, Figure 7-133).

## **DISASSEMBLY**

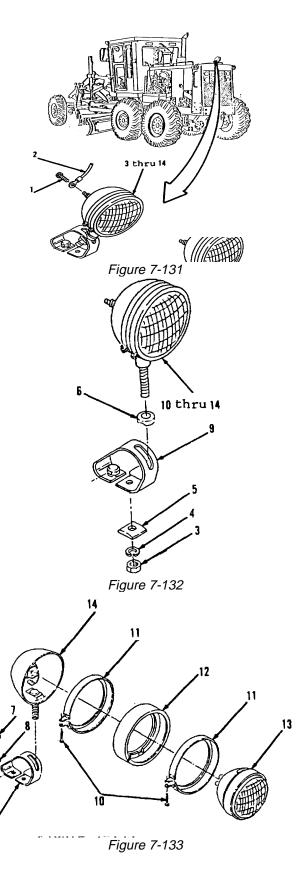
- 1. Remove two screws (10), clamps (11) and ring (12) from body (14, Figure 7-133).
- 2. Remove lamp (13).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.



## **LIGHT SYSTEM MAINTENANCE. (cont)**

## 7-86. Rear Floodlight. (Sheet 3 of 3)

## **ASSEMBLY**

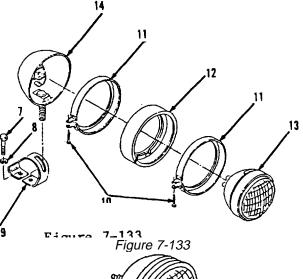
- 1. Install lamp (13) in body (14, Figure 7-133).
- 2. Install ring (12), two clamps (11) and screws (10).

## **INSTALLATION**

- 1. Install bracket (9), two lockwashers (8) and bolts (7, Figure 7-133) on top of engine cover, rear of vehicle.
- 2. Install items 14 thru 10 as an assembly and install spacer (6, Figure 7-132).
- 3. Install spacer (5), lockwasher (4) and nut (3).
- 4. Install items 14 thru 3 as an assembly (Figure 7-131).
- 5. Connect wire assembly (2) by installing screw (1).

## NOTE

Return 130G Grader to original equipment condition.



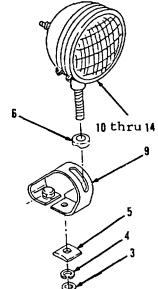


Figure 7-132

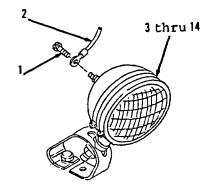


Figure 7-131

End of Task

## 7-87. Dome Light. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41,

Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground.
Parking/emergency brake applied.
Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable oh right side.

Go to Sheet 2

## **LIGHT SYSTEM MAINTENANCE.** (cont)

## 7-87. Dome Light. (Sheet 2 of 3)

## **REMOVAL**

- Remove two screws (1) and door assembly (2, Figure 7-134) from upper, right cab interior.
- 2. Remove lamp (3).
- 3. Remove three screws (4).
- 4. Remove housing (6) from interior frame.

## NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

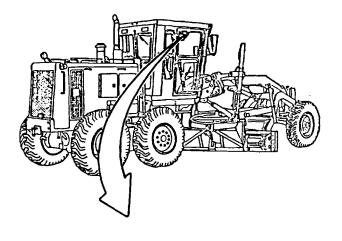
- 5. Disconnect wire assembly (5) at terminal.
- 6. Remove housing (6).

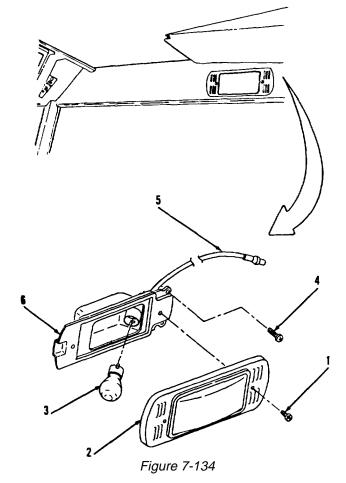
## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.





Go to Sheet 3

## 7-87. Dome Light. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Position housing (6, Figure 7-134).
- 2. Connect wire assembly (5) at terminal.
- 3. Install housing (6) and three screws (4).
- 4. Install lamp (3).
- 5. Install door assembly (2) and two screws (1).

## NOTE

Return 130C Grader to original equipment condition.

End of Task

## Section XXIV. SENDING UNITS AND WARNING SWITCHES TROUBLESHOOTING.

- **7-88. GENERAL INFORMATION**. This section lists the common sending units and warning switches malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **7-89. SENDING UNITS AND WARNING SWITCHES TROUBLESHOOTING PROCEDURES**. This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

## SENDING UNITS AND WARNING SWITCHES TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

## MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

a. AIR PRESSURE SWITCH NOT OPERATING.

Check the air pressure gage for proper reading (Figure 7-135).

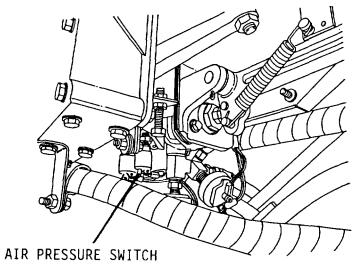


Figure 7-135

If air pressure switch is damaged or defective--replace. Refer to paragraph 7-91.

## SENDING UNITS AND WARNING SWITCHES TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

## MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

## b. ENGINE OIL PRESSURE SWITCH DOES NOT OPERATE.

Step 1. Check oil level in engine (Figure 7-136).

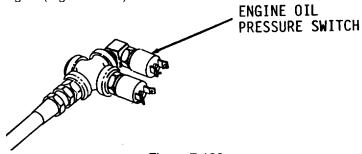


Figure 7-136

Step 2. Start engine and run for several minutes. Check oil pressure on oil pressure gage.

If the oil pressure is within operating range--replace engine oil pressure switch. Refer to paragraph 7-92.

## c. COOLANT TEMPERATURE SWITCH DOES NOT OPERATE.

Step 1. Check the coolant level (Figure 7-137).

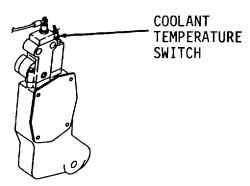


Figure 7-137

Step 2. Start engine and run for several minutes. Check temperature on temperature gages.

## SENDING UNITS AND WARNING SWITCHES TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cont)

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

c. COOLANT TEMPERATURE SWITCH DOES NOT OPERATE. (cont)

If the temperature is within operating range--replace coolant temperature switch. Refer to paragraph 7-93.

d. FUEL PRESSURE SWITCH DOES NOT OPERATE.

Check fuel pressure with a pressure gage of known accuracy installed in the fuel line (Figure 7-138).

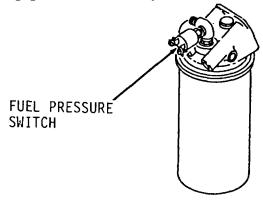


Figure 7-138

If the fuel pressure switch is damaged or defective--replace. Refer to paragraph 7-94.

## SENDING UNITS AND WARNING SWITCHES TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

## MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

## e. HYDRAULIC OIL TEMPERATURE SWITCH DOES NOT OPERATE.

Start engine and run several minutes. Operate implements until hydraulic oil temperature is at normal operating temperature (Figure 7-139).

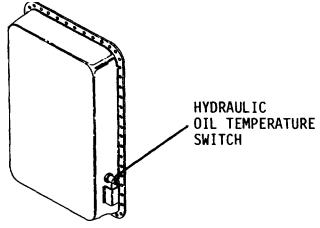


Figure 7-139

If the temperature remains within normal range and the alarm still sounds--replace hydraulic oil temperature switch. Refer to paragraph 7-95.

## f. SERVICE STOP LIGHT SWITCH DOES NOT OPERATE.

Refer to Light System Troubleshooting, paragraphs 7-77 and 7-78.

## Section XXV. SENDING UNITS AND WARNING SWITCHES MAINTENANCE.

## 7-90. SENDING UNITS AND WARNING SWITCHES MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the sending units and its components in good repair.
- b. This section is arranged by functional group code and provides a list of sending units components to be maintained and step-by-step maintenance procedures.

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## SENDING UNITS AND WARNING SWITCHES MAINTENANCE.

## 7-91. Air Pressure Switch. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Small tags, Item 41, Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## 7-91. Air Pressure Switch. (Sheet 2 of 3)

## **REMOVAL**

## NOTE

The following is a maintenance procedure for one air pressure switch. The maintenance procedure for the other air pressure switch is identical.

1. Remove two screws (1) from switch (3, Figure 7-140) under right side of cab.

## NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect two wire assemblies (2) at switch (3).
- 3. Remove switch (3).
- 4. Remove bushing (4) and elbow (5) from brake control valve.

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

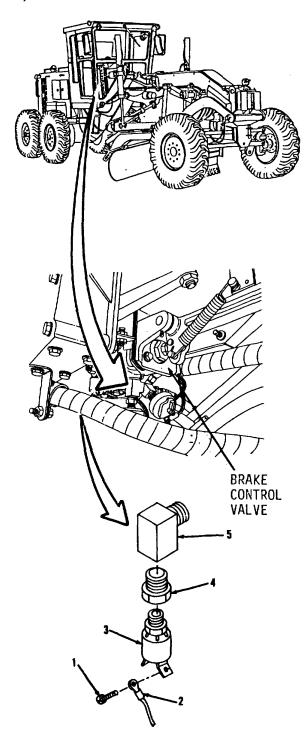


Figure 7-140

Go to Sheet 3

## SENDING UNITS AND WARNING SWITCHES MAINTENANCE.

## 7-91. Air Pressure Switch. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Install elbow (5) and bushing (4, Figure 7-140) under right side of cab.
- 2. Install switch (3).
- 3. Connect two wire assemblies (2) on switch (3).
- 4. Install two screws (1) in switch (3).

## **NOTE**

Return 1300 Grader to original equipment condition.

End of Task

## SENDING UNITS AND WARNING SWITCHES MAINTENANCE. (cont)

#### **Engine Oil Pressure and Hourmeter Switches.** (Sheet 1 of 3) 7-92.

This task covers: a. Removal b. Cleaning c. Inspection

**INITIAL SETUP:** 

Applicable Configurations Personnel Required

Construction equipment repairer MOS 62B

**Tools** 

General Mechanic's Tool Kit: References

d. Installation

Automotive (NSN 5180-00-177-TM 5-3805-261-10

7033)

**Special Environmental Conditions** None

Test Equipment

None

**General Safety Instructions** None

Materials/Parts Dry cleaning solvent,

Item 14, Appendix C **Torques** 

Clean cloths, Item 39, All fasteners are tightened to Appendix C standard torques. Refer to

Small tags, Item 41, Appendix E. Appendix C

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

> Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 13-5 Engine left side cover removed.

Go to Sheet 2

## SENDING UNITS AND WARNING SWITCHES MAINTENANCE.

## 7-92. Engine Oil Pressure and Hourmeter Switches. (Sheet 2 of 3)

## **REMOVAL**

## NOTE

The following is a maintenance procedure for the engine oil pressure switch. The maintenance procedure for the hourmeter switch is identical.

 Remove two screws (1), washers (2, Figure 7-141) from lower rear, left side of engine.

## NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect two wire assemblies (3).
- 3. Remove switch (4).
- 4. Remove bushing (5).
- 5. Remove elbow (6).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

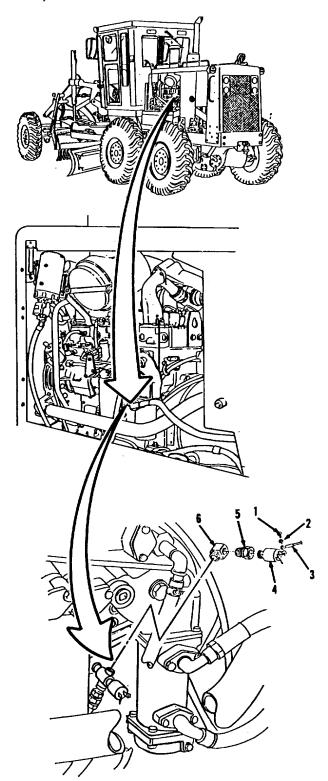


Figure 7-141

Go to Sheet 3

## SENDING UNITS AND WARNING SWITCHES MAINTENANCE. (cont)

## 7-92. Engine Oil Pressure and Hourmeter Switches. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Install elbow (6, Figure 7-141) to lower rear, left side of engine.
- 2. Install bushing (5).
- 3. Install switch (4).
- 4. Connect two wire assemblies (3).
- 5. Install two washers (2) and screws (1).

## NOTE

Return 130G Grader to original equipment condition.

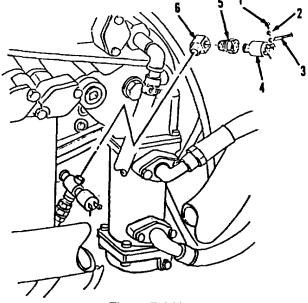


Figure 7-141

End of Task

## SENDING UNITS AND WARNING SWITCHES MAINTENANCE.

#### **Coolant Temperature Switch.** (Sheet 1 of 3) 7-93.

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Appendix C

Clean cloths, Item 39, Small tags, Item 41, Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 13-5 Engine left side cover removed.

Go to Sheet 2

# 7-93. Coolant Temperature Switch. (Sheet 2 of 3)

#### **REMOVAL**

#### WARNING

Remove pressure from system by slowly removing radiator cap. Allow system to cool down before performing this procedure.

1. Remove two screws (1) and lockwashers (2, Figure 7-142).

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

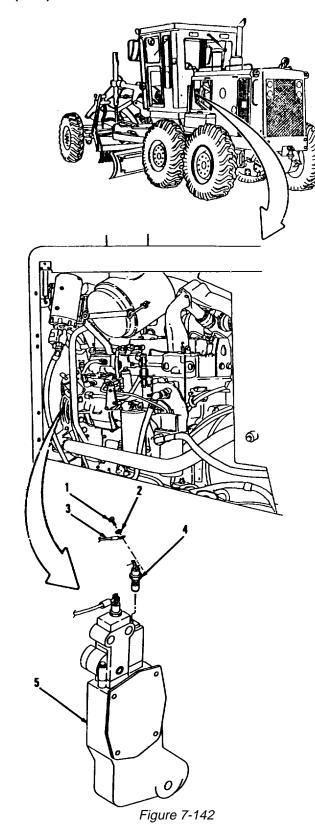
- 2. Disconnect two wire assemblies (3) at terminals from switch (4) on top of water pump (5) on front, left side of engine.
- 3. Remove switch (4).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

# **INSPECTION**

Inspect all parts. Refer to Chapter 2.



Go to Sheet 3

# SENDING UNITS AND WARNING SWITCHES MAINTENANCE.

# 7-93. Coolant Temperature Switch. (Sheet 3 of 3)

# **INSTALLATION**

- 1. Install switch (4) to top of water pump (5, Figure 7-142).
- 2. Connect two wire assemblies (3) at terminals to switch (4).
- 3. Install two lockwashers (2) and screws (1).

# NOTE

Return 130G Grader to original equipment condition.

End of Task

# SENDING UNITS AND WARNING SWITCHES MAINTENANCE. (cont)

## 7-94. Fuel Pressure Switch. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-23 Fuel tank cap assembly removed.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 13-5 Engine right side cover removed.

Go to Sheet 2

## SENDING UNITS AND WARNING SWITCHES MAINTENANCE.

## 7-94. Fuel Pressure Switch. (Sheet 2 of 2)

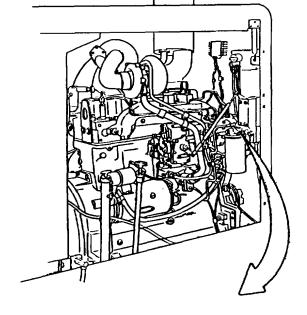
## **REMOVAL**

- 1. Open right side engine door.
- 2. Remove two screws (1) from switch (3, Figure 7-143) on secondary fuel filter on right side of engine.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 3. Disconnect two wire assemblies (2) at terminals from switch (3).
- 4. Remove switch (3) from elbow (4).



# **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

# **INSTALLATION**

- 1. Install switch (3) on elbow (4).
- 2. Position two wire assemblies (2) at terminals on switch (3).
- 3. Install two screws (1).

# NOTE

Return 130G Grader to original equipment condition.

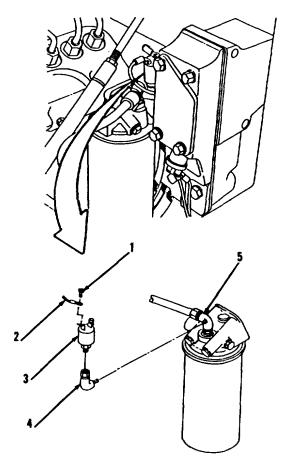


Figure 7-143

End of Task

# SENDING UNITS AND WARNING SWITCHES MAINTENANCE. (cont)

#### Hydraulic Oil Temperature Switch. (Sheet 1 of 3) 7-95.

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41,

Appendix C Performed packing, Item 5 Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Disconnect positive cable on right side. Paragraph 7-112

Go to Sheet 2

## SENDING UNITS AND WARNING SWITCHES MAINTENANCE.

# 7-95. Hydraulic Oil Temperature Switch. (Sheet 2 of 3)

#### **REMOVAL**

1. Remove two screws (1) and washers (2) from switch (4, Figure 7-144) on right side of hydraulic tank.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect two wire assemblies (3).
- 3. Remove switch (4) from hydraulic tank.
- 4. Remove and discard performed packing (5).

# **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

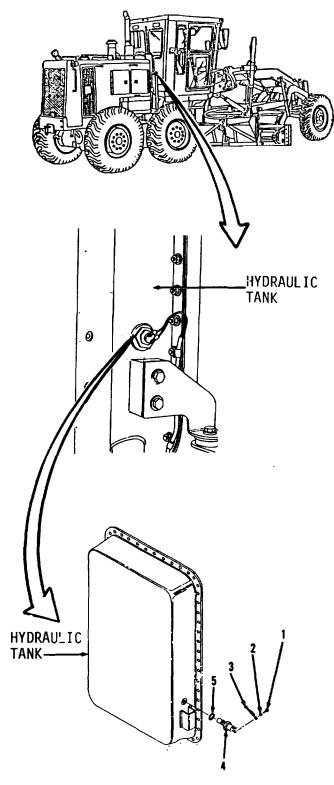


Figure 7-144

# SENDING UNITS AND WARNING SWITCHES MAINTENANCE. (cont)

# 7-95. Hydraulic Oil Temperature Switch. (Sheet 3 of 3)

# **INSTALLATION**

- 1. Install new performed packing (5, Figure 7-144).
- 2. Install switch (4) on hydraulic tank.
- 3. Connect two wire assemblies (3).
- 4. Install two washers (2) and screws (1).

## NOTE

Return 130G Grader to original equipment condition.

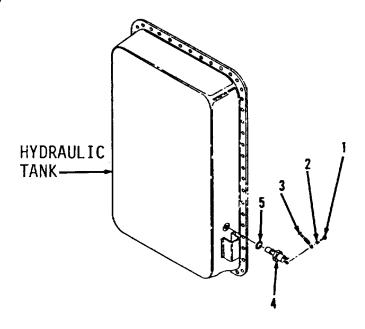


Figure 7-144

End of Task

#### SENDING UNITS AND WARNING SWITCHES MAINTENANCE.

## 7-96. Blackout and Service Stop Light Switches. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations
All
Personnel Required
Construction equipment

Tools

General Mechanic's Tool Kit:

Automotive (NSN 5180-00-1777033)

References

TM 5-3805-261-10

Test Equipment None Special Environmental Conditions
None

General Safety Instructions
Materials/Parts None

Dry cleaning solvent,
Item 14, Appendix C - Torques

Clean cloths, Item 39,
Small tags, Item 41,
Appendix C

Appendix C

All fasteners are tightened to
standard torques. Refer to
Appendix E.

<u>Troubleshooting References</u>

None

Equipment Condition

TM 5-3805-261-10

Vehicle parked on level ground.

Parking/emergency brake applied.

Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. All air pressure vented.

repairer MOS 62B

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# 7-96. Blackout and Service Stop Light Switches. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

The following is a maintenance procedure for the service stop light switch. The maintenance procedure for the blackout stop light switch is identical.

1. Remove two nuts (1) and washers (2, Figure 7-145) from under right side of cab.

## **NOTE**

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect two wire assemblies (3).
- 3. Remove service stop light switch (4).
- 4. Remove bushing (5).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

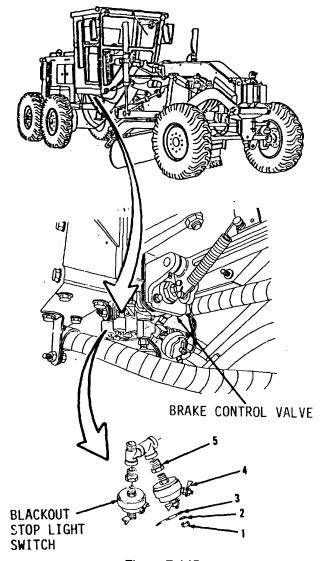


Figure 7-145

Go to Sheet 3

## SENDING UNITS AND WARNING SWITCHES MAINTENANCE.

# 7-96. Blackout and Service Stop Light Switches. (Sheet 3 of 3)

# **INSTALLATION**

- 1. Install bushing (5, Figure 7-145).
- 2. Install service stop light switch (4).
- 3. Connect two wire assemblies (3).
- 4. Install two washers (2) and nuts (1).

# NOTE

Return 130G Grader to original equipment condition.

End of Task

# SENDING UNITS AND WARNING SWITCHES MAINTENANCE. (cont)

## 7-97. Ether Start Switch. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

None

d. Installation

**INITIAL SETUP:** 

Applicable Configurations Personnel Required Construction equipment

repairer MOS 62B

Tools

General Mechanic's Tool Kit: References Automotive (NSN 5180-00-177-TM 5-3805-261-10

7033)

**Special Environmental Conditions** None

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C **Torques** 

Clean cloths, Item 39, All fasteners are tightened to Appendix C standard torques. Refer to Appendix E.

Small tags, Item 41,

Appendix C \_

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

> Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

**General Safety Instructions** 

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 13-5 Left engine side cover removed.

Go to Sheet 2

## SENDING UNITS AND WARNING SWITCHES MAINTENANCE.

## 7-97. Ether Start Switch. (Sheet 2 of 2)

#### **REMOVAL**

1. Remove screw (1) and washer (2, Figure 7-146) from switch (4) on front, left side of engine.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect wire assembly (3).
- 3. Remove switch (4) from top of water pump (5).

# **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install switch (4) on top of water pump (5, Figure 7-146).
- 2. Position wire assembly (3).
- 3. Install washer (2) and screw (1) on switch (4).

## **NOTE**

Return 130C Grader to original equipment condition.

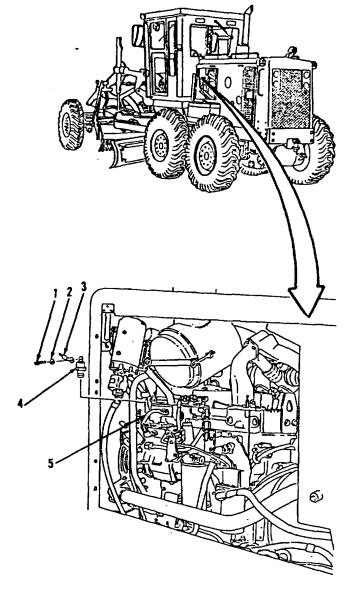


Figure 7-146

**End of Task** 

# Section XXVI. HORN AND BACK-UP ALARM TROUBLESHOOTING.

- **7-98. GENERAL INFORMATION**. This section lists the common horn and back-up alarm malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **7-99. HORN AND BACK-UP ALARM TROUBLESHOOTING PROCEDURES.** This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### HORN AND BACK-UP ALARM TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

#### a. HORN FAILS TO OPERATE.

Step 1. Turn service lights on and check circuit breaker number 60A.

Reset circuit breaker.

Step 2. Check fuse number 15A.

If fuse is blown--replace. Refer to paragraph 7-63.

Step 3. Check horn assembly (Figure 7-147).

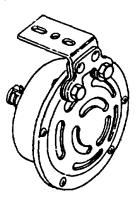


Figure 7-147

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

#### a. HORN FAILS TO OPERATE.

If the horn assembly is damaged or defective--replace. Refer to paragraph 7-102.

Step 4. Test the continuity of the horn switch (Figure 7-148). Connect one multimeter lead to the back of switch and one to ground.

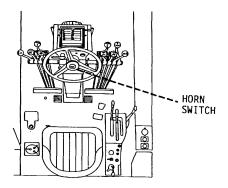


Figure 7-148

If the multimeter needle does not move, the circuit does not have continuity. Replace horn switch. Refer to paragraph 7-103.

Step 5. Check the horn wiring harness.

If the horn wiring harness is cracked, broken or corroded--repair. Refer to paragraph 7-116. If replacement is necessary, refer to paragraph 7-131.

- b. BACK-UP ALARM FAILS TO OPERATE WITH TRANSMISSION IN REVERSE.
  - Step 1. Turn on service lights (refer to TM 5-3805-261-10).
  - Step 2. Check circuit breaker number 60A.

Reset circuit breaker.

Step 3. Check fuse number 15A.

If fuse is blown--replace. Refer to paragraph 7-63.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

- b. BACK-UP ALARM FAILS TO OPERATE WITH TRANSMISSION IN REVERSE. (cont)
  - Step 3. Check the back-up alarm (Figure 7-149).

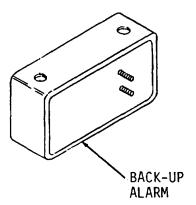
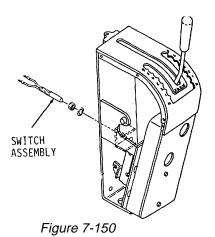


Figure 7-149
If the back-up alarm is damaged or defective--replace. Refer to paragraph 7-104.

Step 4. Test the continuity of the back-up alarm switch (Figure 7-150). Connect one multimeter lead to the back of switch and one to around.



7-242

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

# b. BACK-UP ALARM FAILS TO OPERATE WITH TRANSMISSION IN REVERSE.

If the multimeter needle does not move, the circuit does not have continuity. Replace back-up alarm switch. Refer to paragraph 7-105.

## Step 5. Check the wiring harness.

If the wiring harness is cracked, broken or distorted--repair. Refer to paragraph 7-116. If replacement is necessary--contact Direct Support.

# Section XXVII. HORN AND BACK-UP ALARM MAINTENANCE.

# 7-100. HORN AND BACK-UP ALARM MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the horn and back-up alarm and its components in good repair.
- b. This section is arranged by functional group code and provides a list of horn and back-up alarm components to be maintained and step-by-step maintenance procedures.

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Back-up Alarm	7-104	7-252
Back-up Alarm Switch	7-105	7-255

## HORN AND BACK-UP ALARM MAINTENANCE.

## 7-101. Electrical Monitoring System Alarm. (Sheet 1 of 2)

d. Installation

This task covers: a. Removal b. Cleaning c. Inspection

**INITIAL SETUP:** 

Applicable Configurations

ΔII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Small tags, Item 41, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

Torques

All fasteners are tightened to standard torques. Refer to

.....

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112

Disconnect positive cable on right side.

Paragraph 13-15

Operator's panel console sides

removed.

Go to Sheet 2

# HORN AND BACK-UP ALARM MAINTENANCE. (cont)

# 7-101. Electrical Monitoring System Alarm. (Sheet 2 of 2)

#### **REMOVAL**

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- Disconnect wiring harness (1, Figure 7-151) at plug from inner panel in operator's console.
- 2. Remove bolt (2) and washer (3).
- 3. Remove alarm (4).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install alarm (4, Figure 7-151).
- 2. Install washer (3) and bolt (2).
- 3. Connect wiring harness (1) at plug to inner panel in operator's console.

# NOTE

Return 130G Grader to original equipment condition.

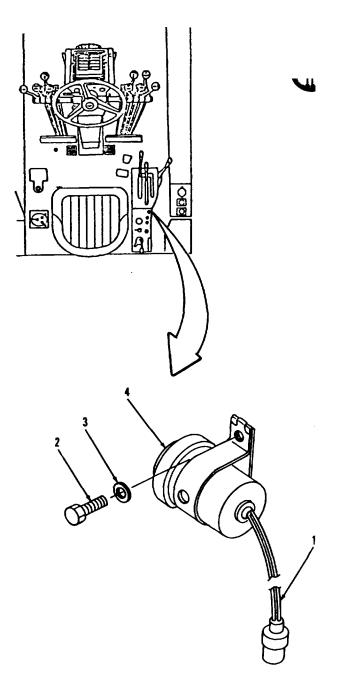


Figure 7-151

End of Task

#### HORN AND BACK-UP ALARM MAINTENANCE.

## 7-102. Horn. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

References

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations Personnel Required ΑII Construction equipment

repairer MOS 62B

Tools

General Mechanic's Tool Kit:

Automotive (NSN 5180-00-177-TM 5-3805-261-10

7033)

**Special Environmental Conditions** None

Test Equipment

None

**General Safety Instructions** Materials/Parts None

Dry cleaning solvent,

Item 14, Appendix C **Torques** Clean cloths, Item 39, All fasteners are tightened to Appendix C standard torques. Refer to

Small tags, Item 41, Appendix E.

Troubleshooting References

None

**Equipment Condition** 

Appendix C

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# HORN AND BACK-UP ALARM MAINTENANCE. (cont)

7-102. Horn. (Sheet 2 of 2)

#### **REMOVAL**

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 1. Disconnect wire assembly (1, Figure 7-152) at two terminals from under front, left side of cab.
- 2. Remove two bolts (2) and washers (3).
- 3. Remove horn (4).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Position horn (4, Figure 7-152).
- 2 Install two washers (3) and bolts (2).
- 3. Connect wire assembly (1) at two terminals.

# NOTE

Return 130G Grader to original equipment condition.

End of Task

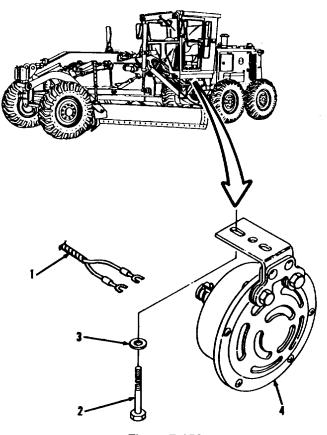


Figure 7-152

#### HORN AND BACK-UP ALARM MAINTENANCE.

## 7-103. Born Switch. (Sheet 1 of 3)

a. Removal This task covers: b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Steering wheel puller

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Gasket, Item 3

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

Seal, Item 16

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## HORN AND BACK-UP ALARM MAINTENANCE. (cont)

## 7-103. Horn Switch. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Remove three screws (1), retainer (2) and gasket (3) from steering wheel (9, Figure 7-153). Discard gasket (3). Remove all gasket material from mounting surfaces.
- 2. Remove horn film (4), button (5) and spring (6).
- 3. Remove three pins (7).
- 4. Remove nut (8).
- 5. Using steering wheel puller, remove steering wheel (9).
- 6. Remove insulator (10) and ring (11, 7-154).
- 7. Remove four brushes (12) and springs (13).

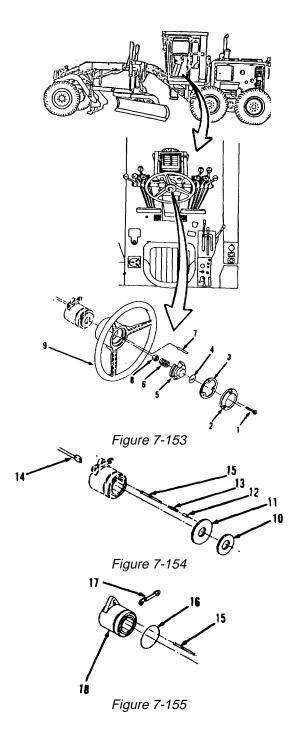
#### **NOTE**

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 8. Disconnect wire harness (14) from wire assembly (15) at connectors.
- 9. Remove wire assembly (15, Figure 7-155).
- 10. Remove and discard seal (16).
- 11. Remove bracket (17) and retainer (18).

### **CLEANING**

Clean all parts. Refer to Chapter 2.



Go to Sheet 3

#### HORN AND BACK-UP ALARM MAINTENANCE.

## 7-103. Horn Switch. (Sheet 3 of 3)

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install retainer (18) and bracket (17, Figure 7-155) on steering wheel console.
- 2. Install new seal (16).
- 3. Position wire assembly (15).
- 4. Connect wire harness (14) to wire assembly (15, Figure 7-154) at connectors.
- 5. Install four springs (13) and brushes (12).
- 6. Install ring (11) and insulator (10).
- 7. Install steering wheel (9, Figure 7-153).
- 8. Install nut (8). Tighten nut (8) to 44 ft-lb torque.
- 9. Install three pins (7).
- 10. Install spring (6) and button (5).
- 11. Install horn film (4).
- 12. Position new gasket (3) and retainer (2).
- 13. Install three screws (1).

#### NOTE

Return 130C Grader to original equipment condition.

End of Task

## HORN AND BACK-UP ALARM MAINTENANCE. (cont)

## 7-104. Back-up Alarm. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations Personnel Required

Construction equipment repairer MOS 62B

Tools

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177-TM 5-3805-261-10

7033)

**Special Environmental Conditions** None

Test Equipment

None

**General Safety Instructions** Materials/Parts None

Dry cleaning solvent, Item 14, Appendix C **Torques** 

Clean cloths, Item 39, All fasteners are tightened to Appendix C standard torques. Refer to

Small tags, Item 41, Appendix E. Appendix C

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

> Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 6-38 Radiator grille removed.

Go to Sheet 2

## HORN AND BACK-UP ALARM MAINTENANCE.

# 7-104. Back-up Alarm. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- Disconnect two wire assemblies (3, Figure 7-156) at connectors from wiring harness on radiator.
- 2. Remove two lock nuts (1) and washers (2) from alarm (6).
- 3. Remove two wire assemblies (3) from alarm (6).
- 4. Remove two bolts (4), washers (5) and alarm (6).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

# **INSPECTION**

Inspect all parts. Refer to Chapter 2.

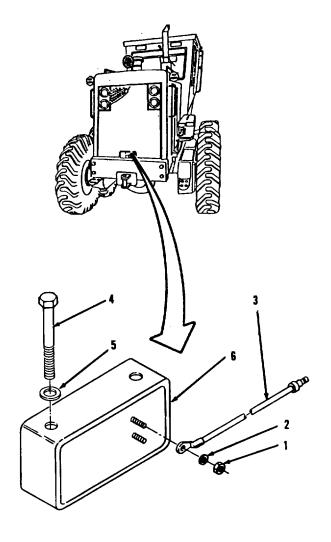


Figure 7-156

Go to Sheet 3

# HORN AND BACK-UP ALARM MAINTENANCE. (cont)

# 7-104. Back-up Alarm. (Sheet 3 of 3)

# **INSTALLATION**

- 1. Install alarm (6, Figure 7-156), two washers (5) and bolts (4).
- 2. Connect two wire assemblies (3) to alarm (6).
- 3. Connect two wire assemblies (3) at connectors to wiring harness.
- 4. Install two washers (2) and lock nuts (1).

## NOTE

Return 130C Grader to original equipment condition .

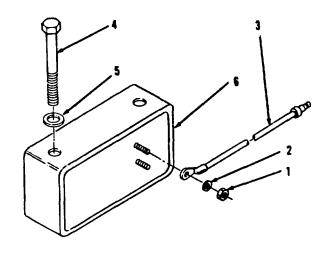


Figure 7-156

**End of Task** 

### HORN AND BACK-UP ALARM MAINTENANCE.

### 7-105. Back-up Alarm Switch. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033) Snap ring pliers

7/8" open end wrench, cut to

4-3/4" long. Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C

Thread sealant, Item 60,

Appendix C

Personnel Required

Construction equipment repairer MOS 62B

Reference

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

## **Troubleshooting References**

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112

Paragraph 13-15

Disconnect positive cable on right side.

Operator's panel console sides

removed.

Go to Sheet 2

# HORN AND BACK-UP ALARM MAINTENANCE. (cont)

# 7-105. Back-up Alarm Switch. (Sheet 2 of 4)

#### **REMOVAL**

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- Disconnect two wire assemblies (1, Figure 7-157) on inside of operator's panel console.
- 2. Remove nut (5) and lockwasher (4) from switch assembly (6). Remove switch assembly (6). (Figure 7-155).
- 3. Remove nut (2), lockwasher (3) from switch assembly (6). (Figure 7-157).
- 4. Remove nut (7) and items 8 thru 14 as an assembly from plate inside transmission control console.

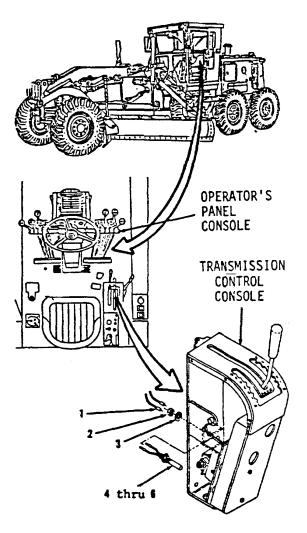


Figure 7-157

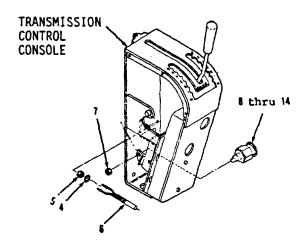


Figure 7-158

Go to Sheet 3

## HORN AND BACK-UP ALARM MAINTENANCE.

# 7-105. Back-up Alarm Switch. (Sheet 3 of 4)

#### **REMOVAL**

5. Remove stud (8) and nut (9) from holder (14, Figure 7-159).

# **DISASSEMBLY**

- 1. Using snap ring pliers, remove ring (10. Figure 7-159).
- 2. Separate cover (11), magnet (12) and filter (13) from holder (14).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **ASSEMBLY**

- Install filter (13), magnet (12) and cover (11) in holder (14). Side of magnet (12) with part number stamped must ace the direction of cover (11. Figure 7-159).
- 2. Install ring (10).

# **INSTALLATION**

- 1. Install nut (9) on stud (8, Figure 7-159) in transmission control console.
- 2. Install items 9 and 8 as an assembly in holder (14). Apply thread sealant to threads on stud (8).
- 3. Seat nut (9) against holder (14) and tighten nut (9) to 18 ft-lb torque.

Go to Sheet 4

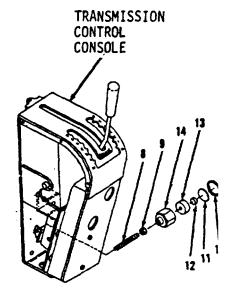


Figure 7-159

# HORN AND BACK-UP ALARM MAINTENANCE. (cont)

## 7-105. Back-up Alarm Switch. (Sheet 4 of 4)

## **INSTALLATION** (cont)

- 4. Position items 14 thru 8 as an assembly in plate (Figure 7-158).
- 5. Install nut (7) loosely.
- 6. Install lockwasher (3) and nut (2) on switch assembly (6). (Figure 7-157).
- 7. Position items 6 thru 4 as an assembly (Figure 7-157) through weldment in operator's compartment.
- 8. Install lockwasher (4) and nut (5, Figure 7-158).
- Connect two wire assemblies (1) to inside of operator's panel console.

## **ADJUSTMENT**

- 1. Position transmission forward-reverse lever in reverse in transmission control console.
- Adjust nuts (9 and 7) until a clearance of 0.25 inch is made between switch assembly (6) and items 14 thru 10 as an assembly.
- 3. Tighten nuts (9 and 7).

#### NOTE

Return 130C Grader to original equipment condition.

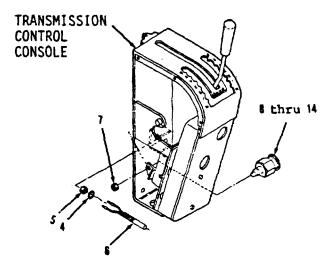


Figure 7-158

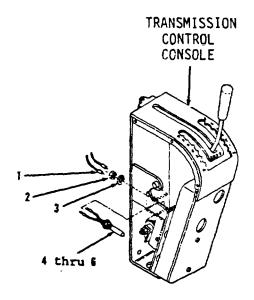


Figure 7-157

**End of Task** 

#### Section XXVIII. BATTERY TROUBLESHOOTING.

**7-106. GENERAL INFORMATION.** This section lists the common battery malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.

**7-107. BATTERY TROUBLESHOOTING PROCEDURES.** This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### BATTERY TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

## a. BATTERY WILL NOT HOLD CHARGE.

Step 1. Check battery terminals for corrosion (Figure 7-160).

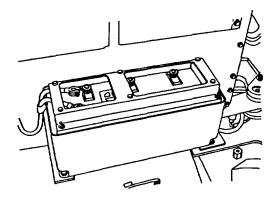


Figure 7-160

If battery terminals are corroded, clean with wire brush and ammonia. If terminals are loose or broken-replace. Refer to paragraph 7-112.

Step 2. Check terminals for loose or broken cable ends.

Clean cable ends with dry steel wool or a wire brush. Clean terminals with wire brush and ammonia. If cable ends are loose--tighten. If cables are damaged or defective--replace. Refer to paragraph 7-112.

Step 3. Check cables with multimeter.

If resistance is higher than .5 ohms--replace.

# BATTERY TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cont)

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

# b. BATTERY CASE CRACKED OR WORN THROUGH.

Step 1. Check the battery case.

If the battery case is damaged or defective--replace. Refer to paragraph 7-113.

- c. BATTERY ELECTROLYTE LOW OR MISSING.
  - Step 1. Check for cracks or distortion in battery casing.

If battery is damaged or defective--replace. Refer to paragraph 7-112.

## **ELECTRICAL SYSTEM.**

# 7-108. Battery STE/ICE Tests.

- a. TEST 67. BATTERY VOLTAGE
  - 1. Refer to VTM General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cables to battery (Figure 6-4).

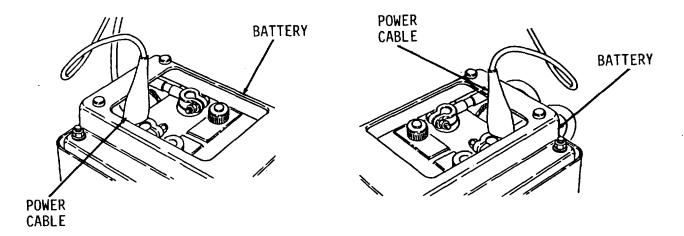


Figure 6-4

2. Attach lead clips (Figure 7-161). Red lead clip is on right battery positive terminal and black lead clip is on left battery negative terminal. Make sure that the electrical contacts are clean.

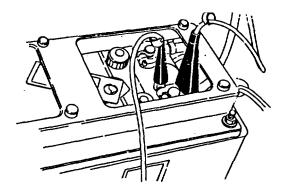


Figure 7-161

- 3. Perform test using procedure TEST 67 as instructed in TM 9-4910-571- 12 & P.
- 4. Battery voltage should be between 26.5-29.5 volts. Take corrective action if necessary.
- 5. Return vehicle to its original condition.

# 7-108. Battery STE/ICE Tests. (cont)

- b. TEST 77. BATTERY RESISTANCE
  - Refer to VTM General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

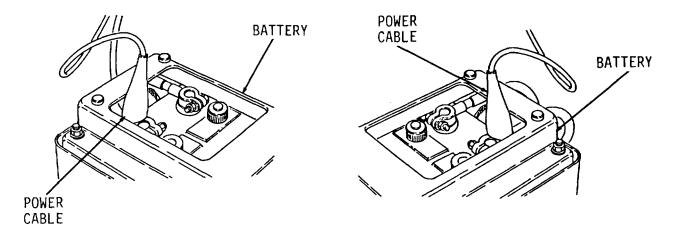
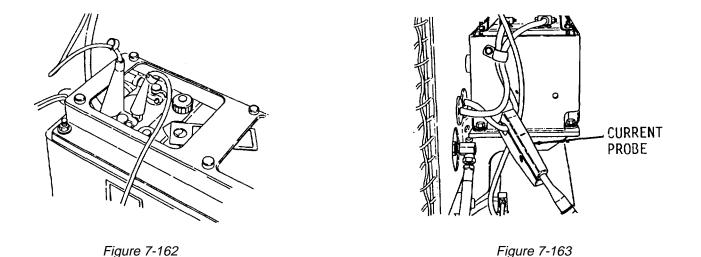


Figure 6-4

2. Attach lead clips (Figure 7-162) and current probe (Figure 7-163). Make sure that electrical contacts are clean.



- 3. Perform test using procedure TEST 77 as instructed in TM 9-4910-571-12 & P. 7-262
- 4. Parameters for this test are TO BE DETERMINED.
- 5. Return vehicle to its original condition.

# 7-108. Battery STE/ICE Tests.

- c. TEST 79 BATTERY RESISTANCE CHARGE
  - Refer to VTM-General Setup and Checkout Instructions in TM 9-4910-571-12 & P. Connect power cable to battery (Figure 6-4).

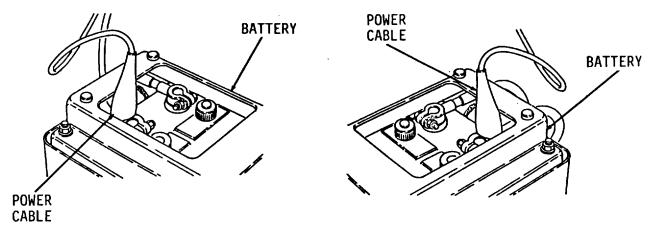
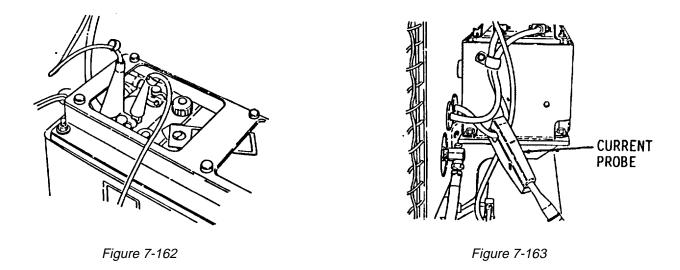


Figure 6-4

2. Attach lead clips (Figure 7-162) and current probe (Figure 7-163). Make sure that all electrical connections are clean.



- 3. Perform test using procedure TEST 79 as instructed in TM 9-4910-571-12 & P.
- 4. Parameters for this test are TO BE DETERMINED.
- 5. Return vehicle to its original condition.

## Section XXIX. BATTERY MAINTENANCE.

# 7-109. BATTERY MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the battery and its components in good repair.
- b. This section is arranged by functional group code and provides a list of battery components to be maintained and step-by-step maintenance procedures.

## **INDEX**

<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
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Battery Holddown	7-111	7-268
Battery Cables and Batteries	7-112	7-271
Battery Box Group	7-113	7-279

## 7-110. Battery Covers. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

## **INITIAL SETUP:**

Applicable Configurations

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Two cotter pins, Items 1, 5

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped.

Master disconnect switch off.

Go to Sheet 2

# **BATTERY MAINTENANCE.** (cont)

# 7-110. Battery Covers. (Sheet 2 of 3)

#### **REMOVAL**

## NOTE

The following is a maintenance procedure for the left battery cover. The maintenance procedure for the right battery cover is identical.

- 1. Lift handle (7, Figure 7-1 to unlatch.
- 2. Remove assembled battery from battery box (Figure 7

## **DISASSEMBLY**

- Remove cotter pin (1) and clevis pin (2) from handle (7, Figure 7-166). Discard pin (1).
- 2. Remove rod (3) and spring (4).
- 3. Remove cotter pin (5) and clevis pin (6). Discard cotter pin (5).
- 4. Remove handle (7) from battery cover (8).

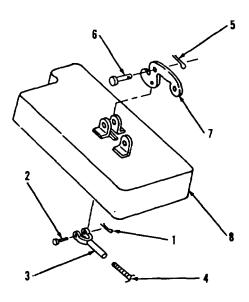


Figure 7-166

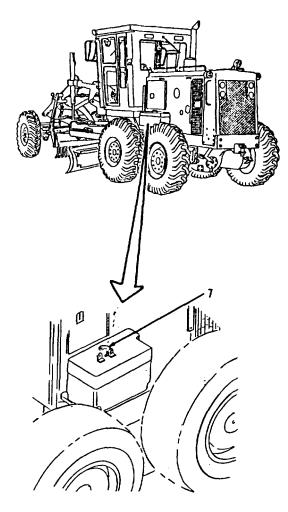


Figure 7-164

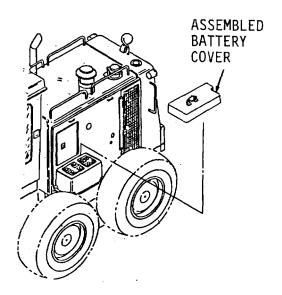


Figure 7-165

# 7-110. Battery Covers. (Sheet 3 of 3)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **ASSEMBLY**

- 1. Position handle (7) in battery cover (8, Figure 7-166).
- 2. Install clevis pin (6) and new cotter pin (5) through handle (7).
- 3. Install spring (4) and rod (3).
- 4. Install clevis pin (2) and new cotter pin (1) through handle (7).

# **INSTALLATION**

- 1. Install assembled battery cover on battery box (Figure 7-165).
- 2. Lift handle (7, Figure 7-164) up. Push down on handle (7) to latch.

#### NOTE

Return 130C Grader to original equipment condition.

**End of Task** 

# **BATTERY MAINTENANCE.** (cont)

## 7-111. Battery Holddown. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Clean cloths, Item 39,

Item 14, Appendix C Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-110 Battery covers removed.

Go to Sheet 2

# 7-111. Battery Holddown. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

The following is a maintenance procedure for the left battery holddown. The maintenance procedure for the right battery holddown is identical.

#### NOTE

Do not remove unless inspection shows need for replacement.

- 1. Remove four lock nuts (2) and washers (3).
- 2. Remove holddown (4).
- 3. Remove two U-bolts (5).
- 4. Remove six grommets (1, Figure 7-167) from battery box.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

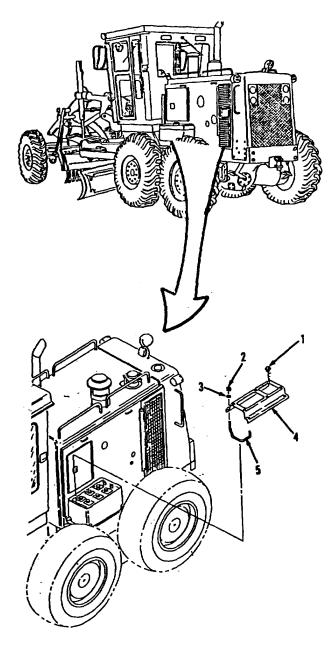


Figure 7-167

Go to Sheet 3

# **BATTERY MAINTENANCE.** (cont)

# 7-111. Battery Holddown. (Sheet 3 of 3)

# **INSTALLATION**

- 1. If removed install six grommets (1).
- 2. Install two U-bolts (5, Figure 7-167).
- 3. Install holddown (4).
- 4. Install four washers (3) and lock nuts (2).

# NOTE

Return 130G Grader to original equipment condition.

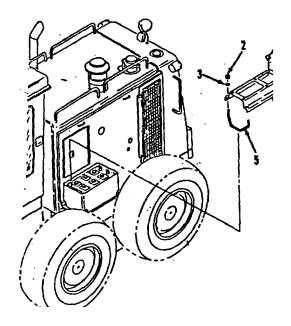


Figure 7-167

**End of Task** 

## 7-112. Battery Cables and Batteries. (Sheet 1 of 8)

a. Removal This task covers: b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment None

Materials/Parts Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Detergent, Item 8, Appendix C

Small tags, Item 41, Appendix C

Personnel Required Construction equipment repairer MOS 62B

References TM 5-3805-261-10 TM 9-6140-200-14

Special Environmental Conditions None

**General Safety Instructions** None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

# Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-110 Battery box covers removed.

Paragraph 7-111 Battery holddowns removed.

Paragraph 13-5 Engine compartment side panels removed.

Paragraph 13-15 Operator's console left side panel removed.

Go to Sheet 2

Change 1 7-271

## **BATTERY MAINTENANCE.** (cont)

# 7-112. Battery Cables and Batteries. (Sheet 2 of 8)

#### **WARNING**

When handling, servicing or testing batteries, always wear safety goggles and rubber gloves. Failure to do so may cause INJURY. Battery electrolite causes severe burns. If electrolite comes in contact with skin or eyes, flush immediately with large amounts of water and seek medical aid.

# **SERVICING**

Service batteries (4) in right and left battery boxes. Refer to Chapter 3, TM 9-6140-200-14.

#### **TESTING**

Test batteries (4) in right and left battery boxes. Refer to paragraph 7-108.

Go to Sheet 3

## 7-112. Battery Cables and Batteries. (Sheet 3 of 8)

#### **REMOVAL**

#### WARNING

#### **ELECTRICAL SHOCK HAZARD**

Always disconnect the positive battery cable on the right side before working on electrical components. Failure to follow this procedure may cause INJURY. If you receive an electrical shock, seek medical attention.

#### CAUTION

If a defective disconnect switch is suspected, check for voltage between the right side positive terminal and a ground (not the negative post). If voltage is present, use extreme caution and remove the negative cable from the left side and troubleshoot the switch.

- 1. Loosen one nut (1) on right side positive battery cable (25) and remove cable.
- Secure battery cable/terminal away from battery.
- 3. Loosen three remaining nuts (1) on other positive cable (25) and two negative cables (12 and 48) and remove cables.
- 4. Remove two bolts (2), washers (3), clips (4) and guards (5).
- 5. Remove batteries. Refer to TM 9-6140-200-14.
- 6. Remove bolt (6), washer (7) and clip (8, Figure 7-169) from rear, left side of engine.

#### **NOTE**

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

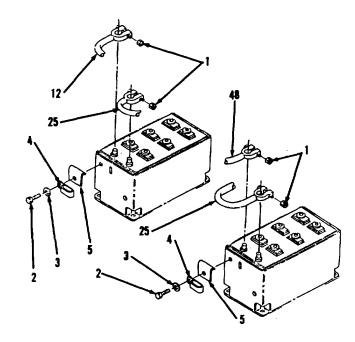


Figure 7-168

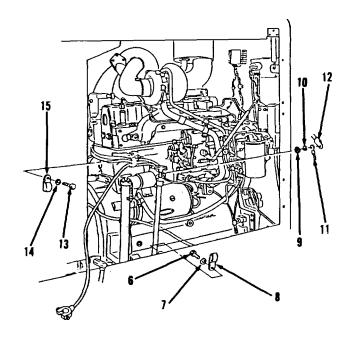


Figure 7-169

Go to Sheet 4

# **BATTERY MAINTENANCE.** (cont)

## 7-112. Battery Cables and Batteries. (Sheet 4 of 8)

## **REMOVAL** (cont)

- 7. Remove nut (9), washer (10) and wire assembly (11) from starter solenoid on starting motor assembly.
- 8. Remove cable assembly (12).
- 9. Remove bolt (13), washer (14) and clip (15) from rear, left side of frame in engine compartment.
- 10. Remove bolt (16), washer (17) and clip (18, Figure 7-170) from under left side of frame.
- 11. Remove bolt (19), washer (20) and clip (21) from top of differential case.
- 12. Remove bolt (22), washer (23) and clip (24) from left side of articulation area. Clip (24) is mounted on inside of frame below front, left corner of engine.
- 13. Remove cable assembly (25).
- 14. Remove two nuts (26), washers (27), clip (28), plate (29) and pad (30, Figure 7-171).
- 15. Separate cable assembly (48) from pad (31).
- 16. Remove two nuts (32), washers (33), clips (34 and 35), plate. (36) and pad (37, Figure 7-172) from right side of articulation area.
- 17. Separate cable assembly (48) from pad (38).

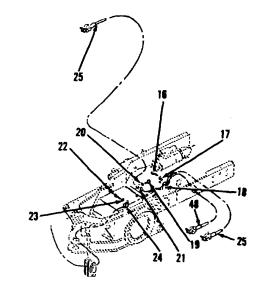


Figure 7-170

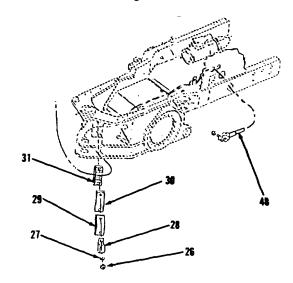


Figure 7-171

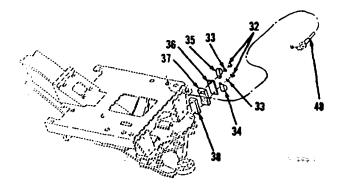


Figure 7-172

Go to Sheet 5

# 7-112. Battery Cables and Batteries. (Sheet 5 of 8)

## **REMOVAL**

- 18. Remove bolt (39), washer (40) and clip (41, Figure 7-173).
- 19. Remove nut (42), washer (43), spacers (44 and 45) from under right side of cab.
- 20. Remove nut (46) and washer (47) from main disconnect switch in operator's console inside cab.
- 21. Remove cable assembly (48) from right and left sides of articulation area.

# **CLEANING**

- Clean batteries and cable assemblies. Refer to TM 9-6140-200-14.
- 2. Clean all other parts. Refer to Chapter 2.

## **INSPECTION**

- 1. Inspect batteries and cable assemblies. Refer to TM 9-6140-200-14.
- 2. Inspect all other parts. Refer to Chapter 2.

Go to Sheet 6

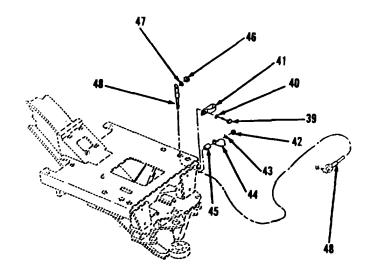


Figure 7-173

## 7-112. Battery Cables and Batteries. (Sheet 6 of 8)

#### **INSTALLATION**

- Position cable assembly (48, Figure 7-173) on right side of articulation area. Feed cable assembly (48) end through floor of cab.
- Install cable assembly (48) on terminal of main disconnect switch on inside of operator's console of cab.
- 3. Install washer (47) and nut (46).
- 4. Install spacer (45), clip (44) washer (43) and nut (42) under right side of cab.
- 5. Install clip (41), washer (40) and bolt (39) at right side of articulation area.
- 6. Position cable assembly (48) on pad (38, Figure 7-172).
- 7. Install pad (37), plate (36), clips (35 and 34), two washers (33) and nuts (32).
- 8. Position cable assembly (48) onto pad (31, Figure 7-171) on left side of articulation area.
- 9. Install pad (30), plate (29), clip (28), two washers (27) and nuts (26).
- 10. Position cable assembly (48). Feed cable assembly (48) end along inside of frame.

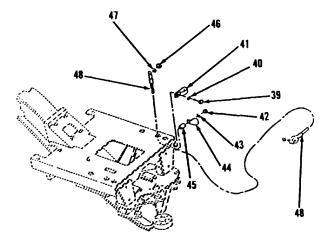


Figure 7-173

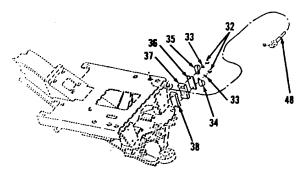


Figure 7-172

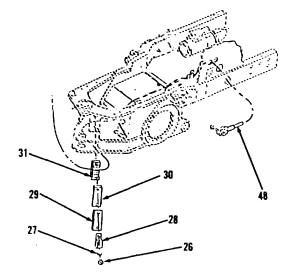


Figure 7-171

Go to Sheet 7

# 7-112. Battery Cables and Batteries.( Sheet 7 of 8)

## **INSTALLATION**

- 11. Install cable assembly (25, Figure 7-170).
- 12. Install clip (24), washer (23) and bolt (22) to left side of articulation area.
- 13. Position cable assembly (25) on top of differential case. Lay across top of differential case.
- 14. Install clip (21), washer (20) and bolt (19) at top of differential case.
- 15. Install clip (18), washer (17) and bolt (16) under left side of frame. Clip (18) holds cable assemblies (25 and 48).
- 16. Install clip (15), washer (14) and bolt (13, Figure 7-169) at rear, right side of frame in engine compartment.
- 17. Install cable assembly (12) on starter solenoid on starting motor assembly.
- 18. Install wire assembly (11), washer (10) and nut (9).
- 19. Install clip (8), washer (7) and bolt (6) on rear, right side of engine.

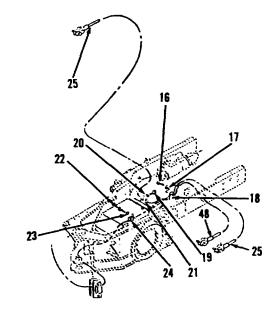


Figure 7-170

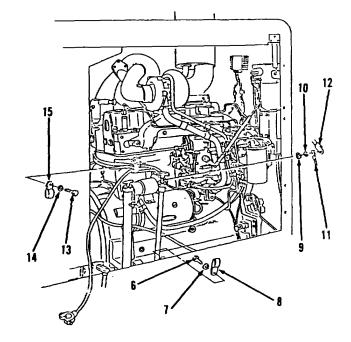


Figure 7-169

Go to Sheet 8

# **BATTERY MAINTENANCE.** (cont)

# 7-112. Battery Cables and Batteries. (Sheet 8 of 8)

# **INSTALLATION** (cont)

- 20. Install two guards (5), clips (4), washers (3) and bolts (2, Figure 7-168) to battery boxes.
- 21. Install two negative cables (12 and 48) and left side positive cable (25) and tighten three nuts (1).
- 22. Install right side positive cable (25) and tighten nut (1).

## NOTE

Return 130G Grader to original equipment condition.

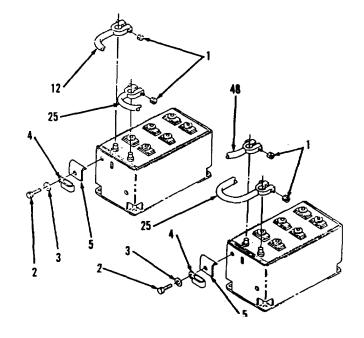


Figure 7-168

**End of Task** 

# 7-113. Battery Box Group. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean Cloths, Item 39 Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Batteries removed.

Paragraph 13-5 Engine compartment side panels and

doors removed.

Go to Sheet 2

## **BATTERY MAINTENANCE.** (cont)

# 7-113. Battery Box Group. (Sheet 2 of 3)

#### **REMOVAL**

#### **NOTE**

The following is a maintenance procedure for the left battery box. The maintenance procedure for the right battery box is identical.

- 1. Remove four bolts (1), washers (2) and nuts (3, Figure 7-174).
- 2. Remove battery box (4) from brackets (7 and 11).
- 3. Remove two bolts (5), washers (6) and bracket (7) from frame.

## NOTE

Access of hardware must be made through side compartment door.

4. Remove two bolts (8), lockwashers (9), washers (10) and bracket (11) from frame.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

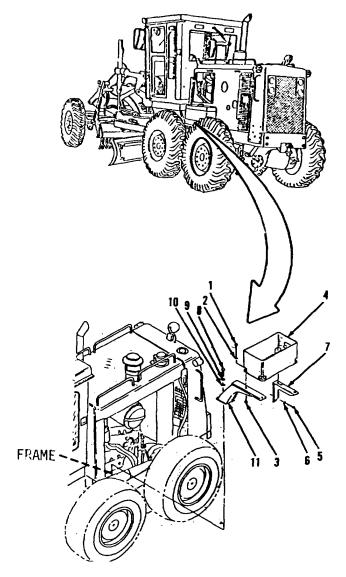


Figure 7-174

Go to Sheet 3

# 7-113. Battery Box Group. (Sheet 3 of 3)

# **INSTALLATION**

- 1. Install bracket (11, Figure 7-174) on frame.
- 2. Install two washers (10), lockwashers (9) and bolts (8).
- 3. Install bracket (7) on frame.
- 4. Install two washers (6) and bolts (5).
- 5. Install battery box (4) on brackets (11 and 7).
- 6. Install four nuts (3), washers (2) and bolts (1).

## NOTE

Return 130G Grader to original equipment condition.

**End of Task** 

#### Section XXX. WIRING HARNESS TROUBLESHOOTING.

**7-114. GENERAL INFORMATION.** This section lists the common wiring harness malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.

**7-115. WIRING HARNESS TROUBLESHOOTING PROCEDURES.** This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### WIRING HARNESS TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

#### **NOTE**

To perform wiring harness troubleshooting, use the continuity test procedure shown below. The steps are to be preformed in the order indicated. The figure numbers indicate location on the vehicle and connections.

Step 1. Clean and inspect all wiring harness terminals and connections for damage, defects or corrosion.

If repair to terminals or connections is necessary, refer to General Repair, paragraph 7-117.

Step 2. Set up and zero multimeter.

#### **NOTE**

- If the multimeter cannot be zeroed, check the multimeter batteries. If the batteries are in good condition--replace multimeter.
  - Step 3. Disconnect wiring harness from power source. To be safe, disconnect the positive cable on the right side.
    - Step 4. Connect multimeter to both ends of the wiring harness being tested. Refer to figure numbers for connection locations.

Change 1 7-282

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

# Step 5. Observe the multimeter needle movement.

If the multimeter needle moves to the right over zero on the top of the scale, the circuit has continuity. The wiring harness is not the problem.

If the multimeter needle does not move, the circuit does not have continuity. Replace wiring harness.

If the multimeter needle jumps or flickers, the wiring harness being tested has a loose connection. Further testing will be necessary.

# a. ALTERNATOR GROUND LEAD (Figure 7-175).

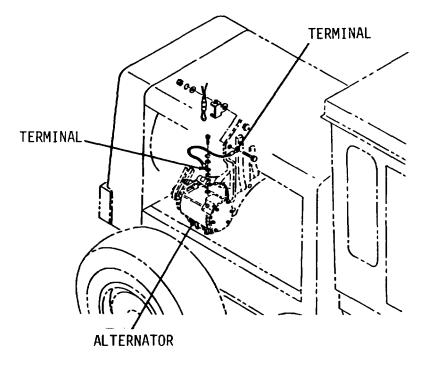


Figure 7-175

# WIRING HARNESS TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

b. STARTING MOTOR LEAD (Figure 7-176).

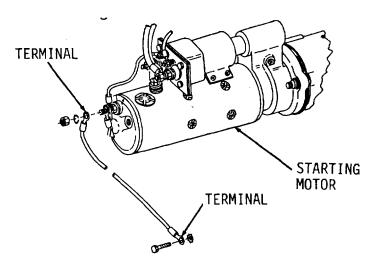


Figure 7-176

c. AIR PRESSURE SWITCH LEAD (Figure 7-177).

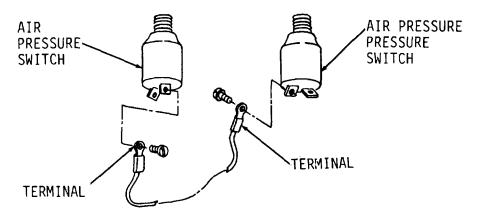


Figure 7-177

## WIRING HARNESS TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

d. SUPPLEMENTAL STEERING GOVERNOR SWITCH AND DUMP VALVE LEAD (Figure 7-178).

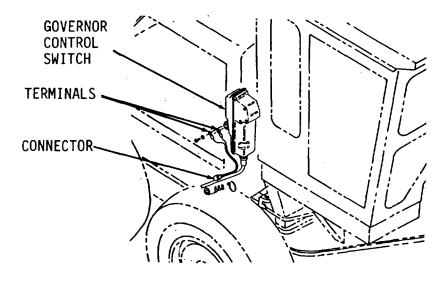


Figure 7-178

e. BLADE FLOAT VALVE HARNESS (Figure 7-179),

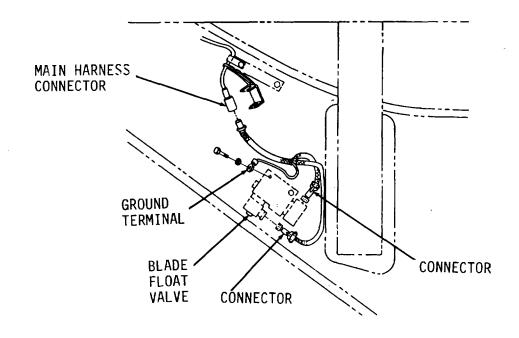


Figure 7-179

# WIRING HARNESS TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

f. REAR DEFROSTER LEAD (Figure 7-180).

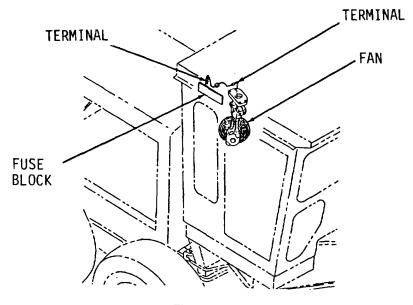


Figure 7-180

g. FRONT FLOODLIGHT LEAD (Figure 7-181).

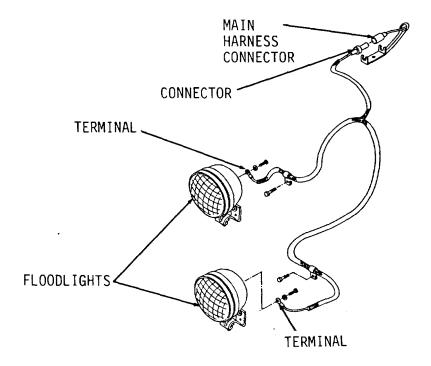


Figure 7-181

# WIRING HARNESS TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

# h. REAR FLOODLIGHT LEAD (Figure 7-182).

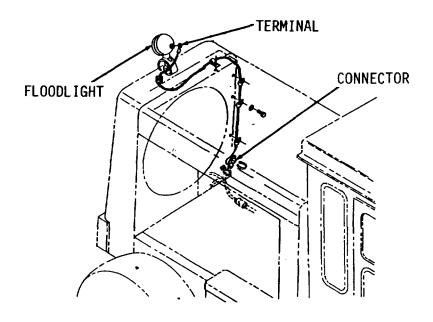


Figure 7-182

i. CAB SIGNAL LIGHT LEAD (Figure 7-183).

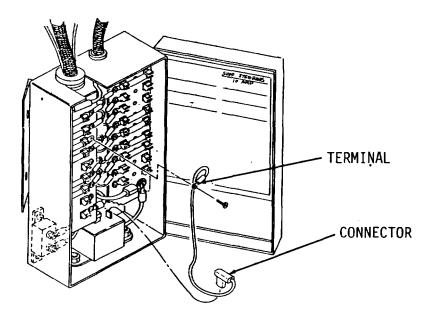


Figure 7-183

# WIRING HARNESS TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cost)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

j. DOME LIGHT HARNESS (Figure 7-184).

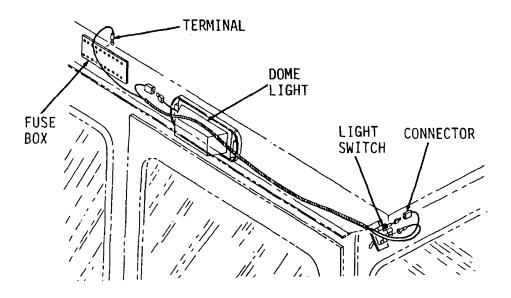


Figure 7-184

k. DOME LIGHT RESISTOR WIRING HARNESS (Figure 7-185).

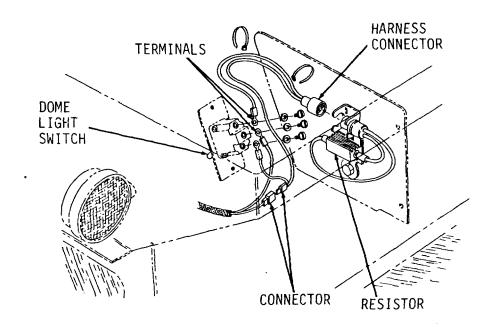


Figure 7-185

## WIRING HARNESS TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

I. DISCONNECT SWITCH CABLE (Figure 7-186).

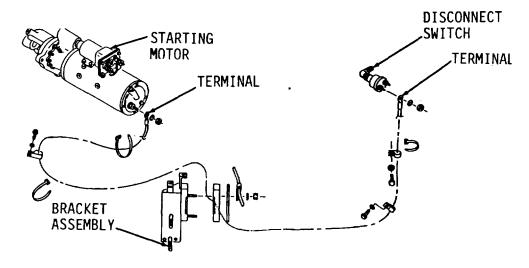


Figure 7-186

m. HEATER WIRING LEAD (Figure 7-187).

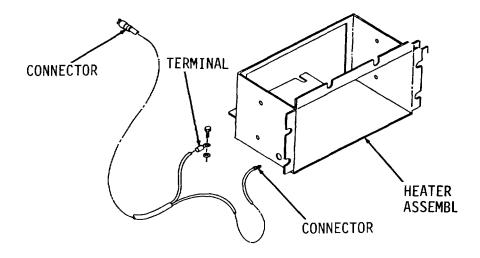


Figure 7-187

7-289

# WIRING HARNESS TROUBLESHOOTING AND AINTENANCE PROCEDURES. (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

n. RIGHT AND LEFT BLADE FLOAT HARNESSES (Figure 7-188).

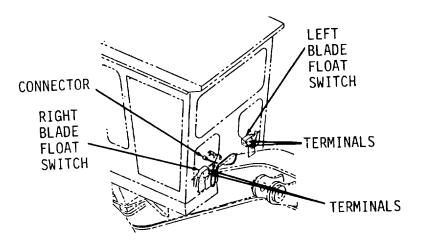


Figure 7-188

o. SUPPLEMENTAL STEERING PUMP POWER LEADS (Figure 7-189).

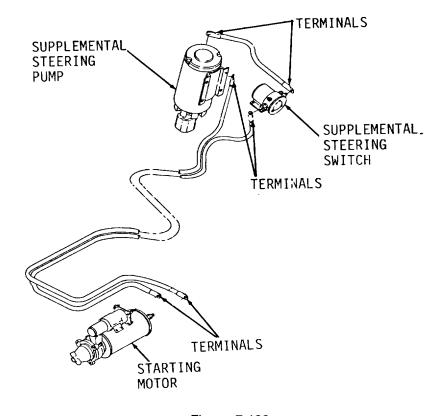


Figure 7-189

## Section XXXI. WIRING HARNESS MAINTENANCE.

# 7-116. WIRING HARNESS MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the wiring harness and its components in good repair.
- b. This section is arranged by functional group code and provides a list of wiring harness components to be maintained and step-by-step maintenance procedures.

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Radio Interference Suppression Maintenance	7-137	7-361

# **WIRING HARNESS MAINTENANCE. (cont)**

# 7-117. General Repair. (Sheet 1 of 15)

This task covers: a. Disassembly b. Inspection c. Assembly

**INITIAL SETUP:** 

Applicable Configurations Personnel Required

II Construction equipment repairer MOS 62B

Tools

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177- TM 5-3805-261-10

7033)

Electrical Connector Tool Kit Special Environmental Conditions

None

Test Equipment

None <u>General Safety Instructions</u>

None

Materials/Parts

Small tags, Item 41, Torques
Appendix C None

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## WIRING HARNESS MAINTENANCE.

# 7-117. General Repair. (Sheet 2 of 15)

(1) Terminal-type connectors, with shell.

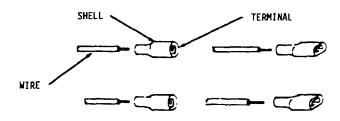
#### **DISASSEMBLY**

Remove and discard defective terminal with shell (Figure 7-190). Cut wire close to shell.

#### **ASSEMBLY**

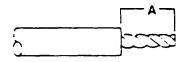
- 1. Strip wire, refer to chart (Figure 7-191). Do not cut or nick wire strands.
- 2. Tin bare wires. Use resin-core solder to coat bare wires. If using solid core solder, clean wires with flux before tinning.
- Strip new terminal wire. Refer to chart. Do not cut or nick wire strands.
- 4. Tin bare wires. Use resin-core solder to coat bare wires. If using solid core solder, clean wires with flux before tinning.
- 5. Slide shrink tubing on wire before splicing.
- 6. Splice wires. Twist wires tightly together.
- 7. Solder wires. Secure wires to prevent movement; use solder sparingly.
- 8. Position shrink tubing over spliced wires.
- 9. Apply heat and shrink until snug.

Go to Sheet 3



Connectors, terminal-type with shell

Figure 7-190



Size     + 0.020       20     .188       16     .250       12     .250       8     .500       4     .500       0     .625	Wire	A
16 .250 12 .250 8 .500 4 .500	Size	<u>+</u> 0.020
12 .250 8 .500 4 .500	20	
8 .500 4 .500	16	
4 .500	12	-250
	8	.500
0 625	4	
.025	0	.625

Figure 7-191

# **WIRING HARNESS MAINTENANCE. (cont)**

# 7-117. General Repair. (Sheet 3 of 15)

(2) Connectors with ring-type terminals.

#### **DISASSEMBLY**

Remove and discard defective terminal (Figure 7-192). Cut wire close to terminal.

#### **ASSEMBLY**

## **NOTE**

New terminal must be selected to match the ring size of the terminal with the mounting screw at the terminal connection. New terminal must also match the crimp tabs with the thickness of the wire.

- Strip wire, refer to chart (Figure 7-191). Do not cut or nick wire strands.
- Tin bare wires. Use resin-core solder to coat bare wires. If using solid core solder, clean wires with flux before tinning.
- 3. Insert in new terminal.
- 4. Crimp securely to fasten wire to new crimptype insulated terminal.
- 5. Solder to new solder type terminal. Secure wire and terminal to prevent movement. Use solder sparingly.

Go to Sheet 4

7-294

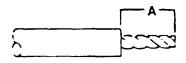


SOLDERED, WITHOUT INSULATOR

CRIMPED, WITHOUT INSULATOR

Connectors, ring-type terminals

Figure 7-192



Wire	A
Size	<u>+</u> 0.020
20	.188
16	.250
12	.250
8	.500
4	.500
0	.625

Figure 7-191

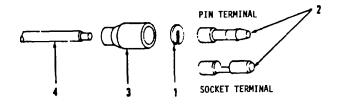
## WIRING HARNESS MAINTENANCE.

# 7-117. General Repair. (Sheet 4 of 15)

(3) Terminal-type connector, pin and socket.

## **DISASSEMBLY**

- 1. Slide shell (3) back on wire (4, Figure 7-193) to expose metal parts.
- 2. Remove C-washer (1).
- 3. Remove and discard terminal (2). Cut wire (4) close to terminal.
- 4. Remove shell (3).



Connector, terminal-type; pin, socket

Figure 7-193

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

Go to Sheet 5

# **WIRING HARNESS MAINTENANCE. (cont)**

# 7-117. General Repair. (Sheet 5 of 15)

(3) Terminal type connector, pin and socket. (cont)

#### **ASSEMBLY**

- 1. Strip wire (4, Figure 7-191), refer to chart. Do not cut or nick wire (4) strands.
- Tin bare wires (4, Figure 7-193). Use resincore solder to coat bare wires (4). If using solid core solder, clean wires (4) with flux before tinning.
- 3. Slide shell (3) onto wire (4).

#### **NOTE**

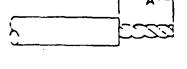
New terminal must be selected to match the size of the mating contact at the terminal connection. New terminal must also match the crimping area with the thickness of the wire.

- 4. Insert wire (4) into new terminal (2).
- 5. Crimp terminal (2) securely to fasten wire (4) to terminal (2).
- 6. Install C-washer (1) on terminal (2).

## **NOTE**

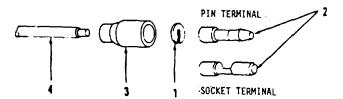
Terminal shell is held in position over terminal by C-washer. C-washer must be firmly seated inside shell.

7. Slide shell (3) up over new terminal (2) and C-washer (1).



A
<u>+</u> 0.020
.188
.250
.250
•500
.500
.625

Figure 7-191



Connector, terminal-type; pin, socket

Figure 7-193

Go to Sheet 6

## WIRING HARNESS MAINTENANCE.

# 7-117. General Repair. (Sheet 6 of 15)

(4) Flag-type connector, terminal with shell.

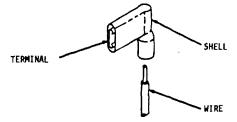
#### **DISASSEMBLY**

Remove and discard defective terminal (Figure 7-194). Cut wire close to terminal.

#### **ASSEMBLY**

- 1. Strip wire, refer to chart (Figure 7-191). Do not cut or nick wire strands.
- 2. Tin bare wires (Figure 7-194). Use resincore solder to coat bare wires. If using solid core solder, clean wires with flux before tinning.
- 3. Roll back insulation on new terminal to expose metal crimping area.
- 4. Insert wire in terminal.
- Crimp terminal securely to fasten wire to terminal.
- 6. Unroll insulation on terminal to cover metal parts.

Go to Sheet 7



Connector, flag-type, terminal with shell

Figure 7-194

# **WIRING HARNESS MAINTENANCE. (cont)**

# 7-117. General Repair. (Sheet 7 of 15)

(5) Polarized connector, multi-wire.

#### **DISASSEMBLY**

#### NOTE

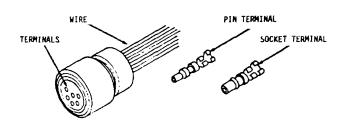
All wires must be tagged upon removal from connector to aid in installation. Each tag must also indicate if the wire is connected to a pin-type terminal or a socket-type terminal.

- Using pin removal/insertion tool, push out connector terminals of connector (Figure 7-195).
- Remove and discard connector terminals.
   Cut wires close to terminals.

#### **ASSEMBLY**

- Strip wires, refer to chart (Figure 7-191).
   Do not cut or nick wire strands.
- 2. Tin bare wires (Figure 7-195). Use resincore solder to coat bare wires. If using solid core solder, clean wires with flux before tinning.
- Insert wires in new terminals. Make sure pin-type or socket-type terminals are used as required.
- 4. Crimp terminals securely to fasten wires to terminals.
- 5. Using pin removal/insertion tool, install in holes of connector, as required.

Go to Sheet 8



Connector, polarized, multi-wire

Figure 7-195



Wire	A
Size	<u>+</u> 0.020
20	.188
16	.250
12	.250
8	.500
4	.500
0	.625

Figure 7-191

## WIRING HARNESS MAINTENANCE.

# 7-117. General Repair. (Sheet 8 of 15)

(6) Ring-type connector, soldered.

#### **DISASSEMBLY**

Remove and discard defective terminal (Figure 7-196). Cut wire close to terminal.

#### **ASSEMBLY**

## NOTE

New terminal must be selected to match the ring size of the terminal with the mounting screw at the terminal connection. New terminal must also match the wire solder area with the size of the wire.

- 1. Strip wire, refer to chart. Do not cut or nick wire strands (Figure 7-191).
- 2. Tin bare wires (Figure 7-196). Use resincore solder to coat bare wires. If using solid core solder, clean wires with flux before tinning.
- 3. Insert in new terminal.
- 4. Secure terminal and wire to prevent movement.
- Solder terminal and wires. Fill terminal cavity with melted solder. Allow to cool several minutes before moving wire or terminal.

Go to Sheet 9

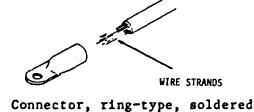


Figure 7-196

# 7-117. General Repair. (Sheet 9 of 15)

(7) Terminal-type connector, weather-proof.

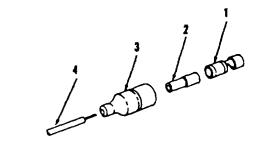
#### **DISASSEMBLY**

- 1. Slide back shell (3) on wire (4) to expose sleeve (2, Figure 7-197).
- 2. Slide back sleeve (2) on wire (4) to expose terminal (1).
- 3. Remove and discard terminal (1). Cut wire (4) close to terminal (1).
- 4. Remove sleeve (2) and shell (3).

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

Go to Sheet 10



Connector, terminal-type, weather-proof

Figure 7-197

# 7-117. General Repair. (Sheet 10 of 15)

(7) Terminal-type connector, weather-proof.

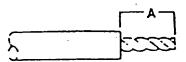
#### **ASSEMBLY**

- 1. Strip wire (4, Figure 7-191), refer to chart. Do not cut or nick wire (4) strands.
- Tin bare wires (4). Use resin-core solder to coat bare wires (4). If using solid core solder, clean wires (4, Figure 7-197) with flux before tinning.
- 3. Slide shell (3) onto wire (4).
- 4. Slide sleeve (2) onto wire (4).

#### **NOTE**

New terminal must be selected to match the size of the mating contact at the terminal connection. New terminal must also match the crimping area with the thickness of the wire.

- 5. Strip wire (4), refer to chart. Do not cut or nick wire (4) strands.
- 6. Tin bare wires (4). Use resin-core solder to coat bare wires (4). If using solid core solder, clean wires (4) with flux before tinning.
- 7. Insert wire (4) into new terminal (1).
- 8. Crimp terminal (1) securely to fasten wire (4) to terminal (1).
- 9. Slide sleeve (2) over new terminal (1).



Wire	* <b>A</b>
Size	<u>+</u> 0.020
20	.188
16	-250
12	.250
8	.500
4	.500
0	-625

Figure 7-191

Go to Sheet 11

# 7-117. General Repair. (Sheet 11 of 15)

(7) Terminal-type connector, weather-proof. (cont)

# **ASSEMBLY (cont)**

#### NOTE

Connector sleeve and shell are held in position over terminal by compression. Sleeve must be firmly seated on terminal and shell must be firmly seated on sleeve.

10. Slide shell (3) over sleeve (2) and terminal (1).

Go to Sheet 12

# 7-117. General Repair. (Sheet 12 of 15)

(8) Multi-wire connector, hard shell.

#### **DISASSEMBLY**

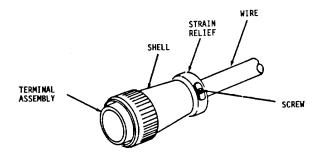
- 1. Loosen two screws until wire is free to rotate within strain relief.
- 2. Remove and discard terminal assembly (Figure 7-198) from shell. Rotate counterclockwise.

#### NOTE

All wires must be tagged upon removal from terminals to aid in installation.

- Cut wires close to terminals. Remove and discard terminals.
- 4. Remove and discard shell from wires.

Go to Sheet 13



Connector, multi-wire (hard shell with strain relief)

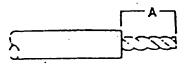
Figure 7-198

## 7-117. General Repair. (Sheet 13 of 15)

(8) Multi-wire connector, hard shell. (cont)

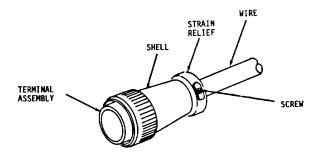
#### **ASSEMBLY**

- 1. Strip wires, refer to chart (Figure 7-191). Do not cut or nick wire strands.
- 2. Tin bare wires. Use resin-core solder to coat bare wires. If using solid core solder, clean wires with flux before tinning.
- 3. Slide new shell (Figure 7-198) onto wire.
- 4. Insert wires into connector pins or socket wells as indicated on tags.
- 5. Crimp wires securely to fasten wires to terminals.
- 6. Solder wires. Secure wires and terminal to prevent movement. Use solder sparingly.
- 7. Insert terminal assembly into shell.
- 8. Tighten two screws.



Wire	· A
Size	<u>+</u> 0.020
20	.188
16	-250
12	•250
8	•500
4	.500
0	.625

Figure 7-191



Connector, multi-wire (hard shell with strain relief)

Figure 7-198

Go to Sheet 14

# 7-117. General Repair. (Sheet 14 of 15)

(9) Multi-wire connector, compression-type.

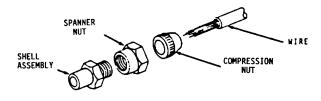
#### **DISASSEMBLY**

- 1. Loosen compression nut (Figure 7-199) from shell assembly; rotate counterclockwise.
- 2. Slide compression nut and spanner nut up on wire to expose pin and socket terminals.

#### NOTE

All wires must be tagged before disconnecting to aid in installation. Each tag must also indicate if the wire is connected to a pin-type terminal or a socket-type terminal.

- 3. Remove and discard terminals. Cut wires close to terminals.
- 4. Remove and discard shell assembly, spanner nut and compression nut.



Connector, multi-wire, compression-type (with hard shell)

Figure 7-199

Go to Sheet 15

## 7-117. General Repair. (Sheet 15 of 15)

(9) Multi-wire connector, compression-type. (cont)

#### **ASSEMBLY**

- 1. Slide new shell assembly onto wire (Figure 7-199).
- 2. Slide new compression nut onto wire.
- 3. Slide new spanner nut onto wire.
- 4. Strip wires, refer to chart (Figure 7-191). Do not cut or nick wire strands.
- Tin bare wires (Figure 7-199). Use resincore solder to coat bare wires. If using solid core solder, clean wires with flux before tinning.
- 6. Insert wires into connector pins or socket wells as indicated on tags.
- 7. Secure wire and new terminal to prevent movement. Use solder sparingly.

# **NOTE**

Return 130G Grader to original equipment condition.

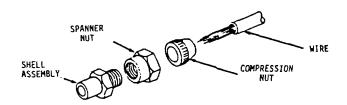
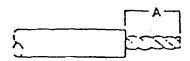


Figure 7-199



Wire	<b>K</b>
Size	$\pm 0.020$
_ 20	.188
16	-250
12	.250
8	-500
4	.500
0	.625

Figure 7-191

**End of Task** 

# 7-118. Alternator Ground Lead. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations Personnel Required Construction equipment

repairer MOS 62B

Tools

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177-TM 5-3805-261-10

7033)

Special Environmental Conditions

Test Equipment

None

**General Safety Instructions** None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C **Torques** 

Clean cloths, Item 39, All fasteners are tightened to Appendix C standard torques. Refer to

Small tags, Item 41,

Appendix C

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 6-49 Right engine screen door open.

Go to Sheet 2

# 7-118. Alternator Ground Lead. (Sheet 2 of 3)

#### **REMOVAL**

1. Remove screw (1) and lockwashers (2 and 3, Figure 7-200) from alternator.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect wire assembly (11) at terminal from alternator.
- 3. Remove lockwasher (4) and capacitor (5).
- 4. Remove lockwasher (6).
- 5. Remove nut (7), lockwasher (8), washer (9) and bolt (10) from fan drive support.
- 6. Remove wire assembly (11) from fan drive support.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

# **INSPECTION**

Inspect all parts. Refer to Chapter 2.

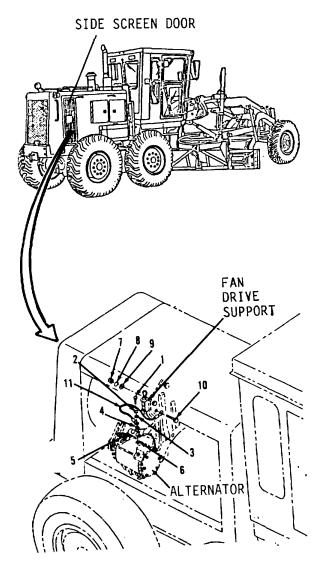


Figure 7-200

Go to Sheet 3

# 7-118. Alternator Ground Lead. (Sheet 3 of 3)

# **INSTALLATION**

- 1. Install wire assembly (11, Figure 7-200) to fan drive support.
- 2. Install bolt (10), washer (9), lockwasher (8) and nut (7).
- 3. Install lockwasher (6).
- 4. Install lockwasher (4) and capacitor (5).
- 5. Connect wire assembly (11) at terminal.

## **NOTE**

Return 130G Grader to original equipment condition.

**End of Task** 

# 7-119. Starting Motor Lead. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# 7-119. Starting Motor Lead. (Sheet 2 of 3)

## **REMOVAL**

 Remove bolt (1, Figure 7-201) from fuel injection mounting support on right engine block.

# NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect wire assembly (5) from mounting support.
- 3. Remove lockwasher (2).
- 4. Remove nut (3) and washer (4) from starting motor.
- 5. Disconnect wire assembly (5) from starting motor.
- 6. Remove wire assembly (5).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

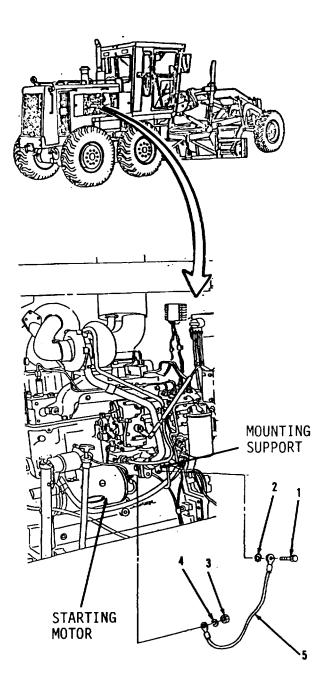


Figure 7-201

Go to Sheet 3

# 7-119. Starting Motor Lead. (Sheet 3 of 3)

# **INSTALLATION**

- 1. Position wire assembly (5, Figure 7-201) on starting motor.
- 2. Install washer (4) and nut (3). Tighten nut (4) to 22 ft-lb torque.
- 3. Position lockwasher (2) and wire assembly (5) on fuel injection mounting support.
- 4. Install bolt (1).

#### NOTE

Return 130G Grader to original equipment condition.

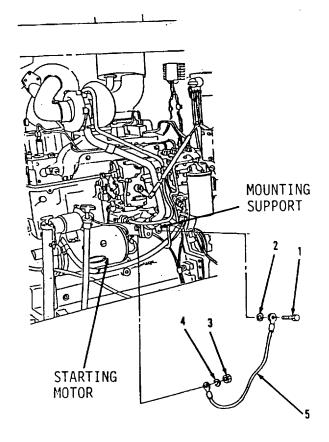


Figure 7-201

**End of Task** 

# 7-120. Air Pressure Switch Lead. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

ΑII

<u>Tools</u>

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Small tags, Item 41, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# 7-120. Air Pressure Switch Lead. (Sheet 2 of 2)

#### **REMOVAL**

1. Remove two screws (1, Figure 7-202) under right side of cab.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

2. Disconnect wire assembly (2) from two switches (3).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

# **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Position wire assembly (2) on two switches (3, Figure 7-202) under right side of cab.
- 2. Install two screws (1).

# **NOTE**

Return 130G Grader to original equipment condition.

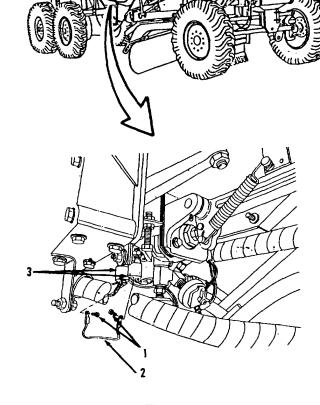


Figure 7-202

**End of Task** 

# 7-121. Electrical Monitoring System Jumper Wire. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

All

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# 7-121. <u>Electrical Monitoring System Jumper Wire</u>. (Sheet 2 of 2)

#### **REMOVAL**

1. Open right side screen door. Refer to paragraph 6-49, steps 1 and 2.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Detach jumper wire assembly and harness assembly at connector from clip on fuel tank (Figure 7-203).
- 3. Disconnect jumper wire assembly and harness assembly at connector.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Connect harness assembly at connector and jumper wire assembly (Figure 7-203).
- 2. Attach harness assembly at connector and jumper wire assembly to clip on fuel tank.
- 3. Close right side screen door. Refer to paragraph 6-49, steps 4 thru 7.

#### NOTE

Return 130G Grader to original equipment condition.

End of Task

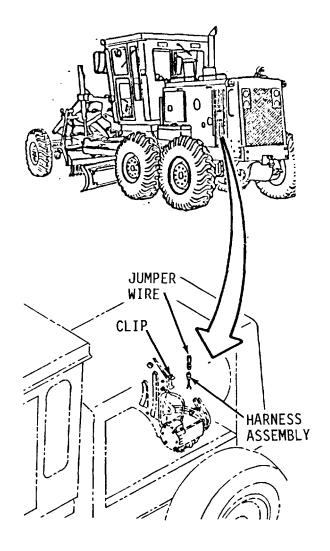


Figure 7-203

## 7-122. Supplemental Steering Dump Valve Wiring Harness. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation .....

**INITIAL SETUP:** 

Applicable Configurations

Personnel Required Construction equipment

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloth, Item 39, Appendix C Detergent, Item 8, Appendix C

Small tags, Item 41,

Appendix C

repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# 7-122. <u>Supplemental Steering Dump Valve Wiring</u> Harness. (Sheet 2 of 3)

## **REMOVAL**

1. Detach main harness and dump valve harness (4) from clip (1, Figure 7-204).

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect main harness from dump valve harness (4).
- 3. Remove clip (1).
- 4. Remove two screws (2) and lockwashers (3) from dump valve switch.
- 5. Remove dump valve harness (4).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

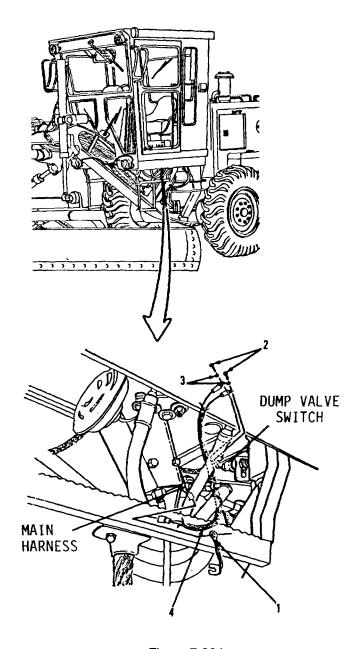


Figure 7-204

Go to Sheet 3

# 7-122. <u>Supplemental Steering Dump Valve Wiring Harness</u>. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Position dump valve harness (4, Figure 7-204).
- 2. Install two lockwashers (3) and screws (2) in dump valve switch.
- 3. Install clip (1).
- 4. Connect dump valve harness (4) to main harness.
- 5. Attach dump valve harness (4) and main harness to clip (1).

#### NOTE

Return 130G Grader to original equipment condition.

**End of Task** 

# 7-123. Supplemental Steering Governor Switch Harness. (Sheet 1 of 3)

a. Removal This task covers: b. Cleaning c. Inspection d. Installation

**INITIAL SETUP:** 

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Strap, Item 3,

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# 7-123. <u>Supplemental Steering Governor Switch</u> Harness. (Sheet 2 of 3)

## **REMOVAL**

 Remove two screws (1) and lockwashers (2, Figure 7-205) from supplemental steering governor switch.

# NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect governor switch harness (5) from governor switch.
- 3. Cut and discard tie strap (3).
- 4. Disconnect governor switch harness (5) from main harness.
- 5. Remove clip (4).
- 6. Remove governor switch harness (5).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

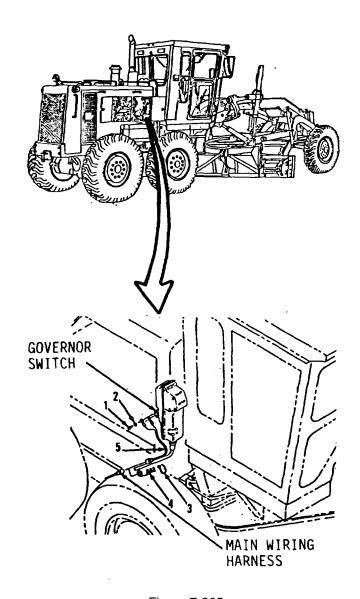


Figure 7-205

Go to Sheet 3

# 7-123. <u>Supplemental Steering Governor Switch</u> Harness. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Position governor switch harness (5, Figure 7-205) in engine compartment.
- 2. Install clip (4).
- 3. Connect governor switch harness (5) to main harness.
- 4. Install new strap (3).
- 5. Connect governor switch harness (5) to governor switch.
- 6. Install two lockwashers (2) and screws (1) to supplemental steering governor switch.

## NOTE

Return 130G Grader to original equipment condition.

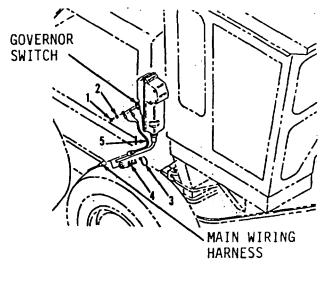


Figure 7-205

**End of Task** 

## 7-124. Blade Float Valve Harness. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

<u>Applicable Configurations</u>
All

Personnel Required
Construction equipment

repairer MOS 62B

<u>Tools</u>

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177- TM 5-3805-261-10 7033)

<u>Special Environmental Conditions</u>
<u>Test Equipment</u>
None

None

General Safety Instructions
None

Materials/Parts None
Dry cleaning solvent,
Item 14, Appendix C Torques

Clean cloths, Item 39,
Appendix C
Small tags, Item 41,
All fasteners are tightened to standard torques. Refer to Appendix E.

Appendix C

Troubleshooting References

None

Equipment Condition

TM 5-3805-261-10 Vehicle parked on level ground.
Parking/emergency brake applied.

Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# 7-124. Blade Float Valve Harness. (Sheet 2 of 2)

#### **REMOVAL**

- 1. Detach clip (4) from main harness and blade float valve harness (3, Figure 7-206).
- 2. Disconnect blade float valve harness (3) from main harness.
- 3. Remove bolt (1) and washer (2).
- 4. Remove blade float valve harness (3) from blade float pilot valve.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- Install blade float valve harness (3, Figure 7-206) to blade float pilot valve.
- 2. Install washer (2) and bolt (1).
- 3. Connect blade float harness (3) to main harness.
- 4. Attach clip (4) to main harness and blade float valve harness

(3).

# **NOTE**

Return 130G Grader to original equipment condition.

**End of Task** 

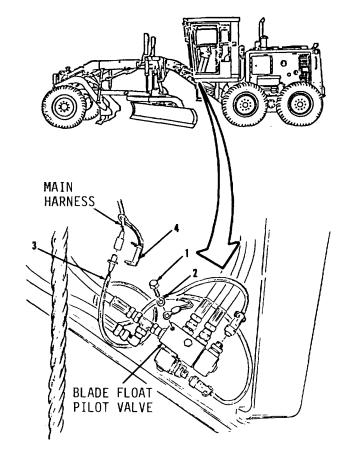


Figure 7-206

#### 7-125. Front Defroster Lead. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 14-8 Front defroster fan removed.

Go to Sheet 2

# 7-125. Front Defroster Lead. (Sheet 2 of 2)

#### **REMOVAL**

#### **NOTE**

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 1. Disconnect wire assembly connector from harness connector in upper left cab (Figure 7-207).
- 2. Remove wire assembly.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Position wire assembly (Figure 7-207).
- Connect harness connector to wire assembly connector.

#### NOTE

Return 130G Grader to original equipment condition.

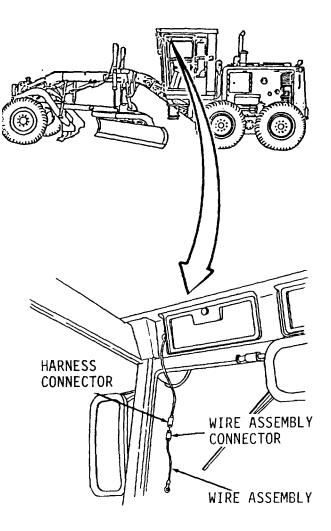


Figure 7-207

**End of Task** 

# 7-126. Rear Defroster Lead. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41,

Appendix C
Detergent, Item 8, Appendix C

Personnel Required

Construction equipment repairer NOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 14-8 Fan removed.

Go to Sheet 2

# 7-126. Rear Defroster Lead. (Sheet 2 of 2)

#### **REMOVAL**

- 1. Remove grommet (Figure 7-208) from rear, upper right side of cab wall.
- 2. Remove screw from fuse block.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

3. Remove wire assembly.

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

# **INSTALLATION**

- 1. Install wire assembly (Figure 7-208).
- 2. Install screw in fuse block.
- 3. Install grommet in rear, upper right side of cab wall.

# **NOTE**

Return 130G Grader to original equipment condition.

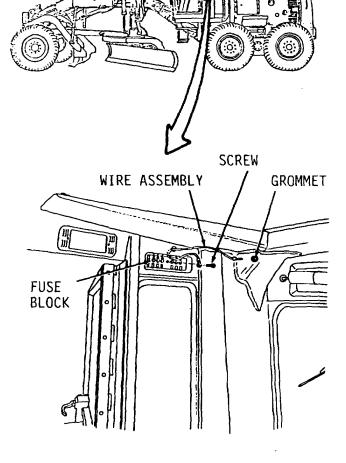


Figure 7-208

**End of Task** 

# 7-127. Front Floodlight Lead. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Appendix C

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2.

# 7-127. Front Floodlight Lead. (Sheet 2 of 3)

#### **REMOVAL**

- Loosen bolt on bottom of floodlight and adjust floodlight forward for access to screw (1).
- 2. Remove screw (1) and lockwasher (2, Figure 7-209) to right side of cab exterior.

## NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 3. Disconnect wire assembly (11) from right floodlight (3).
- 4. Remove bolt (4) from clip (12).
- 5. Adjust lamp forward for access to screw (1).
- 6. Remove screw (5) and lockwasher (6) from left side of cab exterior.
- 7. Disconnect wire assembly (11) from left floodlight (7).
- 8. Remove bolt (8) from clip (13).
- 9. Detach clip (14) from wire assembly (11) at connector (9) and main harness connector (10) from under left side of cab.
- 10. Disconnect wire assembly (11) at connector(9) from main harness connector (10).
- 11. Remove wire assembly (11) from vehicle.
- 12. Remove clips (12 and 13) from wire assembly (11).

# **CLEANING**

Clean all parts. Refer to Chapter 2.

Go to Sheet 3

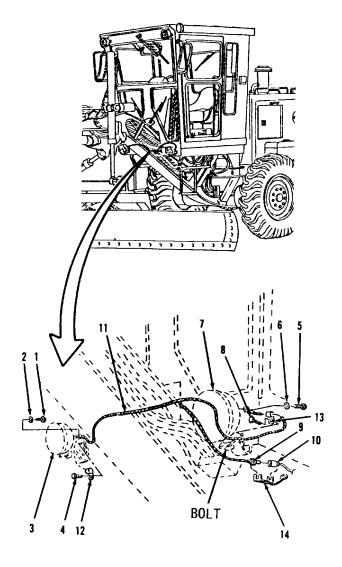


Figure 7-209

# 7-127. Front Floodlight Lead. (Sheet 3 of 3)

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install clips (13 and 12) on wire assembly (11, Figure 7-209).
- 2. Install wire assembly (11) on vehicle.
- 3. Connect main harness connector (10) to wire assembly (11) at connector (9).
- Attach clip (14) to main harness connector (10) and wire assembly (11) at connector (9).
- Install bolt (8) through clip (13) on left side of cab exterior.
- 6. Connect wire assembly (11) to left floodlight (7).
- 7. Install lockwasher (6) and screw (5).
- Install bolt (4) through clip (12) on right side of cab exterior.
- 9. Connect wire assembly (11) on right floodlight (3).
- 10. Move floodlight back to original position and tighten bolt.
- 11. Install lockwasher (2) and screw (1).

#### NOTE

Return 130G Grader to original equipment condition.

**End of Task** 

# 7-128. Rear Floodlight Lead. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent,
Item 14, Appendix C
Clean cloths, Item 39,
Appendix C
Small tags, Item 41,
Appendix C
Tie strap, Item 3

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

Torques

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# 7-128. Rear Floodlight lad. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Open left side screen door. Refer to paragraph 6-49, steps 1 and 2.
- 2. Remove screw (1) and two lockwashers (2, Figure 7-210) from rear of floodlight.

## **NOTE**

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

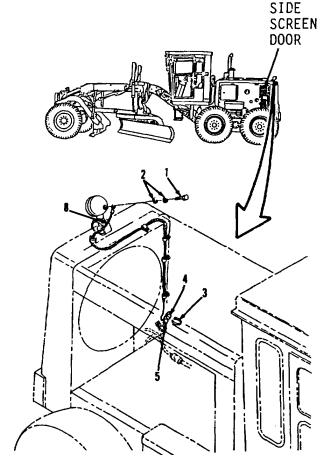
- 3. Disconnect wire assembly (8) from floodlight.
- 4. Cut and discard tie strap (3) from rear, left side of engine compartment near radiator.
- 5. Disconnect wire assembly connector (4) from main harness connector (5).
- Remove four bolts (6) and washers (7, Figure 7-211).
- 7. Remove wire assembly (8) from vehicle. Snake down through grommet (10).
- 8. Remove four clips (9) from wire assembly (8).
- 9. Remove grommet (10).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.



7-210

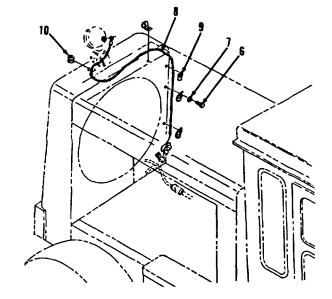


Figure 7-211

Go to Sheet 3

# 7-128. Rear Floodlight Lead. (Sheet 3 of 3

#### **INSTALLATION**

- 1. Install grommet (10, Figure 7-211) on vehicle in exterior, above radiator.
- 2. Install four clips (9) on wire assembly (8) on rear, left side of engine compartment near radiator.
- 3. Install wire assembly (8) on vehicle. Snake up through grommet (10).
- 4. Install four washers (7) and bolts (6) through clips (9).
- 5. Connect main harness connector (5) to wire assembly connector (4, Figure 7-210).
- 6. Install new tie strap (3).
- 7. Connect wire assembly (8) to floodlight.
- 8. Install two lockwashers (2) and screw (1).
- 9. Close left side screen door. Refer to paragraph 6-49, steps 4 thru 7.

### NOTE

Return 130G Grader to original equipment condition.

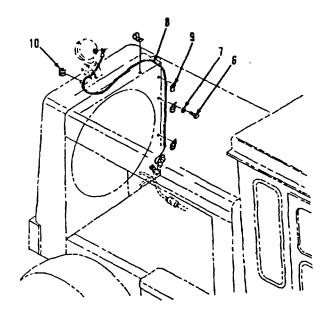


Figure 7-211

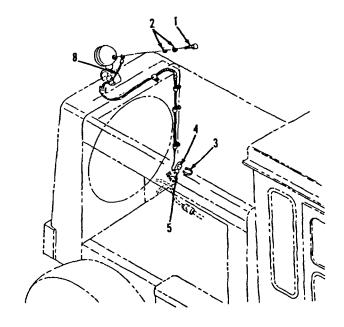


Figure 7-210

**End of Task** 

# 7-129. Cab Signal Light Lead. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# 7-129. Cab Signal Light Lead. (Sheet 2 of 2)

#### **REMOVAL**

1. Remove screw (1, Figure 7-212) from fuse box, under right side of cab.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect wire assembly (2).
- 3. Remove wire assembly (2) from signal flasher (3).

# **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install wire assembly (2) on signal flasher (3, Figure 7-212).
- 2. Connect wire assembly (2) in fuse box.
- 3. Install screw (1) in fuse box.

#### NOTE

Return 130G Grader to original equipment condition.

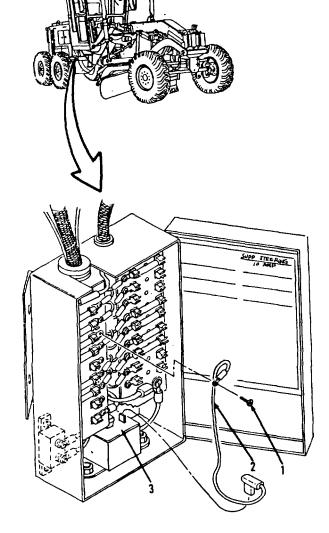


Figure 7-212

**End of Task** 

#### 7-130. Dome Light Harness. (Sheet 1 of 3)

a. Removal This task covers: b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

> Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-68 Dome light switch removed.

Paragraph 7-87 Dome light removed.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# 7-130. Dome Light Harness. (Sheet 2 of 3)

# **REMOVAL**

1. Remove screw (1, Figure 7-213) from cab fuse box in upper right side of cab.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect wiring harness (2) at terminal from fuse box.
- 3. Remove wiring harness (2).

# **CLEANING**

Clean all parts. Refer to Chapter 2.

# **INSPECTION**

Inspect all parts. Refer to Chapter 2.

Go to Sheet 3

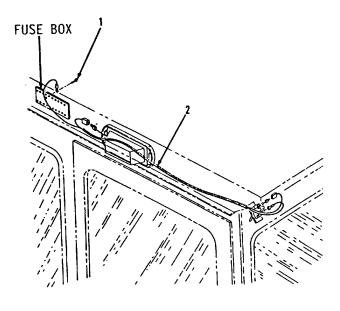


Figure 7-213

# 7-130. Dome Light Harness. (Sheet 3 of 3)

# **INSTALLATION**

- 1. Position wiring harness (2, Figure 7-213).
- 2. Connect wiring harness (2) at terminal to fuse box.
- 3. Install screw (1) in fuse box.

# NOTE

Return 130G Grader to original equipment condition.

**End of Task** 

### 7-131. Dome Light Resistor Wiring Harness. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations
All
Personnel Required
Construction equipment

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

#### **Troubleshooting References**

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-87 Dome light removed.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 13-11 Upper cab storage compartment removed.

Go to Sheet 2

# 7-131. <u>Dome Light Resistor Wiring Harness</u>. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 1. Remove items 1 and 2 as an assembly (Figure 7-214) from clip.
- 2. Disconnect resistor harness (1) at connector from light switch harness (2, Figure 7-215) at connector.,

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

# **INSPECTION**

Inspect all parts. Refer to Chapter 2.

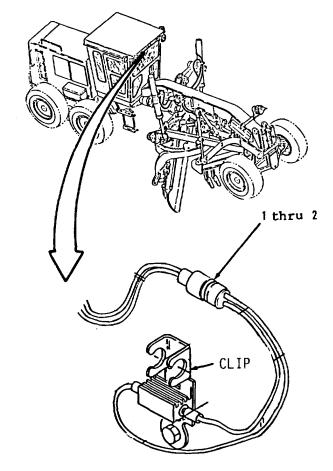


Figure 7-214

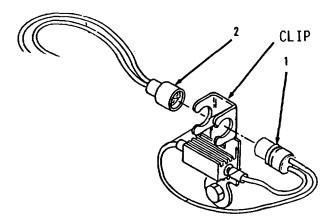


Figure 7-215

Go to Sheet 3

# 7-131. <u>Dome Light Resistor Wiring Harness</u>. (Sheet 3 of 3)

#### **INSTALLATION**

- Connect light switch harness (2) at connector to resistor harness (1, Figure 7-215) at connector.
- 2. Install items 1 and 2 as an assembly (Figure 7-214) in clip.

#### NOTE

Return 130G Grader to original equipment condition.

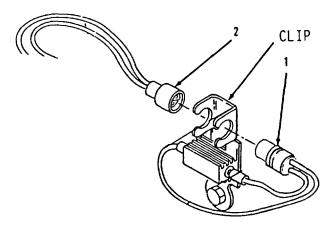


Figure 7-215

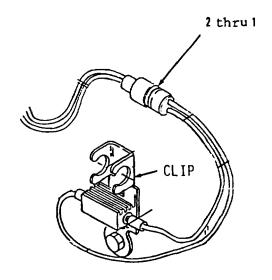


Figure 7-214

**End of Task** 

# 7-132. Horn Wiring Harness. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations
All
Personnel Required
Construction equipment

repairer MOS 62B

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Conor

Materials/Parts
Dry cleaning solvent,

Item 14, Appendix C Clean cloths, Item 39,

Appendix C Small tags, Item 41, Appendix C References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

Torques

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# 7-132. Horn Wiring Harness. (Sheet 2 of 3)

#### **REMOVAL**

1. Remove items 1 and 2 as an assembly from clip (5, Figure 7-216).

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect wiring harnesses (1 and 2, Figure 7-217) at connectors.
- 3. Remove two screws (3) from horn (4).
- 4. Disconnect wiring harness (2) at terminals.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

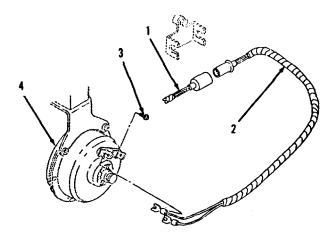


Figure 7-217

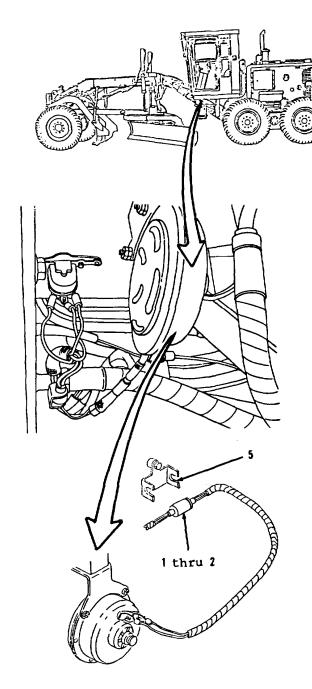


Figure 7-216

Go to Sheet 3

# 7-132. Horn Wiring Harness. (Sheet 3 of 3)

#### **INSTALLATION**

- 1. Position wiring harness (2) at terminals on horn (4, Figure 7-217).
- 2. Install two screws (2).
- 3. Connect wiring harnesses (2 and 1) at connectors.
- 4. Install items 2 and 1 as an assembly in clip (5, Figure 7-216).

#### NOTE

Return 1300 Grader to original equipment condition.

**End of Task** 

# 7-133. Disconnect Switch Cable. (Sheet 1 of 4)

a. Removal This task covers: b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations Personnel Required

Construction equipment repairer MOS 62B

TM 5-3805-261-10

Tools

General Mechanic's Tool Kit:

Automotive (NSN 5180-00-177-

7033)

Special Environmental Conditions

None

References

Test Equipment

None

**General Safety Instructions** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Small tags, Item 41, Appendix C

Straps, Items 3, 4

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

> Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Operator's console left side panel Paragraph 7-33

removed.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# 7-133. Disconnect Switch Cable. (Sheet 2 of 4)

#### **REMOVAL**

 Remove nut (1) and lockwasher (2, Figure 7-218) from starting motor on right side of engine.

#### **NOTE**

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect cable assembly (21).
- 3. Remove and discard straps (3 and 4).
- 4. Remove two bolts (5), washers (6) and clips (7) from inner right, rear frame.
- 5. Remove two nuts (8) and washers (9, Figure 7-219) from bracket assembly.
- 6. Remove clip (10) from hose.
- 7. Remove plate (11).
- 8. Separate two clamps (12) enough to pull cable assembly (21) through.
- 9. Remove two bolts (13), washers (14) and clips (15, Figure 7-220) from under right side of operator's compartment.
- 10. Remove bolt (16), washer (17) and clip (18) from inner operator's console.
- 11. Remove nut (19) and washer (20) from disconnect switch.
- Remove cable assembly (21) from disconnect switch.

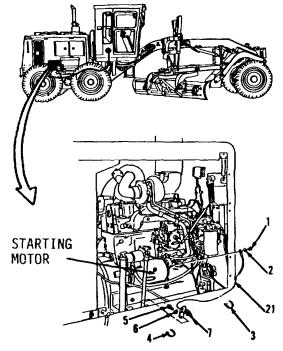


Figure 7-218

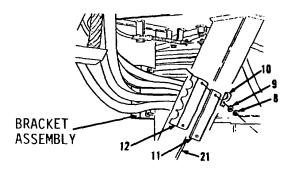


Figure 7-219

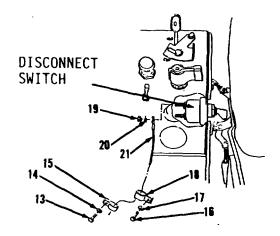


Figure 7-220

# 7-133. Disconnect Switch Cable. (Sheet 3 of 4)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install cable assembly (21, Figure 7-220) on disconnect switch in inner operator's console.
- 2. Install washer (20) and nut (19).
- 3. Install clip (18) on cable assembly (21) in inner operator's console.
- 4. Install washer (17) and bolt (16) and clip (18) to frame.
- 5. Install two clips (15) on cable assembly (21) under right side of operator's compartment.
- 6. Install two washers (14) and bolts (13), securing clips (15) to frame.

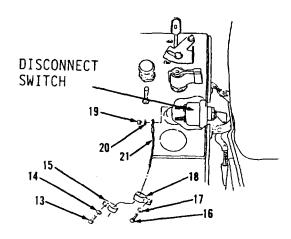


Figure 7-220

Go to Sheet 4

# 7-133. Disconnect Switch Cable. (Sheet 4 of 4)

#### **INSTALLATION**

- 7. Position cable assembly (21) between two clamps (12, Figure 7-219).
- 8. Install two clamps (12) and plate (11).
- 9. Install clip (10) on hose.
- 10. Install two washers (9) and nuts (8) on bracket assembly.
- 11. Position cable assembly (21, Figure 7-218) through rear frame, under engine and across to right side of engine.
- 12. Install two clips (7) on cable assembly (21) on inner right side of rear frame.
- 13. Install two washers (6) and bolts (5).
- 14. Install new straps (4 and 3).
- 15. Connect cable assembly (21) on starting motor terminal on right side of engine.
- 16. Install lockwasher (2) and nut (1). Tighten nut (1) to 22 ft-lb torque.

#### NOTE

Return 130G Grader to original equipment condition.

**End of Task** 

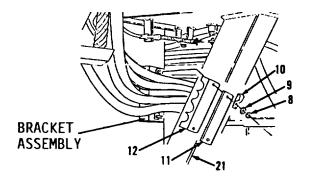


Figure 7-219

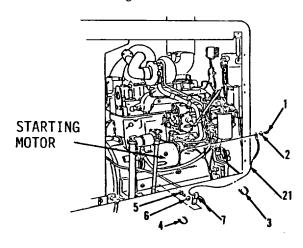


Figure 7-218

# 7-134. Heater Wiring Harness. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

ΑII

Personnel Required
Construction equipment
repairer MOS 62B

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

References

TM 5-3805-261-10

Test Equipment

None

**Special Environmental Conditions** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41.

Small tags, Item 41, Appendix C General Safety Instructions

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

# 7-134. Heater Wiring Harness. (Sheet 2 of 3)

#### **REMOVAL**

1. Remove seat. Refer to paragraph 13-21, steps 1 and 2.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect heater wiring harness (4, Figure 7-221) from main wiring harness.
- 3. Disconnect heater wiring harness (4) from heater lead.
- 4. Remove bolt (1), lockwasher (2) and washer (3).
- 5. Remove heater wiring harness (4).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

# **INSPECTION**

Inspect all parts. Refer to Chapter 2.

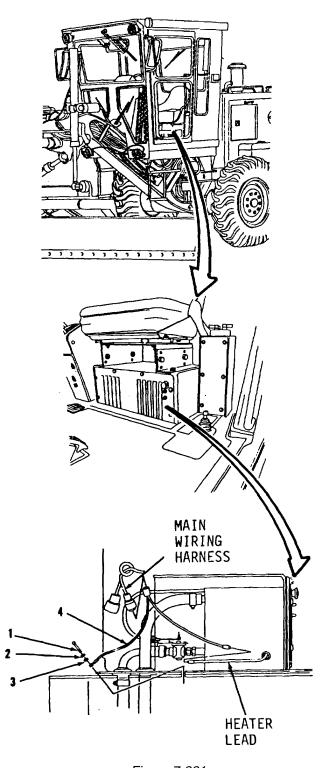


Figure 7-221

Go to Sheet 3

# 7-134. Heater Wiring Harness. (Sheet 3 of 3)

#### **INSTALLATION**

- 1. Install heater wiring harness (4, Figure 7-221).
- 2. Install washer (3), lockwasher (2) and bolt (1).
- 3. Connect heater lead to heater wiring harness (4).
- 4. Connect main wiring harness to heater wiring harness (4).
- 5. Install seat. Refer to paragraph 13-21, steps 7 and 8.

#### NOTE

Return 130G Grader to original equipment condition.

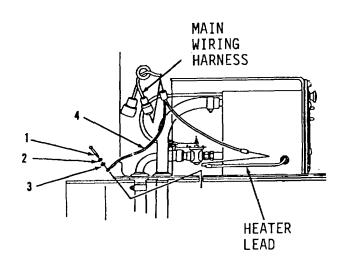


Figure 7-221

**End of Task** 

# 7-135. Right Hand and Left Hand Blade Float Harnesses. (Sheet 1 of 3)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Personnel Required
Construction equipment
repairer MOS 62B

**Tools** 

General Mechanic's Tool Kit:

Automotive (NSN 5180-00-177-

7033)

Special Environmental Conditions

TM 5-3805-261-10

None

References

Test Equipment

None

General Safety Instructions

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41,

Appendix C Gasket, Item 3 **Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112

Disconnect positive cable on right side.

Go to Sheet 2

# 7-135. Right Hand and Left Hand Blade Float Harnesses. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

The following is a maintenance procedure for the right blade float harness. The maintenance procedure for the left blade float harness is identical.

- 1. Remove two screws (1), cover (2) and gasket (3, Figure 7-222). Discard gasket (3) from blade float limit switch in cab. Remove all gasket material from mounting surfaces.
- 2. Loosen two screws (7, Figure 7-223). Do not remove.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 3. Disconnect blade float harness (6) from two screws (7).
- 4. Detach clip (4) from blade float harness (6) and main harness.
- 5. Disconnect blade float harness (6) from main harness.
- 6. Remove clip (4) and grommet (5) from blade float harness (6).
- 7. Remove blade float harness (6).

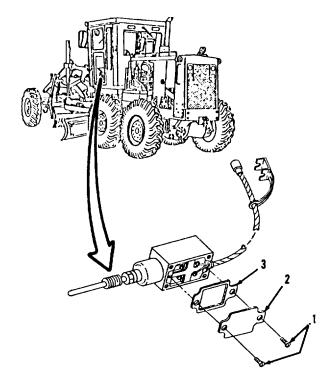


Figure 7-222

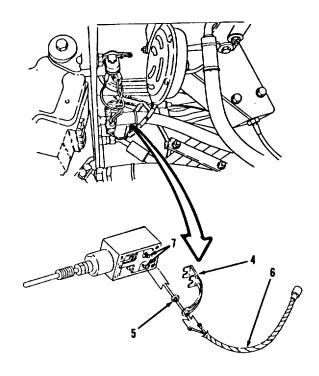


Figure 7-223

Go to Sheet 3

# 7-135. Right Hand and Left Hand Blade Float Harnesses. (Sheet 3 of 3)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install blade float harness (6, Figure 7-223).
- 2. Install grommet (5) and clip (4) on blade float harness (6).
- 3. Connect blade float harness (6) to main harness under cab.
- 4. Connect blade float harness (6) to two screws (7).
- 5. Tighten two screws (7).
- 6. Install new gasket (3), cover (2) and two screws (1, Figure 7-222) on blade float limit switch.

#### NOTE

Return 130C Grader to original equipment condition.

**End of Task** 

# 7-136. Supplemental Steering Pump Power Leads. (Sheet 1 of 5)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

ΑII

Personnel Required
Construction equipment
repairer MOS 62B

<u>Tools</u>

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Detergent, Item 8, Appendix C

Tie strap, Item 7

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112

Disconnect positive cable on right side.

Go to Sheet 2

# 7-136. <u>Supplemental Steering Pump Power Leads</u>. (Sheet 2 of 5)

#### **REMOVAL**

1. Remove nut (1) and washers (2 and 3, Figure 7-224) from supplemental steering pump.

#### NOTE

# All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect wire assembly (28) from supplemental steering pump.
- 3. Remove nut (4) and washers (5 and 6) from supplemental steering pump.
- 4. Disconnect wire assembly (32) from supplemental steering pump.
- 5. Cut and discard tie strap (7).
- 6. Remove nut (8) and washers (9 and 10, Figure 7-225) from supplemental steering pump.
- 7. Remove wire assembly (28) from supplemental steering switch.
- 8. Remove nut (12) and washers (13 and 14) from supplemental steering switch.
- 9. Disconnect wire assembly (11) from supplemental steering switch.
- 10. Remove nut (15), washer (16), clip (17) and bolt (18).

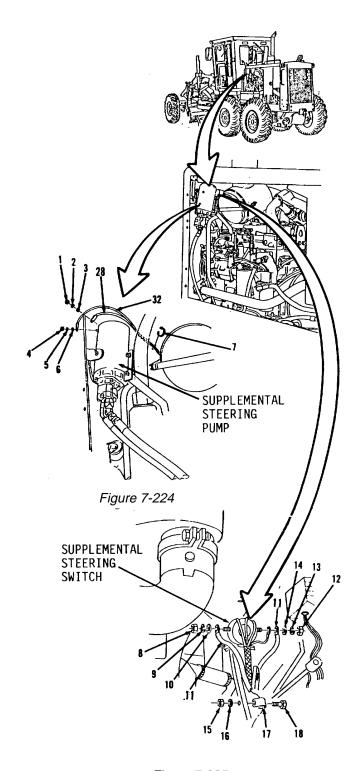


Figure 7-225

Go to Sheet 3

# 7-136. <u>Supplemental Steering Pump Power Leads</u>. (Sheet 3 of 5)

# **REMOVAL** (cont)

- 11. Remove bolt (19), washer (20) and clip (21, Figure 7-226) from rear, right side of engine.
- 12. Remove bolt (22), washer (23) and clip (24) from rear, right side of engine.
- 13. Remove nut (25) and washers (26 and 27) from starting motor.
- 14. Remove wire assembly (28) from starting motor.
- 15. Remove nut (29) and washer (30 and 31) from starting motor.
- Remove wire assembly (32) from starting motor.

# **CLEANING**

Clean all parts. Refer to Chapter 2.

### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

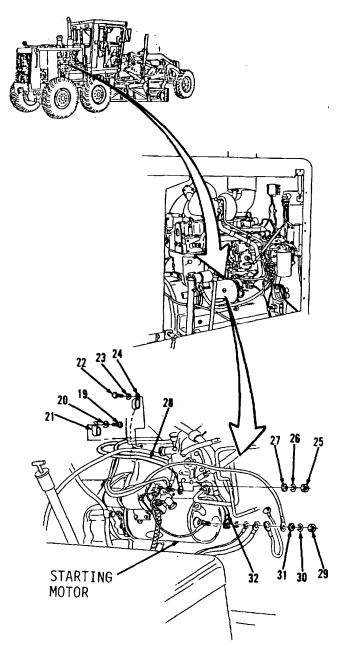


Figure 7-226

Go to Sheet 4

#### WIRING HARNESS MAINTENANCE. (Sheet 4 of 5)

# **7-136.** <u>Supplemental Steering Pump Power Wire</u> Leads. (Sheet 4 of 5)

#### **INSTALLATION**

- 1. Install wire assembly (32, Figure 7-226) on starting motor.
- 2. Install washers (31 and 30) and nut (29) on starting motor.
- 3. Install wire assembly (11) on starting motor.
- 4. Install washers (27 and 26) and nut (25) on starting motor.
- 5. Install clip (24), washer (23) and bolt (22) on rear, right side of engine.
- 6. Install clip (21). washer (20) and bolt (19) on rear, left side of engine.
- 7. Install bolt (18), clip (17), washer (16) and nut (15, Figure 7-225).
- 8. Connect wire assembly (11) to supplemental steering switch.
- 9. Install washers (14 and 13) and nut (12) on supplemental steering switch.
- 10. Install wire assembly (28) on supplemental steering switch.
- 11. Install washers (10 and 9) and nut (8) on supplemental steering switch.

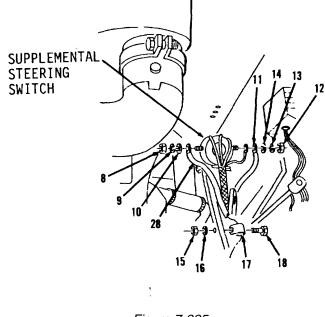


Figure 7-225

Go to Sheet 5

# 7-136. <u>Supplemental Steering Pump Power Leads</u>. (Sheet 5 of 5)

# **INSTALLATION** (cont)

- 12. Install new tie strap (7, Figure 7-224).
- 13. Connect wire assembly (32) on supplemental steering pump.
- 14. Install washers (6 and 5) and nut (4) on supplemental steering pump.
- 15. Connect wire assembly (11) on supplemental steering pump.
- 16. Install washers (3 and 2) and nut (1) on supplemental steering pump.

#### NOTE

Return 130G Grader to original equipment condition.

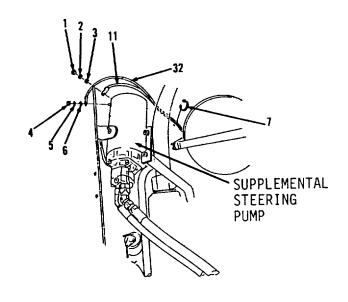


Figure 7-224

**End of Task** 

#### RADIO INTERFERENCE SUPPRESSION.

# 7-137. Radio Interference Suppression Maintenance. (Sheet 1 of 5)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41,

Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-4 Right side screen door assembly

removed.

Paragraph 7-112 **Disconnect positive cable on right side**.

Go to Sheet 2

# **RADIO INTERFERENCE SUPPRESSION (cont)**

7-137. <u>Radio Interference Suppression</u>
Maintenance. (Sheet 2 of 5)

#### **REMOVAL**

#### **NOTE**

Steps 1 thru 6, remove the horn radio interface suppression capacitor.

1. Remove screw (1) and lockwasher (2, Figure 7-227) from horn assembly under front, left side of cab.

#### **NOTE**

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 2. Disconnect wire assembly (5) at terminal from horn assembly (10).
- 3. Remove screw (3) and lockwasher (4).
- 4. Disconnect wire assembly (5) at terminal from capacitor (8).
- 5. Remove wire assembly (5).
- 6. Remove bolt (6), lockwasher (7), capacitor (8) and lockwasher (9).

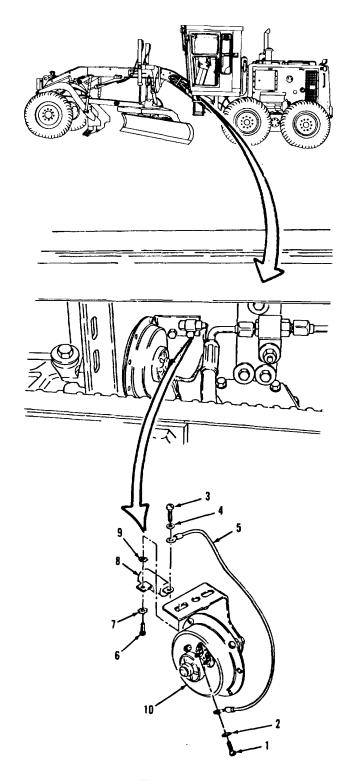


Figure 7-227

Go to Sheet 3

#### RADIO INTERFERENCE SUPPRESSION.

7-137. <u>Radio Interference Suppression</u>
Maintenance. (Sheet 3 of 5)

# **REMOVAL** (cont)

#### **NOTE**

# Steps 7 thru 12, remove the alternator radio suppression capacitor.

- 7. Disconnect wire assembly (11, Figure 7-228) from alternator.
- 8. Remove screw (12) and lockwasher (13).
- 9. Disconnect wire assembly (14).
- 10. Remove lockwasher (15), capacitor (16) and lockwasher (17) from alternator.
- 11. Remove screw (18) from top of capacitor.
- 12. Disconnect wire assembly (22).
- 13. Remove lockwasher (19).
- 14. Remove screw (20), lockwasher (21) and wire assembly (22) from bracket.
- 15. Disconnect wire assembly (23).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

Go to Sheet 4

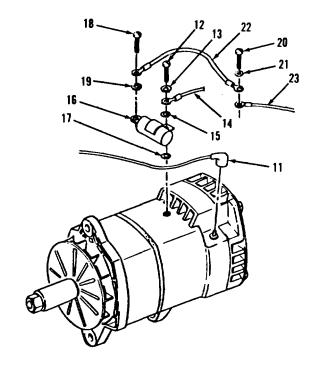


Figure 7-228

# RADIO INTERFERENCE SUPPRESSION. (cont)

7-137. <u>Radio Interference Suppression</u>
Maintenance. (Sheet 4 of 5)

# **INSTALLATION**

- 1. Connect wire assembly (23, Figure 7-228) on bracket.
- 2. Install wire assembly (22), lockwasher (21) and screw (20).
- 3. Install lockwasher (19) on top of capacitor.
- 4. Connect wire assembly (22).
- 5. Install screw (18).
- 6. Install lockwasher (17), capacitor (16) and lockwasher (15) on alternator.
- 7. Connect wire assembly (14).
- 8. Install lockwasher (13) and screw (12).
- 9. Connect wire assembly (11) to alternator.

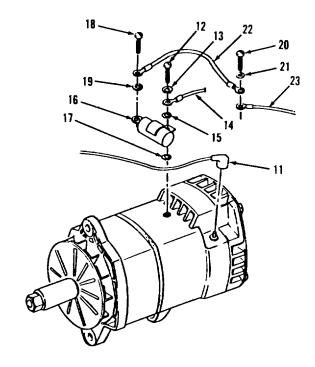


Figure 7-228

Go to Sheet 5

#### RADIO INTERFERENCE SUPPRESSION.

7-137. <u>Radio Interference Suppression</u>
Maintenance. (Sheet 5 of 5)

# **INSTALLATION**

- 10. Install lockwasher (9), capacitor (8), lockwasher (7) and bolt (6) to horn assembly (10, Figure 7-227) under front, left side of cab.
- 11. Install wire assembly (5).
- 12. Position wire assembly (5) at terminal on capacitor (8).
- 13. Install lockwasher (4) and screw (3).
- 14. Position wire assembly (5) at terminal on horn assembly (10).
- 15. Install lockwasher (2) and screw (1).

#### NOTE

Return 1300 Grader to original equipment condition.

**End of Task** 

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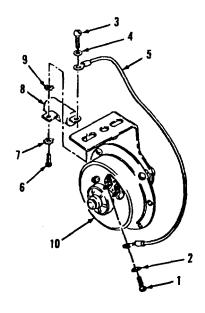


Figure 7-227

#### **CHAPTER 8**

# TRANSMISSION TROUBLESHOOTING AND MAINTENANCE

# **CHAPTER OVERVIEW**

The purpose of this chapter is to help the technician efficiently troubleshoot and repair malfunctioning equipment and to perform authorized organizational support level maintenance procedures on the 130G Grader.

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	Transmission Maintenance Procedures Transmission Modulation Control Transmission Modulation Control Housing Transmission Control Transmission Oil Filter Transmission Oil Filter Base Transmission Oil Sampling Group Transmission Oil Filler and Oil Level Cage	8-3 8-4 8-5 8-6 8-7 8-8 8-9	8-11 8-12 8-17 8-23 8-30 8-33 8-36 8-40

#### Section I. TRANSMISSION TROUBLESHOOTING.

- 8-1. **GENERAL INFORMATION**. This section lists the common transmission malfunctions which may occur during the operation of the 130G Grader. When faults are found, follow the troubleshooting procedures listed below step-by-step until you can go no further. Repair or replace parts or make adjustments. After a fault is fixed, check transmission again to make sure it is working correctly.
- 8-2. **TRANSMISSION TROUBLESHOOTING PROCEDURES**. Faults are found in two ways: by inspection and by using troubleshooting tasks. Inspect and then use the troubleshooting procedures. Always do the steps in order. This section

cannot list all possible faults, tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### TRANSMISSION TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

- a. TRANSMISSION DOES NOT OPERATE IN ANY SPEED OR SLIPS IN ALL SPEEDS.
  - Step 1. Check the transmission oil level (Figure 8-1). Refer to LO 5-3805-261-12 and TM 5-3805-261-10.

Transmission oil level gage is located inside of rear, right side hood door assembly. T-handle must be unscrewed before removing and must be screwed in tightly when repositioning to maintain seal.

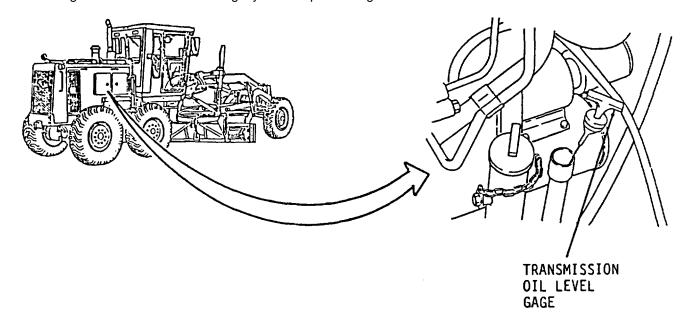


Figure 8-1

If the oil level is low--fill. Refer to LO 5-3805-261-12.

# TRANSMISSION TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

# a. TRANSMISSION DOES NOT OPERATE IN ANY SPEED OR SLIPS IN ALL SPEEDS.

Step 2. Check the speed control and forward-reverse cables (1 and 2, Figure 8-2). Cables should be taut without any slack and all nuts and rod ends tightly secured.

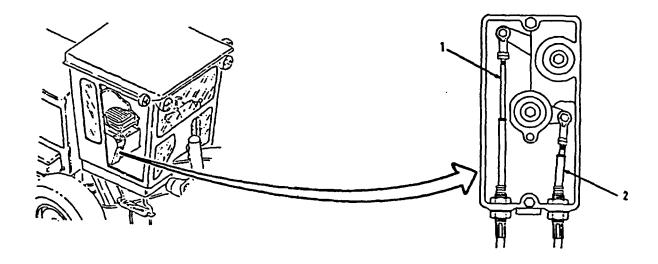


Figure 8-2

If linkage is loose-tighten. Refer to paragraph 8-6.

If linkage is damaged or defective--replace. Refer to paragraph 8-6.

Step 3. Contact Direct Support.

# TRANSMISSION TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

# b. TRANSMISSION DOES NOT SHIFT.

Step 1. Check the transmission oil level (Figure 8-1). Refer to LO 5-3805-261-12 and TM 5-3805-261-10.

Transmission oil level gage is located inside of rear, right side hood door assembly. T-handle must be unscrewed before removing, and must be screwed in tightly when repositioning to maintain seal.

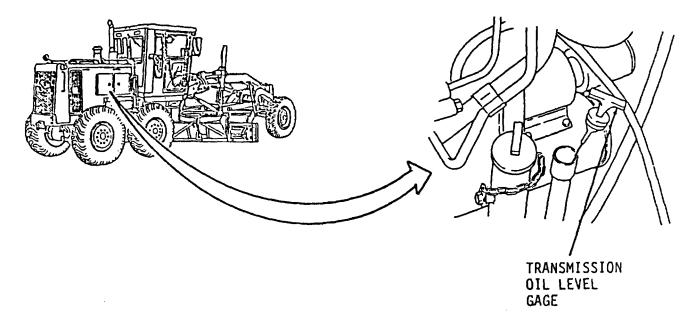


Figure 8-1

If the oil level is low--fill. Refer to LO 5-3805-261-12.

# TRANSMISSION TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

# b. TRANSMISSION DOES NOT SHIFT.

Step 2. Check the speed control and forward-reverse cables (1 and 2, Figure 8-2). Cables should be taut without any slack, and all nuts and rod ends tightly secured.

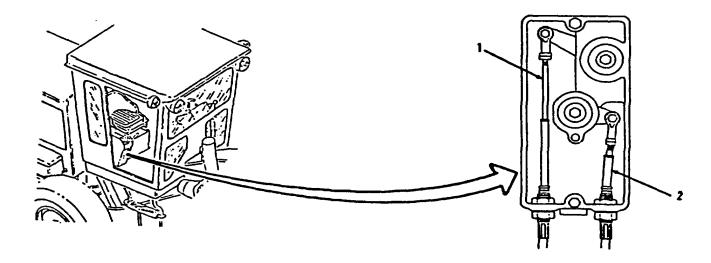


Figure 8-2.

If linkage is loose--tighten. Refer to paragraph 8-6.

If linkage is damaged or defective--replace. Refer to paragraph 8-6.

Step 3. Contact Direct Support.

# TRANSMISSION TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

# c. TRANSMISSION ENGAGES SUDDENLY (ROUGH SHIFTING).

Step 1. Check the speed control and forward-reverse cables (1 and 2, Figure 8-2). Cables should be taut without any slack and all nuts and rod ends tightly secured.

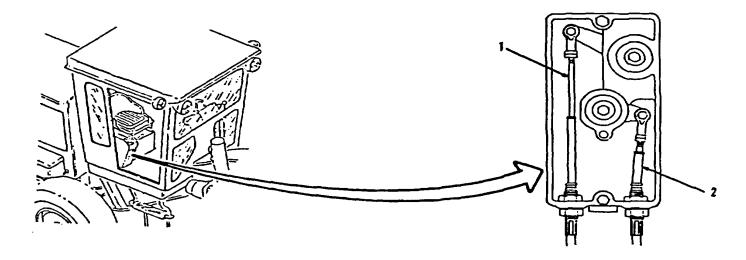


Figure 8-2

If linkage is loose-tighten. Refer to paragraph 8-6.

If linkage is damaged or defective--replace. Refer to paragraph 8-6.

Step 2. Contact Direct Support.

## TRANSMISSION TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

## d. SLOW SHIFTING.

Step 1. Check the speed control and forward-reverse cables (1 and 2, Figure 8-2) for excessive slack. Cables should be taut without any slack and all nuts and rod ends tightly secured.

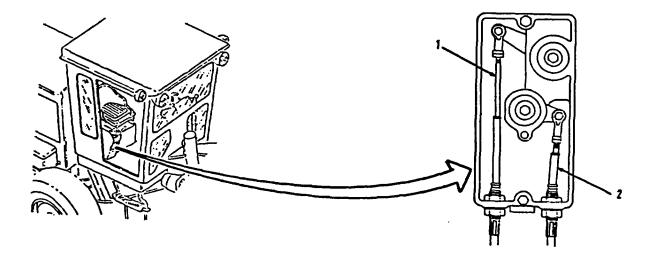


Figure 8-2

If linkage is loose--tighten. Refer to paragraph 8-6.

If linkage is damaged or defective--replace. Refer to paragraph 8-6.

Step 2. Contact Direct Support.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

e. TRANSMISSION DOES NOT OPERATE IN FIRST AND FOURTH SPEEDS.

Contact Direct Support.

f. TRANSMISSION DOES NOT OPERATE IN SECOND AND FIFTH SPEEDS.

Contact Direct Support.

g. TRANSMISSION DOES NOT OPERATE IN THIRD AND SIXTH SPEEDS.

Contact Direct Support.

h. TRANSMISSION WILL NOT OPERATE IN REVERSE.

Contact Direct Support.

i. TRANSMISSION DOES NOT OPERATE IN FORWARD.

Contact Direct Support.

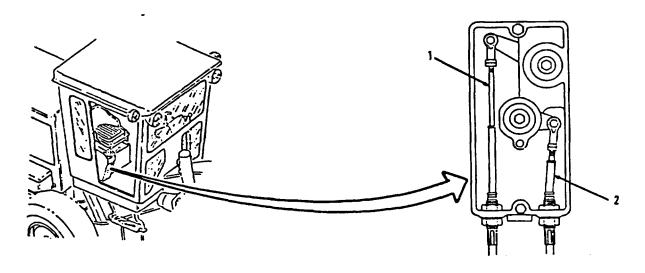
# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

j. TRANSMISSION DOES NOT OPERATE IN FOURTH, FIFTH OR SIXTH SPEEDS.

Contact Direct Support.

k. TRANSMISSION DOES NOT SHIFT OUT OF SPEED WHEN CONTROL LEVER MOVED.

Step 1. Check the speed control and forward-reverse cables (1 and 2, Figure 8-2) for excessive slack. Cables should be taut without any slack and all nuts and rod ends tightly secured.



If linkage is loose--tighten. Refer to paragraph 8-6.

If linkage is damaged or defective--replace. Refer to paragraph 8-6.

Step 2. Contact Direct Support.

## TRANSMISSION TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. TRANSMISSION ENGAGES BUT VEHICLE WILL NOT MOVE.

Contact Direct Support.

## m. TRANSMISSION GETS HOT.

Step 1. Check the transmission oil level (Figure 8-1). Refer to LO 5- 3805-261-12 and TM 5-3805-261-10.

Transmission oil level gage is located inside of rear, right side hood door assembly. T-handle must be unscrewed before removing and must be screwed in tightly when repositioning to maintain seal.

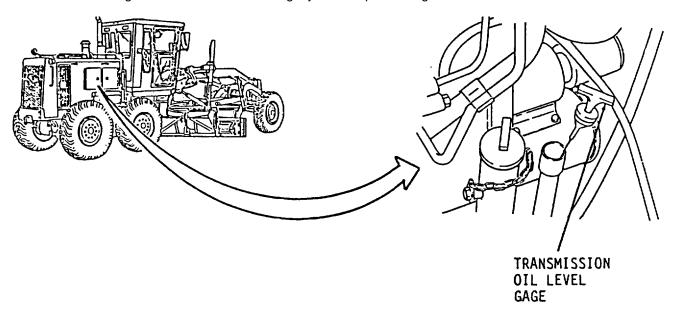


Figure 8-1

If the oil level is low--fill. Refer to LO 5-3805-261-12.

Step 2. Contact Direct Support.

## Section II. TRANSMISSION MAINTENANCE.

## 8-3. TRANSMISSION MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the transmission and its components in good repair.
- b. This section is arranged by functional group code and provides a list of transmission components to be maintained and step-by-step maintenance procedures.

## **INDEX**

<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
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Transmission Oil Filler and Oil Level Gage	8-10	8-40

## 8-4. <u>Transmission Modulation Control</u>. (Sheet 1 of 5)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation e. Adjusting

**INITIAL SETUP:** 

<u>Applicable Configurations</u> <u>Personnel Required</u>

All Construction equipment repairer MOS 62B

Tools

General Mechanics's Tool Kit: References

Automotive (NSN 5180-00- TM 5-3805-261-10

177-7033)

<u>Test Equipment</u> <u>Special Environmental Conditions</u>

None None

Materials/Parts General Safety Instructions

Dry cleaning solvent, None
Item 14, Appendix C

Clean cloths, Item 39, Torques

Appendix C All fasteners are tightened to Cleaning compound, Item 9, standard torques. Refer to

Appendix C Appendix E. Adhesive, Item 1, Appendix C

Washer, Item 4
Bolt, Item 5

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground. Parking/emergency brake applied.

Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Go to Sheet 2

## 8-4. <u>Transmission Modulation Control</u>. (Sheet 2 of 5)

#### **REMOVAL**

1. Remove two bolts (1), washers (2) and tread (3) from pedal (7,Figure 8-3).

## NOTE

Washer is attached to boot with adhesive. Do not separate washer from boot unless replacement of either part is necessary.

- 2. Lifting up left front corner of rubber floor mat, remove washer (4) and boot (5) as an assembly from pedal (7, Figure 8-4). Return floor mat to original position.
- 3. Remove lower end of spring (6,Figure 8-5) from bolt fastened to cab floor frame weldment on outside of vehicle, under left side of cab.
- 4. Remove upper end of spring (6) from pedal (7).
- 5. Remove pedal (7).

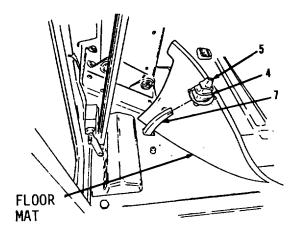


Figure 8-4

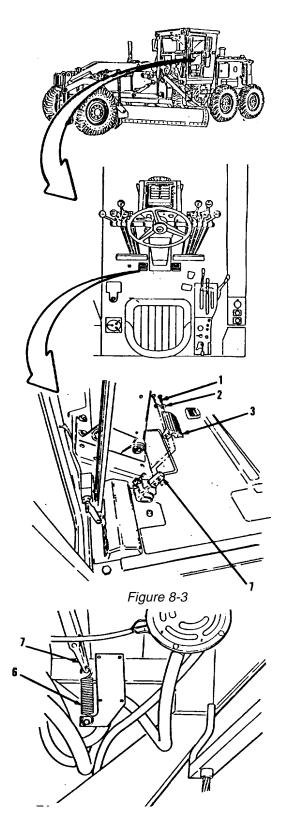


Figure 8-5

## 8-4. <u>Transmission Modulation Control</u>. (Sheet 3 of 5)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install pedal (7, Figure 8-5).
- 2. Insert upper end of spring (6) on pedal (7).
- 3. Install lower end of spring (6)around bolt in cab floor frame weldment.
- 4. If boot (5) or washer (4) required replacement, attach boot (5) to washer (4, Figure 8-4) with adhesive.
- 5. Install boot (5) and washer (4) as an assembly over pedal (7) lifting up left front corner of rubber floor mat. Return floor mat to original position.
- 6. Install thread (3), two washers (2) and bolts (1, Figure 8-3).

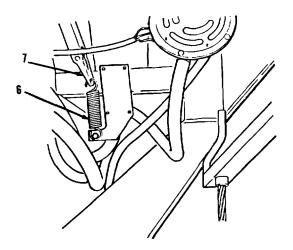


Figure 8-5

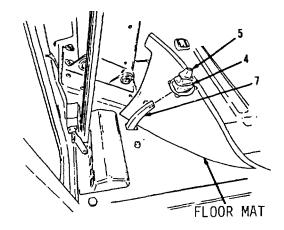


Figure 8-4

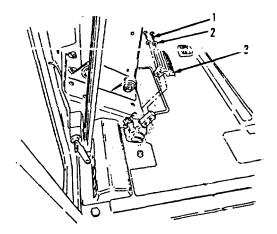


Figure 8-3

## 8-4. <u>Transmission Modulation Control</u>. (Sheet 4 of 5)

#### **ADJUSTMENT**

- 1. Loosen nut (8, Figure 8-6).
- 2. Turn bolt (9) clockwise until bottomed out.

## **WARNING**

Adjustment must be made with engine running. Keep all personnel away from vehicle. Allow only operator on vehicle. Make sure parking brake is applied. Failure to follow this procedure may cause INJURY.

- 3. Start engine. Refer to TM 5-3805-261-10.
- 4. Step on tread (3).
- 5. Fully depress pedal (7, Figure 8-7) and hold down until step 7.
- 6. Pull lever (10) backwards to OFF position to release parking brake.
- 7. Move lever (11) backwards to first speed.
- 8. Release tread (3, Figure 8-6) slowly until wheels start to turn, then depress until wheels stop. Hold in this position.
- Move lever (11, Figure 8-7) forward to NEUTRAL position.

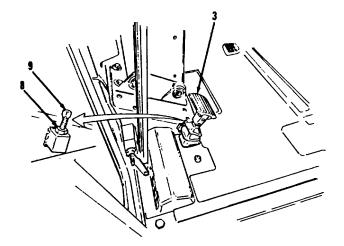


Figure 8-6

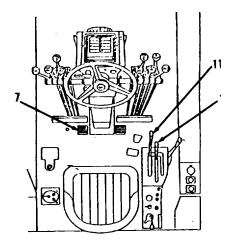


Figure 8-7

## 8-4. <u>Transmission Modulation Control</u>. (Sheet 5 of 5)

## **ADJUSTMENT (cont)**

- 10. Turn bolt (9) clockwise until head of bolt (9) contacts tread (3, Figure 8-6). Back off one complete turn.
- 11. Tighten nut (8) to secure bolt (9).
- 12. Depress tread (3) until contact is made with bolt (9). Hold tread (3) down.
- Move lever (11, Figure 8-7) to all forward and reverse speeds. If wheels do not turn, go to step 14. If wheels turn, repeat steps 7 thru 12 until proper adjustment is achieved.
- 14. Stop engine.
- 15. Release tread (3, Figure 8-6).

## NOTE

Return 130C Grader to original equipment condition.

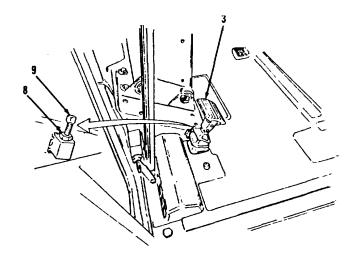


Figure 8-6

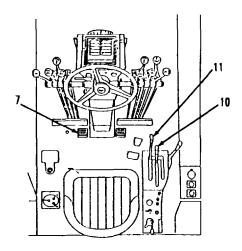


Figure 8-7

**End of Task** 

#### 8-5. Transmission Modulation Control Housing (Sheet 1 of 6)

b. Cleaning This task covers: a. Removal c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

Personnel Required

Construction equipment repairer NOS 62B

Tools

General Mechanics's Tool Kit: Automotive (NSN 5180-00

-177-7033)

Arbor press, 1/2 ton

References

TM 5-3805-261-10

Special Environmental Conditions

All fasteners are tightened to

standard torques. Refer to

None

Test Equipment

None

**General Safety Instructions** 

None

Appendix E.

**Torques** 

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C

Clean cloths, Item 39,

Appendix C

Small tags, Item 41,

Appendix C

Automotive grease, Item 20,

Appendix C

Anti-seize compound, Item 59,

Appendix C

Gasket, Item 4

Caps Plugs

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped.

Master disconnect switch off.

## 8-5. <u>Transmission Modulation Control Housing</u>. (Sheet 2 of 6)

## **REMOVAL**

- Remove four bolts (1), washers (2), cover (3) and gasket (4,Figure 8-8). Discard gasket (4). Remove all gasket material from mounting surfaces.
- 2. Remove bolt (5) and washer (6,Figure 8-9).
- 3. Remove end (7) and nuts (8 and 9) from cable assembly (18, Figure 8-10).

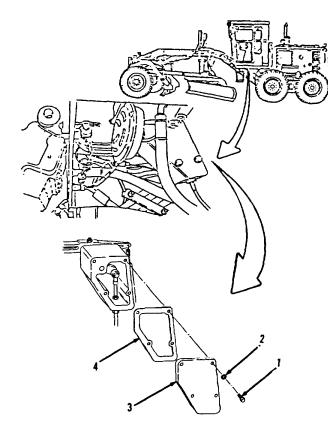


Figure 8-8

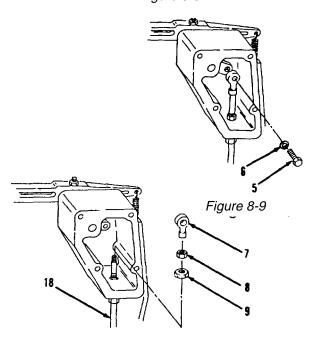


Figure 8-10

## 8-5. Transmission Modulation Control Housing (Sheet 3 of 6)

## **REMOVAL**

#### **NOTE**

#### Lever is keyed to shaft.

4. Remove bolt (10), key (11) and lever (12) from shaft (16, Figure 8-11).

#### NOTE

## Lever will come loose as shaft is removed.

- 5. Remove four bolts (13) and washers (14) attaching housing (17, Figure 8-12) to bracket of cab floor weldment.
- 6. Remove lever (15), shaft (16) and housing (17, Figure 8-13).

#### **NOTE**

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 7. Disconnect cable assembly (18) from housing (17, Figure 8-14).
- 8. Remove washer (19) and nut (20) from cable assembly (18).
- 9. Using an arbor press, remove bearings (21 and 22) from housing (17, Figure 8-15).

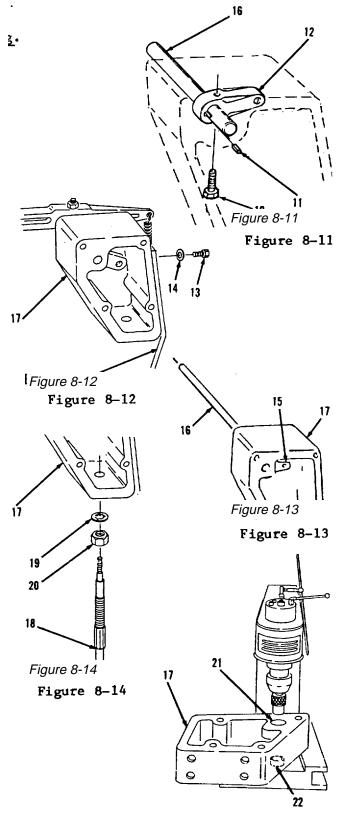


Figure 8-15

## 8-5. <u>Transmission Modulation Control Housing.</u> (Sheet 4 of 6)

## REMOVAL (cont)

- 10. Loosen nut (23) and remove housing (17) from pedal (24, Figure 8-16).
- 11 Remove nut (23) and bolt (25) from pedal (24).

#### **CLEANING**

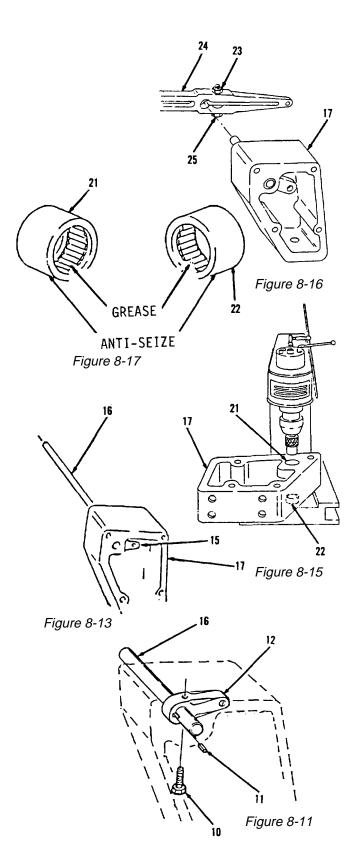
Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Pack rollers of bearings (21 and 22, Figure 8-17) completely with automotive grease.
- 2. Coat outside of bearings (21 and 22) with anti-seize compound.
- 3. Using an arbor press, install bearings (21 and 22) in housing (17, Figure 8-15).
- 4. Position lever (15) inside housing (17) before shaft (16, Figure 8-13) is installed.
- 5. Install shaft (16). End of shaft (16) should be 0.098 inch below flat side of housing.
- 6. Install key (11) in keyway of lever (12, Figure 8-11).
- 7. Install bolt (10) on shaft (16).



## 8-5. <u>Transmission Modulation Control Housing</u> (Sheet 5 of 6)

## **INSTALLATION**

- 8. Install bolt (25) and nut (23) on pedal (24, Figure 8-12). Do not tighten nut (23).
- 9. Install housing (17) onto pedal (24).
- 10. Tighten nut (23).
- 11. Install four washers (14) and bolts (13) supporting housing (17).

## **NOTE**

## For adjustment of cable assembly, refer to Chapter 2.

- 12. Install nut (20) and washer (19, Figure 8-14).
- 13. Connect cable assembly (18) on housing (17).
- 14. Install nuts (9 and 8) and end (7) on cable assembly (18) inside housing (17, Figure 8-10).

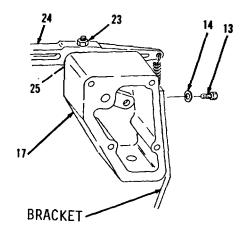


Figure 8-12

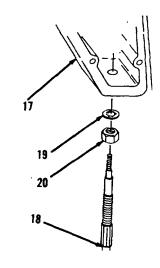


Figure 8-14

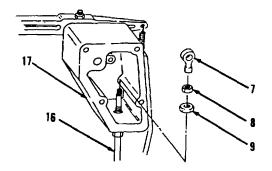


Figure 8-10

## 8-5. <u>Transmission Modulation Control Housing</u>. (Sheet 6 of 6)

## **INSTALLATION (cont)**

- 15. Install washer (6) and bolt (5,Figure 8-9).
  - 16. Install new gasket (4), cover (3), Four washers (2) and bolts (1, Figure 8-8).

## NOTE

Return 130G Grader to original equipment condition.

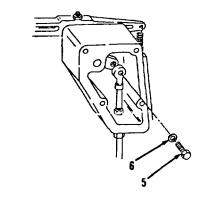


Figure 8-9

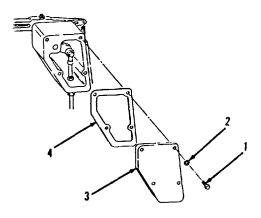


Figure 8-8

**End of Task** 

## 8-6. <u>Transmission Control</u> (Sheet 1 of 7)

This task covers: a. Adjustment

**INITIAL SETUP:** 

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Wood block

**Test Equipment** 

None

Materials/Parts
Gaskets, Items 4, 23

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-1

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

Paragraph 8-2a.

Transmission does not operate in any

speed or slips in all speeds.

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-15 Gate and side panels removed from

operator's panel console.

Go to Sheet 2

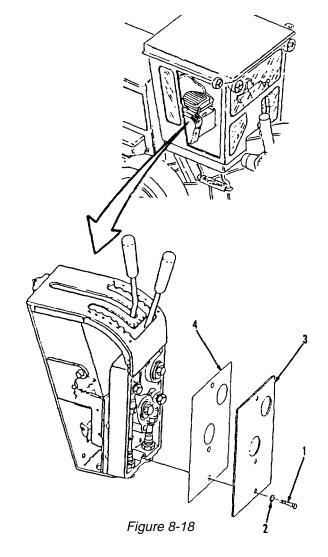
## 8-6. <u>Transmission Control</u>. (Sheet 2 of 7)

#### **ADJUSTMENT**

#### **WARNING**

Transmission control adjustment must be made with the engine off. Accidental transmission engagement and sudden machine movement may cause INJURY. If injured, obtain medical aid immediately.

- Remove three bolts (1), washers (2), cover (3) and gasket (4,Figure 8-18). Discard gasket (4). Remove all gasket material from mounting surfaces.
- Adjust two nuts (5) so the extension of threads on both ends of cable housing (6, Figure 8-19) is the same.



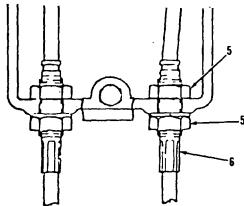


Figure 8-19

## 8-6. <u>Transmission Control</u>. (Sheet 3 of 7)

## **ADJUSTMENT**

#### NOTE

The following procedure is for adjustment of the transmission DIRECTION control.

- 3. Shift transmission control lever to REVERSE-NEUTRAL position (Figure 8-20).
- 4. Remove bolt (7) and lockwasher (8).
- 5. Extend control cable (9). Pull up on rod end (10) asr as control cable (9) will allow.
- 6. Loosen nut (12).
- 7. Adjust rod end (10) by threading up or down on control cable (9). A line hole in rod end (10) with hole in lever (11).
- 8. Tighten nut (12) to secure rod end (10).

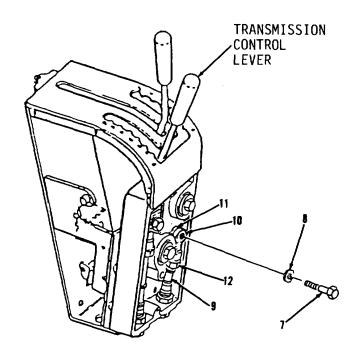


Figure 8-20

## 8-6. <u>Transmission Control</u>. (Sheet 4 of 7)

## **ADJUSTMENT (cont)**

- Shift transmission control lever to FORWARD-NEUTRAL position (Figure 8-21).
- 10. Retract control cable (9) by pushing down on rod end (10) as far as control cable (9) will allow.
- 11. Inspect rod end (10) and lever (11) to see if hole in rod end (10) a lines with hole in lever (11). If holes are not a lined, measure the distance between them.
- 12. Loosen nut (12).
- 13. Adjust rod end (10). Thread rod end (10) on control cable (9) half the distance measured in step 11.
- 14. Install lockwasher (8) and bolt (7).
- 15. Tighten nut (12).

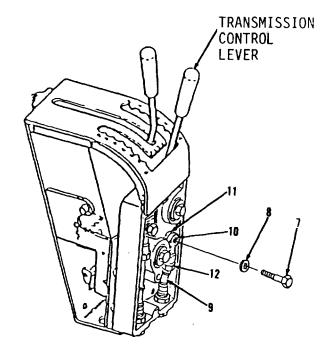


Figure 8-21

Go to Sheet 5

#### 8-6. Transmission Control. (Sheet 5 of 7)

## **ADJUSTMENT**

#### **NOTE**

The following procedure is for adjustment of the transmission SPEED control.

- 16. Remove bolt (13) and lockwasher (14, Figure 8-22).
- 17. Retract control cable (15) by pushing down on rod end (16) as far as control cable (15) will allow. The selector spool in the transmission will be in SIXTH speed.
- Extend control cable (15) by pulling up on rod end (16, Figure 8-23) until detents for FIFTH, FOURTH and THIRD speeds are felt. The selector spool will be in THIRD speed.
- Shift transmission control lever to THIRD-FORWARD position. Transmission control lever must be in center of notch (Figure 8-24).
- 20. Loosen nut (18).
- 21. Adjust rod end (16) by threading up or down on control cable (15). A line hole in rod end (16) with hole in lever (17).
- 22. Install lockwasher (14) and bolt (13).
- 23. Tighten nut (18).
- 24. Shift transmission control lever to all speeds in FORWARD and REVERSE positions. A detent must be felt for all speed positions.

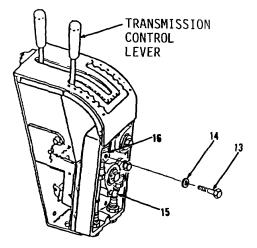


Figure 8-22

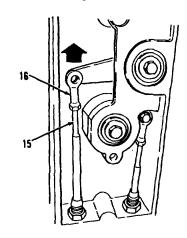


Figure 8-23

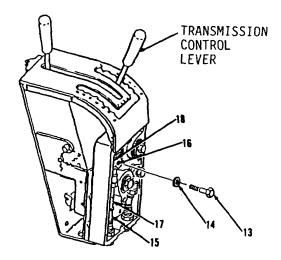


Figure 8-24

## 8-6. <u>Transmission Control</u>. (Sheet 6 of 7)

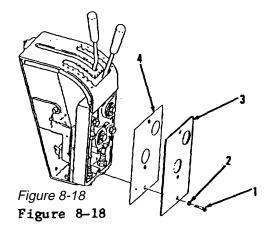
## **ADJUSTMENT (cont)**

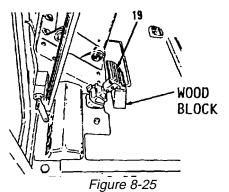
25. Install new gasket (4), cover (3), three washers (2) and bolts (1, Figure 8-18).

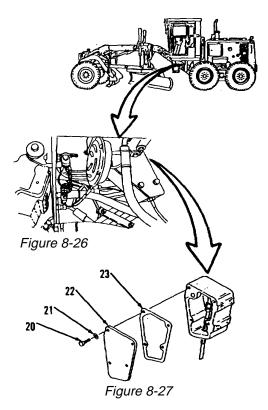
#### NOTE

The following procedure is for adjustment of the transmission MODULATION control.

- 26. Position wood block between pedal assembly (19, Figure 8-25) and cab floor to maintain pedal assembly (19) in raised position. Horizontal portion of pedal assembly (19) must be parallel with cab floor.
- 27. Remove four bolts (20), washers (21), cover (22) and gasket (23, Figures 8-26 and 8-27). Discard gasket (23). Remove all gasket material from mounting surfaces.







## 8-6. <u>Transmission Control</u>. (Sheet 7 of 7)

## **ADJUSTMENT**

- 28. Remove nut (24), bolt (25) and washer (26, Figure 8-28).
- 29. Push down rod end (27) until a noticeable resistance is felt in the control cable (15, Figure 8-29).
- 30. Rotate rod end (27) in half-turn increments until hole in rod end (27) a lines with hole in lever (28).
- 31. Install washer (26), bolt (25) and nut (24, Figure 8-28).
- 32. Install new gasket (23), cover (22), four washers (21) and bolts (20, Figure 8-27).
- 33. Remove wood block (Figure 8-25).

#### NOTE

Return 130G Grader to original equipment condition.

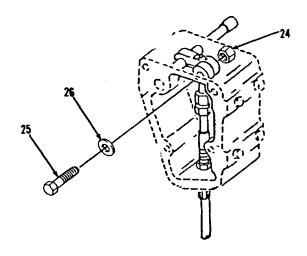


Figure 8-28

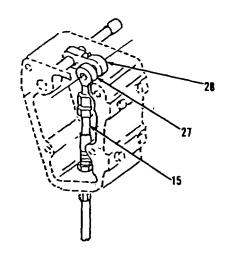


Figure 8-29

**End of Task** 

## 8-7. Transmission Oil Filter. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00

-177-7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Transmission oil, Item 31, Appendix C

Seals, Items 2, 3 Element, Item 4 Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-49

Left side screen door assembly removed.

Go to Sheet 2

## 8-7. Transmission Oil Filter. (Sheet 2 of 3)

#### **REMOVAL**

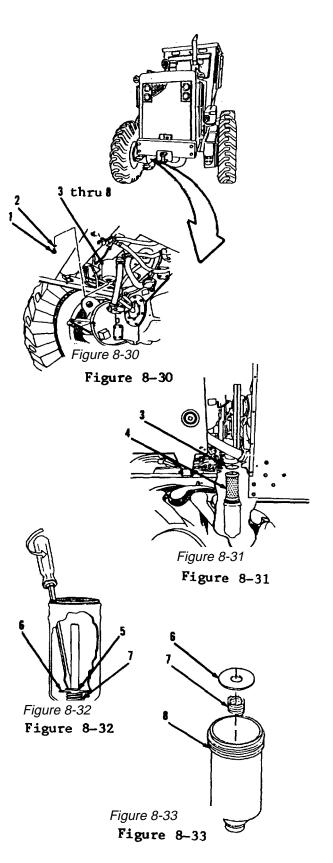
- 1. Position drain pan under transmission oil filter (Figure 8-30).
- 2. Remove plug (1) and seal (2), allowing oil to drain into drain pan. Discard seal (2).
- 3. Remove items 3 thru 8 as an assembly.
- 4. Remove and discard seal (3) and element (4, Figure 8-31).
- 5. Remove ring (5) while pressing retainer (6) downward against spring (7, Figure 8-32).
- 6. Remove retainer (6) and spring (7) from housing (8, Figure 8-33).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.



## 8-7. Transmission Oil Filter. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Install spring (7) and retainer (6) in housing (8, Figure 8-33).
- 2. Install ring (5) while pressing retainer (6) downward against spring (7, Figure 8-32).
- 3. Install new element (4) and new seal (3, Figure 8-31).
- 4. Install items 8 thru 3 as an assembly (Figure 8-30).
- 5. Install new seal (2) and plug (1).

## NOTE

Return 130G Grader to original equipment condition.

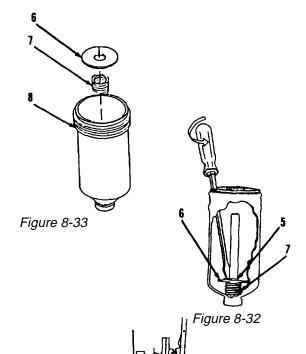


Figure 8-31

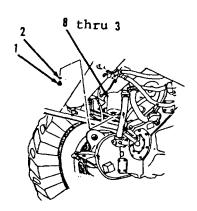


Figure 8-30

**End of Task** 

## 8-8. <u>Transmission Oil Filter Base</u>. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

7033)

Applicable Configurations
All
Personnel Required
Construction equipment

repairer MOS 62B

Tools
General Mechanics's Tool Kit: References

Automotive (NSN 5180-00-177- TM 5-3805-261-10

Special Environmental Conditions

<u>Test Equipment</u> None None

<u>General Safety Instructions</u>

<u>Materials/Parts</u>

None

Dry cleaning solvent,

Item 14, Appendix CTorquesClean cloths, Item 39,All fasteners are tightened to

Appendix C standard torques. Refer to Seals, Items 5, 7 Appendix E.

Two preformed packings, Item 3

T. II. I. C. B.(

Troubleshooting References

**Equipment Condition** 

Paragraph 8-2a. Transmission does not operate in any speed or slips in all speeds.

opodd o'r ongo m'r an opoddo.

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied.
Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 8-7 Transmission oil filter removed.

Go to Sheet 2

## 8-8. Transmission Oil Filter Base. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Remove four bolts (1) and lockwashers (2, Figure 8-34).
- 2. Remove items 4 thru 10 as an assembly.
- 3. Remove and discard two preformed packings (3).

## **DISASSEMBLY**

- 1. Remove plug (4) and seal (5) from base (10, Figure 8-35). Discard seal (5).
- 2. Remove plug (6), seal (7), spool (8) and spring (9). Discard seal (7).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter2.

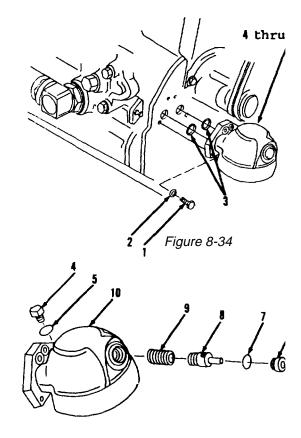


Figure 8-35

Go to Sheet 3

## 8-8. <u>Transmission Oil Filter Base</u>. (Sheet 3 of 3)

## **ASSEMBLY**

- 1. Install spring (9), spool (8), new seal (7) and plug (6) into base (10, Figure 8-35).
- 2. Install new seal (5) and plug (4) into base (10).

## **INSTALLATION**

- 1. Install two new preformed packings (3, Figure 8-34).
- 2. Install items 10 thru 4 as an assembly.
- 3. Install four lockwashers (2) and bolts (1).

#### **NOTE**

Return 130C Grader to original equipment condition.

**End of Task** 

## 8-9. <u>Transmission Oil Sampling Group</u>. (Sheet 1 of 4)

This task covers: a. Removal b. Disassembly c. Cleaning d. Inspection e. Assembly f. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanics's Tool Kit: Automotive(NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Detergent, Item 8, Appendix C
Clean cloths, Item 39,
 Appendix C
Small tags, Item 41,
 Appendix C
Preformed packings,
 Items 3, 11
Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

Troubleshooting References

Paragraph 8-2a

**Equipment Condition** 

TM 5-3805-261-10

Transmission does not operate in any speed or slips in all speeds.

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-5

Left side panel removed.

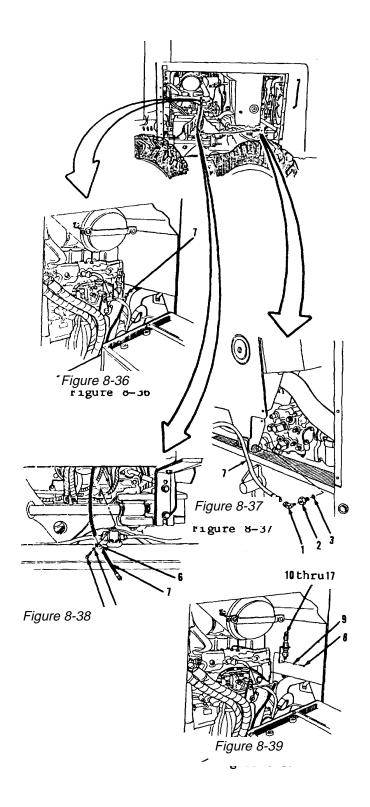
Go to Sheet 2

## 8-9. <u>Transmission Oil Sampling Group</u> (Sheet 2 of 4

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 1. Disconnect hose assembly (7, Figures 8-36 and 8-37).
- 2 Remove elbow (1), adapter (2) and preformed packing (3, Figure 8-37). Discard preformed packing (3).
- 3. Remove bolt (4), washer (5) and clip (6, Figure 8-38).
- 4. Remove hose assembly (7).
- 5. Remove two bolts (8), washers (9) and items 10 thru 17 as an assembly (Figure 8-39).



## 8-9. <u>Transmission Oil Sampling Group. (Sheet 3 of 4)</u>

#### **DISASSEMBLY**

- 1. Remove valve (10) and preformed packing (11, Figure 8-40). Discard preformed packing (11).
- 2. Remove nuts (12 and 13), reducer (14), bracket (15), connector (16) and adapter (17).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **ASSEMBLY**

- 1. Install adapter (17), connector (16), bracket (15), reducer (14) and nuts (13 and 12, Figure 8-40).
- 2. Install new preformed packing (11) and valve (10).

Go to Sheet 4

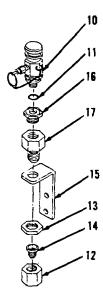


Figure 8-40

## 8-9. <u>Transmission Oil Sampling Group.</u> (Sheet 4 of 4)

## **INSTALLATION**

- 1. Install items 17 thru 10 as an assembly, two washers (9) and bolts (8, Figure 8-39).
- 2. Connect hose assembly (7, Figure 8-38).
- 3. Install clip (6), washer (5) and bolt (4).
- 4. Install new preformed packing (3), adapter (2) and elbow (1, Figure 8-37).
- 5. Connect hose assembly (7, Figure 8-36).

## NOTE

Return 130G Grader to original equipment condition.

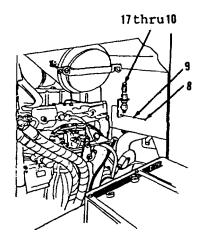


Figure 8-39

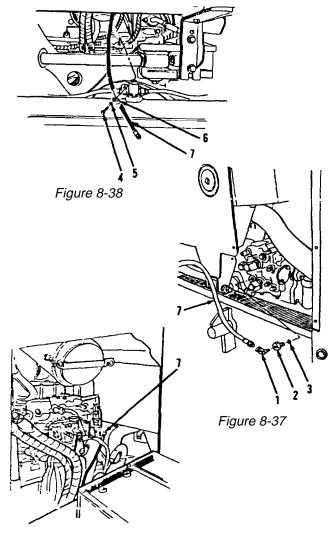


Figure 8-36

**End of Task** 

## 8-10. Transmission Oil Filler and Oil Level Gage. (Sheet 1 of 3)

d. Installation

This task covers: a. Removal b. Cleaning c. Inspection

.....

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Seal, Item 8

Gasket, Item 16

Caps

Personnel Required

Construction equipment repairer MOS. 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-5

Right side panel removed.

Go to Sheet 2

## 8-10. Transmission Oil Filler and Oil Level Gage. (Sheet 2 of 30

#### **REMOVAL**

- 1. Remove bolt (1) and clamp (2, Figure 8-41).
- 2. Remove bolt (3) and clamp (4).

#### **NOTE**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 3. Remove two bolts (5), washers (6), tube assembly (7) and seal (8, Figure 8-42). Discard seal (8).
- 4. Remove gage (12, Figure 8-44).
- 5. Remove bolt (9), lockwasher (10) and cap (11, Figure 8-43).
- 6. Remove bolt (13) and washer (14)from clip (15).
- 7. Slide clip (15) on hose (16).
- Remove two bolts (17), lock washers (18), tube assembly (19) and gasket (20, Figure 8-44). Discard gasket (20). Remove all gasket material from mounting surfaces.

#### **CLEANING**

Clean all parts. Refer to Chapter 2

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

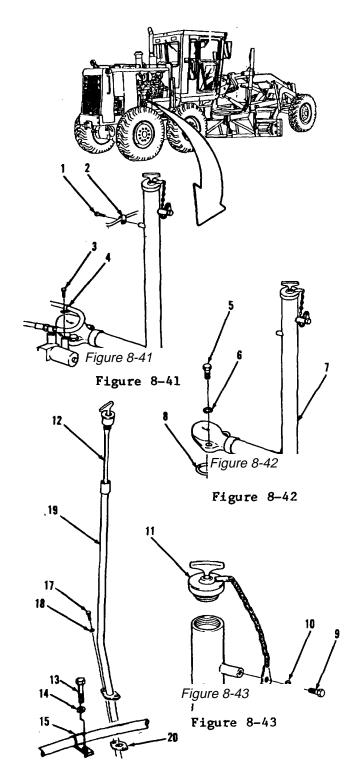


Figure 8-44

Go to Sheet 3 8-41

## 8-10. Transmission Oil Filler and Oil Level Gage (Sheet 3 of 3)

## **INSTALLATION**

- 1. Install new gasket (20), tube assembly (19) , two lockwashers (18) and bolts (17, Figure 8-44).
- 2. Insert gage (12) into tube assembly (19).
- 3. Install cap (11), lockwasher (10) and bolt (9, Figure 8-43).
- 4. Position clip (15) on hose (16).
- 5. Install washer (14)and bolt (13) in clip (15, Figure 8-44).
- 6. Install new seal (8), tube assembly (7), two washers (6) and bolts (5, Figure 8-42).
- 7. Install clamp (4), bolt (3), clamp (2) and bolt (1, Figure 8-41).

#### NOTE

Return 130G Grader to original equipment condition.

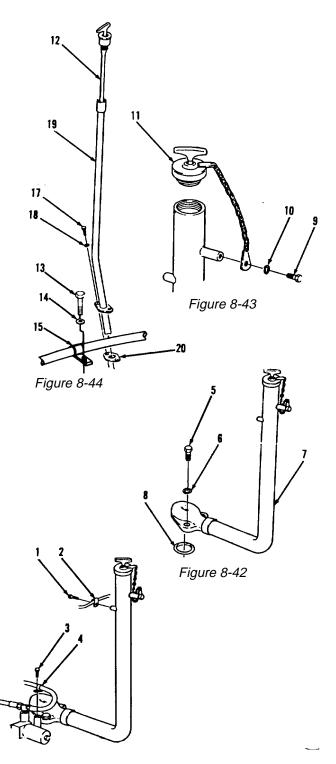


Figure 8-41

**End of Task** 

#### **CHAPTER 9**

#### **BRAKE TROUBLESHOOTING AND MAINTENANCE**

#### **CHAPTER OVERVIEW**

The purpose of this chapter is to help the technician efficiently troubleshoot and repair malfunctioning equipment and to perform authorized organizational support level maintenance procedures on the 130G Grader.

#### **INDEX**

<u>Section</u>	<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
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II	BRAKE MAINTENANCE		
	Brake Maintenance Procedures Service Brakes Air Compressor Air Compressor Lines and Fittings	9-3 9-4 9-5 9-6	9-7 9-8 9-11 9-17

#### Section I. BRAKE TROUBLESHOOTING

- **9-1. GENERAL INFORMATION**. This section lists the common brake malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **9-2. BRAKE TROUBLESHOOTING PROCEDURES**. This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### BRAKE TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

- a. PARKING BRAKE DOES NOT ENGAGE CORRECTLY.
  - Step 1. Check the clearance adjustment on parking brake control valve.

If the clearance is not correct--contact Direct Support.

Step 2. Check the parking brake control valve.

If the control valve is worn, damaged or defective--contact Direct Support.

Step 3. Check the quick release valve.

If the quick release valve is worn, damaged or defective--contact Direct Support.

Step 4. Check the rotochamber.

If the rotochamber is damaged or defective--contact Direct Support.

Step 5. Check the parking brake.

If the parking brake is worn, damaged or defective--contact Direct Support.

#### BRAKE TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

## MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

#### b. PARKING BRAKE NOT RELEASING CORRECTLY.

Step 1. Check the parking brake control valve.

If the control valve is worn, damaged or defective--contact Direct Support.

Step 2. Check the quick release valve.

If the quick release valve is worn, damaged or defective--contact Direct Support.

Step 3. Check the adjustment of the rod end on the rotochamber.

If the adjustment is not correct--contact Direct Support.

Step 4. Check the parking brake.

If the parking brake is worn, damaged or defective--contact Direct Support.

#### c. SERVICE BRAKES NOT ENGAGING CORRECTLY.

Step 1. Check the control valve.

If the control valve is worn, damaged or defective--contact Direct Support.

Step 2. Check the adjustment of the pedal stop (Figure 9-1).

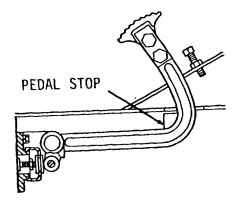


Figure 9-1

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

#### c. SERVICE BRAKES NOT ENGAGING CORRECTLY. (cont)

If the adjustment is not correct—adjust. Refer to paragraph 9-4

Step 3. Check the control valve for adjustment of screw on plunger.

If the screw is not adjusted correctly, piston will not travel in control valve. Contact Direct Support.

Step 4. Check the relay valves.

If the relay valves are worn, damaged or defective--contact Direct Support.

Step 5. Check the seal on piston in wheel spindle housings.

If the seal is worn, damaged or defective--contact Direct Support.

#### BRAKE TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

## MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

#### d. SERVICE BRAKES DO NOT RELEASE CORRECTLY.

Step 1. Check the control valve for adjustment of screw on plunger.

If the screw is not adjusted correctly, piston will not travel in control valve. Contact Direct Support.

Step 2. Check the control valve.

If the control valve is worn, damaged or defective--contact Direct Support.

Step 3. Check the relay valves.

If the relay valves are worn, damaged or defective--contact Direct Support.

#### e. CENTERSHIFT LOCK PIN NOT OPERATING CORRECTLY.

Step 1. Check the control valve.

If the control valve is worn, damaged or defective--contact Direct Support.

Step 2. Check the centershift pin.

If the centershift pin is damaged or defective--contact Direct Support.

#### f. DIFFERENTIAL LOCK NOT RELEASING CORRECTLY.

Step 1. Check the control valve.

If the control valve is worn, damaged or defective--contact Direct Support.

Step 2. Check the differential lock valve.

If the lock valve is worn, damaged or defective--contact Direct Support.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

#### g. DIFFERENTIAL LOCK NOT ENGAGING CORRECTLY.

Step 1. Check the control valve.

If the control valve is worn, damaged or defective--contact Direct Support.

Step 2. Check the differential lock valve.

If the lock valve is worn, damaged or defective--contact Direct Support.

Step 3. Check the differential lock.

If the lock is damaged or defective--contact Direct Support.

Step 4. Check Number Six clutch oil passage to differential lock control.

If the oil passage is restricted or damaged--contact Direct Support.

#### Section II. BRAKE MAINTENANCE.

#### 9-3 BRAKE MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the brake system and its components in good repair.
- b. This section is arranged by functional group code and provides a list of brake components to be maintained and step-by-step maintenance procedures.

#### **INDEX**

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Service Brakes 9-	
Air Compressor Air Compressor Lines and Fittings 9-	• • • • • • • • • • • • • • • • • • • •

#### 9-4. Service Brakes. (Sheet 1 of 3)

This task covers: a. Adjustment

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

**Test Equipment** 

None

Materials/Parts

None

Personnel Required

Construction equipment repairer MOS. 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

Torques

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped.

Master disconnect switch off.

Go to Sheet 2

#### 9-4. Service Brakes. (Sheet 2 of 3)

#### **ADJUSTMENT**

- 1. Fully release pedal (1, Figure 9-2) from beneath floor plate on right side of cab.
- Check roller (2). Roller (2) must be slightly in contact with plunger of brake control valve. A slight drag will be felt if roller (2) is turned.
- 3. Clean stop (3) as required to make contact. Make sure there is no dirt between stop (3) and floor.
- 4. Vent all air pressure. Refer to TM 5-3805-261-10.
- 5. Loosen nut (4).
- 6. Turn out screw (5). A slight drag must be felt when roller (2) is turned.
- 7. Loosen nut (6).
- 8. Turn stop screw (7) all the way down.
- Depress pedal (1) and hold until solid stop in valve is felt. This is maximum stroke of valve.

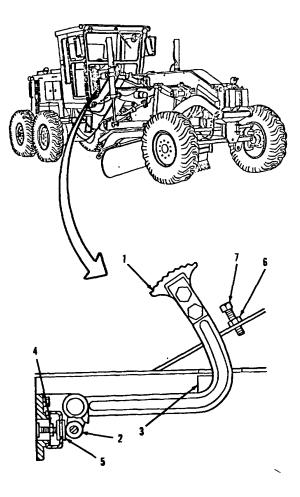


Figure 9-2

Go to Sheet 3

#### **BRAKE MAINTENANCE.** (cont.)

#### 9-4. Service Brakes. (Sheet 3 of 3)

#### **ADJUSTMENT (cont.)**

#### NOTE

If pedal hits platform before maximum stroke of valve is felt, turn screw out one turn.

- 10. Turn stop screw (7) up until contact is made with pedal (1,Figure 9-2) in depressed position.
- 11. Release pedal (1).
- 12. Tighten nuts (6 and 4). Do not turn stop screw (7) and screw (5) after nuts (6 and 4) are tightened.
- 13. Depress pedal (1) and release. Check to insure valve is exhausting when pedal (1) is up, there must be 0 psi at tandem.

#### NOTE

Return 130C Grader to original equipment condition.

End of Task

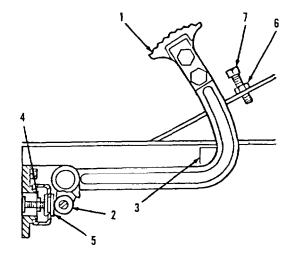


Figure 9-2

#### 9-5. Air Compressor. (Sheet 1 of 6)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation .....

#### **INITIAL SETUP:**

Applicable Configurations

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Preformed packings, Items 3, 7 Gasket, Item 28

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

Caps

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. Hydraulic pressure relieved.

Paragraph 6-48

Cooling system drained below cylinder head level.

Paragraph 13-5 Left side engine compartment side panel removed.

Go to Sheet 2

#### **BRAKE MAINTENANCE.** (cont)

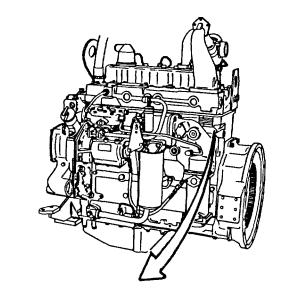
#### 9-5. Air Compressor. (Sheet 2 of 6)

#### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 1 Disconnect hose assembly (1, Figure 9-3) from supplemental steering motor on front left inside of engine compartment.
- 2. Remove elbow (2), connector (3) and preformed packing (4). Discard preformed packing (4).
- 3. Disconnect hose assembly (5).
- 4. Remove connector (6) and preformed packing (7). Discard preformed packing (7).
- 5 Remove tube assembly (8) and elbow (9) from air compressor (27).
- Remove tube assembly (10), elbow (11) and tube assembly (12, Figure 9-4) from air compressor (27).



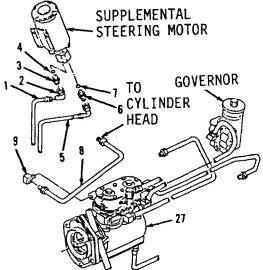


Figure 9-3

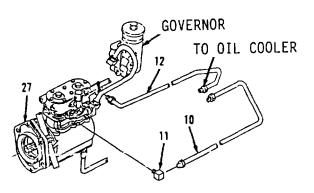


Figure 9-4

Go to Sheet 3

#### 9-5. Air Compressor. (Sheet 3 of 6)

#### **REMOVAL**

- 7. Remove elbow (13), tube assembly(14) and elbow (15, Figure 9-5) from air compressor (27).
- 8. Disconnect hose assembly (16, Figure 9-6).
- 9. Remove elbows (17 and 18) from air compressor (27).
- 10. Disconnect hose assembly (19, Figure 9-7).
- 11. Remove connector (20) from air compressor (27).
- 12. Remove bolt (21) and two washers (22, Figure 9-8).
- 13. Position tube assembly (29) away from air compressor (27).
- 14. Remove bolt (23), washer (24),bolt (25) and washer (26).
- 15. Remove air compressor (27) and gasket (28, Figure 9-9) from front timing gear housing in front, left side of engine. Discard gasket (28). Remove all surfaces. Weight of air gasket material from mounting compressor (27) is approximately 34 lbs.

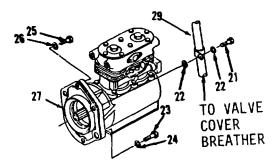


Figure 9-8

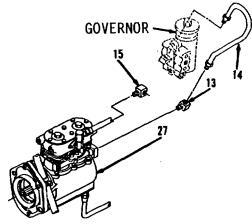


Figure 9-5

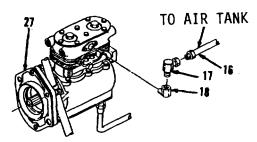


Figure 9-6

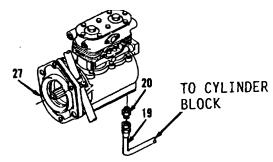


Figure 9-7

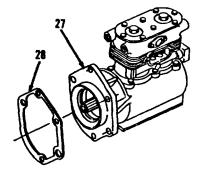


Figure 9-9

#### **BRAKE MAINTENANCE. (cont)**

#### 9-5. Air Compressor. (Sheet 4 of 6)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- Position new gasket (28) and air compressor (27, Figure 9-9) on backside of front timing gear housing in front, left side of engine. Align and engage splines of air compressor (27) shaft with water pump drive gear.
- 2. Install washer (26), bolt (25), washer (24) and bolt (23, Figure 9-8) on air compressor (27).
- 3. Position tube assembly (29) on air compressor (27) flange.
- 4. Install two washers (22) and bolt (21) securing tube assembly (29).
- 5. Install connector (20, Figure 9-7) on air compressor (27).
- 6. Connect hose assembly (19) to air compressor (27).
- 7. Install elbows (18 and 17, Figure 9-6) on air compressor (27).
- 8. Connect hose assembly (16).

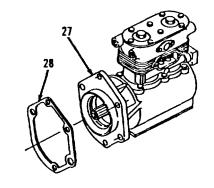


Figure 9-9

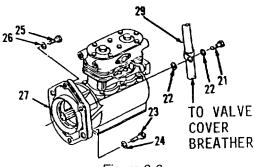


Figure 9-8

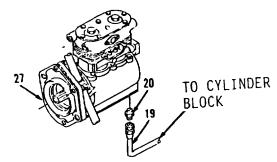


Figure 9-7

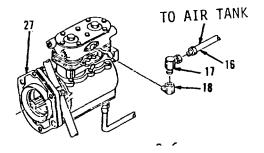


Figure 9-6

Go to Sheet 5

#### 9-5. Air Compressor. (Sheet 5 of 6)

#### **INSTALLATION**

- 9. Install elbow (15, Figure 9-5) on air compressor (27).
- 10. Connect tube assembly (14).
- 11. Install tube assembly (14) on governor and tighten connections.
- 12. Install elbow (13, Figure 9-4) on air compressor (27).
- 13. Connect tube assembly (12) loosely to elbow (13). Route tube assembly (12) behind governor mounting bracket.
- 14. Connect tube assembly (12) to oil cooler and tighten connections.
- 15. Install elbow (11).
- 16. Connect tube assembly (10).Route tube assembly (10) behind governor mounting bracket.
- 17. Connect tube assembly (10) to cylinder head and tighten connections.

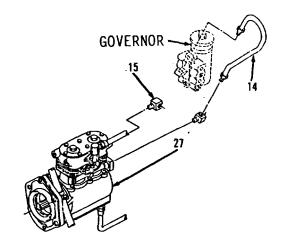


Figure 9-5

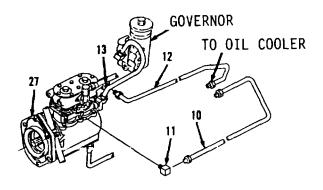


Figure 9-4

Go to Sheet 6

#### **BRAKE MAINTENANCE. (cont)**

#### 9-5. Air Compressor. (Sheet 6 of 6)

#### **INSTALLATION** (cont)

- 18. Install elbow (9, Figure 9-3) on air compressor (27).
- 19. Connect tube assembly (8) to elbow (9).
- 20. Connect tube assembly (8) to air compressor (27). Tighten connections.
- 21 Connect hose assembly (5) to supplemental steering motor on front, left inside of engine compartment.
- 22. Install new preformed packing (7)and connector (6).
- 23. Install new preformed packing (4), connector (3) and elbow (2).
- 24. Connect hose assembly (1).
- 25. Refill cooling system to proper level. Refer to paragraph 6-49.
- 26. Refill hydraulic system to proper level. Refer to LO 5-3805-261-12.
- 27. Check all hose and tube connections.
- 28. Start engine. Refer to TM 5-3805-261-10.
- 29. Run engine for two minutes. Stop engine.

#### **NOTE**

Return 130G Grader to original equipment condition.

**End of Task** 

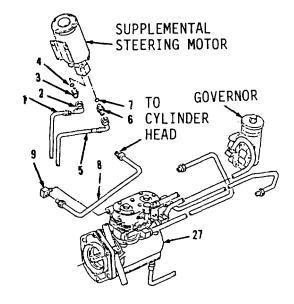


Figure 9-3

#### 9-6. Air Compressor Lines and Fittings. (Sheet 1 of 5)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39,

Appendix C Small tags, Item 41, Appendix C

Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. Reduce air pressure to zero.

Paragraph 6-48 Radiator drained.

Go to Sheet 2

#### **BRAKE MAINTENANCE. (cont)**

### 9-6. <u>Air Compressor Lines and Fittings</u>. (Sheet 2 of 5)

#### **REMOVAL**

#### **NOTE**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 1. Disconnect and remove tube assembly (1) from elbow (2) and connector (3, Figure 9-10) from cylinder head in air compressor.
- 2. Remove elbow (2) from air compressor.
- 3. Remove connector (3) and bushing (4) from cylinder head.
- 4. Disconnect and remove tube assembly (5) from elbows (6 and 7) from transmission oil cooler in air compressor.
- 5. Remove elbow (6) from air compressor.
- 6. Remove elbow (7) from transmission oil cooler.
- 7. Disconnect and remove tube assembly (8) from elbows (9 and 10) from intake manifold in air compressor.
- 8. Remove elbow (9) from air compressor.
- 9. Remove elbow (10) from air intake manifold.
- 10. Remove two oil pressure sending units from cross lubricant line, refer to paragraph 7-90.

Go to Sheet 3

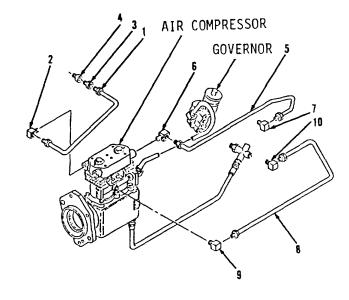


Figure 9-10

### 9-6. <u>Air Compressor Lines and Fittings.</u> (Sheet 3 of 5)

#### **REMOVAL**

- 11. Disconnect and remove tube assembly (11) from elbows (12 and 13, Figure 9-11) from governor in air compressor.
- 12. Remove elbow (12) from air compressor.
- 13. Remove elbow (13) from governor.
- 14. Disconnect and remove hose assembly (14) from connectors (15 and 16, Figure 9-12) from engine block in air compressor.
- 15. Remove connector (15) from cross (17).
- 16. Remove connector (16) from air compressor.
- 17. Remove cross (17) from nipple (18).
- 18. Remove nipple (18) and bushing (19) from engine block.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

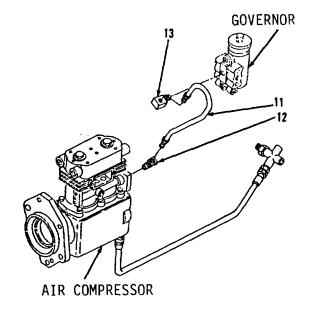


Figure 9-11

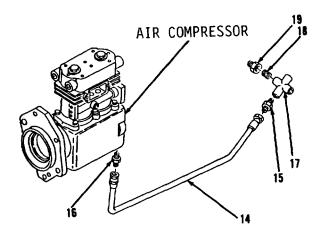


Figure 9-12

Go to Sheet 4

#### **BRAKE MAINTENANCE. (cont)**

## 9-6. <u>Air Compressor Lines and Fittings</u>.(Sheet 4 of 5)

#### **INSTALLATION**

- 1. Install bushing (19) and nipple (18, Figure 9-12) on engine block.
- 2. Install cross (17) on nipple (18).
- 3. Install connector (16) on air compressor.
- 4. Install connector (15) on cross (17).
- 5. Connect hose assembly (14) on connectors (16 and 15).
- 6. Install elbow (13, Figure 9-11) on governor in air compressor.
- 7. Install elbow (12) on air compressor.
- 8. Connect tube assembly (11) on elbows (13 and 12).
- 9. Install two oil pressure sending units on cross lubricant line, refer to paragraph 7-90.

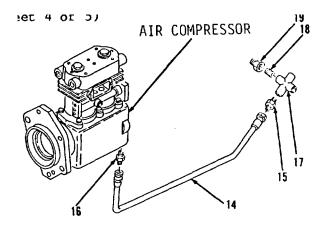


Figure 9-12

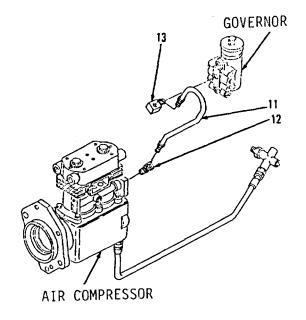


Figure 9-11

Go to Sheet 5

## 9-6. <u>Air Compressor Lines and Fittings.(Sheet 5 of 5)</u>

#### **INSTALLATION**

- 10. Install elbow (10, Figure 9-10) on air intake manifold in air compressor.
- 11. Install elbow (9) on air compressor.
- 12. Connect tube assembly (8) on elbows (10 and 9).
- 13. Install elbow (7) on transmission oil cooler in air compressor.
- 14. Install elbow (6) on air compressor.
- Connect tube assembly (5) on elbows (7 and 6).
- 16. Install bushing (4) and connector (3) on cylinder head in air compressor.
- 17. Install elbow (2) on air compressor.
- 18. Connect tube assembly (1) on connector (3) and elbow (2).
- Close drain valve on radiator and fill coolant to proper level. Refer to LO 5-3805-261-12.
- 20. Close two drain valves in air tanks. Refer to TM 5-3805-261-10.

#### **NOTE**

Return 130CG Grader to original equipment condition.

**End of Task** 

9-21 (9-22 blank)

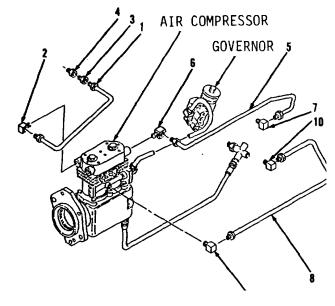


Figure 9-10

#### **CHAPTER 10**

### WHEELS AND TIRES TROUBLESHOOTING AND MAINTENANCE

#### **CHAPTER OVERVIEW**

The purpose of this chapter is to help the technician efficiently troubleshoot and repair malfunctioning equipment and to perform authorized organizational support level maintenance procedures on the 130G Grader.

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<u>Section</u>	<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
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#### Section I. WHEELS AND TIRES TROUBLESHOOTING.

- **10-1. GENERAL INFORMATION**. This section lists the common wheels and tires malfunctions which may occur during the operation of the 13OG Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **10-2. WHEELS AND TIRES TROUBLESHOOTING PROCEDURES**. This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### WHEELS AND TIRES TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

- a. TIRE WEARS UNEVENLY.
  - Step 1. Check for proper tire inflation. Refer to TM 5-3805-261-10.

Inflate tires to correct pressure. Refer to TM 5-3805-261-10.

Step 2. Check the lugnuts. Refer to TM 5-3805-261-10.

Tighten lugnuts. Refer to Paragraph 10-4.

Step 3. Contact Direct Support.

b. WHEEL BENT OR CRACKED.

Check the wheel.

Replace wheel, if necessary. Refer to paragraph 10-4.

#### Section II. WHEELS AND TIRES MAINTENANCE.

#### 10-3. WHEELS AND TIRES MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the wheels and tires and its components in good repair.
- b. This section is arranged by functional group code and provides a list of wheels and tires components to be maintained and step-by-step maintenance procedures.

#### **INDEX**

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Wheels and Tires Removal	10-4	10-4

#### WHEELS AND TIRES MAINTENANCE.

#### 10-4. Wheels and Tires Removal. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033) Hydraulic jack Jack stand Hoist and sling Wood blocks

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C

Detergent, Item 8, Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environment Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

.....

Except for special torques shown, all fasteners are tightened to standard torques. Refer to Appendix E.

### Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

#### 10-4. Wheels and Tires Removal. (Sheet 2 of 4)

#### **REMOVAL**

#### **WARNING**

Be sure the parking brake is set before beginning this task. In addition, block the wheel assembly opposite the wheel assembly being removed. Failure to do so may cause the 130G Grader to slip off the jack stand and may cause INJURY. If you are injured, seek medical aid immediately.

#### NOTE

The following is a maintenance procedure for the right rear wheel assembly. The maintenance procedure for the remaining wheel assembly is identical.

1. Loosen ten nuts (1) and washers (2, Figure 10-1) on wheel assembly being removed.

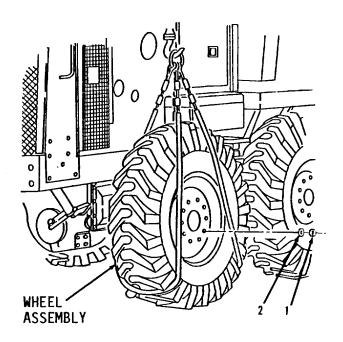


Figure 10-1

Go to Sheet 3

#### WHEELS AND TIRES MAINTENANCE. (cont)

#### 10-4. Wheels and Tires Removal. (Sheet 3 of 4)

#### **REMOVAL** (cont)

- 2. Position jack (3) to lift vehicle high enough to raise wheels off ground and to position jack stand (4, Figure 10-2).
- 3. Position jack stand (4) under vehicle.

#### **WARNING**

Weight of front wheel assembly is approximately 485 lbs. Weight of rear wheel assembly is approximately 430 lbs. Use suitable hoist and sling to perform this task. Failure to do so may cause INJURY. If you are injured, seek medical aid immediately.

- 4. Attach hoist and sling around wheel assembly (Figure 10-1).
- 5. Remove ten nuts (1) and washers (2).
- 6. Remove wheel assembly.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

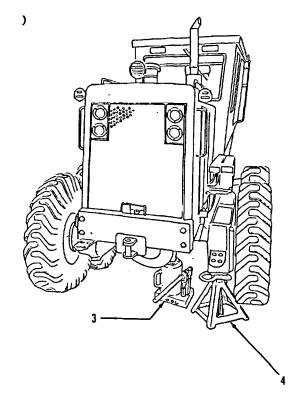


Figure 10-2

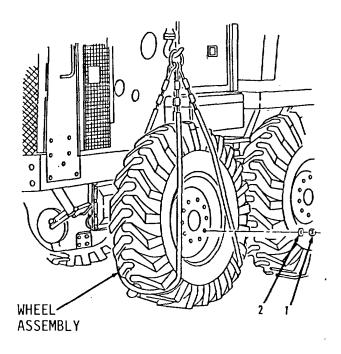


Figure 10-1

Go to Sheet 4

#### WHEELS AND TIRES MAINTENANCE.

#### 10-4. Wheels and Tires Removal. (Sheet 4 of 4)

#### **INSTALLATION**

- 1. Install hoist and sling on wheel assembly (Figure 10-1). Position wheel assembly.
- 2. Install ten washers (2) and nuts (1).
- 3. Using jack (3, Figure 10-2), lift vehicle and remove jack stand.
- 4. Lower wheel assembly to ground and remove jack (3).
- 5. Tighten ten nuts (1, Figure 10-1) evenly to 365 ft-lb torque.
- 6. Remove hoist and sling.

#### NOTE

- Check pressure of tire. Refer to TM 5-3805-261-10 for instructions and safety measures.
- Return 130G Grader to original equipment condition.

**End of Task** 

10-7 (10-8 blank)

#### **CHAPTER 11**

#### **STEERING MAINTENANCE**

#### **CHAPTER OVERVIEW**

The purpose of this chapter is to help the technician efficiently perform authorized organizational support level maintenance procedures on the 130G Grader, in order to keep the steering and its components in good repair. The chapter is arranged by functional group code and provides a list of steering components to be maintained and step-by-step maintenance procedures.

#### **INDEX**

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Steering Hoses, Lines and Fittings: Steering		
Valves to Steering Cylinders	11-3	11-8
Steering Hoses, Lines and Fittings: Steering		
Control Pump to Steering Valves	11-4	11-17
Supplemental Steering Hoses, Lines and Fittings	11-5	11-25
Supplemental Steering Check Valve	11-6	11-32
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Combination Valve	11-8	11-41

#### STEERING MAINTENANCE.

### Steering Wheel and Control Pump Assembly. (Sheet 1 of 3)

d. Installation

a. Removal This task covers: b. Cleaning c. Inspection

#### **INITIAL SETUP:**

Applicable Configurations

**Tools** 

General Mechanics's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C

Preformed packings, Items 7, 9

Caps Plugs Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

#### Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

> Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-103 Horn switch removed.

Paragraph 13-18 Steering console panel and hood

removed.

Go to Sheet 2

#### STEERING MAINTENANCE.

#### 11-1. Steering Wheel and Control Pump Assembly. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

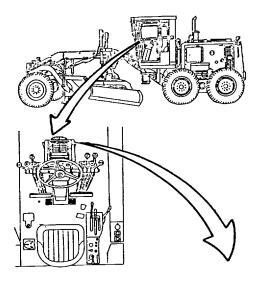
- 1. Disconnect hose assemblies (1, 2, 3 and 4, Figure 11-1) from steering console inside cab.
- 2. Remove control pump assembly (5).
- 3. Remove two connectors (6) and preformed packings (7) from control pump assembly (5, Figure 11-2). Discard two preformed packings (7).
- 4. Remove two connectors (8) and preformed packings (9) from control pump assembly (5). Discard two preformed packings (9).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.



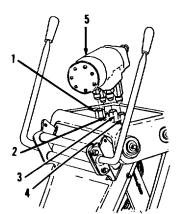


Figure 11-1

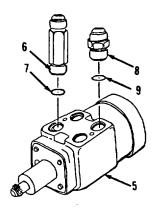


Figure 11-2

Go to Sheet 3

#### **STEERING MAINTENANCE. (cont)**

## 11-1. <u>Steering Wheel and Control Pump Assembly</u>. (Sheet 3 of 3)

#### **INSTALLATION**

- 1. Install two new preformed packings (9) and connectors (8) in control pump assembly (5, Figure 11-2).
- 2. Install two new preformed packings (7) and connectors (6) in control pump assembly (5).
- 3. Install control pump assembly (5) in steering console.
- 4. Connect hose assemblies (4, 3, 2 and 1, Figure 11-1).

#### NOTE

Return 130C Grader to original equipment condition.

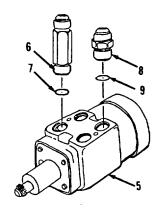


Figure 11-2

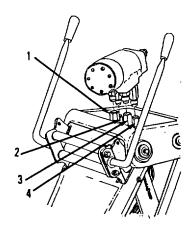


Figure 11-1

**End of Task** 

#### STEERING MAINTENANCE.

#### 11-2. Supplemental Steering Pump and Mounting. (Sheet 1 of 3)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanics's Tool Kit: Automotive (NSN 5180-00-177-7033)

•

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Gasket, Item 5 Caps Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Condition

None

**General Safety Instructions** 

None

**Torques** 

.....

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

Plugs

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 13-5 Left engine compartment side panel

removed.

Go to Sheet 2

#### 11-2. Supplemental Steering Pump and Mounting. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

- Disconnect two hydraulic tubes (1, Figure 11-3) from top front, left of engine compartment.
- 2. Remove four bolts (2), washers (3) and supplemental steering pump (4, Figure 11-4).
- 3. Remove and discard gasket (5, Figure 11-5).
- 4. Remove coupling (6, Figure 11-6).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

- Inspect supplemental steering pump (4). Replace if case is damaged or threads on hose coupling are stripped.
- 2. Inspect all other parts. Refer to Chapter 2.

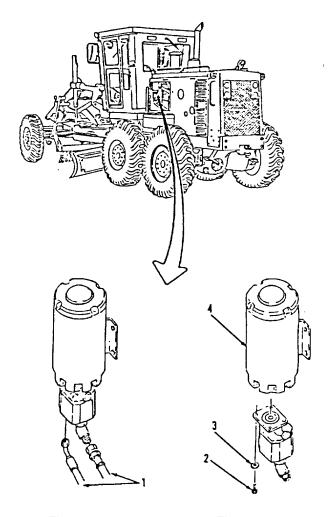


Figure 11-3

Figure 11-4

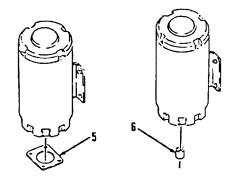


Figure 11-5

Figure 11-6

Go to Sheet 3

#### STEERING MAINTENANCE.

#### 11-2. Supplemental Steering Pump and Mounting. (Sheet 3 of 3)

#### **INSTALLATION**

- 1. Install coupling (6, Figure 11-6) in top front, left of engine compartment.
- 2. Install new gasket (5, Figure 11-5).
- 3. Install supplemental steering pump (4), four washers (3) and bolts (2, Figure 11-4).
- 4. Connect two hydraulic tubes (1, Figure 11-3).

#### NOTE

Return 130G Grader to original equipment condition.

**End of Task** 

#### Steering Hoses, Lines and Fittings: Steering Valves to Steering Cylinders. (Sheet 1 of 9) 11-3.

This task covers: a. Removal b. Cleaning c. Inspection d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

**Tools** 

General Mechanics's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment None

Materials/Parts

Detergent, Item 8, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Preformed packings, Items 2, 4, 6, 8, 11, 14, 16, 18, 24, 27, 30, 36

Caps Plugs Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

#### <u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped.

Master disconnect switch off. Hydraulic pressure relieved.

Paragraph 7-112

Disconnect positive cable on right side.

Go to Sheet 2

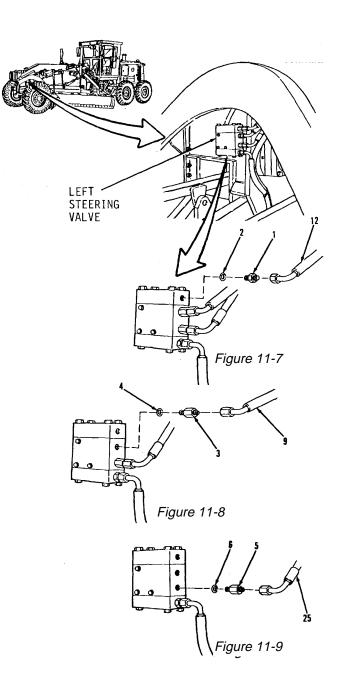
# 11.3. <u>Steering Hoses, Lines and Fittings: Steering</u> Valves to Steering Cylinders. (Sheet 2 of 9)

#### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

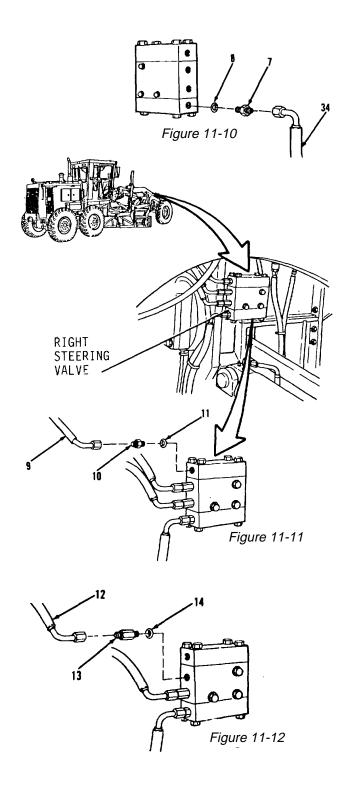
- Disconnect hose assembly (12, Figure 11-7) from top valve port of left steering valve located on left side of front frame.
- 2. Remove connector (1) and preformed packing (2). Discard preformed packing (2).
- 3. Disconnect hose assembly (9, Figure 11-8) from second valve port on top of left steering valve.
- Remove connector (3) and preformed packing (4). Discard preformed packing (4).
- Disconnect hose assembly (25, Figure 11-9) from third valve port on top of left steering valve.
- Remove connector (5) and preformed packing (6). Discard preformed packing (6).



# 11-3. <u>Steering Hoses, Lines and Fittings: Steering Valves to Steering Cylinders</u>. (Sheet 3 of 9)

## **REMOVAL** (cont)

- 7. Disconnect hose assembly (34, Figure 11-10) from bottom valve port of left steering valve.
- 8. Remove connector (7) and preformed packing (8). Discard preformed packing (8).
- 9. Remove hose assembly (9, Figure 11-11) from top valve port of right steering valve.
- 10. Remove connector (10) and preformed packing (11). Discard preformed packing (11).
- 11. Remove hose assembly (12, Figure 11-12) from second valve port on top of right steering valve.
- 12. Remove connector (13) and preformed packing (14). Discard preformed packing (14).



## 11-3. Steering Hoses, Lines and Fittings: Steering Valves to Steering Cylinders. (Sheet 4 of 9)

#### **REMOVAL**

- Disconnect hose assembly (28, Figure 11-13) from third valve port on top of right steering valve.
- 14. Remove connector (15) and preformed packing (16). Discard preformed packing (16).
- Disconnect hose assembly (22, Figure 11-14) from bottom valve port of right steering valve.
- 16. Remove connector (17) and preformed packing (18). Discard preformed packing (18).
- 17. Remove bolt (19), washer (20) and clip (21, Figure 11-15).
- 18. Remove hose assembly (22, Figure 11-16) from top of right steering cylinder.
- 19. Remove connector (23) and preformed packing (24). Discard preformed packing (24).
- 20. Remove hose assembly (25, Figure 11-17) from side of right steering cylinder.
- 21. Remove elbow (26) and preformed packing (27). Discard preformed packing (27).

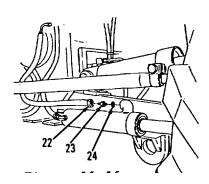
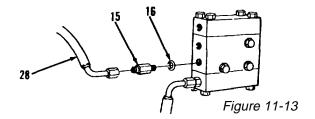


Figure 11-16



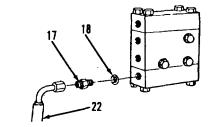


Figure 11-14

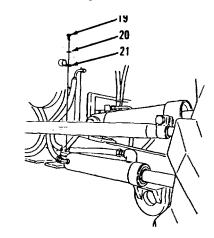


Figure 11-15

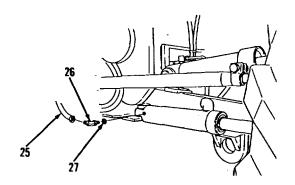


Figure 11-17

## 11-3. Steering Hoses, Lines and Fittings: Steering Valves to Steering Cylinders. (Sheet 5 of 9)

## REMOVAL (cont)

- 22. Remove hose assembly (28, Figure 11-18) from side of left steering cylinder.
- 23. Remove elbow (29) and preformed packing (30). Discard preformed packing (30).
- 24. Remove bolt (31), washer (32) and clip (33, Figure 11-19).
- 25. Remove hose assembly (34, Figure 11-20) from top of left steering cylinder.
- 26. Remove connector (35) and preformed packing (36). Discard preformed packing (36).



Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install new preformed packing (36) and connector (35, Figure 11-20).
- 2. Connect hose assembly (34) to top of left steering cylinder.
- 3. Install clip (33), washer (32) and bolt (31, Figure 11-19) on top of left steering cylinder.

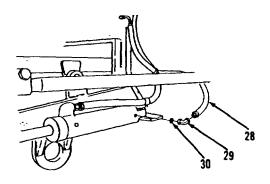


Figure 11-18

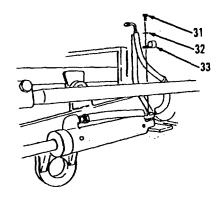


Figure 11-19

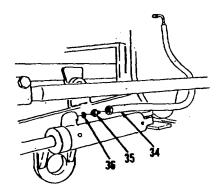


Figure 11-20

Go to Sheet 6

## 11-3. Steering Hoses, Lines and Fittings: Steering Valves to Steering Cylinders. (Sheet 6 of 9)

## **INSTALLATION**

- 4. Install new preformed packing (30) and elbow (29, Figure 11-18).
- 5. Connect hose assembly (28) on side of left steering cylinder.
- 6. Install new preformed packing (27) and elbow (26, Figure 11-17).
- 7. Connect hose assembly (25) on side of right steering cylinder.
- 8. Install new preformed packing (24) and connector (23, Figure 11-16).
- 9. Connect hose assembly (22) on top of right steering cylinder.
- 10. Install clip (21), washer (20) and bolt (19, Figure 11-15).
- 11. Install new preformed packing (18) and connector (17, Figure 11-14).
- 12. Install hose assembly (22) on bottom valve port of right steering valve.

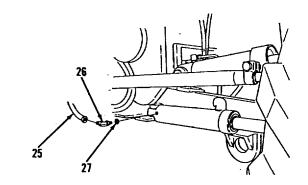
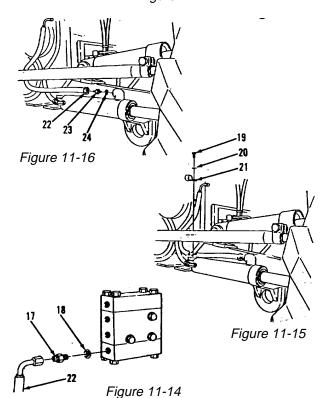


Figure 11-17

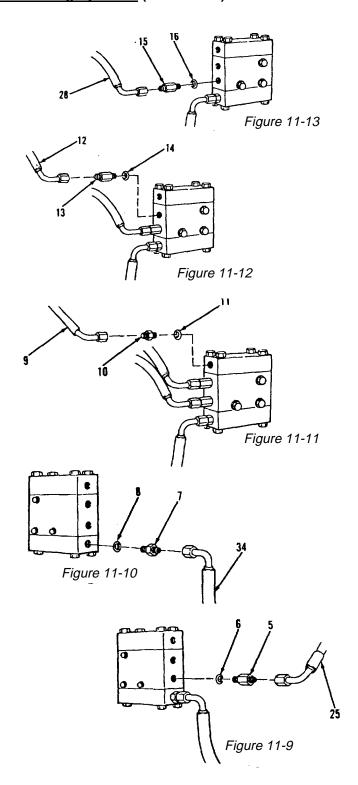


Go to Sheet 7

## 11-3. Steering Hoses, Lines and Fittings: Steering Valves to Steering Cylinders.(Sheet 7 of 9)

## **INSTALLATION** (cont)

- 13. Install new preformed packing (16) and connector (15, Figure 11-13).
- 14. Install hose assembly (28) on third valve port on top of right steering valve.
- 15. Install new preformed packing (14) and connector (13, Figure 11-12).
- 16. Connect hose assembly (12) on second valve port on top of right steering valve.
- 17. Install new preformed packing (11) and connector (10, Figure 11-11).
- 18. Connect hose assembly (9) on top valve port of right steering valve.
- 19. Install new preformed packing (8) and connector (7, Figure 11-10).
- 20. Install hose assembly (34) on bottom valve port of left steering valve.
- 21. Install new preformed packing (6] and connector (5, Figure 11-9).
- 22. Install hose assembly (25) on third valve port on top of left steering valve.



## 11-3. Steering Hoses, Lines and Fittings: Steering Valves to Steering Cylinders. (Sheet 8 of 9)

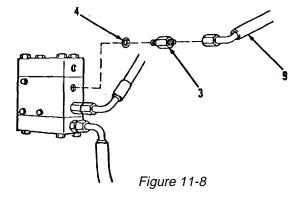
#### **INSTALLATION**

- 23. Install new preformed packing (4) and connector (3, Figure 11-8).
- 24. Install hose assembly (9) on second valve port on top of left steering valve.
- 25. Install new preformed packing (2) and connector (1, Figure 11-7).
- 26. Install hose assembly (12) on top valve port of left steering valve.

### WARNING

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 27. Start engine. Refer to TM 5-3805-261-10.
- 28. Turn steering wheel to the right while moving the vehicle slowly forward a few feet.
- 29. Turn steering wheel to the left while moving the vehicle slowly forward a few feet.



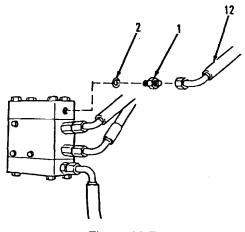


Figure 11-7

Go to Sheet 9

## 11-3. Steering Hoses, Lines and Fittings: Steering Valves to Steering Cylinders. (Sheet 9 of 9)

## **INSTALLATION** (cont)

- 30. Repeat steps 28 and 29 at least five times to bleed air from system.
- 31. Stop engine.
- 32. Inspect hose assemblies and connections for leaks.
- 33. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

## NOTE

Return 130G Grader to original equipment condition.

**End of Task** 

## 11-4. Steering Hoses, Lines and Fittings: Steering Control Pump to Steering Valves. (Sheet 1 of 8)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanics's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Detergent, Item 8, Appendix C
Clean cloths, Item 39,
Appendix C
Small tags, Item 41,
Appendix C

Preformed packings, Items 2, 23, 25

Strap, Item 20 Caps

Plugs

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. Hydraulic pressure relieved.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 12-3 Frame covers removed.

Paragraph 11-1 Steering wheel and control pump

assembly removed.

Go to Sheet 2

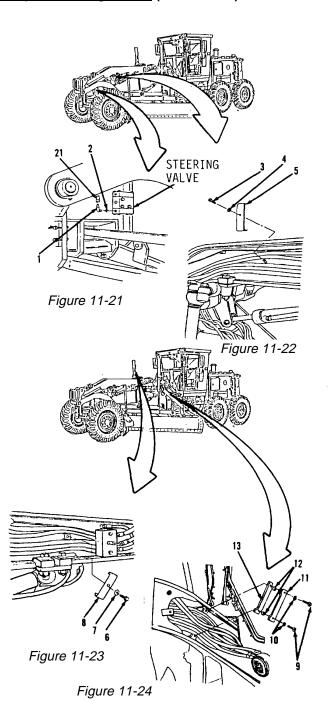
## 11-4. Steering Hoses, Lines and Fittings: Steering Control Pump to Steering Valves (Sheet 2 of 8)

#### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

- 1. Disconnect hose assembly (21, Figure 11-21) from steering valve located in the left, front side of front frame.
- Remove elbow (1) and preformed packing (2). Discard preformed packing (2).
- 3. Remove bolt (3), washer (4) and clamp (5, Figure 11-22) from left, front side.
- 4. Remove bolt (6), washer (7) and clamp (8, Figure 11-23) from left, rear side.
- 5. Remove two bolts (9), washers (10), clamp (11), two spacers (12) and clamp (13, Figure 11-24).



## 11-4. Steering Hoses, Lines and Fittings: Steering Control Pump to Steering Valves. (Sheet 3 of 8)

## **REMOVAL**

- 6. Remove bolt (14). washer (15) and clip (16, Figure 11-25).
- 7. Remove two nuts (17), washers (18) and clamp (19, Figure 11-26).
- 8. Remove and discard strap (20, Figure 11-27).
- 9. Remove hose assembly (21, Figure 11-28).
- 10. Remove elbow (22) and preformed packing (23). Discard preformed packing (23).

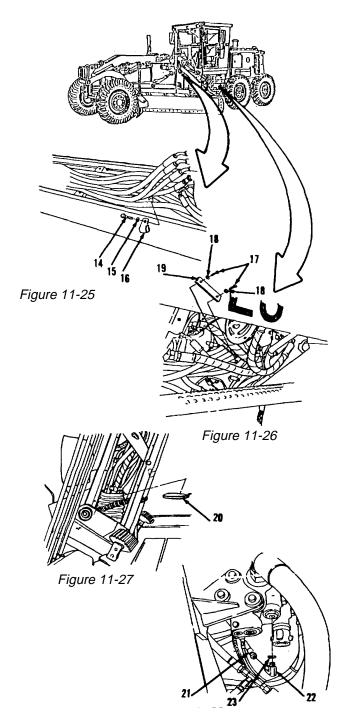


Figure 11-28

## 11-4. Steering Hoses, Lines and Fittings: Steering Control Pump to Steering Valves. (Sheet 4 of 8)

## **REMOVAL** (cont)

- 11. Disconnect hose assembly (45, Figure 11-29) from steering valve.
- 12. Remove elbow (24) and preformed packing (25). Discard preformed packing (25).
- 13. Remove bolt (26), washer (27) and clamp (28, Figure 11-30) from left, front side.
- 14. Remove bolt (29), washer (30) and clamp (31, Figure 11-31) from left, rear side.
- 15. Remove two bolts (32), washers (33), clamp (34), two spacers (35) and clamp (36, Figure 11-32).

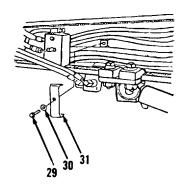


Figure 11-31

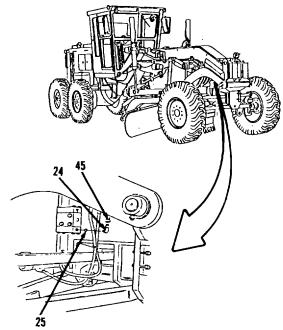


Figure 11-29

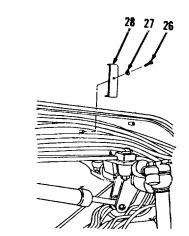


Figure 11-30

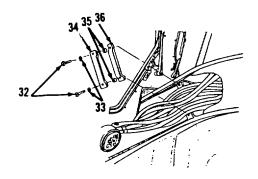


Figure 11-32

## 11-4. Steering Hoses, Lines and Fittings: Steering Control Pump to Steering Valves. (Sheet 5 of 8)

#### **REMOVAL**

- 16. Remove two bolts (37), washers (38) and clamp (39, Figure 11-33).
- 17. Remove two bolts (40), washers (41), clamp (42), two spacers (43) and clamp (44), Figure 11-34).
- 18. Remove hose assembly (45).



Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- Connect hose assembly (45, Figure 11-34) in vehicle.
- 2. Install new preformed packing (25) and elbow (24, Figure 11-29) in steering valve.
- 3. Install hose assembly (45).
- 4. Install clamp (44), two spacers (43), clamp (42), two washers (41) and bolts (40, Figure 11-34).
- 5. Install clamp (39), two washers (38) and bolts (37, Figure 11-33).
- 6. Install clamp (36), two spacers (35), clamp (34), two washers (33) and bolts (32, Figure 11-32).

Go to Sheet 6

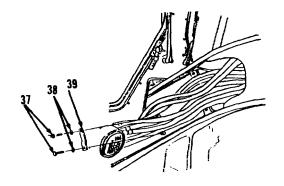


Figure 11-33

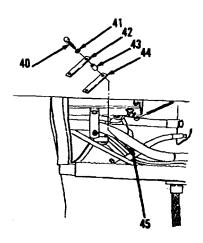


Figure 11-34

## 11-4. Steering Hoses, Lines and Fittings: Steering Control Pump to Steering Valves. (Sheet 6 of 8)

## **INSTALLATION** (cont)

- 7. Install clamp (31), washer (30) and bolt (29, Figure 11-31) in left, rear side.
- 8. Install clamp (28), washer (27) and bolt (26, Figure 11-30) in left, front side.
- 9. Install new preformed packing (23) and elbow (22, Figure 11-28) on bottom of combination valve.
- 10. Connect hose assembly (21) to elbow (22).
- 11. Install hose assembly (21) in vehicle on left, steering valve.
- 12. Install new preformed packing (2) and elbow (1, Figure 11-21) on front side of left steering valve.
- 13. Install hose assembly (21) on elbow (1) on left steering valve.
- 14. Install clamp (8), washer (7) and bolt (6, Figure 11-23) in left, rear side.

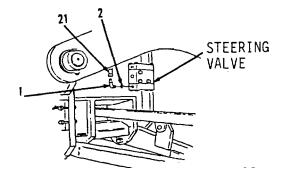
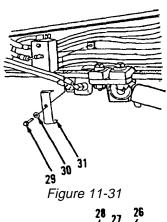


Figure 11-21



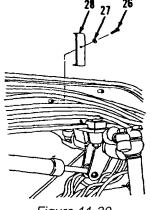
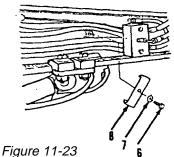


Figure 11-30

Figure 11-28



Go to Sheet 7

# 11-4. <u>Steering Hoses, Lines and Fittings: Steering Control Pump to Steering Control Pump to Steering Valves</u>. (Sheet 7 of 8)

#### **INSTALLATION**

- 15. Install clamp (5), washer (4) and bolt (3, Figure 11-22) in left, front side.
- 16. Install clamp (13), two spacers (12), clamp (11), two washers (10) and bolts (9, Figure 11-24).
- 17. Install clip (16), washer (15) and bolt (14, Figure 11-25).
- 18. Install clamp (19), two washers (18) and nuts (17, Figure 11-26).
- 19. Install new strap (20, Figure 11-27) in steering console, inside of cab.

## **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 20. Start engine. Refer to TM 5-3805-261-10.
- 21. Turn steering wheel to the right while moving the vehicle slowly forward a few feet.
- 22. Turn steering wheel to the left while moving the vehicle slowly forward a few feet.

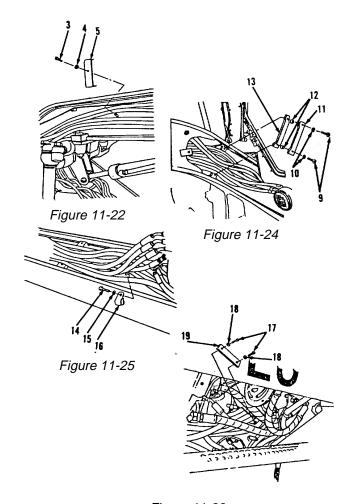


Figure 11-26

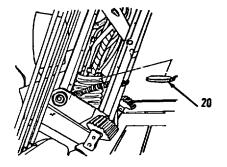


Figure 11-27

## 11-4. Steering Hoses, Lines and Fittings: Steering Control Pump to Steering Valves. (Sheet 8 of 8)

## **INSTALLATION** (cont)

- 23. Repeat steps 22 and 23 at least five times to bleed air from system.
- 24. Stop engine.
- 25. Inspect hose assemblies and connections for leaks.
- 26. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

**NOTE** 

Return 130G Grader to original equipment condition.

**End of Task** 

### Supplemental Steering Hoses, Lines and Fittings. (Sheet 1 of 7)

d. Installation

This task covers: a. Removal b. Cleaning c. Inspection

#### **INITIAL SETUP:**

## **Applicable Configurations**

ΑII

#### **Tools**

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

## **Test Equipment**

None

## **Materials/Parts**

Detergent, Item 8, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Preformed packings, Items 3, 5, 15, 23, 26, 28, 33 Caps Plugs

## **Personnel Required**

Construction equipment repairer MOS 62B

#### **References**

TM 5-3805-261-10

## **Special Environmental Conditions**

None

### **General Safety Instructions**

None

#### **Torques**

All fasteners are tightened to standard torques. Refer to Appendix E.

#### **Troubleshooting References**

None

## **Equipment Condition**

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Hydraulic system drained.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## 11-5. Supplemental Steering Hoses, Lines and Fittings. (Sheet 2 of 7)

## **REMOVAL**

#### **NOTE**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

 Disconnect hose assembly (12, Figure 11-35)

from supplemental steering pump.

- 2. Remove elbow (1), connector (2) and preformed packing (3). Discard preformed packing.
- 3. Disconnect hose assembly (19, Figure 11-36) from supplemental steering pump.
- 4. Remove connector (4) and (5). Discard preformed packing (5).
- 5. Remove bolt (6), washer (7) and clip (8, Figure 11-37).

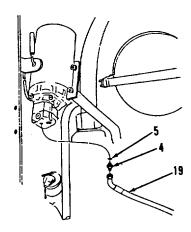


Figure 11-36

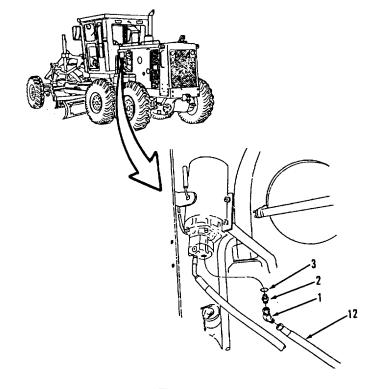


Figure 11-35

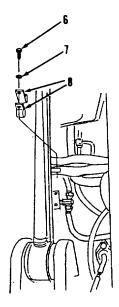


Figure 11-37

## 11-5. Supplemental Steering Hoses, Lines and Fittings. (Sheet 3 of 7)

## **REMOVAL**

- 6. Remove nut (9), washer (10) and clip (11, Figure 11-38).
- 7. Disconnect hose assembly (12, Figure 11-39) from bottom of hydraulic tank.
- 8. Remove elbow (13), connector (14) and preformed packing (15). Discard preformed packing (15).
- 9. Remove nut (16), washer (17) and clip (18, Figure 11-40)

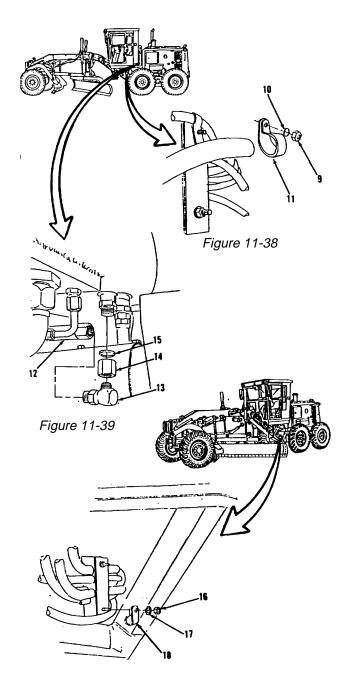


Figure 11-40

## 11-5. Supplemental Steering Hoses, Lines and Fittings. (Sheet 4 of 7)

## **REMOVAL** (cont.)

- 10. Disconnect hose assembly (19) from the bottom of tee (21, Figure 11-41).
- 11. Disconnect hose assembly (20) from side of tee (21).
- 12. Remove tee (21), adapter (22) and preformed packing (23, Figure 11-42). Discard preformed packing (23).
- 13. Remove relief valve (24), union (25), preformed packing (26), adapter (27) and preformed packing (28, Figure 11-43). Discard preformed packings (26 and 28).

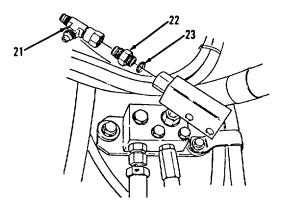


Figure 11-42

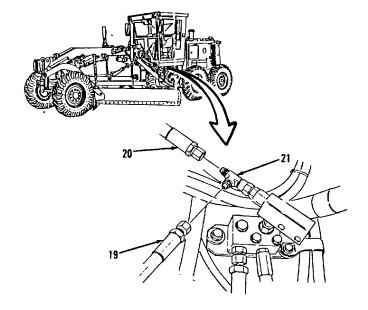


Figure 11-41

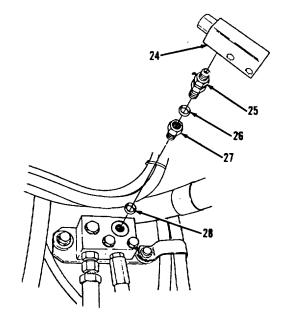


Figure 11-43

Go to Sheet 5

## 11-5. Supplemental Steering Hoses, Lines and Fittings. (Sheet 5 of 7)

#### **REMOVAL**

- 14. Disconnect hose assembly (29) from tee (31, Figure 11-44).
- 15. Disconnect hose assembly (30) from tee (31).
- 16. Remove tee (31), valve (32), preformed packing (33) and adapter (34) from combination valve (35, Figure 11-45). Discard preformed packing (33).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install adapter (34), new preformed packing (33), valve (32) and tee (31) on combination valve (35, Figure 11-45).
- 2. Connect hose assembly (30) on tee (31, Figure 11-44).
- 3. Connect hose assembly (29) on tee (30).
- 4. Install new preformed packing (28), adapter (27), new preformed packing (26), union (25) and relief valve (24, Figure 11-43).

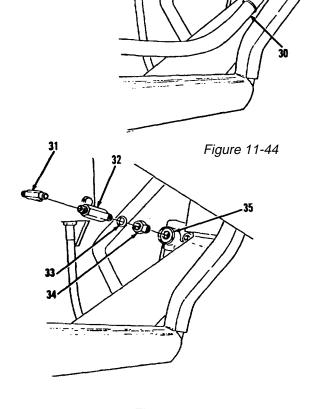


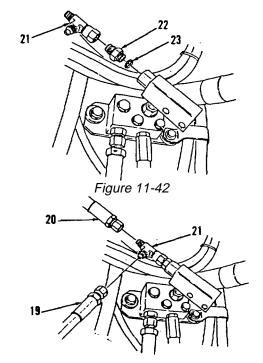
Figure 11-45

Go to Sheet 6

## 11-5. Supplemental Steering Hoses, Lines and Fittings. (Sheet 6 of 7)

## **INSTALLATION** (cont.)

- 5. Install new preformed packing (23), adapter (22) and tee (21, Figure 11-42).
- 6. Connect hose assembly (20) on side of tee (21, Figure 11-41).
- 7. Connect hose assembly (19) to bottom of tee (21).
- 8. Install clip (18), washer (17) and nut (16, Figure 11-40).
- Install new preformed packing (15), connector (14) and elbow (13, Figure 11-39).
- 10. Connect hose assembly (12) to bottom of hydraulic tank.
- 11. Install clip (11), washer (10) and nut (9, Figure 11-38).



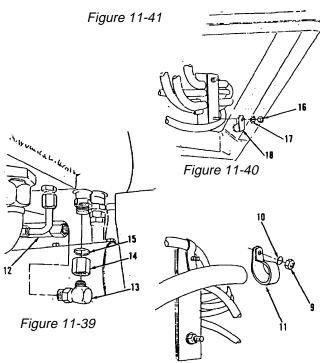


Figure 11-38

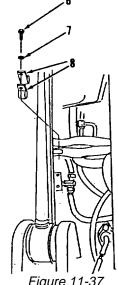
#### 11-5. Supplemental Steering Hoses, Lines and Fittings. (Sheet 7 of 7)

## **INSTALLATION**

- 12. Install clip (8), washer (7) and bolt (6, Figure 11-37).
- 13. Install new preformed packing (5) and connector (4, Figure 11-36).
- 14. Connect hose assembly (19)on supplemental steering pump.
- 15. Install new preformed packing connector (2) and elbow (1, Figure 11-35).
- 16. Connect hose assembly (12) on supplemental steering pump.

#### NOTE

Return 130G Grader to original equipment condition.





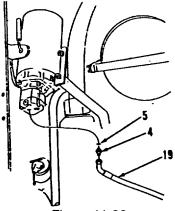
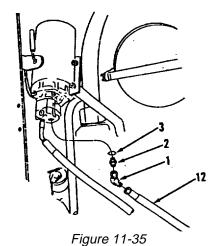


Figure 11-36



**End of Task** 

#### Supplemental Steering Check Valve. (Sheet 1 of 3) 11-6.

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit Automotive (NSN 5180-00-177-

7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Detergent, Item 8, Appendix C

Small tags, Item 41, Appendix C Seals, Items 13, 15

Caps Plugs Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. Hydraulic pressure relieved.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## 11-6. Supplemental Steering Check Valve. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Remove three bolts (1) and washers (2, Figure 11-46) from left side under operator's compartment.
- 2. Remove nut (3), washers (4 and 5), clip (6), bracket (7), bolt (8), washer (9) and plate (10, Figure 11-47).

### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

3. Disconnect hose assemblies (11 and 12) holding body (18, Figure 11-48).

#### **DISASSEMBLY**

- 1. Remove seal (13), adapter (14) and seal (15, Figure 11-49). Discard seals (13 and 15).
- 2. Remove spring (16) and check (17) from body (18).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

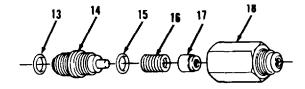


Figure 11-49

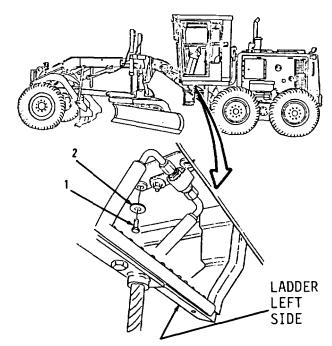


Figure 11-46

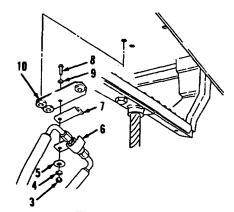
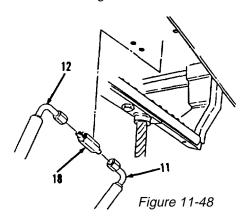


Figure 11-47



Go to Sheet 3

### 11-6. Supplemental Steering Check Valve. (Sheet 3 of 3)

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **ASSEMBLY**

Install check (17), spring (16), new seal (15), adapter (14) and new seal (13) in body (18, Figure 11-49).

## **INSTALLATION**

- Holding body (18) connect hose assemblies (12 and 11, Figure 11-48) so that adapter end of valve faces forward on vehicle.
- 2. Install plate (10), washer (9), bolt (8), bracket (7), clip (6), washers (5 and 4) and nut (3) so that clip (6) hooks over bracket (7, Figure 11-47).
- 3. Install three washers (2) and bolts (1, Figure 11-46).
- 4. Inspect hose assemblies and connections for leaks.
- 5. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

## NOTE

Return 130G Grader to original equipment condition.

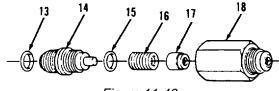


Figure 11-49

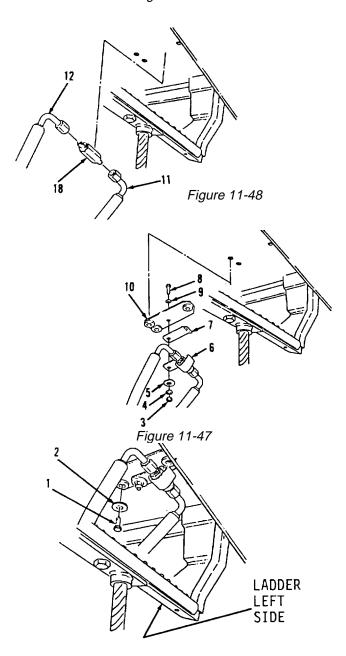


Figure 11-46

**End of Task** 

## 11-7. Steering Valve. (Sheet 1 of 6)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

References

**INITIAL SETUP:** 

<u>Applicable Configurations</u>
All

<u>Personnel Required</u>
Construction equipment

repairer NOS 62B

Tools
General Mechanic's Tool Kit:

Automotive (NSN 5180-00-177- TM 5-3805-261-10 LO 5-3805-261-12

Test Equipment Special Environmental Conditions

None None

<u>Materials/Parts</u> <u>General Safety Instructions</u>

Dry cleaning solvent, None Appendix C

Clean cloths, Item 39, Torques

Appendix C All fasteners are tightened to Small tags, Item 41, standard torques. Refer to

Appendix C Appendix E. Preformed packings, Items 6,

9, 12, 15 Caps

Plugs

<u>Troubleshooting References</u>

None

Equipment Condition
TM 5-3805-261-10
Vehicle parked on level ground.

Parking/emergency brake applied.
Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. Hydraulic pressure relieved.

Paragraph 7-112 Disconnect positive cable on right side.

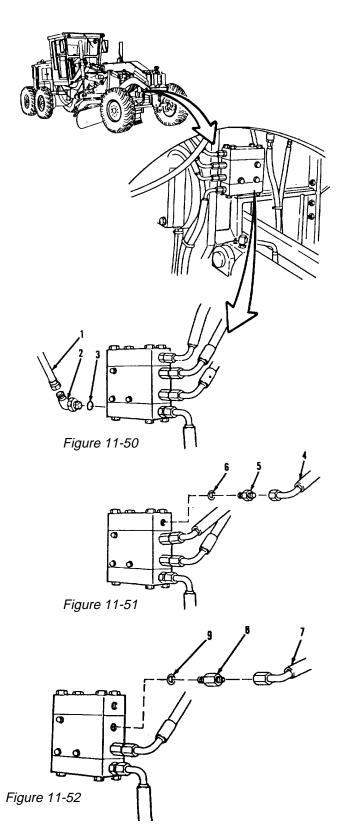
Go to Sheet 2

## 11-7. Steering Valve. (Sheet 2 of 6)

#### **REMOVAL**

#### NOTE

- The following is a maintenance procedure for the left steering valve. The maintenance procedure for the right steering valve is identical.
- All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.
- 1. Disconnect hose assembly (1, Figure 11-50) from front valve port of left steering valve.
- 2. Remove elbow (2) and preformed packing (3). Discard preformed packing (3).
- 3. Disconnect hose assembly (4, Figure 11-51) from top valve port of left steering valve.
- 4. Remove connector (5) and preformed packing (6). Discard preformed packing (6).
- Disconnect hose assembly (7, Figure 11-52) from second valve port from top of left steering valve.
- 6. Remove connector (8) and preformed packing (9). Discard preformed packing (9).



## 11-7. Steering Valve. (Sheet 3 of 6)

#### **REMOVAL**

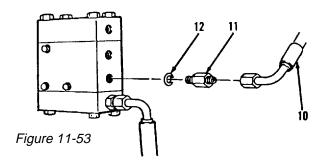
- 7. Disconnect hose assembly (10, Figure 11-53) from third valve port from top of left steering valve.
- 8. Remove connector (11) and preformed packing (12). Discard preformed packing (12).
- 9. Disconnect hose assembly (13, Figure 11-54) from bottom valve port of left steering valve.
- 10. Remove connector (14) and preformed packing (15). Discard preformed packing (15).
- 11. Remove three bolts (16), washers (17) and left steering valve (18, Figure 11-55).

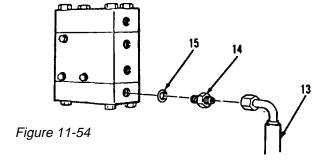
## **CLEANING**

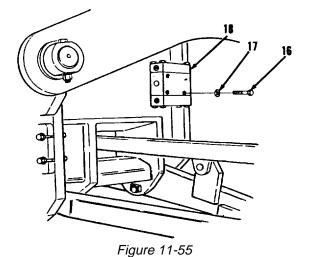
Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.





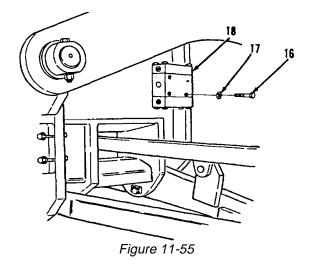


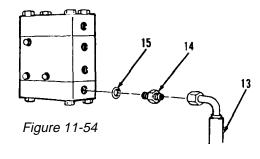
Go to Sheet 4

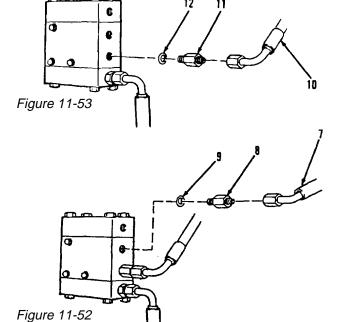
## 11-7. Steering Valve. (Sheet 4 of 6)

## **INSTALLATION**

- 1. Install left steering valve (18), three washers (17) and bolts (16, Figure 11-55).
- 2. Install new preformed packing (15) and connector (14, Figure 11-54).
- 3. Connect hose assembly (13) on bottom valve port of left steering valve.
- 4. Install new preformed packing (12) and connector (11, Figure 11-53).
- 5. Connect hose assembly (10) on third valve port from top of left steering valve.
- 6. Install new preformed packing (9) and connector (8, Figure 11-52).
- 7. Connect hose assembly (7) on second valve port from top of left steering valve.







## 11-7. Steering Valve. (Sheet 5 of 6)

#### **INSTALLATION**

- 8. Install new preformed packing (6) and connector (5, Figure 11-51).
- 9. Connect hose assembly (4) on top valve port of left steering valve.
- 10. Install new preformed packing (3) and elbow (2, Figure 11-50).
- 11. Connect hose assembly (1) on front valve port of left steering valve.

## **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may result in INJURY. If you are injured, seek medical aid immediately.

- 12. Start engine. Refer to TM 5- 3805-261-10.
- 13. Turn steering wheel to the right while moving the vehicle slowly forward a few feet.
- 14. Turn steering wheel left while moving the vehicle slowly forward a few feet.

Go to Sheet 6

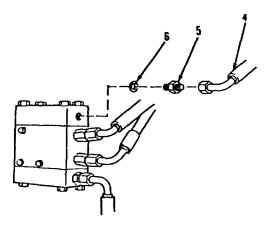


Figure 11-51

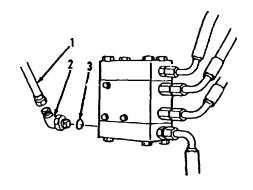


Figure 11-50

## 11-7. Steering Valve. (Sheet 6 of 6)

## **INSTALLATION** (cont.)

- 15. Repeat steps 24 and 25 at least five times to bleed air from system.
- 16. Stop engine.
- 17. Inspect hose assemblies and connections for leaks.
- 18. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

#### NOTE

Return 130G Grader to original equipment condition.

**End of Task** 

## 11-8. Combination Valve. (Sheet 1 of 7)

b. Cleaning This task covers: a. Removal c. Inspection d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment None

Materials/Parts Dry cleaning solvent,

Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Preformed packings, Items 3, 6, 9, 12, 15, 18, 21, 24, 27, 33, 37 Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

.....

Troubleshooting References

None

Plugs

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. Hydraulic pressure relieved.

Paragraph 7-112 Disconnect positive cable on right side.

Paragraph 7-46 Supplemental steering pressure switch

removed.

Go to Sheet 2

## 11-8. Combination Valve. (Sheet 2 of 7)

## **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

- 1. Disconnect hose assembly (1, Figure 11-56).
- 2. Remove elbow (2) and preformed packing (3). Discard preformed packing (3).
- 3. Disconnect hose assembly (4, Figure 11-57) from bottom of valve.
- 4. Remove elbow (5) and preformed packing (6). Discard preformed packing (6).
- 5. Disconnect hose assembly (7).
- 6. Remove elbow (8) and preformed packing (9). Discard preformed packing (9).
- 7. Disconnect hose assembly (10).
- 8. Remove elbow (11) and preformed packing (12). Discard preformed packing (12).

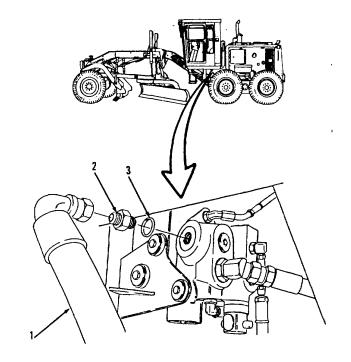
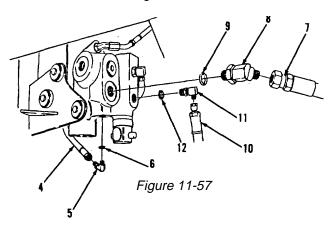


Figure 11-56



Go to Sheet 3

## 11-8. Combination Valve. (Sheet 3 of 8)

## **REMOVAL** (cont.)

- 9. Disconnect hose assembly (13, Figure 11-58).
- 10. Remove elbow (14) and preformed packing (15). Discard preformed packing (15).
- 11. Disconnect hose assembly (16, Figure 11-59).
- 12. Remove elbow (17) and preformed packing (18). Discard preformed packing (18).
- 13. Disconnect hose assembly (19, Figure 11-60).
- 14. Remove elbow (20) and preformed packing (21). Discard preformed packing (21).
- 15. Remove three bolts (22), washers (23), bolts (24), washers (25 and 26) and mountings (27, Figure 11-61).

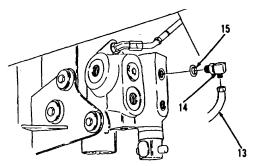


Figure 11-58

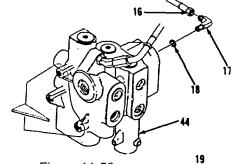


Figure 11-59

Figure 11-60

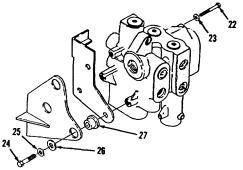


Figure 11-61

## 11-8. Combination Valve. (Sheet 4 of 7)

## **REMOVAL** (cont.)

- 16. Remove spring (28), cotter pin (29) and pin (30, Figure 11-62).
- 17. Disconnect hose assembly (31) from elbow (32).
- 18. Remove elbow (32), connector (33) and preformed packing (34). Discard preformed packing (34).
- 19. Disconnect hose (35) from tee (37, Figure 11-63).
- 20. Disconnect hose (36) from tee (37).
- 21. Remove tee (37), adapter (38). valve (39) and preformed packing (40). Discard preformed packing (40).
- 22. Disconnect hose assembly (41, Figure 11-64)
- 23. Remove connector (42) and preformed packing (43). Discard preformed packing (43).
- 24. Disconnect hose assembly (44).
- 25. Remove connector (45), preformed packing (46). Discard preformed packing (46).
- 26. Remove combination valve (47).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

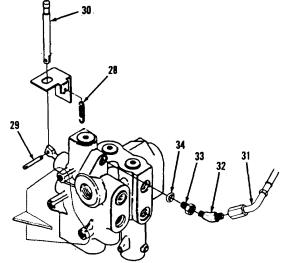


Figure 11-62

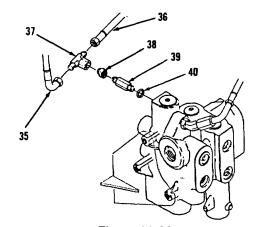
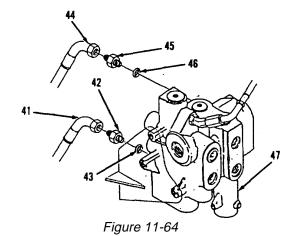


Figure 11-63



Go to Sheet 5

## STEERING MAINTENANCE.

## 11-8. Combination Valve. (Sheet 5 of 7)

#### **INSTALLATION**

- 1. Position combination valve (47, Figure 11-64).
- 2. Install new preformed packing (46) and connector (45).
- 3. Connect hose assembly (44).
- 4. Install new preformed packing (43) and connector (42).
- 5. Connect hose assembly (41) to connector (42).
- 6. Install new preformed packing (40), valve (39), adapter (38) and tee (37, Figure 11-63).
- 7. Connect hose assembly (36) on tee (37).
- 8. Connect hose assembly (35) on tee (37).
- Install new preformed packing (34), connector (33) and elbow (32, Figure 11-62).
- 10. Connect hose assembly (31) to elbow (32).
- 11. Install pin (30), cotter pin (29) and spring (28).

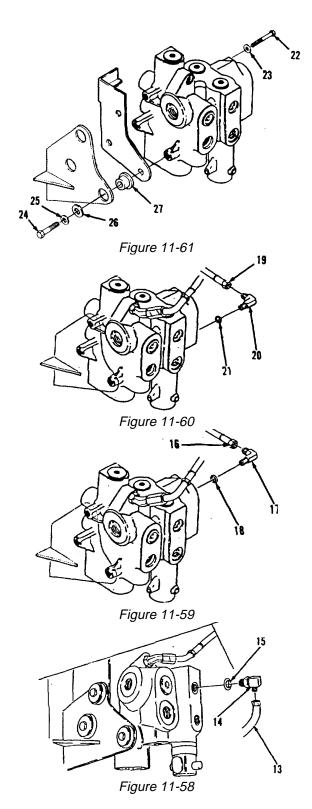
Go to Sheet 6

## **STEERING MAINTENANCE. (cont.)**

## 11-8. Combination Valve. (Sheet 6 of 7)

## **INSTALLATION** (cont.)

- 12. Install three mountings (27), washers (26 and 25), bolts (24), washers (23) and bolts (22, Figure 11-61).
- 13. Install new preformed packing (21) and elbow (20, Figure 11-60).
- 14. Connect hose assembly (19).
- 15. Install new preformed packing (18) and elbow (17, Figure 11-59).
- 16. Connect hose assembly (16).
- 17. Install new preformed packing (15) and elbow (14, Figure 11-58).
- 18. Connect hose assembly (13).
- 19. Install new preformed packing (12) and elbow (11, Figure 11-57).
- 20. Connect hose assembly (10).
- 21. Install new preformed packing (9) and elbow (8).
- 22. Connect hose assembly (7).
- 23. Install new preformed packing (6) and elbow (5).
- 24. Connect hose assembly (4).



## STEERING MAINTENANCE.

## 11-8. Combination Valve. (Sheet 7 of 7)

#### **INSTALLATION**

- 25. Install new preformed packing (3) and elbow (2, Figure 11-56).
- 26. Connect hose assembly (1).

## **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 28. Start engine. Refer to TM 5- 3805-261-10.
- 29. Turn steering wheel to the left while moving the vehicle slowly forward a few feet.
- 30. Repeat steps 26 and 27 at least five times to bleed air from system.
- 31. Stop engine.
- 32. Inspect hose assemblies and connections for leaks.
- 33. Refill hydraulic tank to proper level. Refer to LO 5-3805- 261-12.

#### NOTE

Return 130G Grader to original equipment condition.

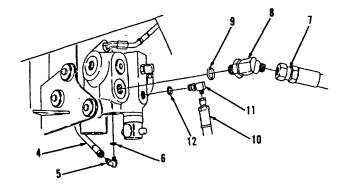


Figure 11-57

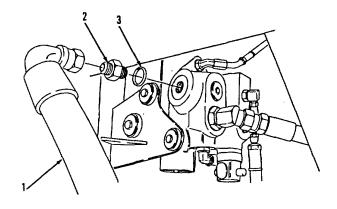


Figure 11-56

**End of Task** 

11-47 (11-48 blank)

## **CHAPTER 12**

## FRAME AND TOWING MAINTENANCE

## **CHAPTER OVERVIEW**

The purpose of this chapter is to help the technician efficiently troubleshoot and repair malfunctioning equipment and to perform authorized organizational support level maintenance procedures on the 130G Grader.

## **INDEX**

<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
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Steps	12-2	12-3
Frame Covers	12-3	12-6
Front Tow Hook	12-4	12-10

## FRAME AND TOWING MAINTENANCE.

## 12-1. FRAME AND TOWING MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the frame and towing and its components in good repair.
- b. This section is arranged by functional group code and provides a list of frame and towing components to be maintained and step-by-step maintenance procedures.

	INDEX		
<u>Title</u>		<u>Paragraph</u>	<u>Page</u>
Steps		12-2	12-3
Frame Covers		12-3	12-6
Front Tow Hook		12-4	12-10

## FRAME AND TOWING MAINTENANCE.

## 12-2. Steps. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit:

Automotive (NSN 5180-00-177-7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Go to Sheet 2

## FRAME AND TOWING MAINTENANCE. (cont.)

## 12-2. Steps. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

The following is a maintenance procedure for the left side steps. The maintenance procedure for the right side steps is identical.

- 1. Remove four bolts (1), washers (2) and items 3 through 6 as an assembly (Figure 12-1) from left side of cab.
- 2. Remove two bolts (3) and washers (4) to separate step assemblies (5 and 6, Figure 12-2).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

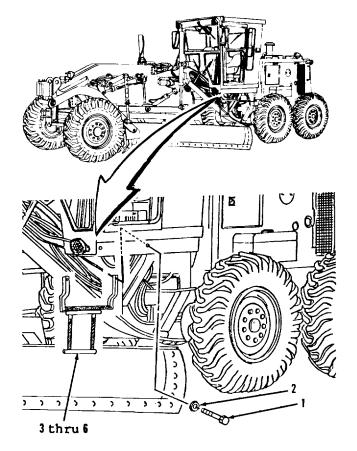


Figure 12-1

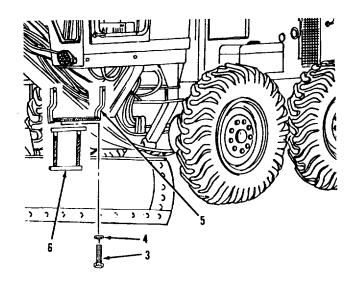


Figure 12-2

## FRAME AND TOWING MAINTENANCE.

## 12-2. Steps. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Position step assemblies (6 and 5, Figure 12-2).
- 2. Install two washers (4) and bolts (3).
- 3. Install items 6 through 3 as an assembly, four washers (2) and bolts (1, Figure 12-1) on left side of cab.

## NOTE

Return 130G Grader to original equipment condition.

**End of Task** 

## FRAME AND TOWING MAINTENANCE. (cont.)

#### 12-3. Frame Covers. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation 

#### **INITIAL SETUP:**

Applicable Configurations Personnel Required ΑII Construction equipment

repairer MOS 62B

**Tools** General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177-TM 5-3805-261-10 7033)

**Special Environmental Conditions** Test Equipment None

None **General Safety Instructions** 

Materials/Parts None Dry cleaning solvent,

Item 14, Appendix C **Torques** Clean cloths, Item 39, All fasteners are tightened to standard torques. Refer to

Appendix C Appendix E.

<u>Troubleshooting References</u>

**Equipment Condition** 

None

TM 5-3805-261-10 Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Go to Sheet 2

## FRAME AND TOWING MAINTENANCE.

## **12-3. Frame Covers.** (Sheet 2 of 4)

## **REMOVAL**

- 1. Remove nine bolts (1), washers (2 and 3) and cover (4, Figure 12-3) from front, right side of frame.
- 2. Remove two bolts (5), washers (6) and cover (7).
- 3. Remove three bolts (8) and washers (9). Support valve assembly (10) with one hand when removing bolts (8, Figure 12-4).
- 4. Support valve assembly (10) by tying to frame with suitable rope.
- 5. Remove two bolts (11), washers (12) and plate (13).
- 6. Remove two bolts (14), washers (15) and cover (16).

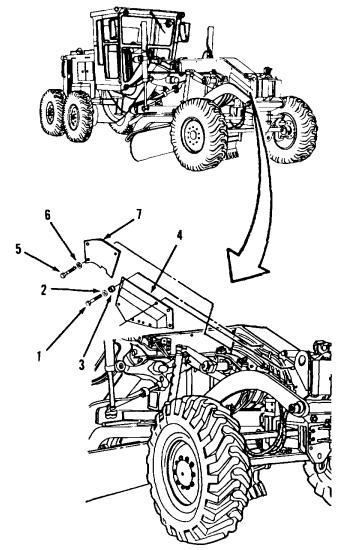
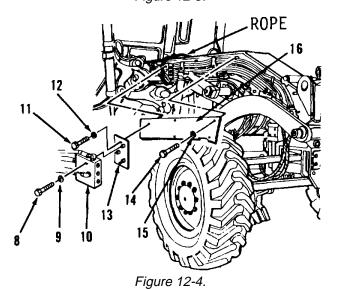


Figure 12-3.



## FRAME AND TOWING MAINTENANCE. (cont)

## **12-3. Frame Covers.** (Sheet 3 of 4)

## **REMOVAL** (cont)

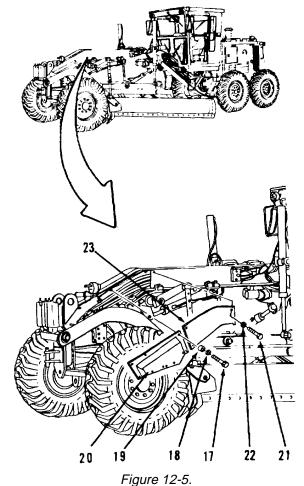
- 7. Remove eight bolts (17), washers (18 and 19) and cover (20, Figure 12-5) from front, left side of frame.
- 8. Remove two bolts (21), washers (22) and cover (23).
- 9. Remove three bolts (24) and washers (25). Support valve assembly (26) with one hand when removing bolts (24, Figure 12-6).
- 10. Support valve assembly (26) by tying to frame with suitable rope.
- 11. Remove two bolts (27), washers (28) and plate (29).
- 12. Remove two bolts (30), washers (31) and cover (32).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.



Go to Sheet 4

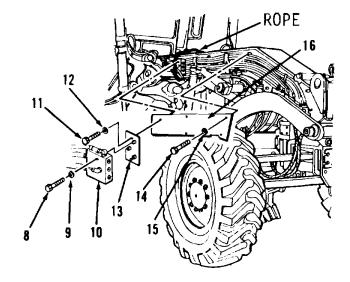
#### FRAME AND TOWING MAINTENANCE.

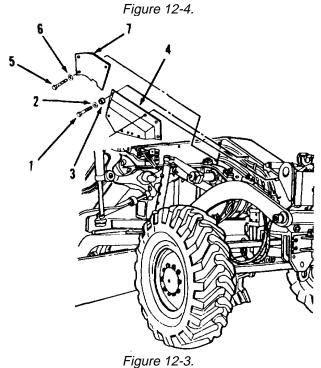
## **12-3. Frame Covers.** (Sheet 4 of 4)

#### **INSTALLATION**

- 1. Install cover (32), two washers (31) and bolts (30, Figure 12-6) on front, left side of frame.
- 2. Install plate (29), two washers (28) and bolts (27).
- 3. Remove valve supporting rope and position valve assembly (26).
- 4. Install three washers (25) and bolts (24).
- 5. Install cover (23), two washers (22) and bolts (21, Figure 12-5).
- 6. Install cover (20), eight washers (19 and 18) and bolts (17).
- 7. Install cover (16), two washers (15) and bolts (14, Figure 12-4) on front, right side of frame.
- 8. Install plate (13), two washers (12) and bolts (11).
- 9. Remove valve supporting rope and position valve assembly (10).
- 10. Install three washers (9) and bolts (8).
- 11. Install cover (7), two washers (6) and bolts (5, Figure 12-3).
- 12. Install cover (4), nine washers (3 and 2) and bolts (1).

# NOTE Return 130G Grader to original equipment condition.





End of Task

## FRAME AND TOWING MAINTENANCE. (cont)

#### 12-4. Front Tow Hook. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped.

Master disconnect switch off.

Go to Sheet 2

## FRAME AND TOWING MAINTENANCE.

## **12-4.** Front Tow Hook. (Sheet 2 of 3)

## **REMOVAL**

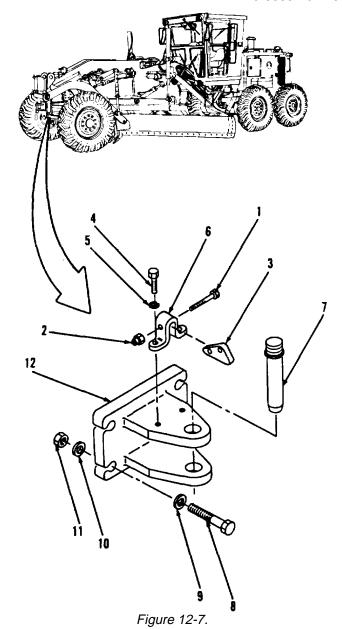
- Remove bolt (1), lock nut (2) and latch pin
   (3) from lock plate (6, Figure 12-7) in front of vehicle.
- 2. Remove two bolts (4), lockwashers (5) and lock plate (6) from bracket (12).
- 3. Remove pin (7).
- 4. Remove four bolts (8), washers (9 and 10), nuts (11) and bracket (12).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.



Go to Sheet 3

## FRAME AND TOWING MAINTENANCE. (cont)

## **12-4.** Front Tow Hook. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Position bracket (12, Figure 12-7) on front of vehicle.
- 2. Install four nuts (11), washers (10 and 9) and bolts (8).
- 3. Install pin (7) in bracket (12).
- 4. Position lock plate (6).
- 5. Install two lockwashers (5) and bolts (4) on bracket (12).
- 6. Position latch pin (3) in lock plate (6).
- 7. Install lock nut (2) and bolt (1) in lock plate (6) and through latch pin (3).

NOTE
Return 130G Grader to original equipment condition.

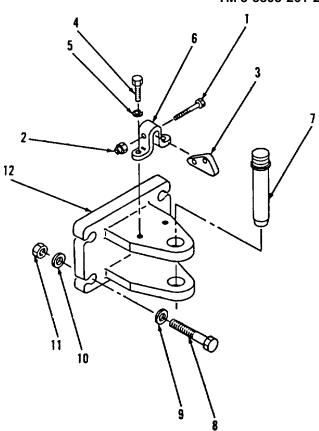


Figure 12-7.

End of Task

## **CHAPTER 13**

## BODY, CAB, HOOD AND HULL TROUBLESHOOTING AND MAINTENANCE

## **CHAPTER OVERVIEW**

The purpose of this chapter is to help the technician efficiently troubleshoot and repair malfunctioning equipment and to perform authorized organizational support level maintenance procedures on the 130G Grader.

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## Section I. BODY, CAB, HOOD AND HULL TROUBLESHOOTING.

- **13-1. GENERAL INFORMATION**. This section lists the common body, cab, hood and hull malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **13-2. BODY, CAB, HOOD AND HULL TROUBLESHOOTING PROCEDURES**. This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

BODY, CAB, HOOD AND HULL TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

- a. CAB ROLLOVER PROTECTIVE STRUCTURE IS NOT SECURE.
  - Step 1. Check ROPS mounting hardware (Figure 13-1).

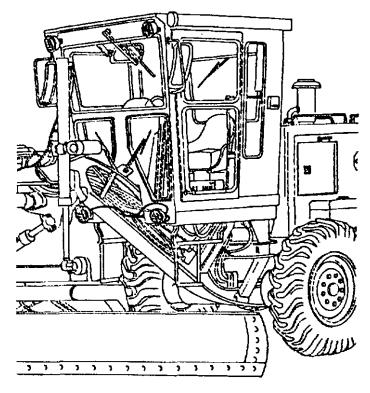


Figure 13-1.

Tighten bolts where necessary.

Step 2. Check strips on the bottom of ROPS assembly.

If the strip are not sealed, or if they are damaged or defective--replace. Refer to paragraph 13-7.

Step 3. Contact Direct Support.

## BODY, CAB, HOOD AND HULL TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

## b. DEFECTIVE WINDOW SEALS.

Step 1. Check the window seals. Refer to paragraphs 13-8 and 13-9.

If seals are damaged or defective--replace. Refer to paragraphs 13-8 and 13-9.

Step 2. Check the windows. Refer to paragraphs 13-8 and 13-9.

If window is cracked or broken--replace. Refer to paragraphs 13-8 and 13-9.

## c. DOOR ASSEMBLY WILL NOT CLOSE OR CATCH.

Step 1. Check for bends or dents in door assembly. Refer to paragraph 13-10.

If the door is damaged or defective--replace. Refer to paragraph 13-10.

Step 2. Check the hinges and springs. Refer to paragraph 13-10.

If the hinges and springs are damaged or defective--replace. Refer to paragraph 13-10.

## Section II. BODY, CAB, HOOD AND HULL MAINTENANCE.

## 13-3. BODY, CAB, HOOD AND HULL MAINTENANCE PROCEDURES.

- **a.** The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the body, cab, hood and hull and its components in good repair.
- **b.** This section is arranged by functional group code and provides a list of body, cab, hood and hull components to be maintained and step-by-step maintenance procedures.

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#### **13-4.** Engine Hood Assembly. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033) Hoist and sling

Hoist and sling

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

12 rivets, Item 2

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-16 Air precleaner removed.

Paragraph 6-32 Muffler removed.

Go to Sheet 2

## Engine Hood Assembly. (Sheet 2 of 3)

#### **REMOVAL**

Release four fasteners (4) from brackets by pulling rings (5, Figure 13-2) down.

## **WARNING**

Use adequate hoist and sling for Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

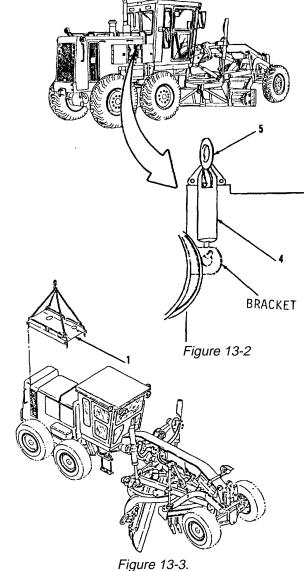
- Attach hoist and sling to hood (1, Figure 13-
- Remove hood (1). 3.
- Remove hoist and sling.
- Remove and discard 12 rivets (2, Figure 13-4) by drilling out.
- Remove four plates (3) and fasteners (4).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.



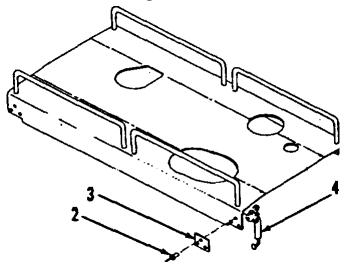


Figure 13-4.

## **13-4.** Engine Hood Assembly. (Sheet 3 of 3)

#### **INSTALLATION**

- 1. Position four fasteners (4) and plates (3) on hood (1, Figure 13-4).
- 2. Install 12 new rivets (2).
- 3. Attach hoist and sling to hood (1, Figure 13-3).
- 4. Position hood (1) on vehicle. Make sure holes on front of hood (1, Figure 13-5) align with dash plate guide pins.
- 5. Remove hoist and sling.
- 6. Fasten four fasteners (4) by pushing up rings (5, Figure 13-2).

NOTE
Return 130G Grader to original equipment condition.

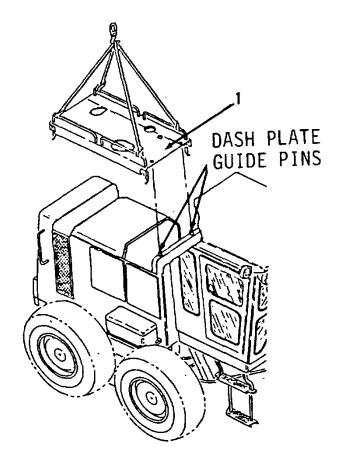


Figure 13-5.

End of Task

## 13-5. Engine Compartment Side Panels and Doors. (Sheet 1 of 10)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033) Hoist and sling Pan, drain

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C

Detergent, Item 8, Appendix C Adhesive, Item 1, Appendix C Ten rivets, Items 21, 23, 51 13 seals (bulk material), Items 11, 25, 43, 53

Caps

Personnel Required

Two construction equipment repairers MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112

Paragraph 6-49 Paragraph 7-113 Disconnect positive cable on right side.

Left and right screen doors removed.

Battery box group removed.

Go to Sheet 2

## **13-5.** Engine Compartment Side Panels and Doors. (Sheet 2 of 10)

#### **REMOVAL/RIGHT SIDE**

1. Remove two grommets (1, Figure 13-6).

#### **NOTE**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 2. Position suitable drain pan under hose assembly (2) and disconnect hose assembly (2).
- 3. Remove bolt (3), washer (4) and clip (5) from top, center inside of panel (26, Figure 13-7).

#### **WARNING**

Weight of right engine compartment panel and door assembly is approximately 105 lbs. Use adequate hoist and sling for lifting. Failure to follow this procedure may cause INJURY. If you are injured, seek aid immediately.

## **CAUTION**

Do not attach sling to handles for lifting panel. Rivets may not support weight of panel.

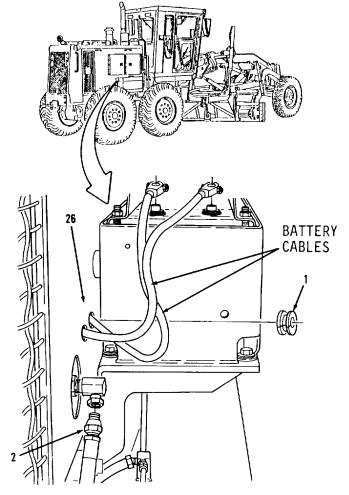


Figure 13-6.

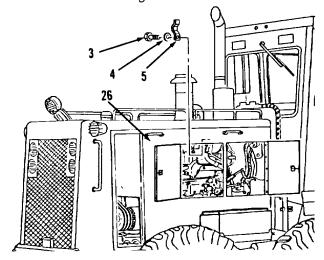


Figure 13-7.

## 13-5. Engine Compartment Side Panels and Doors. (Sheet 3 of 10)

## REMOVAL/RIGHT SIDE (cont)

4. Attach hoist and sling to panel (26, Figure 13-8). Wrap sling through door ports.

#### CAUTION

Bar will fall out from behind panel when bolts are removed.

5. Remove eight bolts (6), washers (7) and bar (8).

#### **CAUTION**

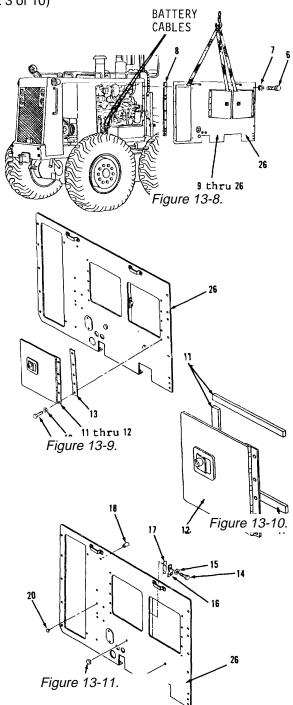
Battery cables will be damaged if caution is not exercised.

- 6. Push two cable assemblies (2) through holes in panel (27) and position in engine compartment, (Figure 13-6).
- 7. Remove items 9 thru 26 as an assembly.
- 8. Remove hoist and sling.
- 9. Remove 10 bolts (9), washers (10), two items 11 thru 12 as assemblies and two spacers (14) from panel (26, Figure 13-9).

#### NOTE

Removal of seals will cause destruction of seals. Remove seals only if inspection indicates replacement is necessary.

 Remove six seals (11) from two Door assemblies (12, Figure 13-10). Discard six seals (11). Remove all old adhesive and seal material from mounting surfaces.



Go to Sheet 4

## 13-5. Engine Compartment Side Panels and Doors. (Sheet 4 of 10)

#### **REMOVAL/RIGHT SIDE**

- 11. Remove four bolts (14), washers (15), two catches (16) and shims (17) from panel (26, Figure 13-11).
- 12. Remove four bumpers (18).
- 13. Remove two bumpers (19).
- 14. Remove four plugs (20).
- 15. Remove four rivets (21), by drilling out, and two handles (22, Figure 13-12).
- 16. Remove two rivets (23), by drilling out, and plate (24).

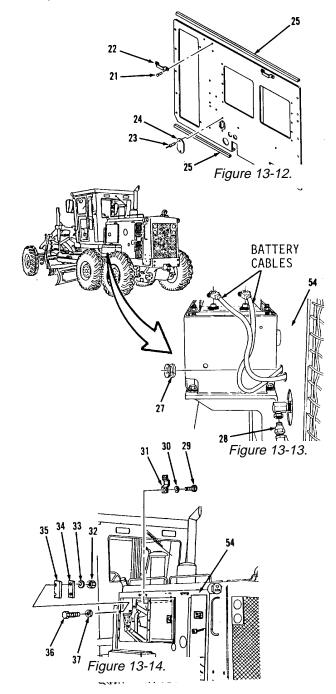
#### NOTE

- Removal of seals will cause destruction of seals.

  Remove seals only if inspection indicates replacement is necessary.
  - Remove two seals (25) from panel (26).
     Discard two seals (25). Remove all old adhesive and seal material from mounting surfaces.

## **REMOVAL/LEFT SIDE**

- 18. Remove two grommets (27, Figure 13-13).
- 18. Disconnect hose assembly (30).
- 19. Remove bolt (31), washer (32) and clip (33) from top, center inside of panel (56, Figure 13-14).
- 20. Remove two nuts (34), washers (35), catch (36), shims (37), two bolts (38) and washers (39).



## **13-5.** Engine Compartment Side Panels and Doors. (Sheet 5 of 10)

#### REMOVAL/LEFT SIDE

#### WARNING

Weight of left side engine compartment panel assembly is approximately 105 lbs. Use adequate hoist and sling for lifting. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

#### **CAUTION**

Do not attach sling to handles for lifting panel. Rivets may not support weight of panel.

21. Attach hoist and sling to items 41 thru 54 as an assembly (Figure 13-15). Wrap sling through door ports.

#### **CAUTION**

Battery cables will be damaged if caution is not exercised.

22. Push two cable assemblies (29) through holes in panel (56, Figure 13-13) and position in engine compartment.

## **CAUTION**

Bar will fall out from behind panel when bolts are removed.

- 23. Remove six bolts (38), washers (39) and bar (40).
- 24. Remove items 41 thru 54 as an assembly.
- 25. Remove hoist and sling.

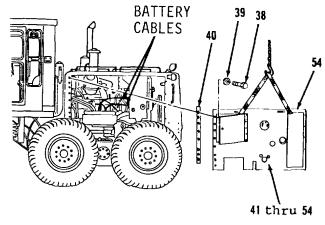


Figure 13-15.

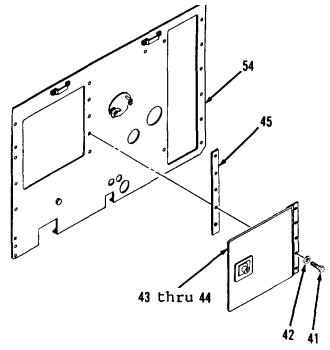


Figure 13-16.

Go to Sheet 6

## 13-5. Engine Compartment Side Panels and Doors. (Sheet 6 of 10)

#### **REMOVAL/LEFT SIDE**

26. Remove six bolts (41), washers (42), items 43 thru 44 as an assembly and spacer (45, Figure 13-16).

#### **NOTE**

Removal of seals will cause destruction of seals. Remove seals only if inspection indicates replacement is necessary.

- 27. Remove three seals (43) from door assembly (44, Figure 13-17). Discard three seals (43). Remove all old adhesive and seal material from mounting surfaces.
- 28. Remove two bumpers (45 and 46, Figure 13-18).
- 29. Remove two wing nuts (47), washers (48), cover assembly (49) and gasket (50). Discard gasket (50). Remove all gasket material from mounting surfaces.
- 30. Remove four rivets (51), by drilling out, and two handles (52).

## **NOTE**

Removal of seals will cause destruction of seals. Remove seals only if inspection indicates replacement is necessary.

31. Remove two seals (53) from panel (54). Discard two seals (53). Remove all adhesive and seal material from mounting surfaces, if necessary.

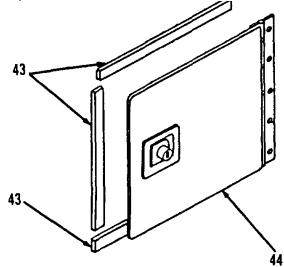


Figure 13-17.

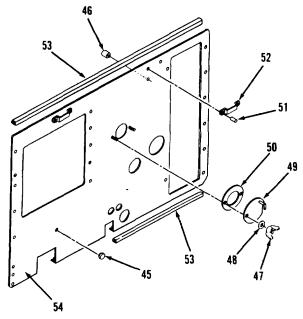


Figure 13-18.

## 13-5. Engine Compartment Side Panels and Doors. (Sheet 7 of 10)

#### **CLEANING**

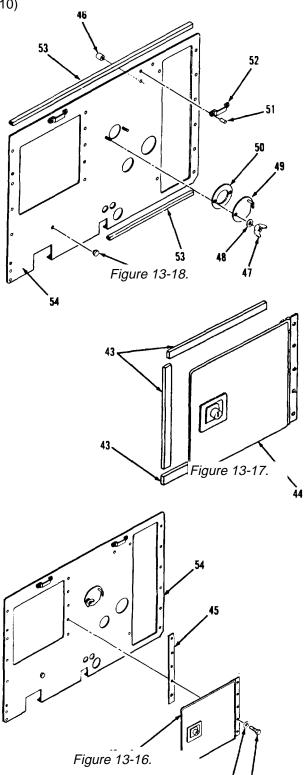
Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION/LEFT SIDE**

- Install two new seals (53) on panel (54, Figure 13-18), if removed. Cut bulk seal to length and apply seals to clean surface with adhesive.
- 2. Install two handles (52) and four new rivets (51).
- 3. Install gasket (50), cover assembly (49), two washers (48) and wing nuts (47).
- 4. Install two bumpers (46 and 45).
- Install three new seals (43) on door assembly (44, Figure 13-17), if removed. Cut bulk seal to length and apply seals to clean surface.
- 6. Install spacer (45), items 44 thru 43 as an assembly, six washers (42) and bolts (41) on panel (54, Figure 13-16).



## **13-5.** Engine Compartment Side Panels and Doors. (Sheet 8 of 10)

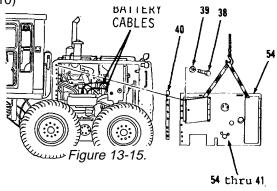
## **INSTALLATION/LEFT SIDE**

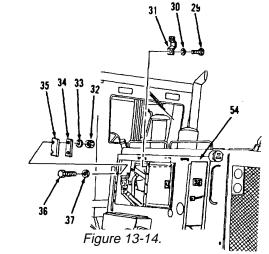
7. Attach hoist and sling to items 54 thru 41 as an assembly (Figure 13-15).

#### **CAUTION**

Battery cables will be damaged if caution is not exercised.

- 8. Position two battery cables through holes in panel (54).
- 9. Install items 54 thru 41 as an assembly and bar (42) on vehicle.
- 10. Install five washers (39) and bolts (38).
- 11. Remove hoist and sling.
- 12. Install two washers (37), bolts (36), shims (35), catch (34), two washers (33) and nuts (32, Figure 13-14).
- 13. Install clip (31), washer (30) and bolt (29) to top, center inside of panel (54).
- 14. Connect hose assembly (28, Figure 13-13).
- 15. Install two grommets (27).





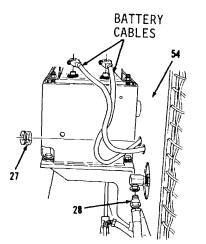
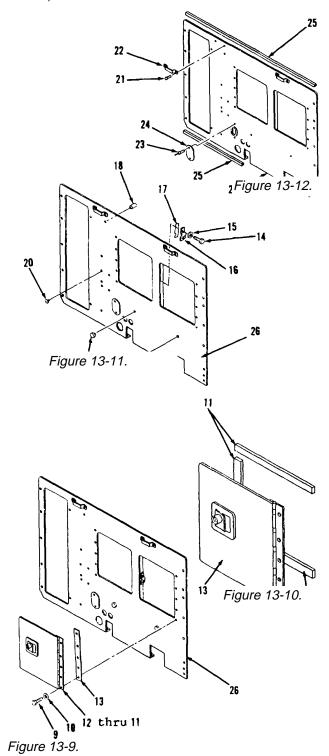


Figure 13-13.

## **13-5.** Engine Compartment Side Panels and Doors. (Sheet 9 of 10)

## **INSTALLATION/RIGHT SIDE**

- 16. Install two seals (25) on panel (26, Figure 13-12), if removed. Cut bulk seal to length and apply seals to clean surface with adhesive.
- 17. Install plate (24) and two new rivets (23).
- 18. Install two handles (22) and four new rivets (21).
- 19. Install four plugs (20) on panel (26, Figure 13-11).
- 20. Install two bumpers (19).
- 21. Install four bumpers (18).
- 22. Install shims (17), two catches (16), washers (15) and bolts (14).
- 23. Install six new seals (11) on two door assemblies (12, Figure 13-10), if removed. Cut bulk seal to length and apply seal to clean surface.
- 24. Install two spacers (13), two items 12 thru 11 as assemblies, 10 washers (10) and bolts (9) on panel (26, Figure 13-9).



Go to Sheet 10

## 13-5. Engine Compartment Side Panels and Doors. (Sheet 10 of 10)

## **INSTALLATION/RIGHT SIDE**

25. Attach hoist and sling to panel (26, Figure 13-8).

## **CAUTION**

Battery cables will be damaged if caution is not exercised.

- 26. Position two battery cables through holes in panel (26).
- 27. Install items 26 thru 9 as an assembly and bar (8) on vehicle.
- 28. Install eight washers (7) and bolts (6).
- 29. Remove hoist and sling.
- 30. Install clip (5), washer (4) and bolt (3) to top, center, inside of panel (26, Figure 13-7).
- 31. Connect hose assembly (2, Figure 13-6).
- 32. Install two grommets (1).

#### **NOTE**

Return 130G Grader to original equipment condition.

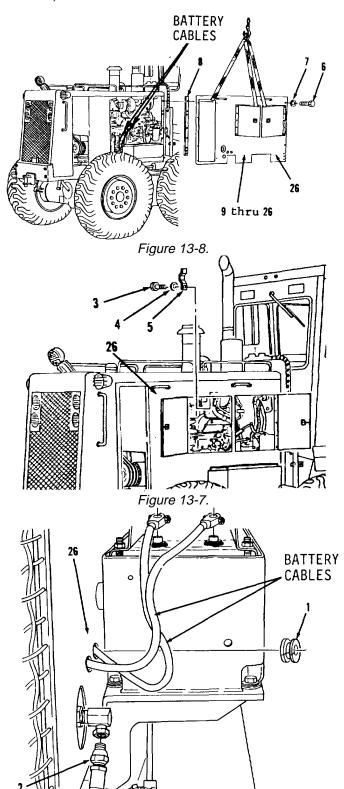


Figure 13-6.

End of Task

#### 13-6. Dash Plate. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations Personnel Required Construction equipment repairer MOS 62B

Tools

General Mechanic's Tool Kit: References Automotive (NSN 5180-00-177-

7033)

Hoist and sling

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

TM 5-3805-261-10

Special Environmental Conditions

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

## <u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-48 Supplemental steering electronic

control removed.

Paragraph 13-4 Engine hood removed.

Paragraph 13-5 Engine compartment side panels and

doors removed.

Go to Sheet 2

## **13-6. Dash Plate**. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Disconnect instrument panel. Refer to paragraph 16-7, step 1.
- 2. Disconnect electronic control. Refer to paragraph 7-48, steps 3 and 4.
- 3. Unlatch hood fastener assembly from dash plate (10, Figure 13-19).

#### **WARNING**

Weight of dash plate is 70 lbs. Use adequate hoist and sling for lifting. Failure to follow this procedure may result in INJURY. If you are injured, seek medical aid immediately.

- 4. Install hoist and sling to dash plate (9).
- 5. Remove bolt (1), washer (2), nut (3), washer (4), bolt (5) and brace (6) from front of engine compartment and dash plate (9, Figure 13-20).
- 6. Remove two bolts (7) and washers (8).
- 7. Raise front of hood slightly and using hoist and sling, remove dash plate (9) and two mountings (10).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

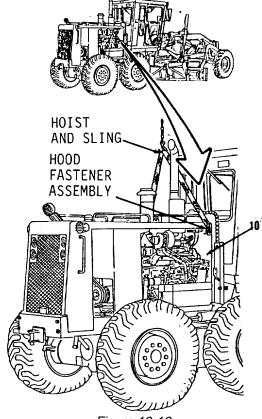
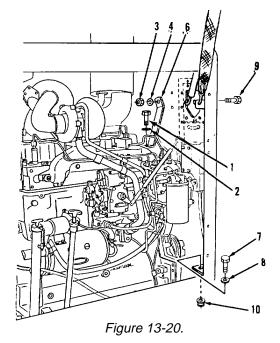


Figure 13-19.



Go to Sheet 3

## **13-6. Dash Plate**. (Sheet 3 of 3)

#### **INSTALLATION**

- Using hoist and sling, install two mountings (10) and dash plate (9, Figure 13-20) while slightly raising front hood.
- 2. Install two washers (8) and bolts (7) in front engine compartment.
- 3. Install brace (6), bolt (5), washer (4), nut (3), washer (2) and bolt (1).
- 4. Remove hoist and sling (Figure 13-19).
- 5. Latch hood fastener assembly to dash plate (9).
- 6. Connect electronic control. Refer to paragraph 7-48, steps 1 and 2.
- 7. Connect instrument panel. Refer to paragraph 16-7, step 3.

# NOTE Return 130G Grader to original equipment condition.

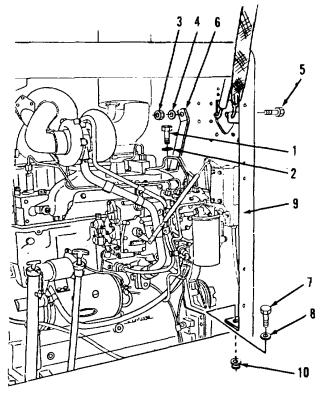
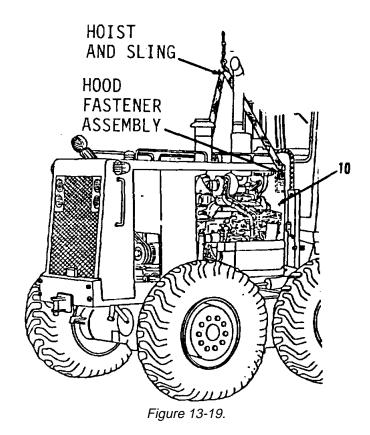


Figure 13-20.



End of Task

#### **13-7. ROPS Accessories.** (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Rivets, Items 1, 7, 9 Screws, Item 5 Gasket, Item 4 Personnel Required

Construction equipment repairer MOS 62B

<u>References</u>

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

.....

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-80 Headlights removed.

Paragraph 13-14 Cab sound suppression rear panel

removed.

Go to Sheet 2

## 13-7. ROPS Accessories. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

The following is a maintenance procedure for the left air door. The maintenance procedure for the right air door is identical.

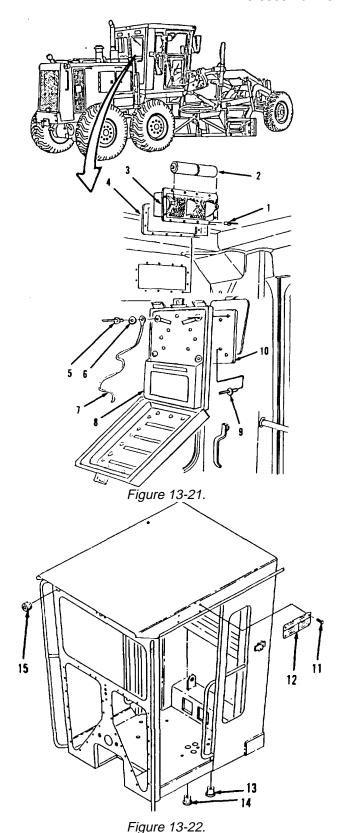
- 1. Remove 12 rivets (1), roller (2), air door (3) and gasket (4, Figure 13-21) on upper, rear side of cab. Discard 12 rivets (1) and gasket (4). Remove all gasket material from mounting surfaces.
- 2. Remove four rivets (5), washers (6), lanyard (7) and compartment (8). Discard four rivets (5).
- 3. Remove three rivets (9) and plate (10). Discard three rivets (9).
- 4. Remove four rivets (11) and instruction plate (12, Figure 13-22) in upper, left side of cab. Discard four rivets (11).
- 5. Remove three plugs (13) and (14) and two grommets (15) in cab.

## **CLEANING**

Clean all parts. Refer to Chapter 2.

### **INSPECTION**

Inspect all parts. Refer to Chapter 2.



Go to Sheet 3

## **13-7.** ROPS Accessories. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Install grommet (15) and three plugs (13 and 14, Figure 13-22) in cab.
- 2. Install instruction plate (12) and four new rivets (11).
- 3. Install plate (10) and three new rivets (9, Figure 13-21) in upper, left side of cab.
- 4. Install compartment (8), lanyard (7), four washers (6) and new rivets (5).
- 5. Install new gasket (4), air door (3), roller (2) and 12 new rivets (1).

NOTE
Return 130G Grader to original equipment condition.

End of Task

#### 13-8. Lower Front Windshields. (Sheet 1 of 7)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Hoist and sling

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Detergent, Item 8, Appendix C Seal, Item 12 Gasket, Item 14 Seal (Bulk Material), Item 26 Gasket (Bulk Material), Item 28 Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

34 Screw inserts, Item 30

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-12 Lower front sound suppression panels

removed.

## 13-8. Lower Front Windshields. (Sheet 2 of 7)

#### **REMOVAL**

#### **WARNING**

When working with glass, always wear safety goggles and protective gloves. Failure to do so may cause INJURY. If injury occurs, seek medical help immediately.

#### NOTE

The following is a maintenance for the left, lower front windshield. The maintenance procedure for the right, lower front windshield is identical.

- 1. Remove handle (1) and one of two spacers (2, Figure 13-23) from inside of cab. Turn handle (1) counterclockwise to remove.
- 2. Remove one spacer of two (2) and bolt (3).
- 3. Remove four bolts (4) and housing (5).
- 4. Remove washer (6) and bearing (7) from housing (5).
- 5. Remove items 17 thru 29 as an assembly.

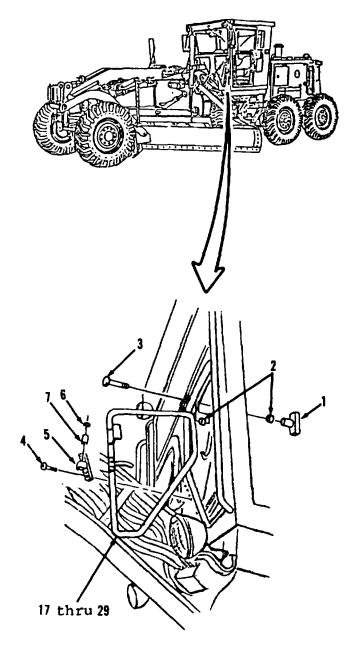


Figure 13-23.

Go to Sheet 3

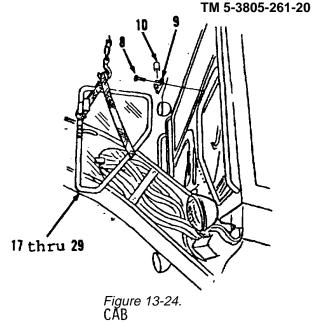
## **13-8.** Lower Front Windshields. (Sheet 3 of 7)

## **REMOVAL** (cont)

- 6. Remove two bolts (8) and housing (9, Figure 13-24).
- 7. Remove bearing (10) from housing (9).
- 8. Remove 13 bolts (11, Figure 13-25).
- 9. Remove seal (12) and discard if necessary, from outer window frame (13).
- 10. Remove outer window frame (13) and gasket (14). Discard gasket (14). Remove all gasket material from mounting surfaces.
- 11. Remove two bolts (15) and stop (16) from outer window frame (13).

## **DISASSEMBLY**

- 1. Remove four bolts (17) and pivot (18, Figure 13-26).
- 2. Remove three bolts (19) and pivot (20).
- 3. Remove two bolts (21) and handle (22).
- 4 Remove two screws (23) and latch (24).
- 5. Remove two bolts (25).



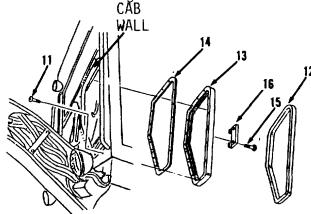
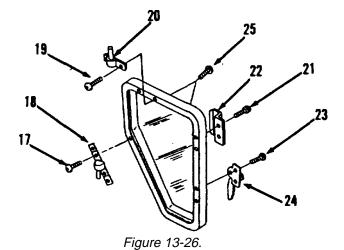


Figure 13-25.



## **13-8.** Lower Front Windshields. (Sheet 4 of 7)

#### **DISASSEMBLY**

- Remove seal (26) and discard if necessary, glass (27) and gasket (28) from inner window frame (29, Figure 13-27). Discard gasket (28). Remove all gasket material from mounting surfaces.
- 7. Using a hammer and punch, remove 34 screw inserts (30) if damaged, from inner and outer window frames (13 and 29).

### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

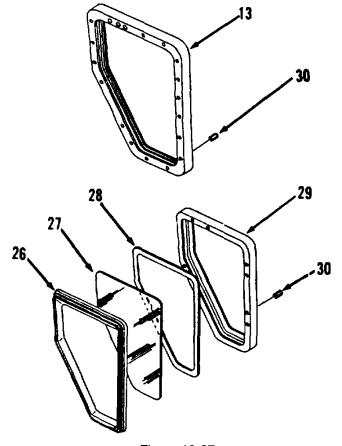


Figure 13-27.

Go to Sheet 5

## **13-8.** Lower Front Windshields. (Sheet 5 of 7)

#### **ASSEMBLY**

- Install 34 screw inserts (30) in inner and outer window frames (13 and 29, Figure 13-27) if necessary, tap in with soft faced hammer.
- Install new gasket (28) in inner window frame (29) with adhesive backing onto lip of inner window frame. Surface must be clean and dry. Cut bulk gasket material to size.
- Install glass (27) and seal (26). Seat lip of seal (26) between glass (27) and inner window frame (29), work lip of seal (26) around inner window frame (29) until ends meet and glass (27) is secured in inner window frame (29). If installing new seal (26), cut bulk seal material to size.
- 4. Install two bolts (25, Figure (13-26).
- 5. Install latch (24) and two screws (23).
- 6. Install handle (22) and two bolts (21).
- 7. Install pivot (20) and three bolts (19).
- 8 Install pivot (18) and four bolts (17).

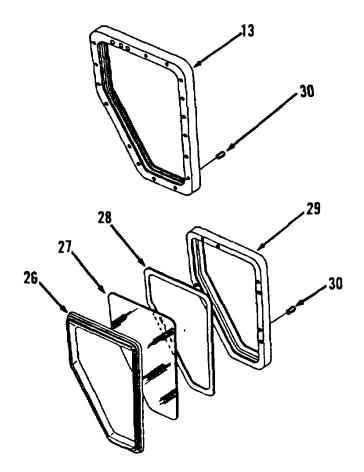


Figure 13-27.

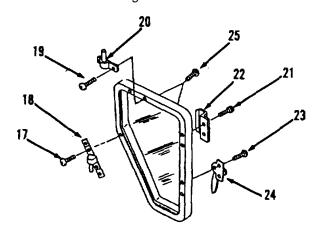


Figure 13-26.

Go to Sheet 6

## **13-8.** Lower Front Windshields. (Sheet 6 of 7)

#### **INSTALLATION**

- 1. Install stop (16) and two bolts (15) in outer window frame (13-25).
- Install new gasket (14) with adhesive backing onto mounting surface of outer window frame (13). Surface must be clean and dry. Cut bulk gasket material to size and remove gasket material from all mounting holes.
- 3. Install seal (12). Seat lips of seal (12) into grooves of outer window frame (13), work seal (12) around outer window frame (13) until ends meet. If installing new seal (12) cut bulk seal material to size.
- 4. Position outer window frame (13) against cab wall in left front, inside of cab.
- 5. Install 13 bolts (11). Move outer window frame (13) to align holes.
- 6. Install bearing (10) into housing (9).

Go to Sheet 7

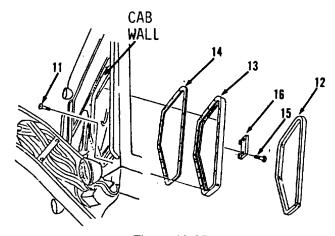


Figure 13-25.

## **13-8.** Lower Front Windshields. (Sheet 7 of 7)

## **INSTALLATION** (cont)

#### WARNING

Use adequate hoist and sling to perform this task. Failure to do so could result in INJURY. If you are injured, seek medical aid immediately.

- 7. Attach hoist and sling to items 17 thru 29 as an assembly (Figure 13-24).
- 8. Insert pivot (20) into housing (9).
- 9. Install housing (9) and two bolts (8).
- 10. Remove hoist and sling.
- 11. Install bearing (7) and washer (6) into housing (5, Figure (13-23).
- 12. Install housing (5) and four bolts (4).
- 13. Install bolt (3) only halfway.
- 14. Install one of two spacers (2) under lip, inside of cab. Line up with bolt (3) and push bolt (3) through one of two spacers (2) and cab panel.
- 13. Install one of two spacers (2) and handle (1). Turn handle (1) clockwise to install.

#### NOTE

Return 130G Grader to original equipment condition.

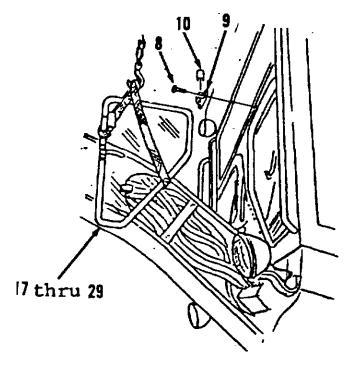


Figure 13-24.

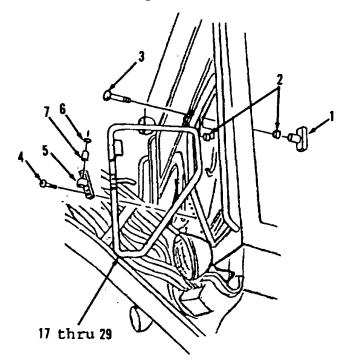


Figure 13-23.

End of Task

## 13-9. Cab Window Panels. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Seal installer tool 5H485

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Detergent, Item 8, Appendix C Seal (Bulk Material), Item 2 Personnel Required

Two construction equipment repairers MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

## Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 14-5 Upper front windshield wiper arm

removed.

Paragraph 14-6 Rear windshield wiper arm removed.

Go to Sheet 2

## 13-9. Cab Window Panels. (Sheet 2 of 4)

#### **REMOVAL**

#### **WARNING**

When working with glass, always wear safety goggles and protective gloves. Failure to do so may cause INJURY. If injured, seek medical aid immediately.

#### NOTE

The following is a maintenance procedure for the rear window glass. The maintenance procedure for the upper front windshield glass, right and left side window glass, right and left upper door window glass and right and left lower door window glass is identical.

 Using a seal installer tool, unlock seal (2, Figure 13-29) in rear window, outside of cab. Place curved end of seal installer tool in between locking lips at butted ends of seal (2). Work seal installer tool around the circumference of the window pulling locking lip away from cab.

#### NOTE

## Step 2 requires two mechanics.

- 2. Remove glass (1). Two mechanics must tilt top of glass (1) away from cab and remove from bottom channel.
- 3. Remove seal (2) and discard if necessary. Pull out seal (2) from edge of window opening.

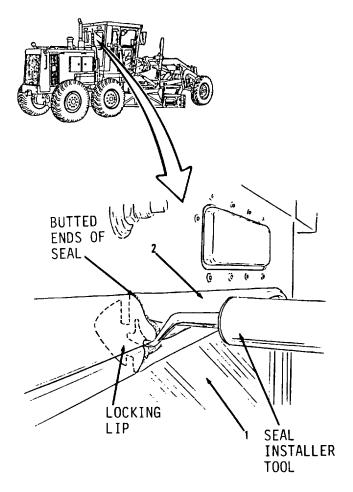


Figure 13-29.

## **13-9.** Cab Window Panels. (Sheet 3 of 4)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

- 1. Inspect seal (2). Replace if torn, deteriorated or otherwise damaged.
- 2. Inspect all other parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install seal (2). Start one end of seal (2) on side of window opening, with locking lip towards the outside of cab.
- 2. Push seal (2) onto edge of window opening around the circumference of opening until ends are closed together smooth and tight. If installing new seal (2, Figure 13-30), cut bulk seal material 1/8 inch per foot of window opening circumference past the starting point, then close ends.

#### **NOTE**

## Step 3 requires two mechanics.

3. Two mechanics must position bottom of glass (1) into channel of seal (2) as far as possible. Do not use too much force.

Go to Sheet 4

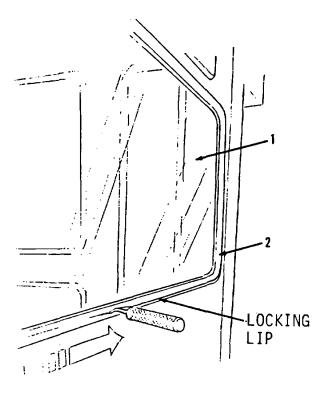


Figure 13-30.

## 13-9. Cab Window Panels. (Sheet 4 of 4)

## **INSTALLATION** (cont)

- 4. Install glass (1). Use seal installer tool to lift edge of seal (2) around the circumference of the window, so glass (1, Figure 13-30) can slip into position.
- 5. Inspect seal (2) in rear window, inside of cab. Make sure edge of seal (2) is over glass (1).
- 6. Lock seal (2) in rear window, outside of cab. Apply mild soap and water solution to locking lip around circumference of seal (2).
- With seal installer tool, insert curved end between locking lip and groove at any point away from the butted ends. Work seal installer tool along groove until locking lip is locked into position around circumference of the window.

NOTE
Return 130G Grader to original equipment condition.

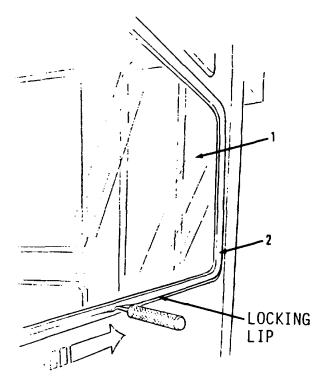


Figure 13-30.

End of Task

## 13-10. Cab Doors and Latch Assemblies. (Sheet 1 of 9)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Hoist and sling

Test Equipment

None

Materials/Parts

Dry cleaning solvent,
Item 14, Appendix C
Clean cloths, Item 39,
Appendix C
Detergent, Item 8, Appendix C
Adhesive, Item 2, Appendix C
Lubricant
14 Rivets, Item 21
Seals (Bulk Material),
Items 23, 24
Cotter pins, Items 32,

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

35, 40, 43, 47

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-9 Cab windows removed.

Paragraph 14-7 Windshield washer reservoir removed.

Go to Sheet 2

## 13-10. Cab Doors and Latch Assemblies. (Sheet 2 of 9)

#### **REMOVAL**

#### WARNING

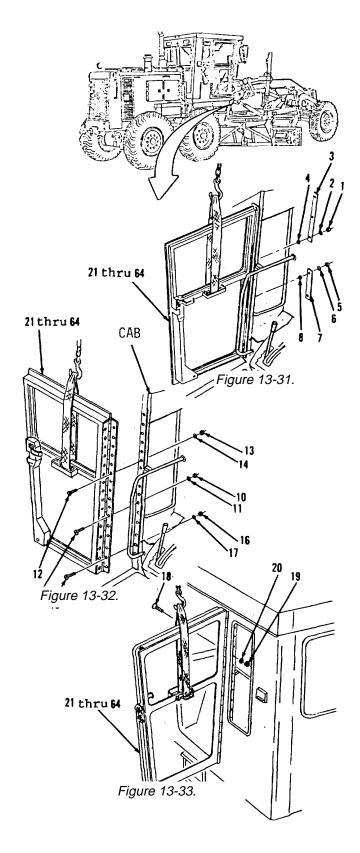
Weight of each door assembly is approximately 85 lbs. Use adequate hoist and sling for lifting. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 1. Disconnect cab switch panel. Refer to paragraph 7-43, steps 1 and 5.
- 2. Attach hoist and sling to items 21 thru 64 as an assembly in right door (Figure 13-31).

#### NOTE

Use pencil and outline door hinge to aid in installation.

- 3. Remove three nuts (1), washers (2), plate (3) and three spacers (4).
- 4. Remove two nuts (5), washers (6), plate (7) and two spacers (8).
- 5. Remove two screws (9), nuts (10) and washers (11, Figure 13-32).
- 6. Remove three screws (12), nuts (13) and washers (14).
- 7. Remove nine screws (15), nuts (16) and washers (17).
- 8. Using hoist and sling, remove items 21 thru 64 as an assembly.
- 9. Remove hoist and sling.
- 10. Attach hoist and sling to items 21 thru 64 as an assembly in left door (Figure 13-33).



## 13-10. Cab Doors and Latch Assemblies. (Sheet 3 of 9)

#### **REMOVAL**

- 11. Remove 14 screws (18), nuts (19) and washers (20).
- 12. Using hoist and sling, remove items 21 thru 64 as an assembly.
- 13. Remove hoist and sling.

#### NOTE

- Steps 13 thru 32 of this removal procedure is for the left door components. The removal procedure for the right door components is identical.
- Remove rivets, hinge and seals only if inspection indicates replacement is necessary.
  - 14. Remove 14 rivets (21), hinge (22), seals (23 and 24, Figure 13-34), if necessary. Discard 14 rivets (21) and seals (23 and 24). Remove all old adhesive and seal material from mounting surfaces.
  - 15. Remove plug (25).
  - 16. Remove two nuts (26), plate (27), two bolts (28) and handle (29).
  - 17. Remove three screws (30) and cover (31, Figure 13-35).
  - 18. Remove cotter pin (32), two screws (33) and handle (34). Discard cotter pin (32).

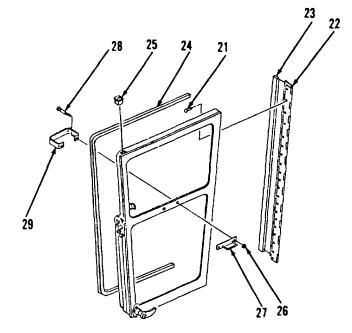
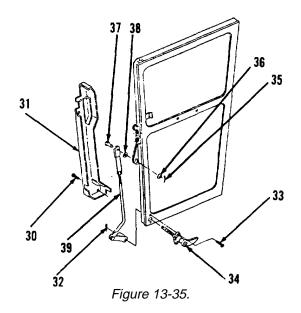


Figure 13-34.

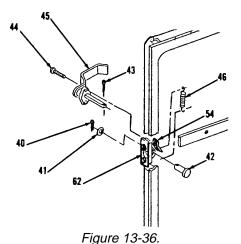


Go to Sheet 4

## 13-10. Cab Doors and Latch Assemblies. (Sheet 4 of 9)

## **REMOVAL** (cont)

- 19. Remove cotter pin (35), washer (36), pin (37), washer (38) and link assembly (39). Discard cotter pin (35).
- 20. Remove cotter pin (40), washer (41) and pin (42, Figure 13-36). Discard cotter pin (40).
- 21. Remove cotter pin (43), two screws (44) and handle (45). Discard cotter pin (43).
- 22. Remove spring (46) from plate (54) and latch (62).
- 23. Remove cotter pin (47), washer (48), arm (49), washer (50) and link (51, Figure 13-37). Discard cotter pin (47).
- 24. Remove nut (52), washer (53), plate (54) and bolt (55).
- 25. Remove nut (56), washer (57) and bolt (58, Figure 13-38).
- 26. Remove two nuts (59), washers (60), bolts (61), latch (62) and two washers (63) from door (64).



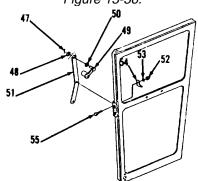
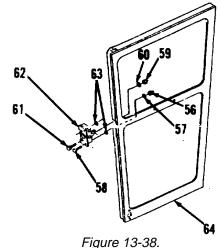


Figure 13-37.



Go to Sheet 5

## 13-10. Cab Doors and Latch Assemblies. (Sheet 5 of 9)

#### **REMOVAL**

- 27. Remove striker (65), shims (66) and plate (67, Figure 13-39) from door post in operator's compartment.
- 28. Remove four bolts (68) and washers (69) from bracket (74).
- 29. Remove four screws (70), two washers (71), nuts (72), latch (73) and bracket (74).

#### NOTE

## Remove strip only if inspection indicates replacement is necessary.

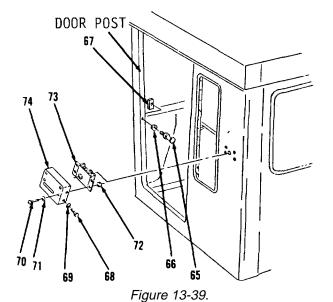
- 30. Remove and discard strip (75, Figure 13-40), if necessary. Remove all old adhesive from mounting.
- 31. Remove retainer (76) and washer (77).
- 32. Remove items 78 thru 80 as an assembly from inside of operator's compartment.
- 33. Remove retainer (78) and ball (79) from handle (80, Figure 13-41).

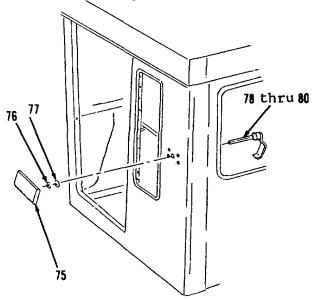
#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.





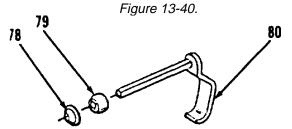


Figure 13-41.

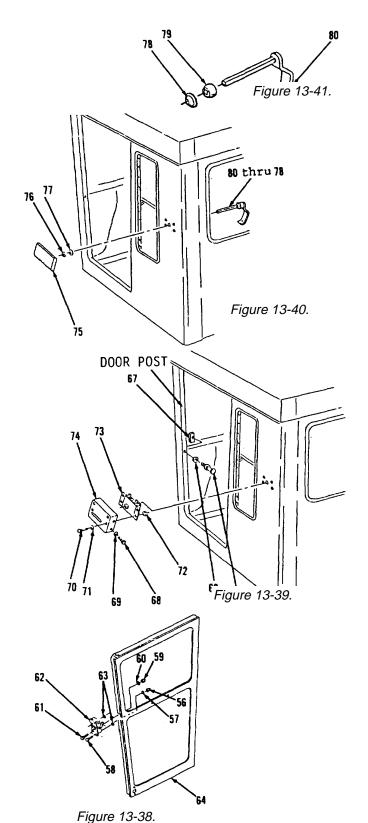
## 13-10. Cab Doors and Latch Assemblies. (Sheet 6 of 9)

#### **INSTALLATION**

#### NOTE

Steps 1 thru 22 of this installation procedure are for the left door components. The installation procedure for the right door components is identical.

- 1. Install ball (79) and retainer (78) on handle (80, Figure 13-41).
- Install items 80 thru 78 as an assembly in rear of operator's compartment (Figure 13-40).
- 3. Install washer (77) and retainer (76).
- 4. Apply thin coat of adhesive to strip (75). Install new strip (75) on cab, if removed.
- 5. Install latch (73), two nuts (72), washers (71) and four screws (70) on bracket (74, Figure 13-39).
- 6. Install four washers (69) and bolts (68) on bracket (74).
- 7. Install plate (67), shims (66) and striker (65) in door post of operator's compartment.
- 8. Install two washers (63), latch (62), two bolts (61), washers (60) and nuts (59) on door (64). Lubricate all moving parts of latch (62, Figure 13-38) with dry type lubricant.



Go to Sheet 7

## 13-10. Cab Doors and Latch Assemblies. (Sheet 7 of 9)

## **INSTALLATION**

- 9. Install bolt (58), washer (57) and nut (56).
- 10. Install bolt (55), plate (54), washer (53) and nut (52, Figure 13-37).
- 11. Install link (51), washer (50), arm (49), washer (48) and new cotter pin (47).
- 12. Install spring (46) on plate (54) and latch (62, Figure 13-36).
- 13. Install handle (45), two screws (44) and new cotter pin (43).
- 14. Install pin (42), washer (41) and new cotter pin (40).
- 15. Install link assembly (39), washer (38), pin (37), washer (36) and new cotter pin (35, Figure 13-35).
- 16. Install handle (34), two screws (33) and new cotter pin (32).
- 17. Install cover (31) and three screws (30). Tighten three screws (30) to 79 lb.-in torque.

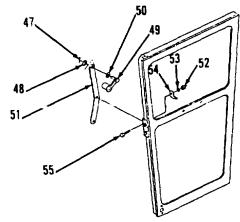
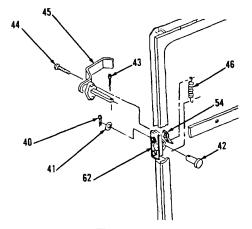


Figure 13-37.



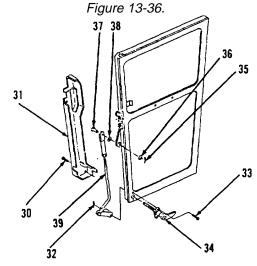
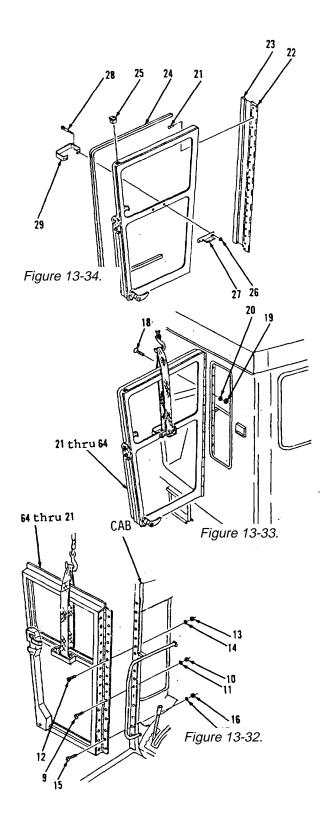


Figure 13-35.

## 13-10. Cab Doors and Latch Assemblies. (Sheet 8 of 9)

## **INSTALLATION** (cont)

- 18. Install handle (29), two bolts (28), plate (27) and two nuts (26, Figure 13-34).
- 19. Install plug (25).
- 20. Install new seal (24), if removed. Cut to size from adhesive backed bulk seal.
- 21. Install new seal (23), if removed. Cut to size from adhesive backed bulk seal.
- 22. Install hinge (22) and 14 new rivets (21), if removed.
- 23. Attach hoist and sling to items 64 thru 21 as an assembly of left door (Figure 13-33).
- Using hoist and sling, position items 64 thru
   as an assembly on cab. Aline with pencil marks made previously.
- 25. Install 14 washers (20), nuts (19) and screws (18).
- 26. Remove hoist and sling.
- 27. Attach hoist and sling to items 64 thru 21 as an assembly of right door (Figure 13-32).
- Using hoist and sling, position items 64 thru
   on cab. Aline with pencil marks made previously.
- 29. Install nine washers (17), nuts (16) and screws (15).
- 30. Install three washers (14), nuts (13) and screws (12).



## 13-10. Cab Doors and Latch Assemblies. (Sheet 9 of 9)

## **INSTALLATION**

- 31. Install two washers (11), nuts (10) and screws (9).
- 32. Install two spacers (8), plate (7), two washers (6) and nuts (5, Figure 13-31).
- 33. Install three spacers (4), plate (3), three washers (2) and nuts (1).
- 34. Remove hoist and sling.
- 35. Connect cab switch panel. Refer to paragraph 7-43, steps 6 and 10.

#### **ADJUSTMENT**

- 1. Close doors, left and right sides (Figure 13-42).
- 2. Inspect striker (65) to see if striker (65) is centered in latch (62) and does not guide the door up or down.
- 3. Adjust, if necessary, by removing or installing shims (66).

# NOTE Return 130G Grader to original equipment condition.

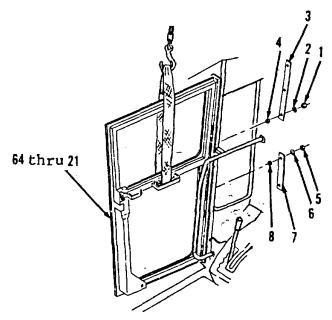


Figure 13-31.

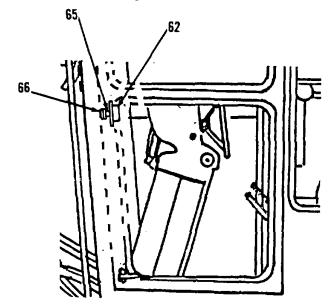


Figure 13-42.

End of Task

## 13-11. Cab Storage Compartment. (Sheet 1 of 4)

a. Removal This task covers: b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations Personnel Required

Tools

General Mechanic's Tool Kit Automotive (NSN 5180-00-177

7033)

Test Equipment None

Materials/Parts Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Rivets, Items 29, 31

Construction equipment repairer MOS 62B

References TM 5-3805-261-10

**Special Environmental Conditions** None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

## **Troubleshooting References**

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

> Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-68 Dome light switch removed.

Paragraph 14-8 Defroster fan removed.

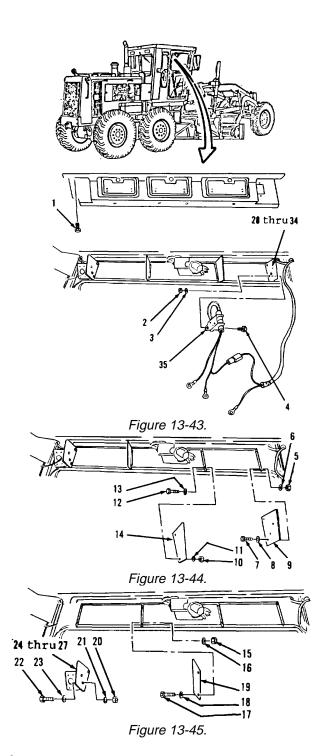
Paragraph 14-10 Rear view mirror (inside) removed.

Go to Sheet 2

## **13-11.** Cab Storage Compartment. (Sheet 2 of 4)

#### **REMOVAL**

- 1. Remove 14 screws (1, Figure 13-43).
- 2. Remove storage compartment items 28 thru 34 as an assembly.
- 3. Remove nut (2), washer (3) and bolt (4).
- 4. Separate clip (35) from plate (9).
- 5. Remove two nuts (5), washers (6), bolts (7), washers (8) and plate (9, Figure 13-44).
- 6. Remove two nuts (10), washers (11), bolts (12), washers (13) and plate (14).
- 7. Remove two nuts (15), washers (16), bolts (17), washers (18) and plate (19, Figure 13-45).
- 8. Remove two nuts (20), washers (21), bolts (22), washers (23) and items 24 thru 27 as an assembly.



## 13-11. Cab Storage Compartment. (Sheet 3 of 4)

## **REMOVAL** (cont)

9. Remove two bolts (24), washers (25) and bracket (26) from plate (27, Figure 13-46).

#### NOTE

Remove rivets, hinges or doors only if inspection indicates replacement is necessary.

- 10. Remove three knobs (28), six rivets (29) and three latches (30, Figure 13-47). Drill out six rivets (29), if necessary.
- 11. Remove 24 rivets (31), six hinges (32) and three doors (33) from storage compartment (34). Drill out 24 rivets (31), if necessary.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install three doors (33), six hinges (32) and 24 new rivets (31) to storage compartment (34, Figure 13-47), if removed.
- 2. Install three latches (30), six new rivets (29) and three knobs (28) on three doors (33), if removed.

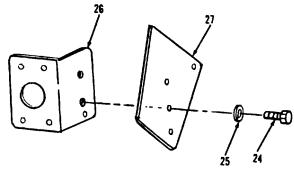
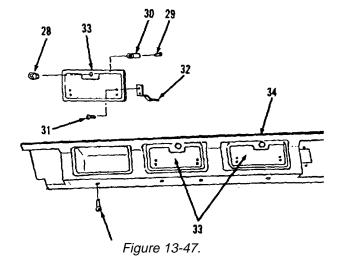


Figure 13-46.



Go to Sheet 4

## **13-11.** Cab Storage Compartment. (Sheet 4 of 4)

#### **INSTALLATION**

- 3 Install bracket (26), two washers (25) and bolts (24) on plate (27, Figure 13-46).
- 4. Install items 27 thru 24 as an assembly, two washers (23), bolts (22), washers (21) and nuts (20, Figure 13-45).
- 5. Install plate (19), two washers (18), bolts (17), washers (16) and nuts (15).
- Install plate (14), two washers (13), bolts (12), washers (11) and nuts (10, Figure 13-44).
- 7. Install plate (9), two washers (8), bolts (7), washers (6) and nuts (5).
- 8. Position clip (35) on plate (9, Figure 13-43).
- 9. Install bolt (4), washer (3) and nuts (2) on plate (9).
- 10. Position storage compartment items 34 thru 28 as an assembly.
- 11. Install 14 screws (1).

# NOTE Return 130G Grader to original equipment condition.

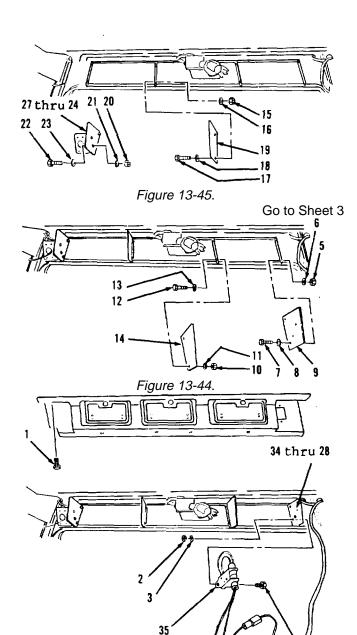


Figure 13-43.

End of Task

## 13-12. Cab Sound Suppression Panels (Lower Front and Rear). (Sheet 1 of 3)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit Automotive (NSN 5180-00-177

7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Detergent, Item 8. Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

## 13-12. Cab Sound Suppression Panels (Lower Front and Rear). (sheet 2 of 3)

#### **REMOVAL**

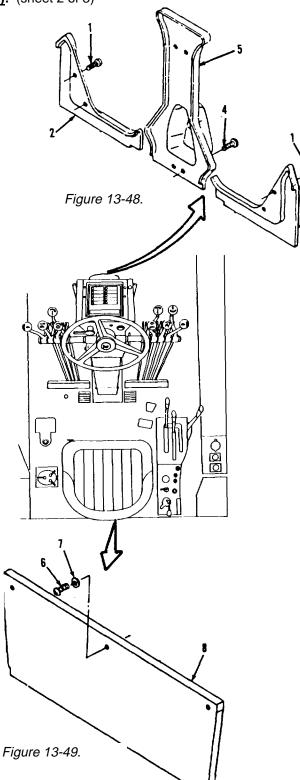
- 1. Using an offset screwdriver, remove four screws (1) and covers (2 and 3, Figure 13-48) in front, inside of cab.
- 2. Remove four screws (4) and panel (5).
- 3. Remove three screws (6), washers (7) and insulation (8, Figure 13-49) from rear, inside of cab.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

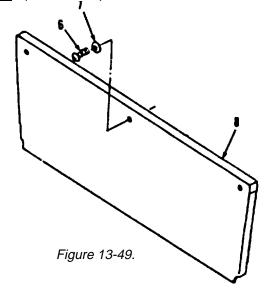


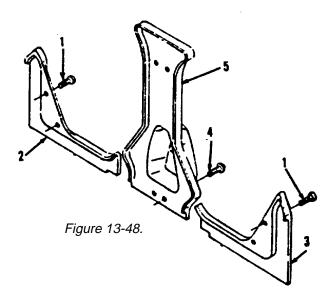
## 13-12. Cab Sound Suppression Panels (Lower Front and Rear). (Sheet 3 of 3)

## **INSTALLATION**

- 1. Install insulation (8), three washers (7) and screws (6, Figure 13-49).
- 2. Install panel (5) and four screws (4, Figure 13-48).
- 3. Install covers (3 and 2) and four screws (1).

NOTE
Return 130C Grader to original equipment condition.





End of Task

## 13-13. Cab Sound Suppression Panel (Ceiling). (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

<u>Applicable Configurations</u>
All

<u>Personnel Required</u>
Construction equipment

**Tools** 

General Mechanic's Tool Kit Automotive (NSN 5180-00-177

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C repairer MOS 62B

TM 5-3805-261-10

**Special Environmental Conditions** 

None

References

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

## **Troubleshooting References**

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-68 Dome light removed.

Paragraph 14-8 Defroster fan removed.

Paragraph 14-10 Rear view mirror (inside) removed.

Go to Sheet 2

## 13-13. Cab Sound Suppression Panel (Ceiling). (Sheet 2 of 2)

#### **REMOVAL**

- 1. Remove four screws and plates (Figure 13-50) in upper, front of cab.
- 2. Remove insulation from cab ceiling. Slide insulation forward out of cab ceiling plates.

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- Install insulation in cab ceiling. Slide insulation into cab ceiling plates (Figure 13-50).
- 2. Install four plates and screws.

NOTE
Return 130C Grader to original equipment condition.

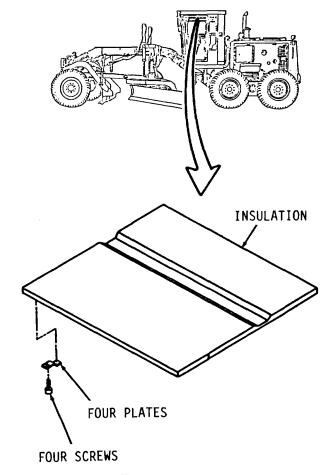


Figure 13-50.

End of Task

## 13-14. Cab Sound Suppression Panel (Rear). (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

<u>Applicable Configurations</u> <u>Personnel Required</u>

II Construction equipment repairer MOS 62B

**Tools** 

General Mechanic's Tool Kit References

Automotive (NSN 5180-00-177 TM 5-3805-261-10

7033)

Test Equipment Special Environmental Conditions
None

st Equipment
None

Materials/Parts General Safety Instructions
None

Dry cleaning solvent,

Item 14, Appendix C <u>Torques</u>

Clean cloths, Item 39,

Appendix C

Appendix C

All fasteners are tightened to standard torques. Refer to

Detergent, Item 8. Appendix C Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-68 Dome light removed.

Paragraph 14-6 Rear wiper and wiper motor removed.

Paragraph 14-8 Defroster fan removed.

Paragraph 14-10 Rearview mirror (inside) removed.

Go to Sheet 2

## 13-14. Cab Sound Suppression Panel (Rear). (Sheet 2 of 2)

## **REMOVAL**

Remove two screws (1), two washers (2) and panel (3, Figure 13-51).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install panel (3). Base of panel (3, Figure 13-51) is longer than the top.
- 2. Install two washers (2) and two screws (1).

NOTE
Return 130G Grader to original equipment condition.

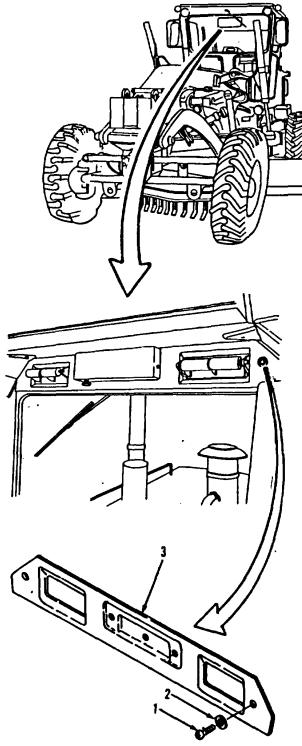


Figure 13-51.

End of Task

#### 13-15. Operator's Panel Console. (Sheet 1 of 6)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Cotter pin, Item 1 Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

.....

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

## 13-15. Operator's Panel Console. (Sheet 2 of 6)

#### **REMOVAL**

- 1. Remove seat. Refer to paragraph 13-21, steps 1 and 2.
- 2. Remove cotter pin (1) and clevis pin (2) from right side of operator's panel console, inside of cab. Discard cotter pin (1). Lay linkage rod (3, Figure 13-52) to one side.
- 3. Remove four bolts (4) and washers (5).
- 4. Separate harness assembly (6) from bracket (10) in rear of operator's panel console.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 5. Disconnect harness assembly (6) from harness assembly (7).
- 6. Remove four bolts (8), washers (9) and bracket (10).
- 7. Remove panel (11, Figure 13-53).
- 8. Remove two bolts (12), washers (13) and plate (14).
- 9. Remove nut (15), washer (16), seat (17), spring (18), washer (19), lever (20), bearing (21) and disc (22).

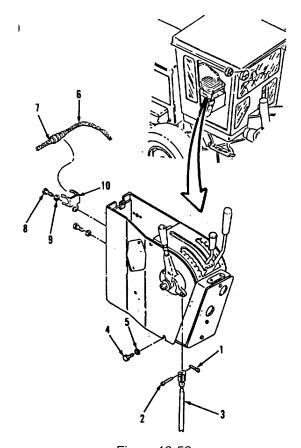


Figure 13-52.

## 13-15. Operator's Panel Console. (Sheet 3 of 6)

#### **REMOVAL**

- 10. Remove four bolts (23) and washers (24, Figure 13-54) from left side of operator's panel console.
- 11. Remove nut (25), washer (26) and plate (27) from master disconnect switch (28).
- 12. Remove two screws (29) and nuts (30) from main circuit breaker (31).
- 13. Disconnect harness assembly (32) from harness assembly (33).
- 14. Separate harness assemblies (6 and 32) and grommet (34) from panel (38). Separate by pushing grommet (34) through opening along with harness assemblies (6 and 32).
- 15. Remove bolt (35), washer (36) and clip (37, Figure 13-55).
- 16. Remove panel (38).
- 17. Remove two nuts (39), washers (40) and bolts (41) from top of operator's panel console.
- 18. Remove bolt (42) and washer (43).
- 19. Remove two bolts (44) and washers (45).
- 20. Remove handle (46) and gate (47). Turn handle (46) counterclockwise.
- 21. Remove two bolts (48), washers (49) and bracket (50).

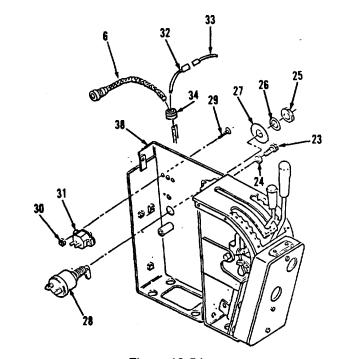


Figure 13-54.

36

37

41

48

49

Figure 13-55.

## 13-15. Operator's Panel Console. (Sheet 4 of 6)

## **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install bracket (50), two washers (49) and bolts (48, Figure 13-55) in top of operator's panel console.
- 2. Install gate (47).
- 3. Install handle (46).
- 4. Install two washers (45) and bolts (44).
- 5. Install washer (43) and bolt (42).
- 6. Install two bolts (41), washers (40) and nuts (39).
- 7. Install panel (38) on left side of operator's panel console.
- 8. Install clip (37), washer (36) and bolt (35).

Go to Sheet 5

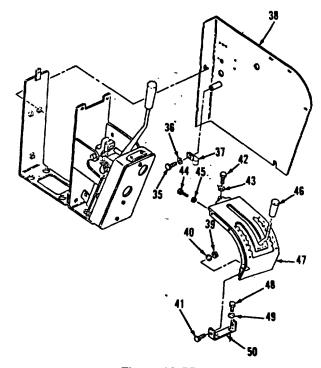


Figure 13-55.

## 13-15. Operator's Panel Console. (Sheet 5 of 6)

#### **INSTALLATION**

- 9. Position grommet (34) and harness assemblies (32 and 6). Push through opening in panel (38). Seat lips of grommet (34, Figure 13-54) around edge of opening.
- 10. Connect harness assembly (33) to harness assembly (32).
- 11. Install main circuit breaker (31), two nuts (30) and screws (29).
- 12. Install master disconnect switch (28), plate (27), washer (26) and nut (25).
- 13. Install four washers (24) and bolts (23).
- Install disc (22), bearing (21), lever (20), washer (19), spring (18), seat (17), washer (16) and nut (15) in panel (11, Figure 13-53).
- 15. Install plate (14), two washers (13) and bolts (12).
- 16. Position panel (11) on right side of operator's panel console.

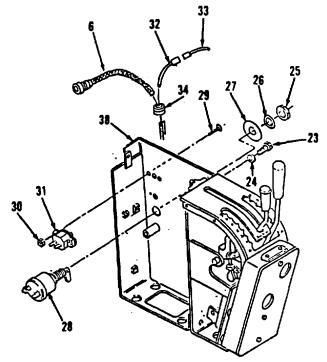


Figure 13-54.

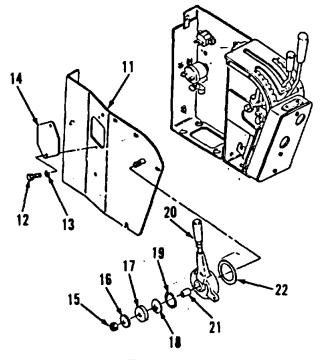


Figure 13-53.

## 13-15. Operator's Panel Console. (Sheet 6 of 6)

## **INSTALLATION** (cont)

- 17. Install bracket (10), four washers (9) and bolts (8, Figure 13-52).
- 18. Connect harness assembly (7) to harness assembly (6).
- 19. Install harness assembly (6) onto bracket (10).
- 20. Install four washers (5) and bolts (4).
- 21. Install clevis pin (2) and new cotter pin (1). Install clevis pin (2) through linkage rod (3) and lever (20).
- 22. Install seat. Refer to paragraph 13-21, steps 7 and 8.

## NOTE Return 130C Grader to original equipment condition.

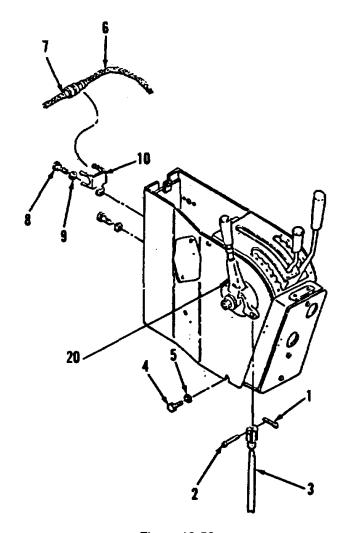


Figure 13-52.

End of Task

#### 13-16. Cab Insulation and Mounting. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39,

Appendix C

Personnel Required

Construction equipment repairer NOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped.

Master disconnect switch off.

Go to Sheet 2

## **13-16.** Cab Insulation and Mounting. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

The following is a maintenance procedure for the left cover. The maintenance procedure for the right cover is identical.

- 1. Remove three screws (1), washers (2), cover (3) and seal (4, Figure 13-56) on floor in interior of cab.
- 2. Remove two bolts (5) and bracket (6).
- 3. Remove three nuts (7), bolts (8), washers (9), plate (10) and seal (11).
- 4. Remove two bolts (12), washers(13) and plate (14).
- 5. Remove seal (15) by pulling out through top of floormat (16, Figure 13-57).
- 6. Remove floormat (16).
- 7. Remove nut (17), washer (18) and bushing (19) from floor of cab.

## **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

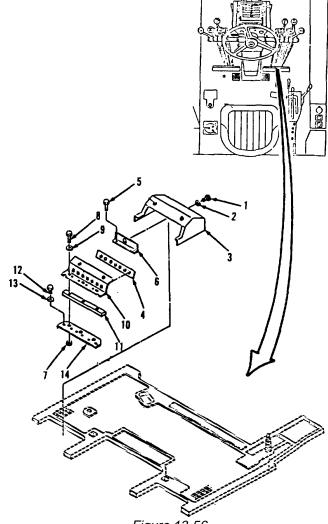


Figure 13-56.

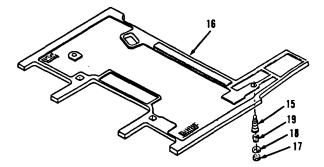


Figure 13-57.

Go to Sheet 3

## 13-16. Cab Insulation and Mounting. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Install bushing (19), washer (18) and nut (17, Figure 13-57) in floor in interior of cab.
- 2. Install floormat (16).
- 3. Install seal (15) through top of floormat (16).
- 4. Install plate (14), two washers (13) and bolts (12, Figure 13-56).
- 5. Install seal (11), plate (10), three washers (9), bolts (8) and nuts (7).
- 6. Install bracket (6) and two bolts (5).
- 7. Install seal (4), cover (3), three washers (2) and screws (1).

NOTE
Return 130C Grader to original equipment condition.

End of Task

#### 13-17. Gage Panel Vandalism Guard. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Rivets, Item 1, 4, 7, 10

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. Vehicle articulated left.

Paragraph 13-6 Dash plate removed.

Go to Sheet 2

## 13-17. Gage Panel Vandalism Guard. Sheet 2 of 3)

## **REMOVAL**

- 1. Remove two rivets (1) and plate (2, Figure 13-58) from front right, outside of engine compartment.
- 2. Remove cover (3).
- 3. Remove two rivets (4), handle (5) and plate (6) from cover (3).
- 4. Remove ten rivets (7), two plates (8) and strips (9).
- 5. Remove three rivets (10) and plate (11).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

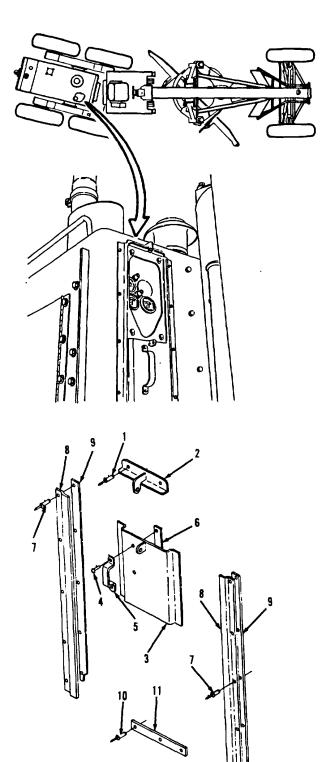


Figure 13-58.

Go to Sheet 3

## 13-17. Gage Panel Vandalism Guard. (Sheet 3 of 3)

## **INSTALLATION**

- Install plate (11) and three new rivets (10, Figure 13-58) in front right, outside of engine compartment.
- 2. Install two strips (9), plates (8) and ten new rivets (7).
- 3. Install plate (6), handle (5) and two new rivets (4) on cover (3).
- 4. Install cover (3).
- 5. Install plate (2) and two new rivets (1).

## NOTE Return 130G Grader to original equipment condition.

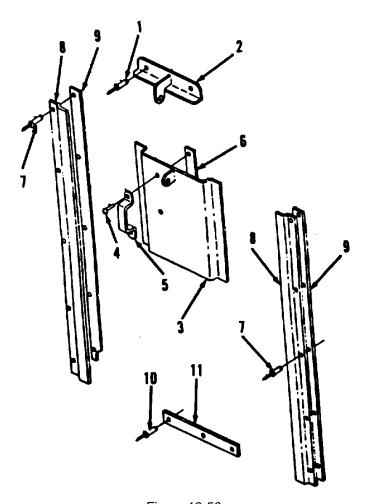


Figure 13-58.

End of Task

#### 13-18. Steering Console Hood and Panel Support. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

**Torques** 

d. Installation

**INITIAL SETUP:** 

Applicable Configurations
All
Personnel Required
Construction equipment

repairer MOS 62B

**Tools** 

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177- TM 5-3805-261-10

7033)

<u>Special Environmental Conditions</u>
<u>Test Equipment</u>
None

<u>st Equipment</u> N None

General Safety Instructions

Materials/Parts None

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39,

Elean cloths, Item 39,

Appendix C

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Paragraph 16-6 Articulation indicator removed (Not

necessary if only removing hood).

Paragraph 7-21 Monitor system fault light removed.

Paragraph 7-22 Turn signal switch removed.

Paragraph 7-24 Steering control console cover removed.

Paragraph 7-103 Steering wheel/horn switch removed.

Paragraph 15-21 Hydraulic control levers removed.

Go to Sheet 2

## 13-18. Steering Console Hood and Panel Support. (Sheet 2 of 3)

## **REMOVAL**

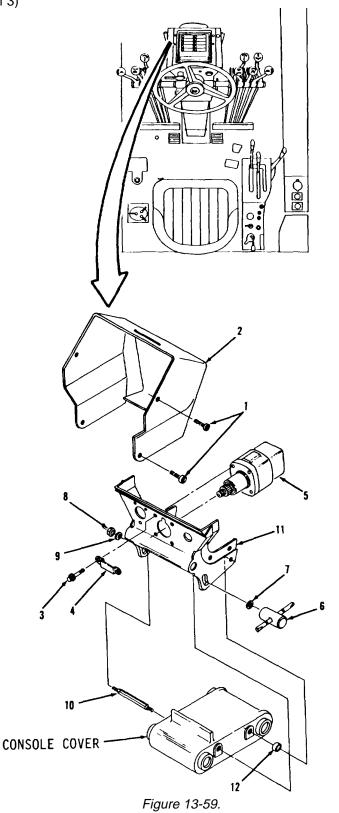
- 1. Remove six bolts (1) and hood (2, Figure 13-59) from steering console.
- 2. Remove four bolts (3) and bracket (4) in steering console inside of cab.
- 3. Position pump assembly (5) away from console (10).
- 4. Remove handle assembly (6), washer (7), nut (8) and washer (9).
- 5. Remove shaft (10) and console (11).
- 6. Remove two bearings (12) from console cover.

## **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.



Go to Sheet 3

## 13-18. Steering Console Hood and Panel Support. (Sheet 3 of 3)

## **INSTALLATION**

- 1. Install two bearings (12, Figure 13-59) in console cover.
- 2. Position console (11).
- 3. Install shaft (10).
- 4. Install washer (9), nut (8), washer (7) and handle assembly (6).
- 5. Position pump assembly (5) on console (11).
- 6. Install bracket (4) and four bolts (3).
- 7. Install hood (2) and six bolts (1).

**NOTE** 

Return 130C Grader to original equipment condition.

End of Task

## **13-19.** Steering Console Support. (Sheet 1 of 5)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-18 Steering console hood and panel

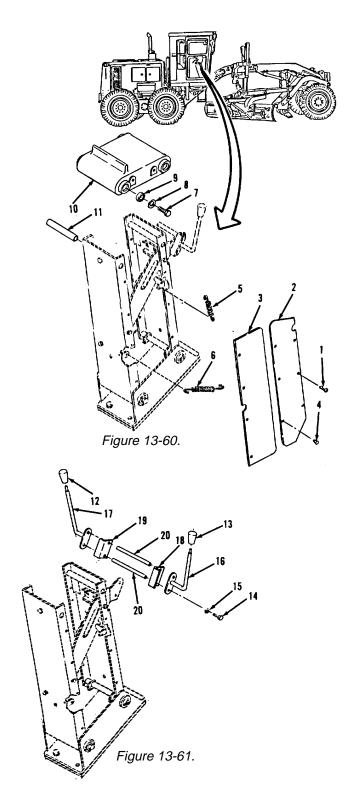
support removed.

Go to Sheet 2

## 13-19. Steering Console Support. (Sheet 2 of 6)

## **REMOVAL**

- 1. Remove 14 screws (1, Figure 13-60) from both sides steering console support.
- 2. Remove two plates (2 and 3).
- 3. Remove six fasteners (4) from two plates (2 and 3).
- 4. Remove two springs (5 and 6).
- 5. Remove four bolts (7), washers (8) and bearings (9).
- 6. Remove cover (10) and two shafts (11).
- 7. Remove knobs (12 and 13, Figure 13-61).
- 8. Remove four bolts (14), washers (15), control rods (16 and 17), plates (18 and 19) and two shafts (20).



Go to Sheet 3 13-71

## **13-19.** Steering Console Support. (Sheet 3 of 6)

## **REMOVAL** (cont)

- 9. Remove two bolts (21) and nuts (22, Figure 13-62).
- 10. Remove two lock nuts (23), bolts (24), washers (25), angles (26) and plates (27).
- 11. Remove two bolts (28), washers (29), spacers (30), plates (31) and shaft (32).
- 12. Remove two bolts (33), washers (34) and stop (35, Figure 13-63).
- 13. Remove two bolts (36), washers (37) and bracket (38).
- 14. Remove two plugs (39).
- 15. Remove four bolts (40), washers (41), bearings (42), two shafts (43) and channels (44 and 45).

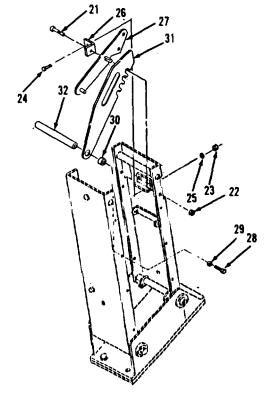


Figure 13-62.

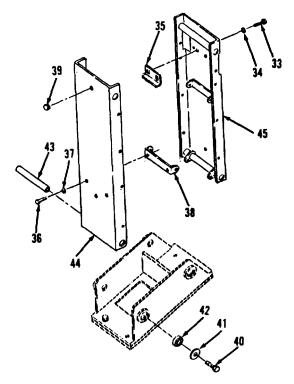


Figure 13-63.

Go to Sheet 4

## 13-19. Steering Console Support. (Sheet 4 of 6)

## **REMOVAL**

16. Remove four bolts (46), washers (47), mountings (49), console base (48) and pad (50, Figure 13-64).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install pad (50), four mountings (49), console base (48), four washers (47) and bolts (46, Figure 13-64) in steering console support.
- 2. Install channels (45 and 44), two shafts (43), four bearings (42), washers (41) and bolts (40, Figure 13-63).
- 3. Install two plugs (39).
- 4. Install bracket (38), two washers (37) and bolts (36).
- 5. Install stop (35), two washers (34) and bolts (33).

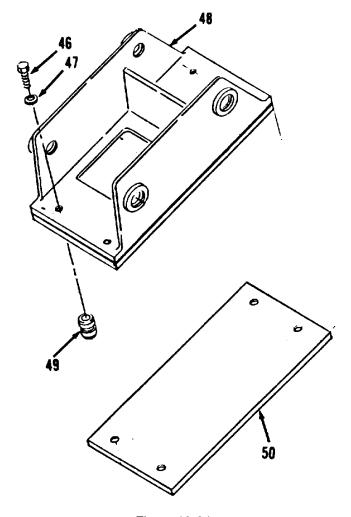


Figure 13-64.

Go to Sheet 5

## **13-19.** Steering Console Support. (Sheet 5 of 6)

## **INSTALLATION** (cont)

- 6. Install shaft (32), two plates (31), spacers (30), washers (29) and bolts (28, Figure 13-62).
- 7. Install two plates (27), angles (26), washers (25), bolts (24) and lock nuts (23).
- 8. Install two nuts (22) and bolts (21).
- 9. Install two shafts (20), plates (19 and 18), control rods (17 and 16), four washers (15) and bolts (14, Figure 13-61).
- 10. Install knobs (13 and 12).

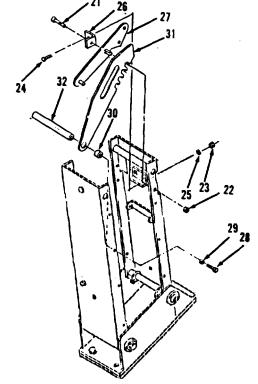


Figure 13-62.

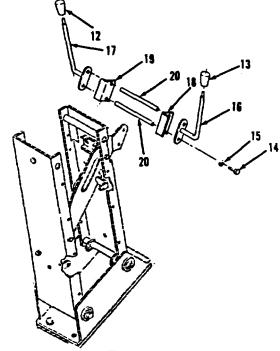


Figure 13-61.

## 13-19. Steering Console Support. (Sheet 6 of 6)

## **INSTALLATION**

- 11. Install two shafts (11) and cover (10, Figure 13-60).
- 12. Install four bearings (9), washers (8) and bolts (7).
- 13. Install two springs (6 and 5).
- 14. Install six fasteners (4) on two plates (3 and 2).
- 15. Install two plates (3 and 2).
- 16. Install 14 screws (1).

NOTE
Return 130G Grader to original equipment condition.

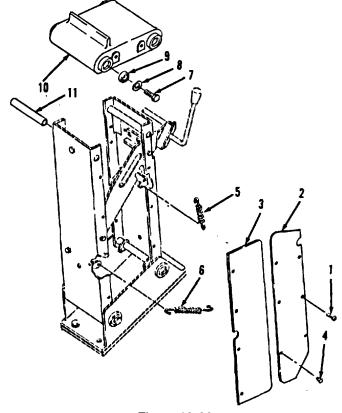


Figure 13-60.

End of Task

## 13-20. Hydraulic Drive Protection Cover. (Sheet 1 of 3)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit:
Automotive (NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

## 13-20. Hydraulic Drive Protection Cover. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Remove three bolts (1) and washers (2) from shields (5 and 6, Figure 13-65) below hydraulic tank.
- 2. Remove two of four bolts (3), two of four washers (4) and left shield (5).

## **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 3. Start engine. Refer to TM 5-3805-261-10.
- 4. Articulate vehicle full left.
- 5. Stop engine.
- 6. Remove two of four bolts (3), two of four washers (4) and right shield (6).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter2.

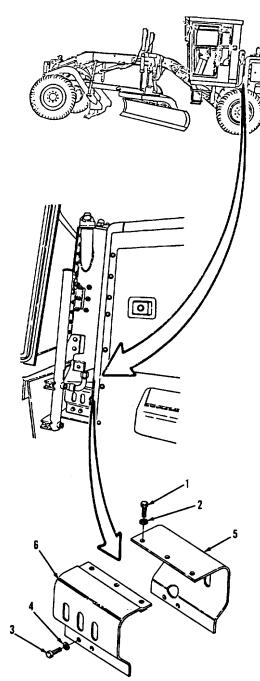


Figure 13-65.

Go to Sheet 3

## 13-20. Hydraulic Drive Protection Cover. (Sheet 3 of 3)

## **INSTALLATION**

- Install right shield (6), two of four washers
   (4) and two of four bolts (3, Figure 13-65).
   Do not tighten bolts (3) at this time.
- 2. Start engine. Refer to TM5-3805-261-10.
- 3. Articulate vehicle full right.
- 4. Stop engine.
- 5. Install left shield (5), two of four washers (4) and two of four bolts (3). Do not tighten bolts (3) at this time.
- 6. Install three washers (2) and bolts (1).
- 7. Tighten four bolts (3).

NOTE
Return 130C Grader to original equipment condition.

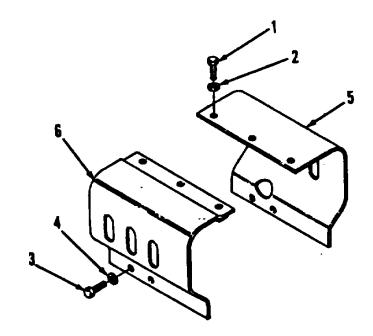


Figure 13-65.

End of Task

## **13-21. Seat.** (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39,

Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 13-22 Seat belt removed.

Go to Sheet 2

## **13-21. Seat.** (Sheet 2 of 3)

## **REMOVAL**

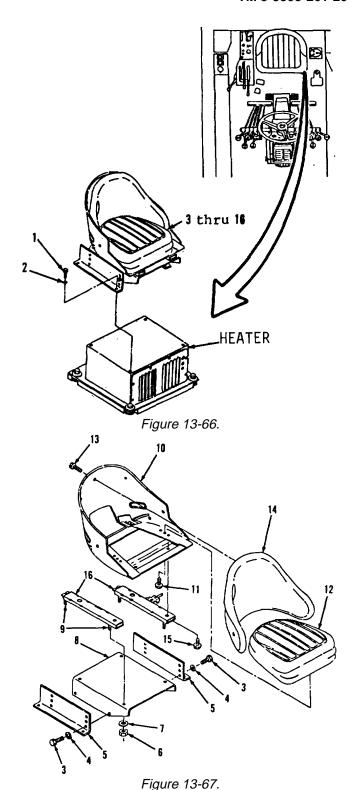
- 1. Remove four bolts (1) and washers (2, Figure 13-66) from top of cab heater.
- 2. Remove items 3 thru 16 as an assembly from cab.
- 3. Remove four bolts (3), washers (4) and two brackets (5) from seat (10, Figure 13-67).
- 4. Remove four nuts (6) and washers (7).
- 5. Remove support (8) from four studs (9) and seat (10).
- 6. Remove two bolts (11) and cushion (12).
- 7. Remove five bolts (13) and back cushion (14).
- 8. Remove four bolts (15) and two track rails (16).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.



Go to Sheet 3

## **13-21. Seat.** (Sheet 3 of 3)

## **INSTALLATION**

- 1. Install two track rails (16) and four bolts (15) on seat (10, Figure 13-67).
- 2. Install back cushion (14) and five bolts (13).
- 3. Install cushion (12) and two bolts (11).
- 4. Install seat (10), four studs (9) and support (8).
- 5. Install four washers (7) and nuts (6).
- 6. Install two brackets (5), four washers (4) and bolts (3).
- 7. Install items 16 thru 3 as an assembly (Figure 13-66) in cab.
- 8. Install four washers (2) and bolts (1) in top of cab heater.

#### NOTE

Return 130G Grader to original equipment condition.

End of Task

## **13-22. Seat Belt.** (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

## 13-22. Seat Belt. (Sheet 2 of 2)

## **REMOVAL**

- 1. Remove two nuts (1) and bolts (2) from seat (6, Figure 13-68) in operator's compartment.
- 2. Detach belt (3) from two eyebolts (5).
- 3. Remove belt (3) from seat (6).
- 4. Remove two nuts (4) and eyebolts (5).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install two eyebolts (5) and nuts (4, Figure 13-68).
- 2. Install belt (3) through seat (6).
- 3. Attach belt (3) to eyebolts (5).
- 4. Install two bolts (2) and nuts (1).

## NOTE Return 130G Grader to original equipment condition.

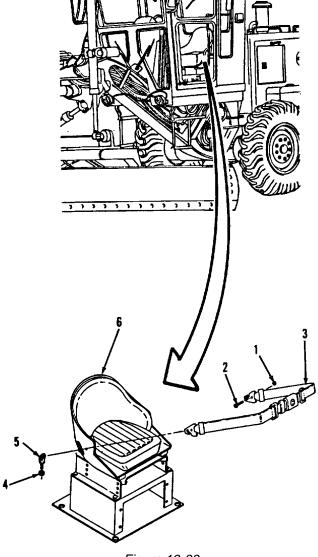


Figure 13-68.

End of Task

## 13-23. Tool Box. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

## 13-23. <u>Tool Box</u>. (Sheet 2 of 2)

## **REMOVAL**

- 1. Open lock (1) and cover (2) of tool box (7, Figure 13-69) at front of vehicle.
- 2. Remove two nuts (3) and washers (4) from bottom of tool box (7) at front corners.
- 3. Remove four bolts (5) and washers (6) from inside tool box (7) at each corner.
- 4. Remove tool box (7).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install tool box (7, Figure 13-69).
- 2. Install four washers (6) and bolts (5).
- 3. Install two washers (4) and nuts (3).
- 4. Close and lock cover (2) with lock (1).

#### **NOTE**

Return 130G Grader to original equipment condition.

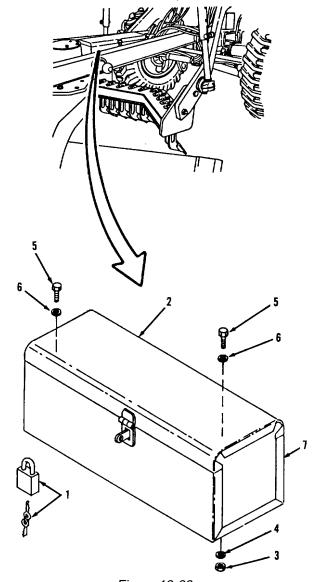


Figure 13-69.

End of Task

#### 13-24. Scarifier Shanks Stowage Rack. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped.

Master disconnect switch off.

Go to Sheet 2

## 13-24. Scarifier Shanks Stowage Rack. (Sheet 2 of 2)

## **REMOVAL**

- 1. Remove four nuts (1), washers (2) and plates (3 and 4, Figure 13-70) from front frame.
- 2. Remove two bolts (5) and washers (6).
- 3. Remove two bolts (7), washers (8) and stowage rack (9).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install stowage rack (9, Figure 13-70).
- 2. Install two washers (8) and bolts (7).
- 3. Install two washers (6) and bolts (5).
- 4. Install plates (4 and 3), four washers (2) and nuts (1).

NOTE
Return 130G Grader to original equipment condition.

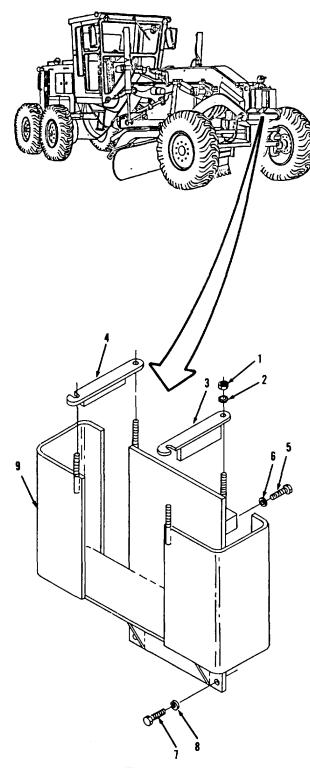


Figure 13-70.

End of Task

#### **13-25. Rear Bumper.** (Sheet 1 of 3)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00 7033)

Bar breaker, 3/4 inch drive Socket, 3/4 inch drive, 1-1/2 inch

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Cotter pin, Item 1 Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-104

Back-up alarm removed.

Go to Sheet 2

## **13-25. Rear Bumper.** (Sheet 2 of 3)

#### **REMOVAL**

1. Remove cotter pin (1), pin (2) and clevis pin (3, Figure 13-71). Discard cotter pin (1).

## **WARNING**

Weight of bumper is approximately 100 lbs. Use adequate hoist and sling for lifting. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 2. Install 3/8 inch-16NC eyebolts into top center hole in bumper (8, Figure 13-72).
- 3. Attach hoist and sling and take up slack.
- 4. Remove four bolts (4) and washers (5, Figure 13-73).
- 5. Remove four bolts (6) and washers(7).
- 6. Remove bumper (8) by sliding out from rear frame.
- 7. Remove hoist and sling.

## **CLEANING**

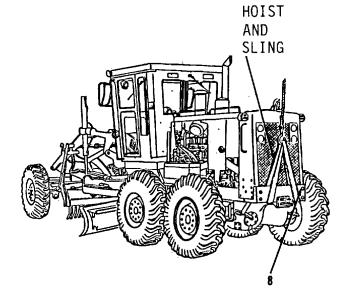
Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.



Figure 13-71.



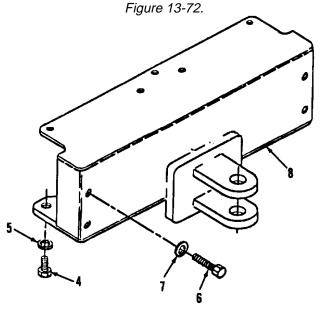


Figure 13-73.

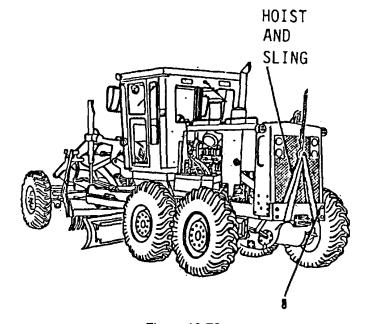
Go to Sheet 3

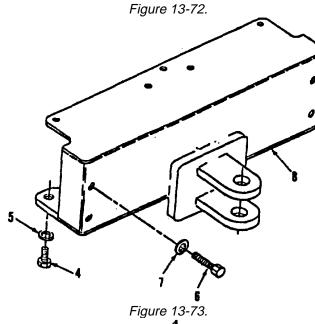
## **13-25. Rear Bumper**. (Sheet 3 of 3)

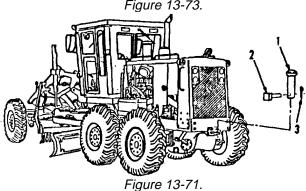
## **INSTALLATION**

- 1. Attach hoist and sling and position bumper (8, Figure 13-72) on vehicle.
- 2. Install four washers (7) and bolts (6, Figure 13-73).
- 3. Install four washers (5) and bolts (4).
- 4. Remove hoist and sling.
- 5. Install clevis pin (3) and pin (2, Figure 13-71).
- 6. Install new cotter pin (1).

# NOTE Return 130G Grader to original equipment condition.







End of Task

## **CHAPTER 14**

## BODY, CHASSIS AND HULL ACCESSORY ITEMS TROUBLESHOOTING AND MAINTENANCE

## **CHAPTER OVERVIEW**

The purpose of this chapter is to help the technician efficiently troubleshoot and repair malfunctioning equipment and to perform authorized organizational support level maintenance procedures on the 130G Grader.

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## Section I. BODY, CHASSIS AND HULL ACCESSORY ITEMS TROUBLESHOOTING.

- **14-1. GENERAL INFORMATION**. This section lists the common body, chassis and hull accessory items malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **14-2. BODY, CHASSIS AND HULL ACCESSORY ITEMS TROUBLESHOOTING PROCEDURES.** This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

BODY, CHASSIS AND HULL ACCESSORY ITEMS TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

- a. ALL WINDSHIELD WIPERS AND WASHERS FAIL TO OPERATE.
  - Step 1. Check circuit breaker number 60A.

Reset circuit breaker (Figure 14-1).

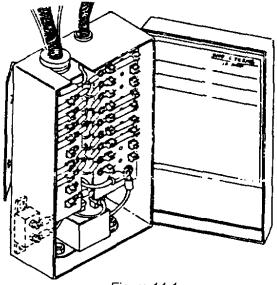


Figure 14-1.

- Step 2. Test the continuity of the main wiring harness at the rear wiper motor. Refer to Wiring Harness Troubleshooting, paragraphs 7-114 and 7-115 for continuity test procedure.
- b. ONE OR MORE WINDSHIELD WIPERS FAIL TO OPERATE.
  - Step 1. Check fuse number 4A.

If fuse is blown--replace. Refer to paragraph 7-63.

Step 2. Check the individual wiper motors.

If the wiper motor is damaged or defective--replace. Refer to paragraphs 14-4, 14-5 and 14-6.

## BODY, CHASSIS AND HULL ACCESSORY ITEMS TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

## MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

- b. ONE OR MORE WINDSHIELD WIPERS FAIL TO OPERATE.
  - Step 3. Test the continuity of the windshield wiper switch. Refer to Wiring Harness Troubleshooting, paragraphs 7-114 and 7-115 for continuity test procedure.

If windshield wiper switch is damaged or defective--replace. Refer to paragraph 7-43.

- Step 4. Test the continuity of the main harness between the fuse block and the windshield wiper switch, and between the windshield wiper switch and the windshield wiper motor. Refer to Wiring Harness Troubleshooting, paragraphs 7-114 and 7-115 for continuity test procedure.
- c. WINDSHIELD WASHER FAILS TO OPERATE.
  - Step 1. Check the windshield washer motor.

If the windshield washer motor is damaged or defective--replace. Refer to paragraph 14-7.

- Step 2. Test the continuity of the main harness between the windshield wiper switch and the windshield washer. Refer to Wiring Harness Troubleshooting, paragraphs 7-114 and 7-115 for continuity test procedure.
- d. FRONT OR REAR WINDOW DEFROSTER DOES NOT OPERATE.
  - Step 1. Check circuit breaker number 60A.

Reset circuit breaker (Figure 14-1).

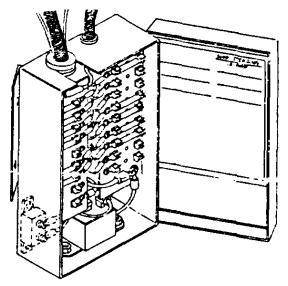


Figure 14-1.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

- d. FRONT OR REAR WINDOW DEFROSTER DOES NOT OPERATE. (cont)
  - Step 2. Check fuse number 10A.

If fuse is blown--replace. Refer to paragraph 7-63.

Step 3. Check the defroster motor.

If the defroster motor is damaged or defective--replace. Refer to paragraph 14-8.

- Step 4. Test the continuity of the defroster switch. Refer to Wiring Harness Troubleshooting, paragraphs 7-114 and 7-115 for continuity test procedure.
- Step 5. Test the continuity of the harness between the defroster motor and defroster switch. Refer to Wiring Harness Troubleshooting, paragraphs 7-114 and 7-115 for continuity test procedure.
- e. HEATER FANS AND CONTROLS OPERATE, BUT NO HEAT.
  - Step 1. Check hoses and connections to heater coil.

If hose clamps are loose--tighten. If hose is damaged or defective-- replace. Refer to paragraph 14-9.

Step 2. Check control valve assembly.

If the control valve assembly is damaged or defective--replace. Refer to paragraph 14-9.

Step 3. Check heater coil.

If the coil is blocked, damaged or defective--replace. Refer to paragraph 14-9.

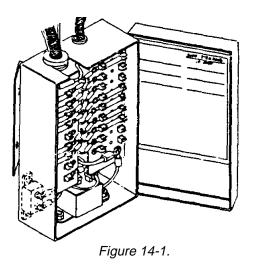
- f. BOTH HEATER FANS FAIL TO OPERATE.
  - Step 1. Check circuit breaker number 60A.

### BODY, CHASSIS AND HULL ACCESSORY ITEMS TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

f. BOTH HEATER FANS FAIL TO OPERATE.

Reset circuit breaker (Figure 14-1).



Step 2. Check fuse number 20A.

If fuse is blown--replace. Refer to paragraph 7-63.

Step 3. Test the continuity of the heater wiring harness between the two heater motors. Refer to Wiring Harness Troubleshooting, paragraphs 7-114 and 7-115 for continuity test procedures.

If heater wiring harness is damaged or defective--replace. Refer to paragraph 7-114.

- g. ONE HEATER FAN FAILS TO OPERATE.
  - Step 1. Check heater motor.

If the motor is damaged or defective--replace. Refer to paragraph 14-9.

Step 2. Test the continuity of the heat switch. Refer to Wiring Harness Troubleshooting, paragraphs 7-114 and 7-115 for continuity test procedure.

If the switch is damaged or defective--replace. Refer to paragraph 4-9.

Step 3. Test the continuity of the heater wiring harness between the heater motor and heater switch. Refer to Wiring Harness Troubleshooting, paragraphs 7-114 and 7-115 for continuity test procedure.

If heater wiring harness is damaged or defective--replace. Refer to paragraph 7-114.

# Section II. BODY, CHASSIS AND HULL ACCESSORY ITEMS MAINTENANCE.

# 14-3. BODY, CHASSIS AND HULL ACCESSORY ITEMS MAINTENANCE PROCEDURES.

- **a.** The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the body, chassis and hull accessory items and its components in good repair.
- **b.** This section is arranged by functional group code and provides a list of body, chassis and hull accessory items components to be maintained and step-by-step maintenance procedures.

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#### **14-4.** Front Wiper (Lower). (Sheet 1 of 7)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Pliers, snap ring

Puller, clamp type, 4 inch

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C

Appendix C Gaskets, Items 12, 15, 28 Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

#### **14-4.** Front Wiper (Lower). (Sheet 2 of 7)

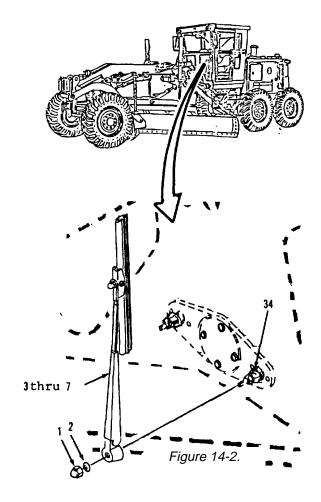
#### **REMOVAL**

- Remove two nuts (1) and lock-washers (2, Figure 14-2) from lower wiper assembly on exterior of cab.
- 2. Remove items 3 thru 7 as an assembly. Push in on hinged part to straighten items 3 thru 7 as an assembly and pull from two linkage (34) shafts. Note position of items 3 thru 7 as an assembly.
- 3. Remove two lock nuts (3), screws (4), blades (5) and clips (6) from arm assembly (7, Figure 14-3).
- Remove two drivers (8), caps (9), nuts (10), washers (11), snap rings (12), flat washers (13), spring washers (14) and gaskets (15) from linkage (34) shafts. Discard two gaskets (15) and spring washers (14). Remove all gasket material from mounting surfaces.
- 5. Remove four screws (16), cover (17) and gasket (18). Discard gasket (18). Remove all gasket material from mounting surfaces.

#### **NOTE**

Turn wiper switch on. Turn disconnect switch on and off as needed to expose three motor mounting bolts and linkage mounting nut.

- 6. Remove three bolts (19) and lockwashers (20).
- 7. Remove nut (21) and lockwasher (22).



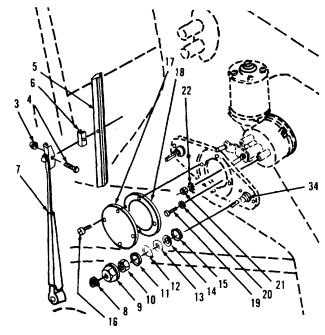


Figure 14-3.

### **14-4.** Front Wiper (Lower). (Sheet 3 of 7)

#### **REMOVAL**

- 8. Disconnect ground cables from batteries. Refer to paragraph 7-112.
- Remove four screws (23) and cover (24, Figure 14-4) in front of steering column in interior of cab.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 10. Disconnect three wire assemblies (25) at terminals.
- 11. Remove wiper motor (26) and washer (27). If necessary, use a screwdriver to separate arm (45) from shaft of wiper motor (26). Do not damage threads of shaft on wiper motor (26).
- Remove four screws (28) and lockwashers (29). Hold flange (30) and gasket (31) while removing four screws (28). Open lower windshield if necessary.
- Remove flange (30) and gasket (31).
   Discard gasket (31). Remove all gasket material from mounting surfaces.

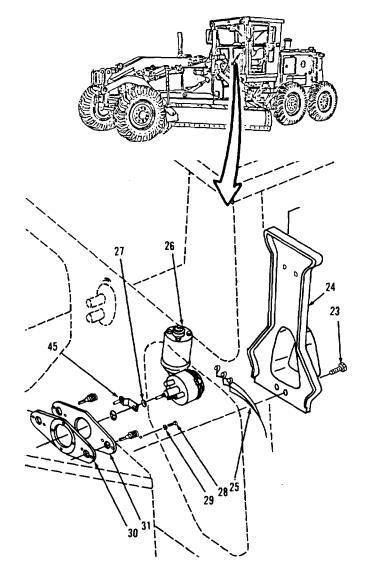


Figure 14-4.

Go to Sheet 4

# **14-4.** Front Wiper (Lower). (Sheet 4 of 7)

# **REMOVAL** (cont)

- 14. Remove two nuts (32) and lockwashers (33) from studs (43, Figure 14-5).
- 15. Remove two linkages (34) and spacers (35).
- 16. Remove two nuts (36) and washers (37). Hold two stops (40) while removing nuts (36). Open lower windshield if necessary.
- 17. Remove two stops (40) from vehicle.
- 18. Remove two washers (38) and nuts (39) from stops (40).

#### **DISASSEMBLY**

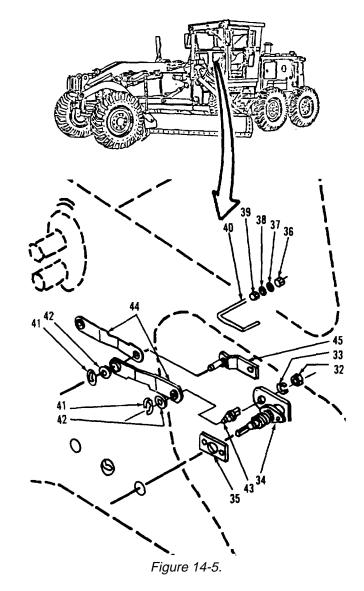
- 1. Remove two clips (41).
- 2. Separate two washers (42), studs (43), links (44) and arm (45).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.



Go to Sheet 5

### **14-4.** Front Wiper (Lower). (Sheet 5 of 7)

#### **ASSEMBLY**

- 1. Position arm (45), two links (44), studs (43) and washers (42, Figure 14-5). Right link (44) should be down and left link (44) up.
- 2. Install two clips (41).

# **INSTALLATION**

- Install two nuts (39) and washers (38) on stops (40) in lower wiper area on exterior of cab.
- 2. Install two stops (40) in vehicle.
- 3. Install two washers (37) and nuts (36) on stops (40) in front of steering column in interior of cab.
- 4. Position spacer (35) and two linkages (34). Holes of linkages (34) go on studs (43).
- 5. Install two lockwashers (33) and nuts (32) on studs (43).

Go to Sheet 6

# **14-4.** Front Wiper (Lower). (Sheet 6 of 7)

# **INSTALLATION** (cont)

- 6. Install new gasket (31), flange (30), four lockwashers (29) and screws (28, Figure 14-4).
- 7. Position washer (27) and shaft of wiper motor (26) on arm (45).
- 8. Install washer (27) and wiper motor (26).
- 9. Connect three wire assemblies (25) at terminals.
- 10. Install cover (24) and four screws (23) in front of steering column in interior of cab.
- 11. Connect ground cables in batteries. Refer to paragraph 7-112.

### **NOTE**

Turn wiper switch on. Turn disconnect switch on and off as needed to stop motor so that flat surfaces at sides of threaded motor shaft align with mounting hole in arm.

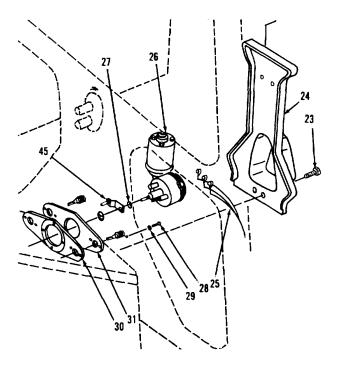


Figure 14-4.

Go to Sheet 7

### **14-4.** Front Wiper (Lower). (Sheet 7 of 7)

### **INSTALLATION**

12. Install lockwasher (22) and nut (21, Figure 14-3).

#### **NOTE**

Turn wiper switch on. Turn disconnect switch on and off as needed so that bolts are exposed.

- 13. Install three lockwashers (20) and bolts (19).
- 14. Install new gasket (18), cover (17) and four screws (16) in lower wiper area of exterior of cab.
- 15. Install two new gaskets (15), spring washers (14), flat washers (13), snap rings (12), washers (11), nuts (10), caps (9) and drivers (8) on two shafts of linkage (34).
- 16. Install two clips (6), blades (5), screws (4) and lock nuts (3) on arm assembly (7).
- 17. Install items 7 thru 3 as an assembly (Figure 14-2) in same position as removed.
- 18. Install two lockwashers (2) and nuts (1).

# NOTE Return 130G Grader to original equipment condition.

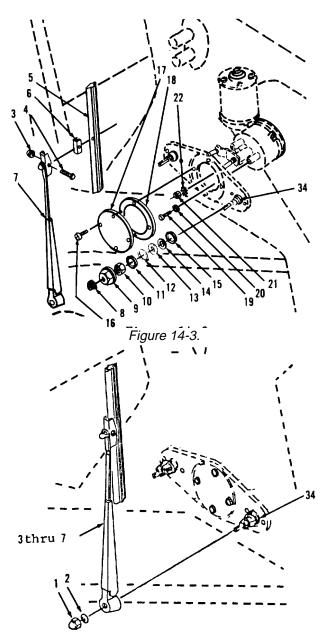


Figure 14-2.

End of Task

#### **14-5.** Front Wiper (Upper). (Sheet 1 of 5)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Pliers, snap ring

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Personnel Required

Two construction equipment repairers MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

Gasket, Item 12

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Di

Disconnect positive cable on right side

Go to Sheet 2

#### **14-5.** Front Wiper (Upper). (Sheet 2 of 5)

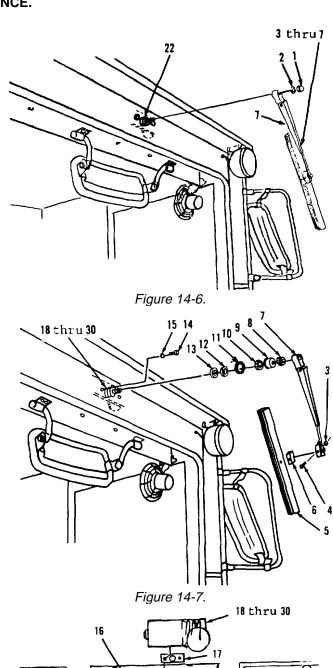
#### **REMOVAL**

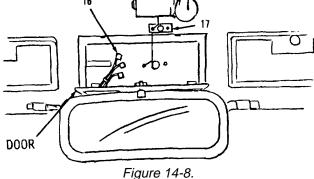
- Remove nut (1) and lockwasher (2, Figure 14-6) from upper wiper assembly in exterior of cab.
- Remove items 3 thru 7 as an assembly. Push in on hinged part of arm assembly (7) to straighten items 3 thru 7 as an assembly and pull from shaft assembly (22). Note position of items 3 thru 7 as an assembly on arm assembly (7).
- 3. Remove lock nut (3), screw (4), blade assembly (5) and clip (6) from arm assembly (7, Figure 14-7).
- 4. Remove driver (8), cap (9), nut (10),snap ring(1l) washer(12) and gasket (13). Discard gasket (13). Remove all gasket material from mounting surfaces.
- 5. Remove two bolts (14) and lockwashers (15).
- Open center door in upper storage compartment in interior of cab (Figure 14-8).

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 7. Disconnect three wire assemblies (16) at terminals.
- 8. Remove plate (17) and items 18 thru 30 as an assembly.





# **14-5.** Front Wiper (Upper). (Sheet 3 of 5)

### **DISASSEMBLY**

- 1. Remove nut (18), lockwasher (19) and washer (20) from motor (30, Figure 14-9) shaft.
- 2. Remove two clips (22) and washers (23) from link (24).
- 3. Remove link assembly(24), crank assembly (25), washer (20) and shaft assembly (26).
- 4. Remove three bolts (28) and washers (29).
- 5. Remove two screws (21).
- 6. Remove bracket (27) and motor (30).

21

28

22 23

Figure 14-9.

### **CLEANING**

Clean all parts. Refer to Chapter 2.

### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

Go to Sheet 4

# **14-5.** Front Wiper (Upper). (Sheet 4 of 5)

### **ASSEMBLY**

- 1. Position motor (30) and bracket (27). Insert motor (30) shaft through bracket (27, Figure 14-9).
- 2. Install two screws (21) and tighten to 51 lb-in torque.
- 3. Install three washers (29) and bolts (28). Tighten three bolts (28) to 43 lb-in torque.
- 4. Install shaft assembly (26), crank assembly (25), link assembly (24), two washers (23), clips (22) and position on bracket (27).
- Install lockwasher (19) and nut (18) on motor (30) shaft. Tighten nut (18) to 10 ft-lb torque.

Go to Sheet 5

### **14-5.** Front Wiper (Upper). (Sheet 5 of 5)

#### **INSTALLATION**

- 1. Position items 30 thru 18 as an assembly and plate (17, Figure 14-8) in upper storage compartments in interior of cab.
- 2. Connect three wire assemblies (16) at terminals to motor (30).

### **NOTE**

# Step 3 requires two mechanics.

- One mechanic installs two lockwashers (15) and bolts (14) in upper front, exterior of cab while the other mechanic holds items 30 thru 18 as an assembly (Figure 14-7) in cab interior.
- 4. Install new gasket (13), washer (12), snap ring (11), nut (10), cap (9) and driver (8). Tighten nut (10) to 15 ft-lb torque.
- 5. Install clip (6), blade assembly (5), screw (4) and lock nut (3) on arm assembly (7).
- Install items 7 thru 3 as an assembly (Figure 14-6) in same position as when removed.
- 7. Install lockwasher (2) and nut (1). Tighten nut (1) to 12 ft-lb torque.

#### **NOTE**

Return 130G Grader to original equipment condition.

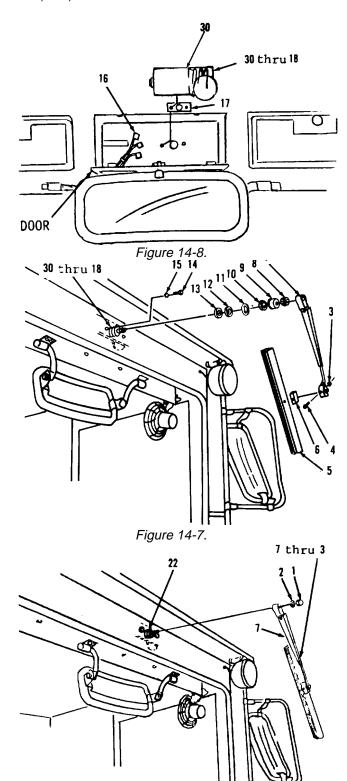


Figure 14-6.

End of Task

#### **14-6. Rear Wiper.** (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41,

Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

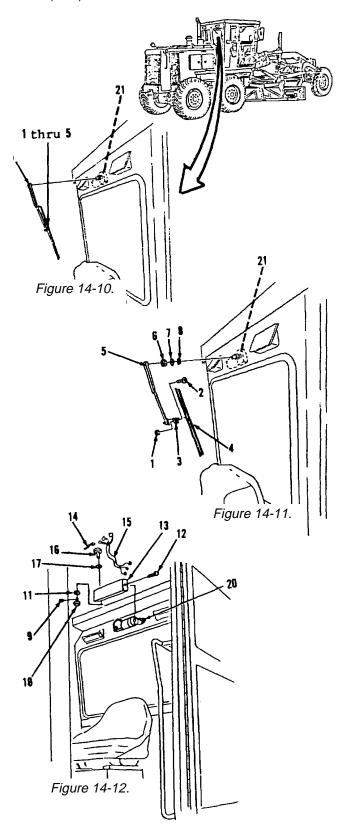
### **14-6. Rear Wiper**. (Sheet 2 of 4)

#### **REMOVAL**

#### NOTE

Note position of items 1 thru 5 as an assembly on rear window to aid in installation.

- Remove items 1 thru 5 as an assembly in upper rear, exterior of cab. Push in on hinged part of arm (5) to straighten items 1 thru 5 as an assembly. Then pull arm (5) from shaft of motor (21, Figure 14-10).
- 2. Remove nut (1) and screw (2, Figure 14-11).
- 3. Separate clip (3), blade (4) and arm (5).
- 4. Remove nut (6) and washers (7 and 8) from shaft of motor (21).
- 5. Remove screw (9, Figure 14-12) in upper rear, interior of cab.
- 6. Remove knob (10) and nut (11).
- 7. Remove two screws (12).
- 8. Separate cover (13) from two brackets (20).
- 9. Separate switch (16) from cover (13).



Go to Sheet 3

## **14-6. Rear Wiper.** (Sheet 3 of 4)

#### **REMOVAL**

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 10. Disconnect wire assembly (14) and three wire assemblies (15) from switch (16).
- 11. Remove switch (16) and nut (17).
- 12. Remove screws (18 and 19), two brackets (20) and motor (21, Figure 14-13).

### NOTE

Note location of nut on shaft of motor to aid in installation.

13. Remove washer (22) and nut (23) from shaft of motor (21).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

1. Install nut (23) and washer (22) on shaft of motor (21, Figure 14-13) in upper rear, interior of cab.

Go to Sheet 4

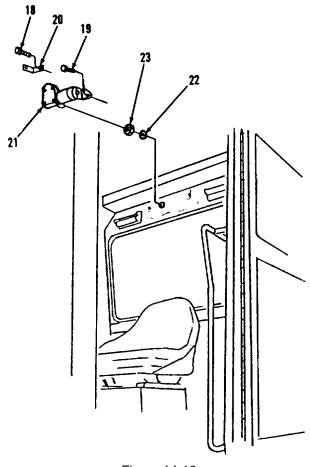


Figure 14-13.

### **14-6. Rear Wiper.** (Sheet 4 of 4)

### **INSTALLATION** (cont)

- 2. Position motor (21) and two brackets (20). Adjust brackets (20) to a line with holes in cover (13).
- 3. Install screws (19 and 18).
- 4. Install nut (17) on switch (16, Figure 14-12).
- 5. Position switch (16) in cover (13).
- 6. Install nut (11).
- 7. Adjust nuts (17 and 11) to obtain proper switch (16) shaft length.
- 8. Connect three wire assemblies (15) and wire assembly (14) to switch (16).
- 9. Position cover (13) on two brackets (20).
- 10. Install two screws (12).
- 11. Install knob (10) and screw (9).
- 12. Install washers (8 and 7) and nut (6, Figure 14-11) in upper rear, exterior of cab.
- 13. Position blade (4) and clip (3) on arm (5).
- 14. Install screw (2) and nut (1).
- Install items 5 thru 1 as an assembly. Push back on splined shaft of motor (21, Figure 14-10) at same angle as when removed.

#### NOTE

Return 130G Grader to original equipment condition.

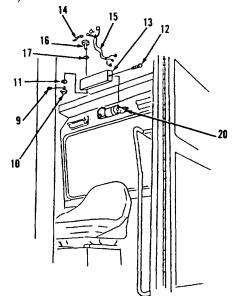
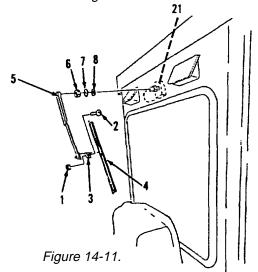


Figure 14-12.



5 thru 1

Figure 14-10.

End of Task

### 14-7. Windshield Washer. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Offset Screwdriver NSN 5120-00-242-3268

Test Equipment

None

Materials/Parts

Detergent, Item 8, Appendix C
Clean cloths, Item 39,
Appendix C
Small tags, Item 41,
Appendix C
Gasket, Item 22

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 5-6 Transmission removed from vehicle.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

### **14-7.** Windshield Washer. (Sheet 1 of 2)

#### **REMOVAL**

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

1. Disconnect four wire assemblies (1, Figure 14-14) from interior, right side of cab.

#### **NOTE**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 2. Disconnect two hoses (17).
- 3. Remove eight screws (2) and two pump assemblies (3).
- 4. Remove two nozzles (4), strainers (5) and hoses (6) from pump assemblies (3).
- 5. Remove cover (7), reservoir (8) and pad (9) from vehicle.
- Remove two screws (10) and cover (11, Figure 14-15) from interior, right front of cab.

## **NOTE**

Open bottom right window to aid in removal procedures.

7. Remove four screws (12) and panel (13).

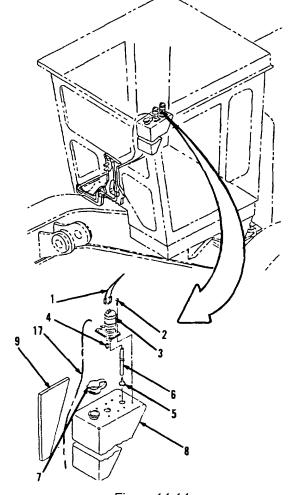


Figure 14-14.

Figure 14-15.

Go to Sheet 3

### **14-7.** Windshield Washer. (Sheet 3 of 4)

#### **REMOVAL**

- 8. Remove three screws (14), washers (15) and six clips (16, Figure 14-16).
- 9. Remove two hoses (17).
- Remove upper nozzle assembly (18), lower nozzle assembly (19), two screws (20), bracket (21) and gasket (22) from exterior, center of cab. Discard gasket (22). Remove all gasket material from mounting surfaces.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

#### **CAUTION**

Be sure that the parking brake lever enters the notch in the housing when the transmission is put into position in the transmission case.

- Install new gasket (22), bracket (21), two screws (20), lower nozzle assembly (19) and upper nozzle assembly (18, Figure 14-16) in exterior, center of cab.
- 2. Install two hoses (17) in interior, right front of cab.
- 3. Install six clips (16), three washers (15) and screws (14).

Go to Sheet 4

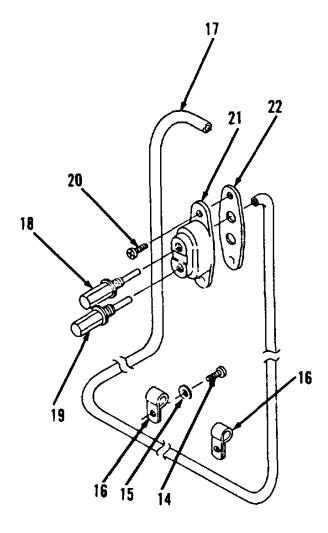


Figure 14-16.

# 14-7. Windshield Washer. (Sheet 4 of 4)

# **INSTALLATION** (cont)

- 4. Install panel (13) and four screws (12, Figure 14-15).
- 5. Install cover (11) and two screws (10).
- 6. Install pad (9), reservoir (8) and cover (7, Figure 14-14) in interior, right side of cab.
- 7. Install two hoses (6), strainers (5) and nozzles (4).
- 8. Install two pump assemblies (3) and eight screws (2).
- 9. Connect two hoses (17) and four wire assemblies (1).

# NOTE Return 1300 Grader to original equipment condition.

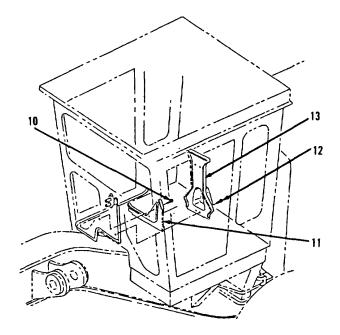


Figure 14-15.

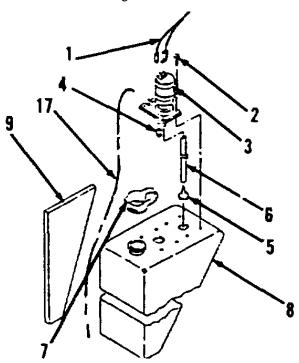


Figure 14-4.

End of Task

# 14-8. Front and Rear Defroster Fans and Mounting. (Sheet 1 of 6)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP:** 

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit:

Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Appendix C

Clean cloths, Item 39,

Appendix C Small tags, Item 41, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

### 14-8. Front and Rear Defroster Fans and Mounting. (Sheet 2 of 6)

#### **REMOVAL**

#### NOTE

The following is a maintenance procedure for the front defroster fan. The maintenance procedure for the rear defroster fan is identical.

- 1. Remove four bolts (1) and lockwashers (2) from left, front of upper cab. Support items 8 thru 41 as an assembly with one hand when removing final bolt. Do not let items 8 thru 41 as an assembly hang by wire assembly (4, Figure 14-17).
- 2. Remove screw (3) from switch (11).

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 3. Disconnect wire assembly (4).
- 4. Remove items 8 thru 41 as an assembly.

#### NOTE

Remove plate from front defroster fan only. Remove bolt, washer and plate from rear defroster fan only.

- 5. Remove bolt (5), washer (6) and plate (7) from rear defroster fan only.
- 6. Remove plate (7) from front defroster fan only.

Go to Sheet 3

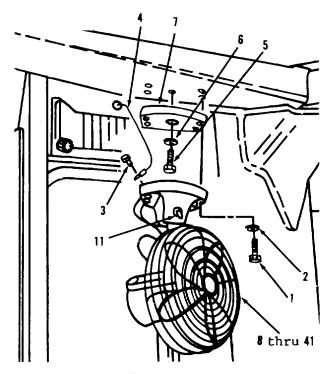
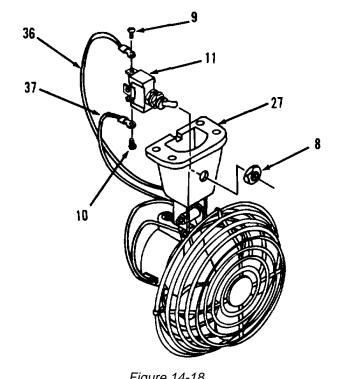


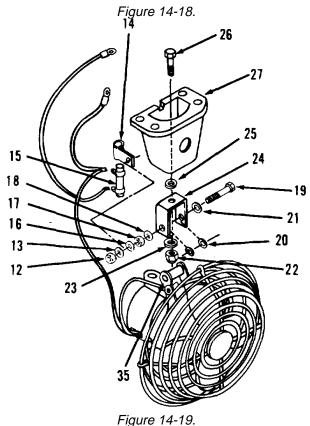
Figure 14-17.

# 14-8. Front and Rear Defroster Fans and Mounting. (Sheet 3 of 6)

### **DISASSEMBLY**

- 1. Remove nut (8, Figure 14-18).
- 2. Lift switch (11) out of base (27).
- 3. Remove screw (9).
- 4. Disconnect wire assembly (36) at terminal from switch (11).
- 5. Remove screw (10).
- 6. Disconnect wire assembly (37) at terminal from switch (11).
- 7. Remove switch (11).
- 8. Remove nut (12), washer (13), clip (14), resistor (15) and washer (16, Figure 14-19).
- 9. Remove nut (17), washer (18), bolt (19), two washers (20) and washer (21).
- 10. Remove nut (22), washer (23), bracket (24), washer (25), bolt (26) and base (27).





Go to Sheet 4

# 14-8. Front and Rear Defroster Fans and Mounting. (Sheet 4 of 6)

# **DISASSEMBLY** (cont)

- 11. Remove outer fan guard (28) from inner fan guard (34) by detaching the four hooks on outer fan guard (28, Figure 14-20).
- 12. Remove screw (29) and fan (30).
- 13. Remove screw (31) from bracket (35).
- 14. Disconnect wire assembly (32) at terminal.
- 15. Remove two nuts (33), inner fan guard (34) and bracket (35) from motor (40).
- 16. Remove two caps (38) and brushes (39) from motor (40).
- 17. Remove wire assemblies (36 and 37) and wire assembly (41) from resistor (15).

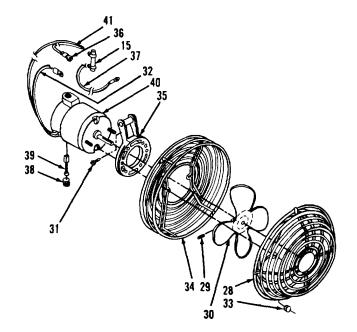


Figure 14-20.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

Go to Sheet 5

### 14-8. Front and Rear Defroster Fans and Mounting. (Sheet 5 of 6)

#### **ASSEMBLY**

- 1. Install wire assembly (41) and wire assemblies (37 and 36) to resistor (15, Figure 14-20) terminals.
- 2. Install two brushes (39) and caps (38) in motor (40).
- 3. Install bracket (35), inner fan guard (34) and two nuts (33) on motor (40).
- 4. Connect wire assembly (32) at terminal on bracket (35).
- 5. Install screw (31).
- 6. Install fan (30) and screw (29) on motor (40).
- 7. Attach outer fan guard (28) to inner fan guard (34) by using the hooks on outer fan guard (28).
- 8. Install base (27), bolt (26), washer (25), bracket (24), washer (23) and nut (22) on bracket (35, Figure 14-19).
- 9. Install washer (21), two washers (20) and bolt (19) on brackets (35 and 24).
- 10. Install washer (18), nut (17), washer (16), resistor (15), clip (14), washer (13) and nut (12).

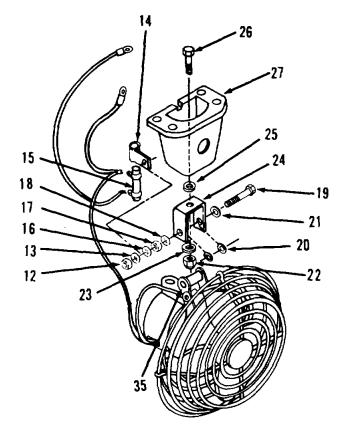


Figure 14-19.

Go to Sheet 6

### 14-8. Front and Rear Defroster Fans and Mounting. (Sheet 6 of 6)

### **ASSEMBLY** (cont)

- 11. Connect wire assembly (37) at terminal to switch (11, Figure 14-18).
- 12. Install screw (10) in switch (11).
- 13. Connect wire assembly (36) at terminal.
- 14. Install screw (9).
- 15. Position switch (11) in base (27).
- 16. Install nut (8).

### **INSTALLATION**

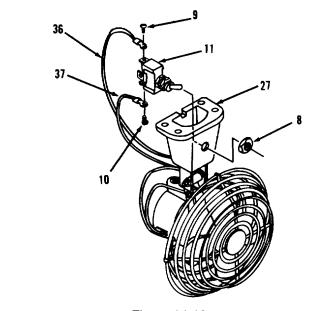
#### **NOTE**

Install plate, washer and bolt on rear defroster fan only.
Install plate on front defroster fan only.

- Install plate (7, Figure 14-17) on front defroster fan only.
- 2. Install plate (7), washer (6) and bolt (5) on rear defroster fan only.
- 3. Position items 41 thru 8 as an assembly.
- 4. Connect wire assembly (4) at terminal to switch (11).
- 5. Install screw (3).
- 6. Install four lockwashers (2) and bolts (1).

#### **NOTE**

Return 130G Grader to original equipment condition.



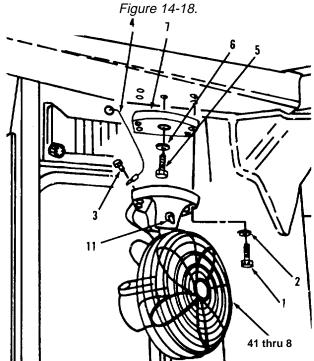


Figure 14-17.

End of Task

### **14-9. Heater**. (Sheet 1 of 7)

a. Removal This task covers: b. Cleaning c. Inspection d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Detergent, Item 8, Appendix C Seal, Item 12 Grommet, Item 5

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

Caps

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 6-48 Drain radiator.

Paragraph 7-112 Disconnect positive cable on right side.

Go to Sheet 2

### **14-9. Heater**. (Sheet 2 of 7)

#### **REMOVAL**

- 1. Remove seat. Refer to paragraph 13-21, steps 1 and 2.
- 2. Remove six bolts (1), washers (2) and cover (3, Figure 14-21) from front seat support in operator's compartment.

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- 3. Disconnect wire assembly (4) from connector (34).
- 4. Remove and discard grommet (5).
- 5. Pull heater wiring harness out of heater assembly (8).
- 6. Loosen clamp (47).

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation.

- 7. Disconnect hose (6) from outlet.
- 8. Loosen clamp (48).
- 9. Disconnect hose (7) from valve (9).
- 10. Remove bolt (10), lockwasher (11), clip (12) and washer (13) from right side of plate (14) of heater assembly (8).
- 11. Remove bolt (15) and washer (16) from left side of heater assembly plate.
- 12. Remove heater assembly (8) from front seat support.

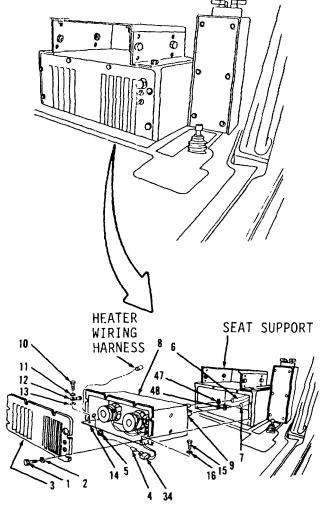


Figure 14-21.

Go to Sheet 3

### **14-9. Heater**. (Sheet 3 of 7)

#### **DISASSEMBLY**

- 1. Loosen nut (50) from heater assembly (8, Figure 14-22).
- 2. Remove valve (9) from inlet.
- 3. Remove four screws (17).
- 4. Remove coil (18) and seal (19). Discard seal (19).

#### NOTE

The following steps are for maintenance of the right side fan and motor assembly, resistor and switch. The maintenance procedure for the left side fan and motor assembly, resistor and switch is identical.

- 5. Loosen screw (49).
- 6. Remove fan (20).
- 7. Remove nut (21) from wire assembly (22).
- 8. Disconnect wire assembly (22) at terminal.
- 9. Disconnect wire assembly (23) at terminal from resistor (32).
- 10. Remove two nuts (24).
- 11. Remove items 25 thru 29 as an assembly from bracket (46).

Go to Sheet 4

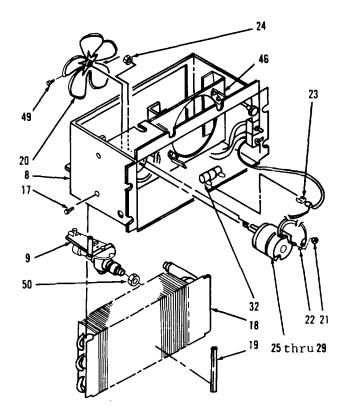
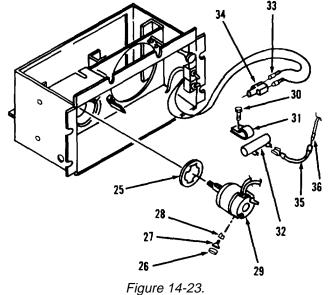


Figure 14-22.

### **14-9. Heater**. (Sheet 4 of 7)

# **DISASSEMBLY** (cont)

- 12. Remove washer (25), cap (26), screw (27) and brush (28) from motor (29, Figure 14-23).
- 13. Disconnect wire assembly (35) at terminal from resistor (32).
- 14. Remove bolt (30), clip (31) and resistor (32).
- 15. Disconnect two wire assemblies (33) at terminals from connector (34).
- 16. Remove connector (34).
- 17. Disconnect wire assemblies (35 and 36) at connectors.
- 18. Remove wire assembly (35).
- 19. Disconnect two wire assemblies (37 and 38, Figure 14-24) at connectors.
- 20. Remove two nuts (39) and switches (40).
- 21. Remove nut (41).
- 22. Disconnect cable assembly (42).
- 23. Remove knob (43).
- 24. Remove bracket assembly (44) from heater assembly (8).
- 23. Remove four nuts (45) and bracket (46) from bracket assembly (44).



41 43 45 45 40 38 39

Figure 14-24.

Go to Sheet 5

### **14-9. Heater**. (Sheet 5 of 7)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **ASSEMBLY**

- 1. Install bracket (46) and four nuts (45) on bracket assembly (44) in heater assembly (8, Figure 14-24).
- 2. Install bracket assembly (44).
- 3. Install knob (43).
- 4. Connect cable assembly (42).
- 5. Install nut (41).
- 6. Install two switches (40) and nuts (39).
- Connect two wire assemblies (38 and 37) at connectors.
- 8. Connect two wire assemblies (36 and 35, Figure 14-23) at connectors.
- 9. Connect two wire assemblies (33) at terminals to connector (34).
- 10. Install resistor (32), clip (31) and bolt (30).
- 11. Connect wire assembly (35) at terminal on resistor (32).
- 12. Install brush (28), screw (27) and cap (26) on motor (29).
- 13. Install washer (25) on motor (29).

Go to Sheet 6

### **14-9. Heater**. (Sheet 6 of 7)

# ASSEMBLY (cont)

- 14. Install items 29 thru 25 as an assembly on bracket (46, Figure 14-22).
- 15. Install two nuts (24).
- 16. Connect wire assembly (23) on resistor (32).
- 17. Connect wire assembly (22) at terminal.
- 18. Install nut (21) on wire assembly (22).
- 19. Position fan (20).
- 20. Tighten screw (49).
- 21. Install new seal (19) and coil (18) in heater assembly (8).
- 22. Install four screws (17).
- 23. Position valve (9).
- 22. Tighten nut (50).

#### **INSTALLATION**

- Install heater assembly (8, Figure 14-21) in front seat support in operator's compartment.
- 2. Install washer (16) and bolt (15) in left side of plate (14) of heater (8).
- Install washer (13), clip (12), lockwasher (11) and bolt (10) in right side of plate (14) of heater assembly (8).
- 4. Connect hose (7) to valve (9).

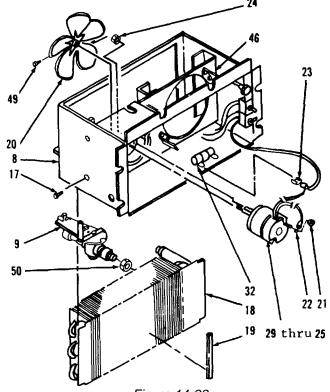


Figure 14-22.

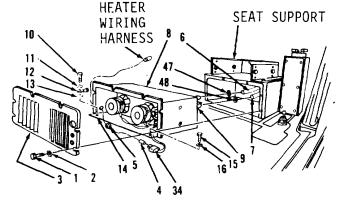


Figure 14-21.

Go to Sheet 7

# **14-19. Heater**. (Sheet 7 of 7)

# **INSTALLATION** (cont)

- 5. Tighten clamp (48).
- 6. Connect hose (6) to outlet.
- 7. Tighten clamp (47).
- 8. Pull heater wiring harness into heater assembly (8).
- 9. Install new grommet (5).
- 10. Connect wire assembly (4) to connector (34).
- 11. Install cover (3), six washers (2) and bolts (1).
- 12. Fill radiator with coolant.

NOTE
Return 130G Grader to original equipment condition.

End of Task

#### 14-10. Inside Rearview Mirror. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

1000,

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

#### 14-10. Inside Rearview Mirror. (Sheet 2 of 2)

#### **REMOVAL**

- 1. Remove two caps (1, Figure 14-25) from top, front of cab.
- 2. Remove two bolts (2), lockwashers (3 and 4), nuts (5) and mirror (6).
- 3. Remove four bolts (7) and washers (8, Figure 14-26).
- 4. Remove two plugs (9), clamps (10) and arms (11).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install two arms (11) and clamps (10, Figure 14-26).
- 2. Install two plugs (9), four washers (8) and bolts (7).
- 3. Install mirror (6, Figure 14-25).
- 4. Install two nuts (5), lockwashers (4 and 3), bolts (2) and caps (1).

# NOTE Return 130G Grader to original equipment condition.

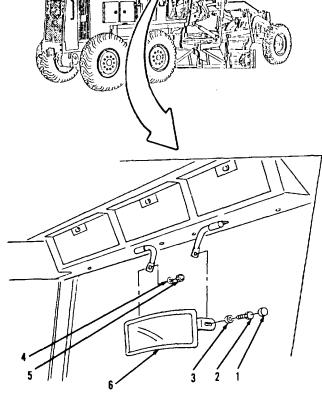
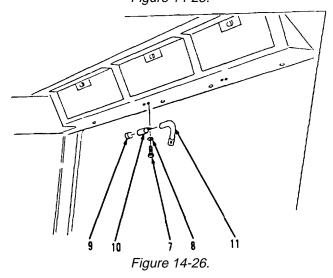


Figure 14-25.



End of Task

#### 14-11. Outside Rearview Mirrors. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

Except for special torques shown, all fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

#### 14-11. Outside Rearview Mirrors. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

The following is a maintenance procedure for the right outside rearview mirror. The maintenance procedure for the left outside rearview mirror is identical.

- Remove two bolts (1), nuts (2), lockwashers
   (3) and mirror (4, Figure 14-27) from mounting on right side of cab.
- 2. Remove two bolts (5), nuts (6), lockwashers (7 and 8) and clamps (9).
- 3. Remove two bolts (10), clamps (11), lockwashers (12), nuts (13), strips (14) and arm (15, Figure 14-28).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

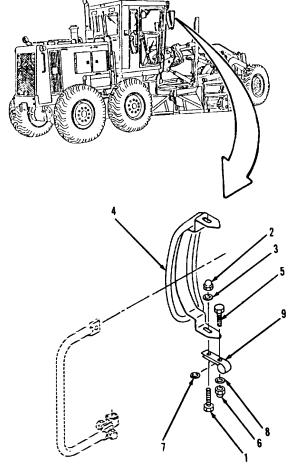


Figure 14-27.

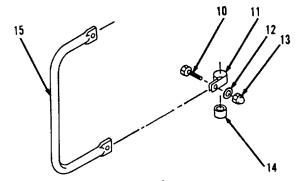


Figure 14-28.

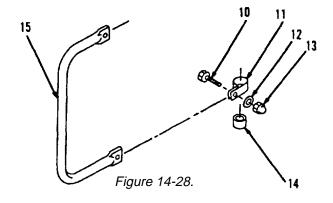
Go to Sheet 3

#### 14-11. Outside Rearview Mirrors. (Sheet 3 of 3)

#### **INSTALLATION**

- 1. Position arm (15, Figure 14-28).
- 2. Install two strips (14) on two clamps (11) with adhesive side on clamp halves.
- 3. Install two nuts (13), lockwashers (12), clamps (11) and bolts (10). Secure arm (15) to grabiron. Tighten bolts (10) to 19 ft-lb.
- 4. Install two clamps (9), lockwashers (8 and 7), nuts (6) and bolts (5, Figure 14-27).
- 5. Position mirror (4).
- 6. Install two lockwashers (3), nuts (2) and bolts (1).

# NOTE Return 1300 Grader to original equipment condition.



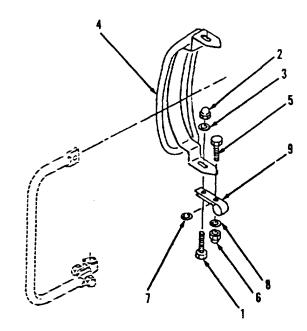


Figure 14-27.

End of Task

#### 14-12. Data Plates. (Sheet 1 of 11)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Detergent, Item 8, Appendix C

Film, Item 26

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

### 14-12. <u>Data Plates</u>. (Sheet 2 of 11)

#### **REMOVAL**

- 1. Remove two screws (1) and data plate (2, Figure 14-29) from right side of vehicle.
- 2. Remove four screws (3) and data plate (4).
- 3. Remove two bolts (5) and washers (6).
- 4. Open screen (7).
- 5. Remove decal (8).

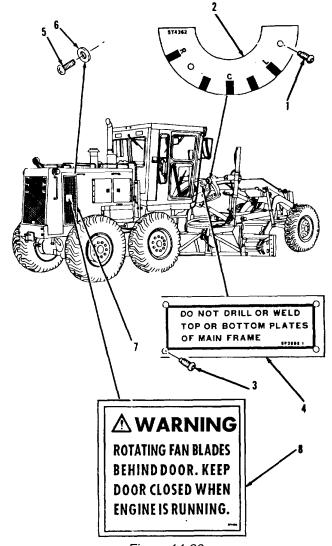


Figure 14-29.

Go to Sheet 3

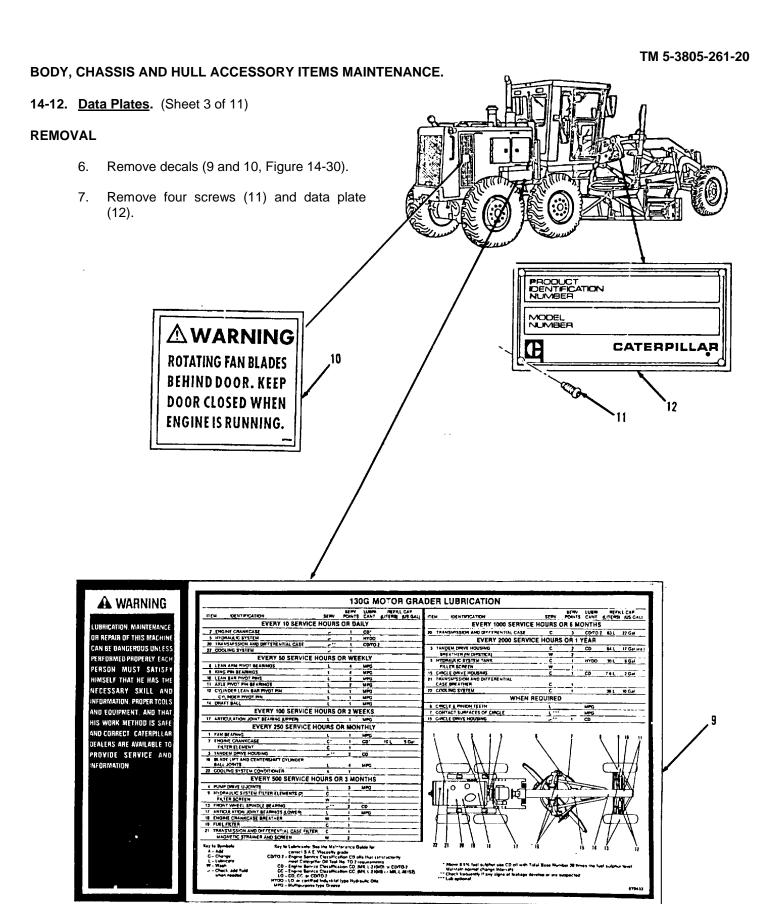


Figure 14-30.

Go to Sheet 4

# 14-12. <u>Data Plates</u>. (Sheet 4 of 11) **REMOVAL** (cont) Remove data plate (13, Figure 14-31) from left side of vehicle. Remove four nuts (14), screws (15), 9. washers (16) and data plate (17). 10. Remove decal (18, Figure 14-32). **MARNING** 11. Remove decals (19 and 20). **ENGAGE PIN WITH CONTROL LEVER AT INDEX BEFORE LOOSENING BOLTS** TRANSPORTATION DATA FOR GRADER, ROAD, MOTORIZED, D. E. D. Z LIFT EYES CAP 27,025 LBS 17 Figure 14-31. 15 $oldsymbol{\Delta}$ WARNING CATERPILLAR **ROTATING FAN BLADES** BEHIND DOOR. KEEP CATERPILIAR, CAT AND THE ARE TRADEMARKS OF CATERPILIAR TRACTOR CO., PROMA, RUMOR, U.S.A. DOOR CLOSED WHEN MARUFACTURED UNDER ONE OR MORE OF THE FOLLOWING LETTERS PATENT **<sup>↑</sup> WARNING** ENGINE IS RUNNING. NO CLEARANCE FOR MAN IN THIS AREA WHEN TURNING VEHICLE 20

Figure 14-32.

Go to Sheet 5

20.000 Performance of Trial Performance 1.11 Performance

#### **14-12. Data Plates.** (Sheet 5 of 11)

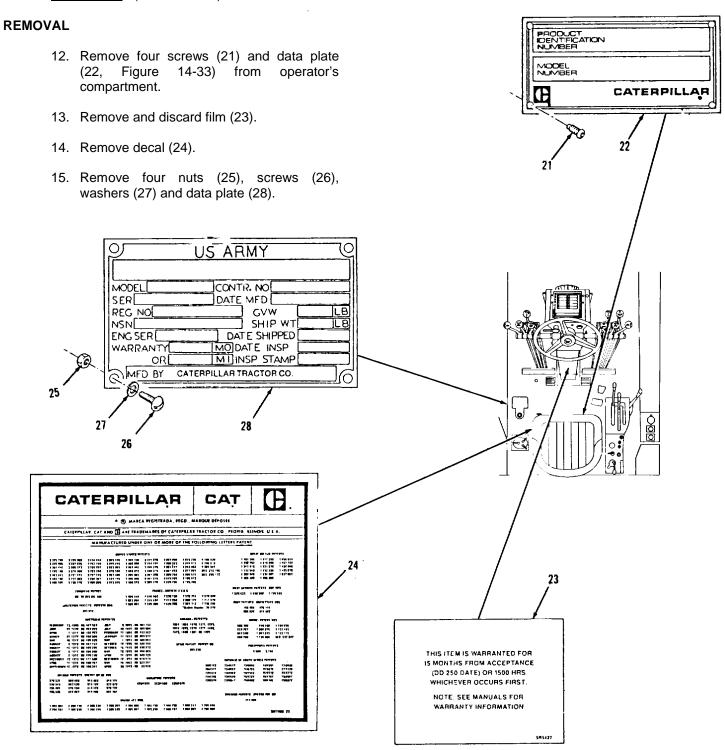


Figure 14-33.

#### 14-12. <u>Data Plates</u>. (Sheet 6 of 11)

#### **REMOVAL** (cont)

- 16. Remove data plate (29, Figure 14-34)
- 17. Remove switch (30) and decal (31).
- 18. Remove four screws (32) and data plate (33).
- 19. Remove four screws (34) and data plate (35).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

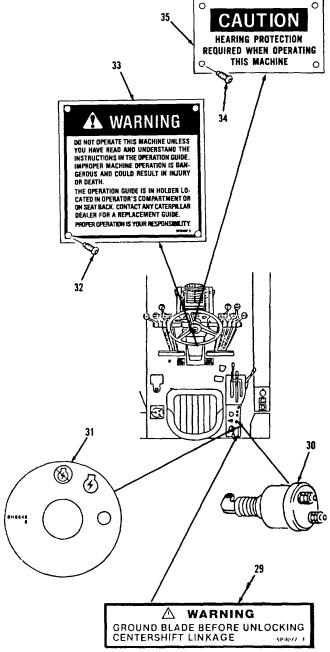


Figure 14-34.

### 14-12. <u>Data Plates</u>. (Sheet 7 of 11)

#### **INSTALLATION**

- 1. Install data plate (35) and four screws (34, Figure 14-34).
- 2. Install data plate (33) and four screws (32).
- 3. Install decal (31) and switch (30).
- 4. Install data plate (29).

Go to Sheet 8

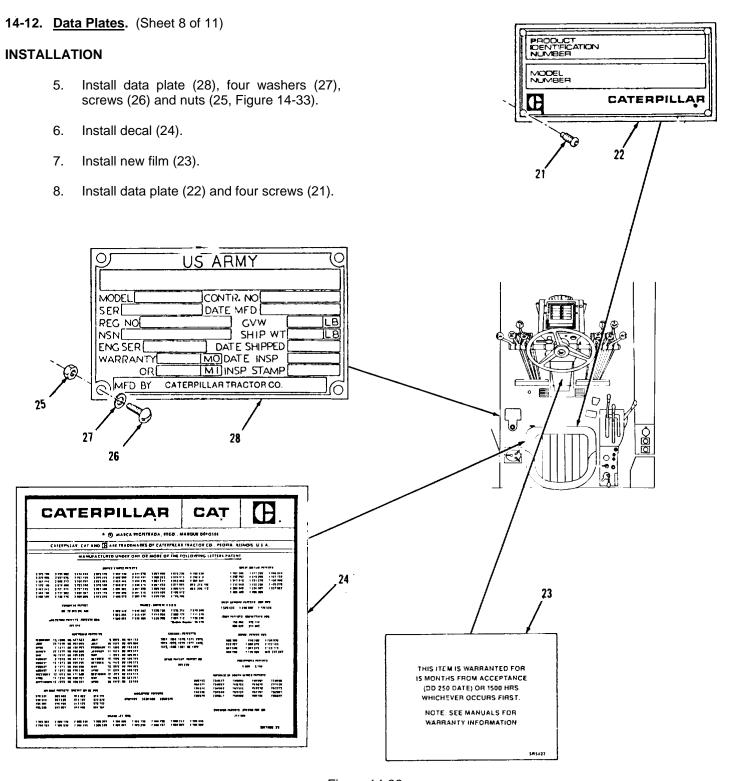
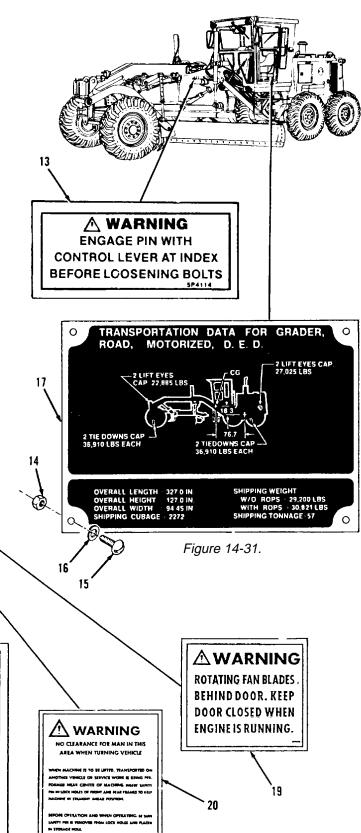


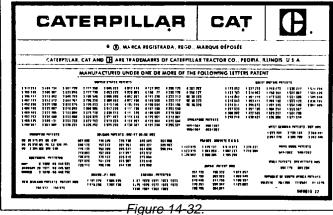
Figure 14-33.

#### **14-12. Data Plates.** (Sheet 9 of 11)

#### **INSTALLATION**

- Install decals (20 and 19, Figure 14-32).
- 10. Install data (18).
- 11. Install data plate (17), four washers (16), screws (15) and nuts (14, Figure 14-31).
- 12. Install data plate (13).





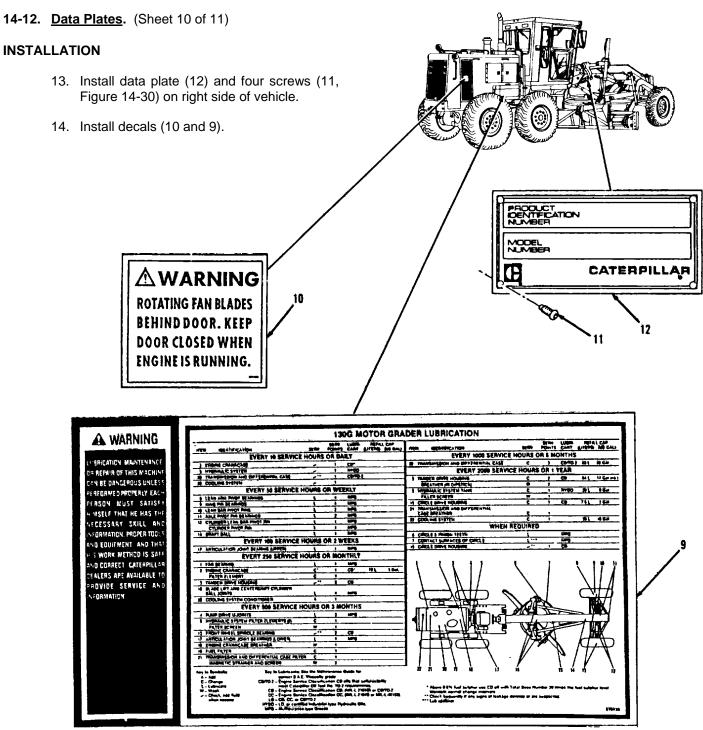


Figure 14-30.

## 14-12. <u>Data Plates</u>. (Sheet 11 of 11)

#### **INSTALLATION**

- 15. Install decal (8, Figure 14-29).
- 16. Close screen (7).
- 17. Install two washers (6) and bolts (5).
- 18. Install data plate (4) and four screws (3).
- 19. Install data plate (2) and two screws (1).

# NOTE Return 130G Grader to original equipment condition.

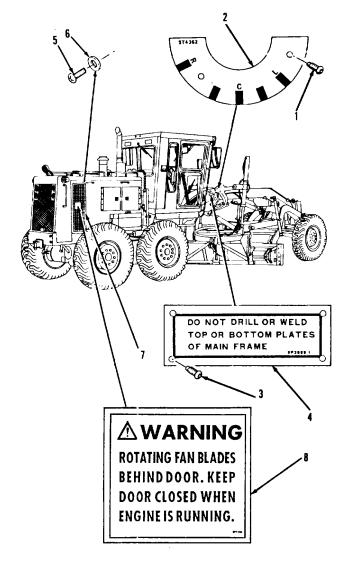


Figure 14-29.

End of Task

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#### **CHAPTER 15**

# HYDRAULIC SYSTEM TROUBLESHOOTING AND MAINTENANCE

#### **CHAPTER OVERVIEW**

The purpose of this chapter is to help the technician efficiently troubleshoot and repair malfunctioning equipment and to perform authorized organizational support level maintenance procedures on the 130G Grader.

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#### Section I. HYDRAULIC SYSTEM TROUBLESHOOTING.

- **15-1. GENERAL INFORMATION**. This section lists the common hydraulic system malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **15-2. HYDRAULIC SYSTEM TROUBLESHOOTING PROCEDURES.** This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### HYDRAULIC SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

- a. ALL IMPLEMENTS FAIL TO OPERATE OR OPERATE SLOWLY.
  - Step 1. Check the hydraulic hoses for leaks and loose fittings. Apply soap and water solution over length of hoses and observe.

If a hydraulic hose fitting is loose--tighten. If a hose is damaged or defective--replace. Refer to paragraphs 15-22 through 15-33.

Step 2. Check the hydraulic filters.

If the filters are clogged, damaged or defective--replace. Refer to paragraph 15-35.

Step 3. Check the hydraulic pump assembly.

If the hydraulic pump assembly is damaged or defective--replace. Refer to paragraph 15-5.

If the problem has not been identified, a flow meter tee test should be performed. Contact Direct Support.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

- b. CIRCLE DRIVE OPERATES SLOWLY OR FAILS TO OPERATE.
  - Step 1. Check the circle drive hydraulic hoses for leaks and loose fittings.

If a circle drive fitting is loose--tighten. If a hose is damaged or defective--replace. Refer to paragraph 15-29.

Step 2. Measure circle drive operation time. Using a stop watch, measure the amount of time for a one quarter revolution.

The time for a one quarter revolution in either direction is between 9.5 and 11.5 seconds.

If the time recorded is not within this range--replace circle drive. Refer to paragraph 15-6.

If the time recorded is within range, a flow meter tee test should be performed. Contact Direct Support.

- c. BLADE FLOAT FAILS TO OPERATE.
  - Step 1. Check the blade float hydraulic hoses for leaks and loose fittings.

If a blade float fitting is loose--tighten. If a hose is damaged or defective--replace. Refer to paragraph 15-25.

Step 2. Check to see if it is one or both sides of the blade that do not float.

If both sides of the blade float do not operate--replace blade float pilot valve. Refer to paragraph 15-7.

If one side of the blade float does not operate--replace blade float check valve. Refer to paragraph 15-8.

#### HYDRAULIC SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

#### d. BLADE LIFT FAILS TO OPERATE.

Step 1. Check the blade lift hydraulic hoses for leaks and loose fittings.

If a blade lift fitting is loose--tighten. If a hose is damaged or defective--replace. Refer to paragraph 15-26.

Step 2. Check fluid level in hydraulic tank.

Refer to Operator's Manual, TM 5-3805-261-10 for proper fluid, level and cautions.

Step 3. Measure blade lift time. Using a stop watch, measure the amount of time for the blade to be listed from the ground to the stopping point.

The time for the blade to be lifted is between 0.5 and 9.5 seconds.

If the time is not within this range--contact Direct Support.

If the time is within range, a flow meter tee test should be performed. Contact Direct Support.

#### e. CENTER SHIFT FAILS TO OPERATE.

Check the center shift hydraulic hoses for leaks and loose fittings.

If a center shift fitting is loose--tighten. If a hose is damaged or defective--replace. Refer to paragraph 15-30.

#### HYDRAULIC SYSTEM TROUBLESHOOTING AND MAINTENANCE PROCEDURES. (cont)

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

#### f. BLADE TIP FAILS TO OPERATE.

Check the blade tip hydraulic hoses for leaks and loose fittings.

If a blade tip fitting is loose--tighten. If a hose is damaged or defective--replace. Refer to paragraph 15-27.

#### g. LEANING WHEEL FAILS TO OPERATE.

Check the leaning wheel hydraulic hoses for leaks or loose fittings.

If a leaning wheel fitting is loose--tighten. If a hose is damaged or defective--replace. Refer to paragraph 15-28

#### h. SIDE SHIFT FAILS TO OPERATE.

Check the side shift hydraulic hoses for leaks and loose fittings.

If a side shift fitting is loose--tighten. If a hose is damaged or defective--replace. Refer to paragraph 15-32.

#### Section II. HYDRAULIC SYSTEM MAINTENANCE.

#### 15-3. HYDRAULIC SYSTEM MAINTENANCE PROCEDURES.

- **a.** The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the hydraulic system and its components in good repair.
- **b.** This section is arranged by functional group code and provides a list of hydraulic system components to be maintained and step-by-step maintenance procedures.

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#### **HYDRAULIC SYSTEM MAINTENANCE.** (cont)

#### 15-4. Circle Drive Motor Assembly. (Sheet 1 of 3)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

.....

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Detergent, Item 8, Appendix C

Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

#### **HYDRAULIC SYSTEM MAINTENANCE.**

#### **15-4.** Circle Drive Motor Assembly. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- Disconnect hose assemblies (1 and 2) at connectors from circle drive motor (5, Figure 15-1).
- 2. Remove four bolts (3), washers (4) and circle drive motor (5).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- Install circle drive motor (5, Figure 15-1) in left rear frame of circle drive. Hose ports face outside left.
- 2. Install four washers (4) and bolts (3).
- 3. Connect hose assemblies (2 and 1) at connectors on circle drive motor (5).

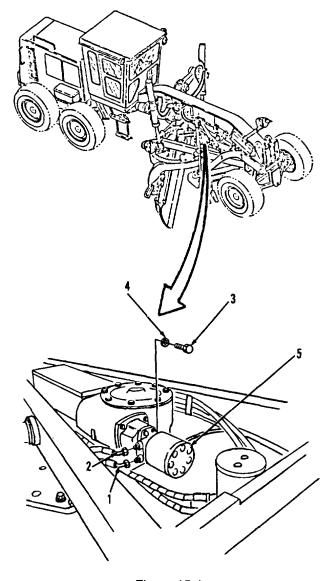


Figure 15-1.

#### **15-4.** Circle Drive Motor Assembly. (Sheet 3 of 3)

#### **INSTALLATION** (cont)

#### WARNING

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 4. Start engine. Refer to TM 5-3805-261-10.
- Operate circle drive control lever. Move system through at least five full movements of travel to bleed air from system. Refer to TM 5-3805-261-10.
- 6. Stop engine,
- 7. Inspect hose assemblies and connections, Check for leaks.
- Refill hydraulic tank in rear left side of operator's compartment to proper level. Refer to LO 5-3805-261-12.

#### NOTE

Return 130G Grader to original equipment condition.

End of Task

#### **HYDRAULIC SYSTEM MAINTENANCE.**

#### Blade Float Pilot Valve. (Sheet 1 of 4) 15-5.

a. Removal This task covers: b. Cleaning c. Inspection d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Detergent, Item 8, Appendix C Preformed packings, Items 10, 12, 15

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

Caps

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. Hydraulic pressure relieved.

Paragraph 7-124

Blade float valve harness removed.

Go to Sheet 2

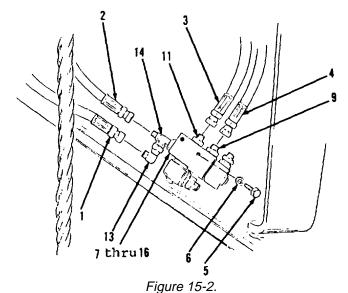
#### **15-5.** Blade Float Pilot Valve. (Sheet 2 of 4)

#### **REMOVAL**

#### **NOTE**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 1. Disconnect hose assembly (1) from elbow (13, Figure 15-2).
- 2. Disconnect hose assembly (2) from tee (14).
- 3. Disconnect hose assembly (3).
- 4. Disconnect hose assembly (4).
- 5. Remove bolt (5) and washer (6).
- 6. Remove items 7 thru 16 as an assembly.
- 7. Remove coils (7 and 8) from pilot valve (16, Figure 15-3).
- 8. Remove connector (9) and preformed packing (10). Discard preformed packing (10).
- 9. Remove connector (11) and preformed packing (12). Discard preformed packing (12).
- 10. Remove elbow (13).
- 11. Remove tee (14) and preformed packing (15). Discard preformed packing (15).



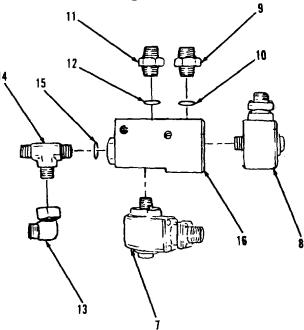


Figure 15-3.

Go to Sheet 3

#### **HYDRAULIC SYSTEM MAINTENANCE.**

#### **15-5.** Blade Float Pilot Valve. (Sheet 3 of 4)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install new preformed packing (15) and tee (14) into pilot valve (16, Figure 15-3).
- 2. Install elbow (13).
- 3. Install new preformed packing (12) and connector (11).
- 4. Install new preformed packing (10) and connector (9).
- 5. Install coils (8 and 7).
- 6. Position items 16 thru 7 as an assembly (Figure 15-2) on vehicle.
- 7. Install washer (6) and bolt (5).
- 8. Connect hose assembly (4) to connector (9).
- 9. Connect hose assembly (3) to connector (11).
- 10. Connect hose assembly (2) to tee (14).
- 11. Connect hose assembly (1) to elbow (13).

Go to Sheet 4

#### **15-5.** Blade Float Pilot Valve. (Sheet 4 of 4)

#### **INSTALLATION** (cont)

#### WARNING

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 12. Start engine. Refer to TM 5-3805-261-10.
- 13. Operate blade float control. Move system through at least five full movements to bleed air from hydraulic system.
- 14. Inspect all hose assemblies for leaks.
- 15. Stop engine.
- 16. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

#### NOTE

Return 13OG Grader to original equipment condition.

End of Task

#### **HYDRAULIC SYSTEM MAINTENANCE.**

#### **15-6.** Blade Float Check Valve. (Sheet 1 of 3)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

# INITIAL SETUP:

#### **Applicable Configurations**

ΑII

#### Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

#### Test Equipment

None

#### Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Detergent, Item 8, Appendix C Preformed packings, Items 3, 6, 9, 12 Caps

#### Personnel Required

Construction equipment repairer MOS 62B

#### References

TM 5-3805-261-10

#### **Special Environmental Conditions**

None

#### **General Safety Instructions**

None

#### **Torques**

All fasteners are tightened to standard torques. Refer to Appendix E.

#### Troubleshooting References

None

#### **Equipment Condition**

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off. Hydraulic pressure relieved.

Go to Sheet 2

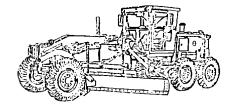
#### **HYDRAULIC SYSTEM MAINTENANCE.** (cont)

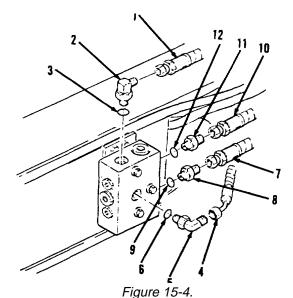
#### **15-6.** Blade Float Check Valve. (Sheet 2 of 3)

#### **REMOVAL**

#### **NOTE**

- All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.
- The following is a maintenance procedure for the left side blade float check valve. The maintenance procedure for the right side blade float check valve is identical.
  - 1. Disconnect hose assembly (1, Figure 15-4).
  - 2. Remove elbow (2) and preformed packing (3). Discard preformed packing (3).
  - 3. Disconnect hose assembly (4).
  - 4. Remove elbow (5) and preformed packing (6). Discard preformed packing (6).
  - 5. Disconnect hose assembly (7).
  - 6. Remove connector (8) and preformed packing (9). Discard preformed packing (9).
  - 7. Disconnect hose assembly (10).
  - 8. Remove connector (11) and preformed packing (12). Discard preformed packing (12).
  - 9. Remove three bolts (13) and washers (14, Figure 15-15).
  - 10. Remove blade float check valve (15).





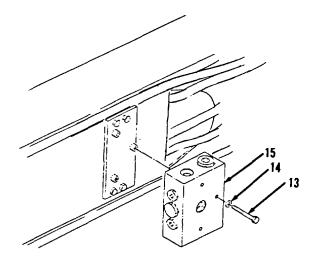


Figure 15-5.

#### **HYDRAULIC SYSTEM MAINTENANCE.**

#### **15-6.** Blade Float Check Valve. (Sheet 3 of 3)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install blade float check valve (15, Figure 15-5).
- 2. Install three washers (14) and bolts (13).
- 3. Install new preformed packing (12) and connector (11, Figure 15-4).
- 4. Connect hose assembly (10).
- 5. Install new preformed packing (9) and connector (8).
- 6. Connect hose assembly (7).
- 7. Install new preformed packing (6) and elbow (5).
- 8. Connect hose assembly (4).
- 9. Install new preformed packing (3) and elbow (2).
- 10. Connect hose assembly (1).

#### NOTE

Return 130G Grader to original equipment condition.

End of Task

### 15-7. Hydraulic Pump Relief Valve Assembly and Mounting. (Sheet 1 of 3)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

#### **INITIAL SETUP:**

#### **Applicable Configurations**

ΔΙ

#### Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

#### Test Equipment

None

#### Materials/Parts

Dry cleaning solvent,
Item 14, Appendix C
Clean cloths, Item 39,
Appendix C
Small tags, Item 41,
Appendix C
Detergent, Item 8, Appendix C
Caps

#### Personnel Required

Construction equipment repairer MOS 62B

#### References

TM 5-3805-261-10

#### **Special Environmental Conditions**

None

#### **General Safety Instructions**

None

#### **Torques**

All fasteners are tightened to standard torques. Refer to Appendix E.

## Troubleshooting References

None

#### **Equipment Condition**

TM 5-3805-261-10

Vehicle parked on level ground.
Parking/emergency brake applied.
Equipment lowered to the ground.
Engine stopped.
Master disconnect switch off.
Hydraulic pressure relieved.

Go to Sheet 2

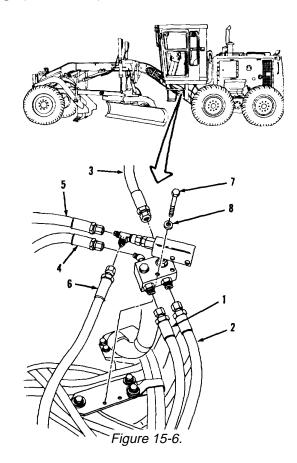
#### 15-7. Hydraulic Pump Relief Valve Assembly and Mounting. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 1. Disconnect hose assembly (1, Figure 15-6).
- 2. Disconnect hose assembly (2).
- 3. Disconnect hose assembly (3).
- 4. Disconnect hose assembly (4).
- 5. Disconnect hose assembly (5).
- 6. Disconnect hose assembly (6).
- 7. Remove two bolts (7) and washers (8) and items 15 thru 33 as an assembly.
- 8. Remove three bolts (9), washers (10 and 11), plate (12), three grommets (13) and washers (14, Figure 15-7).



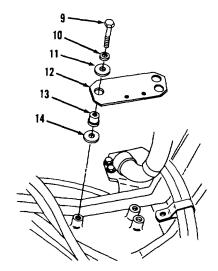


Figure 15-7.

#### 15-7. Hydraulic Pump Relief Valve Assembly and Mounting. (Sheet 3 of 3)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

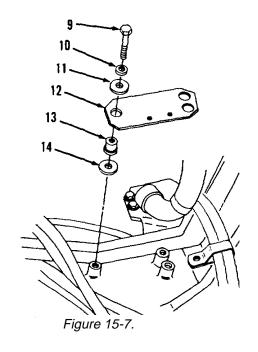
#### **INSPECTION**

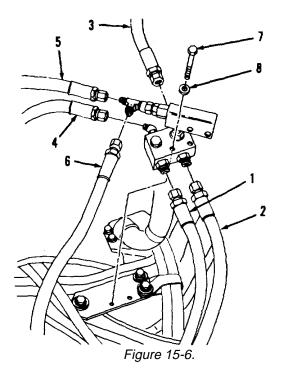
Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install three washers (14), grommets (13), plate (12), washers (11 and 10) and three bolts (9, Figure 15-7).
- 2. Install items 33 thru 15 as an assembly, two washers (8) and bolts (7, Figure 15-6) to vehicle.
- 3. Connect hose assembly (6).
- 4. Connect hose assembly (5).
- 5. Connect hose assembly (4).
- 6. Connect hose assembly (3).
- 7. Connect hose assembly (2).
- 8. Connect hose assembly (1).

# NOTE Return 130G Grader to original equipment condition.





End of Task

## 15-8. Circle Drive Check Valve. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C

Detergent, Item 8, Appendix C Preformed packings, Items 8,

10, 14, 16

Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

Torques

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped.

Master disconnect switch off. Hydraulic pressure relieved.

Go to Sheet 2

## **HYDRAULIC SYSTEM MAINTENANCE.** (cont)

## **15-8.** Circle Drive Check Valve. (Sheet 2 of 4)

#### **REMOVAL**

 Remove nine bolts (1), washers (2 and 3) and frame cover (4, Figure 15-8) in front, left side of frame.

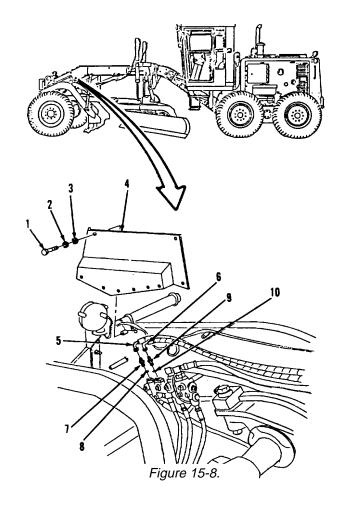
## NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 2. Disconnect hose assemblies (5 and 6) from top valve ports.
- 3. Remove connector (7) and preformed packing (8). Discard preformed packing (8).
- 4. Remove connector (9) and preformed packing (10). Discard preformed packing (10).
- 5. Disconnect hose assemblies (11 and 12, Figure 15-9) from bottom valve ports.
- 6. Remove connector (13) and preformed packing (14). Discard preformed packing (14).
- 7. Remove elbow (15) and preformed packing (16). Discard preformed packing (16).
- 8. Remove three bolts (17), washers (18) and valve assembly (19).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.



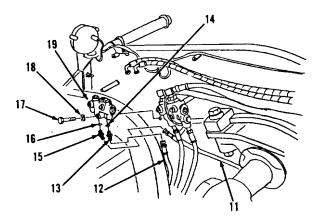


Figure 15-9.

## **15-8.** Circle Drive Check Valve. (Sheet 3 of 4)

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install valve assembly (19), three washers (18) and bolts (17, Figure 15-9) from front, left side of frame.
- 2. Install new preformed packing (16) and elbow (15).
- 3. Install new preformed packing (14) and connector (13).
- 4. Connect hose assemblies (12 and 11).
- 5. Install new preformed packing (10) and connector (9, Figure 15-8).
- 6. Install new preformed packing (8) and connector (7).
- 7. Connect hose assemblies (6 and 5).

#### **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

8. Start engine. Refer to TM 5-3805-261-10.

Go to sheet 4

## **HYDRAULIC SYSTEM MAINTENANCE.** (cont)

## **15-8.** Circle Drive Check Valve. (Sheet 4 of 4)

## **INSTALLATION** (cont)

- Operate circle drive control lever. Move system through at least five full movements of travel to bleed air from system.
- 10. Stop engine.
- 11. Inspect hose assemblies and connections for leaks.
- 12. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.
- 13. Install frame cover (4), nine washers (3 and 2) and bolts (1, Figure 15-8).

# NOTE Return 130G Grader to original equipment condition.

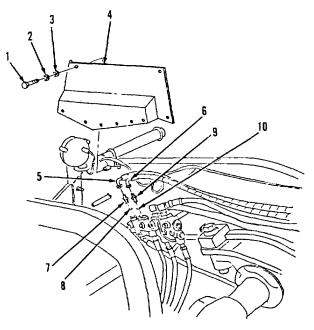


Figure 15-8.

End of Task

#### Leaning Wheel Check Valve. (Sheet 1 of 4) 15-9.

This task covers: a. Removal b. Cleaning c. Inspection d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Detergent, Item 8, Appendix C

Small tags, Item 41,

Appendix C

Preformed packings, Items 8,

10, 14, 16

Caps

Personnel Required

Construction equipment

repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Hydraulic pressure relieved.

Go to Sheet 2

## 15-9. Leaning Wheel Check Valve. (Sheet 2 of 4)

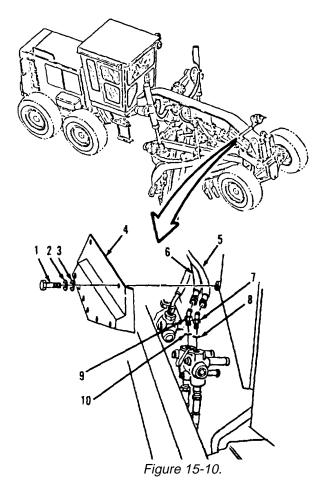
#### **REMOVAL**

1. Remove nine bolts (1), washers (2 and 3) and frame cover (4, Figure 15-10) in front, right side of frame.

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 2. Disconnect hose assemblies (5 and 6) from top valve ports.
- 3. Remove elbow (7) and preformed packing (8). Discard preformed packing (8).
- 4. Remove elbow (9) and preformed packing (10). Discard preformed packing (10).
- 5. Disconnect hose assemblies (11 and 12, Figure 15-11) from bottom valve ports.
- Remove connector (13) and preformed packing (14). Discard preformed packing (14).
- 7. Remove connector (15) and preformed packing (16). Discard preformed packing (16).
- 8. Remove bolt (17), washer (18) and valve assembly (19).



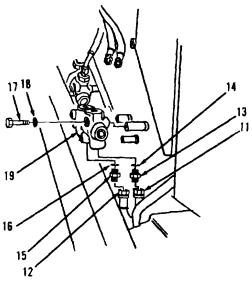


Figure 15-11.

## 15-9. Leaning Wheel Check Valve. (Sheet 3 of 4)

## **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install valve assembly (19), washer (18) and bolt (17, Figure 15-11).
- 2. Install new preformed packing (16) and connector (15).
- 3. Install new preformed packing (14) and connector (13).
- 4. Connect hose assemblies (12 and 11).

Go to Sheet 4

## **HYDRAULIC SYSTEM MAINTENANCE.** (cont)

## 15-9. Leaning Wheel Check Valve. (Sheet 4 of 4)

## **INSTALLATION** (cont)

- 5. Install new preformed packing (10) and elbow (9, Figure 15-10).
- 6. Install new preformed packing (8) and elbow (7).
- 7. Connect hose assemblies (6 and 5).

#### **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 8. Start engine. Refer to TM 5-3805-261-10.
- 9. Operate leaning wheel control lever. Move system through at least five full movements of travel to bleed air from system.
- 10. Stop engine.
- Inspect hose assemblies and connections for leaks.
- 12. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.
- 13. Install frame cover (4), nine washers (3 and 2) and bolts (1) in front, right side of frame.

## **NOTE**

Return 130CG Grader to original equipment condition.

End of Task

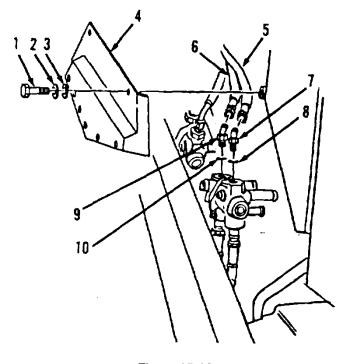


Figure 15-10.

## 15-10. Sideshift Check and Relief Valves. (Sheet 1 of 4)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

## INITIAL SETUP:

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Detergent, Item 8, Appendix C Small tags, Item 41, Appendix C Preformed packings, Items 8, 10, 14, 16 Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

Troubleshooting References

None

Caps

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off. Hydraulic pressure relieved.

Go to Sheet 2

## 15-10. Sideshift Check and Relief Valve. (Sheet 2 of 4)

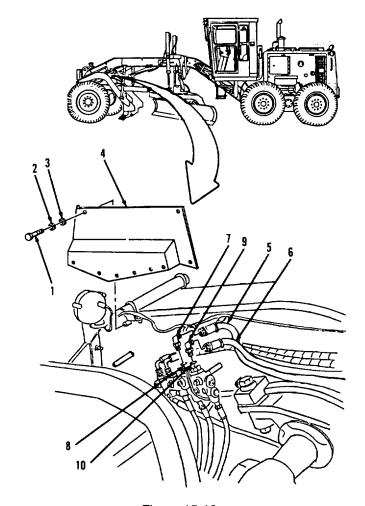
#### **REMOVAL**

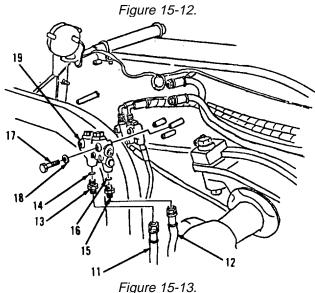
 Remove eight bolts (1), washers (2 and 3) and frame cover (4, Figure 15-12) in front, left side of frame.

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation Cap all hose and tube ends to prevent contamination.

- 2. Disconnect hose assemblies (5 and 6) from top valve ports.
- 3. Remove elbow (7) and preformed packing (8). Discard preformed packing (8).
- 4. Remove elbow (9) and preformed packing (10). Discard preformed packing (10).
- 5. Disconnect hose assemblies (11 and 12, Figure 15-13) from bottom valve ports.
- 6. Remove connector (13) and preformed packing (14). Discard preformed packing (14).
- 7. Remove connector (15) and preformed packing (16). Discard preformed packing (16).
- 8. Remove bolt (17), washer (18) and valve assembly (19).





## 15-10. Sideshift Check and Relief Valve. (Sheet 3 of 4)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install valve assembly (19), washer (18) and bolt (17, Figure 15-13).
- 2. Install new preformed packing (16) and connector (15).
- 3 Install new preformed packing (14) and connector (13).
- 4. Connect hose assemblies (12 and 11) on bottom valve ports.
- 5. Install new preformed packing (10) and elbow (9, Figure 15-12).
- 6. Install new preformed packing (8) and elbow (7).
- 7. Connect hose assemblies (6 and 5) on top valve ports.

Go to Sheet 4

## HYDRAULIC SYSTEM MAINTENANCE. (cont)

## 15-10. Sideshift Check and Relief Valve. (Sheet 4 of 4)

## **INSTALLATION** (cont.)

#### WARNING

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 8. Start engine. Refer to TM 5-3805-261-10.
- Operate sideshift control lever. Move system through at least five full movements of travel to bleed air from system.
- 10. Stop engine.
- 11. Inspect hose assemblies and connections for leaks.
- 12. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.
- 13. Install frame cover (4), eight washers (3 and 2) and bolts (1, Figure 15-12).

#### NOTE

Return 130G Grader to original equipment condition.



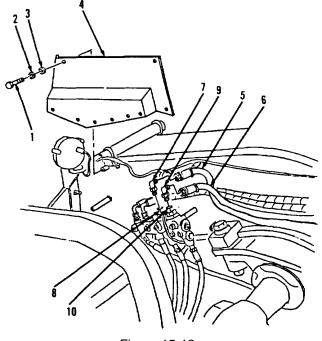


Figure 15-12.

## 15-11. Blade Tip Check and Relief Valve. (Sheet 1 of 4)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Detergent, Item 8, Appendix C Preformed packings, Items 8, 10, 14, 16 Caps <u>Personnel Required</u>
Construction equipment

repairer MOS. 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off. Hydraulic pressure relieved.

Go to Sheet 2

## 15-11. Blade Tip Check and Relief Valve. (Sheet 2 of 4)

#### **REMOVAL**

1. Remove nine bolts (1), washers (2 and 3) and frame cover (4, Figure 15-14) in front, right side of front frame.

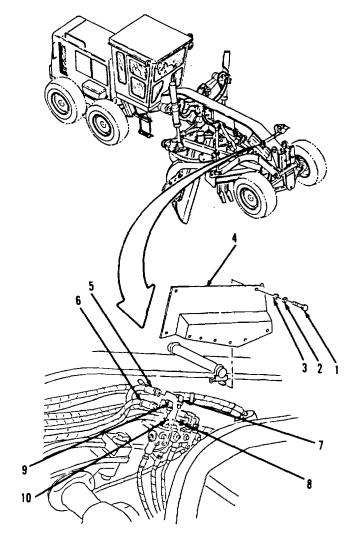
#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 2. Disconnect hose assemblies (5 and 6) from top valve ports.
- 3. Remove elbow (7) and preformed packing (8). Discard preformed packing (8).
- 4. Remove elbow (9) and preformed packing (10). Discard preformed packing (10).
- 5. Disconnect hose assemblies (11 and 12, Figure 15-15) from bottom valve ports.
- 6. Remove connector (13) and preformed packing (14). Discard preformed packing (14).
- 7. Remove connector (15) and preformed packing (16). Discard preformed packing (16).
- 8. Remove bolt (17), washer (18) and valve assembly (19).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.



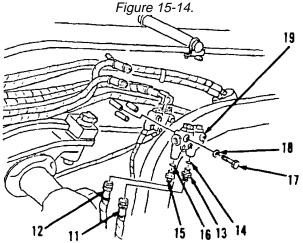


Figure 15-15.

## 15-11. Blade Tip Check and Relief Valve. (Sheet 3 of 4)

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install valve assembly (19), washer (18) and bolt (17, Figure 15-15).
- 2. Install new preformed packing (16) and connector (15).
- 3. Install new preformed packing (14) and connector (13).
- 4. Connect hose assemblies (12 and 11).
- 5. Install new preformed packing (10) and elbow (9, Figure 15-14).
- 6. Install new preformed packing (8) and elbow (7).
- 7. Connect hose assemblies (6 and 5).

#### **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

8. Start engine. Refer to TM 5-38055-261-10.

Go to Sheet 4

## **HYDRAULIC SYSTEM MAINTENANCE**. (cont.)

## 15-11. Blade Tip Check and Relief Valve. (Sheet 4 of 4)

## **INSTALLATION** (cont.)

- Operate blade tip control lever. Move system through at least five full movements of travel to bleed air from system.
- 10. Stop engine.
- 11. Inspect hose assemblies and connections for leaks.
- 12. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.
- 13. Install frame cover (4), nine washers (3 and 2) and bolts (1, Figure 15-14).

# NOTE Return 130G Grader to original equipment condition.

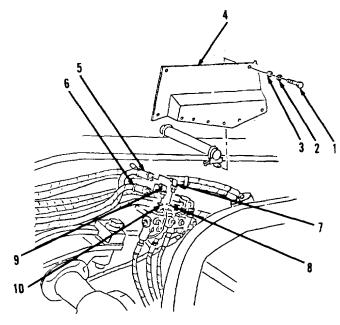


Figure 15-14.

End of Task

## 15-12. Scarifier Check and Relief Valve. (Sheet 1 of 5)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Detergent, Item 8, Appendix C Preformed packings, Item 3, 6, 9, 12 Caps Personnel Required

Construction equipment repairer MOS. 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off. Hydraulic pressure relieved.

Go to Sheet 2

## **HYDRAULIC SYSTEM MAINTENANCE**. (cont.)

## 15-12. Scarifier Check and Relief Valve. (Sheet 2 of 5)

## **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 1. Disconnect hose assembly (1, Figure 15-16) under right side of front frame.
- 2. Remove elbow (2) and preformed packing (3). Discard preformed packing (3).
- 3. Disconnect hose assembly (4).
- 4. Remove elbow (5) and preformed packing (6). Discard preformed packing (6).
- 5. Disconnect hose assembly (7).
- 6. Remove connector (8) and preformed packing (9). Discard preformed packing (9).
- 7. Disconnect hose assembly (10).
- 8. Remove connector (11) and preformed packing (12). Discard preformed packing (12).
- 9. Remove three bolts (13), washers (14) and valve assembly (15, Figure 15-17).

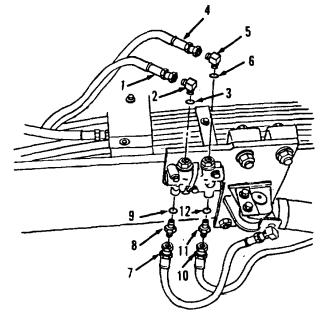


Figure 15-16.

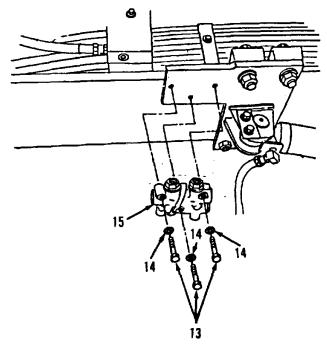


Figure 15-17.

## **15-12.** Scarifier Check and Relief Valve. (Sheet 3 of 5)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

#### NOTE

Be sure that side of valve with two plugged ports is facing front of vehicle and side with one plugged port is facing rear of vehicle.

- 1. Position valve assembly (15, Figure 15-17) under right side of front frame.
- 2. Install three washers (14) and bolts (13) in valve assembly (15).

Go to Sheet 4

## **HYDRAULIC SYSTEM MAINTENANCE.** (cont.)

## 15-12. Scarifier Check and Relief Valve. (Sheet 4 of 5)

## **INSTALLATION** (cont.)

- 3. Install new preformed packing (12) and connector (11, Figure 15-16).
- 4. Connect hose assembly (10).
- 5. Install new preformed packing (9) and connector (8).
- 6. Connect hose assembly (7).
- 7. Install new preformed packing (6) and elbow (5).
- 8. Connect hose assembly (4).
- 9. Install new preformed packing (3) and elbow (2).
- 10 Connect hose assembly (1).
- 11 Start engine. Refer to TN 5-3805-261-10.

## **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

12. Operate scarifier control valve. Move system through five full movements to bleed air from system.

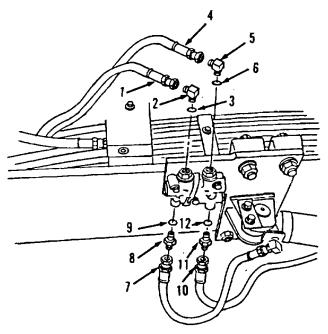


Figure 15-16.

Go to Sheet 5

## **15-12.** Scarifier Check and Relief Valve. (Sheet 5 of 5)

## **INSTALLATION**

- 13. Stop engine.
- 14. Inspect all hose assemblies and connections for leaks.
- 15. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

NOTE
Return 130CG Grader to original equipment condition.

End of Task

## **HYDRAULIC SYSTEM MAINTENANCE**. (cont.)

## 15-13. Centershift Check Valve. (Sheet 1 of 4)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

#### **INITIAL SETUP:**

## **Applicable Configurations**

ΔII

#### Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

## Test Equipment

None

#### Materials/Parts

Dry cleaning solvent,
Item 14, Appendix C
Clean cloths, Item 39,
Appendix C
Small tags, Item 41,
Appendix C
Detergent, Item 8, Appendix C
Preformed packings, Items 8,
10, 14, 16
Caps

## Personnel Required

Construction equipment repairer MOS. 62B

## References

TM 5-3805-261-10 LO 5-3805-261-12

## **Special Environmental Conditions**

None

## **General Safety Instructions**

None

#### Torques

All fasteners are tightened to standard torques. Refer to Appendix E.

## Troubleshooting References

None

#### **Equipment Condition**

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off. Hydraulic pressure relieved.

Go to Sheet 2

## 15-13. Centershift Check Valve. (Sheet 2 of 4)

#### **REMOVAL**

1. Remove nine bolts (1), washers (2 and 3) and frame cover (4, Figure 15-18) from front, right side of frame.

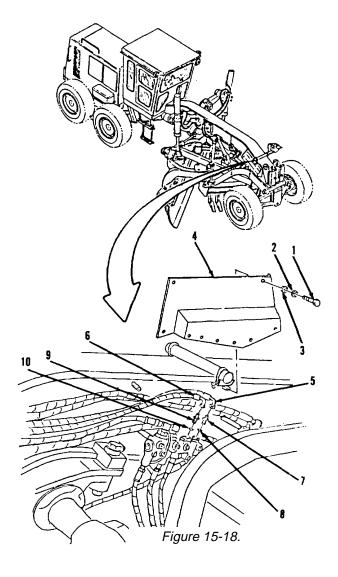
## NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 2. Disconnect hose assemblies (5 and 6) from top valve ports of center valve.
- 3. Remove connector 7) and preformed packing (8). Discard preformed packing (8).
- 4. Remove connector (9) and preformed packing (10). Discard preformed packing (10).
- 5. Disconnect hose assemblies (11 and 12, Figure 15-19) from bottom valve ports.
- 6. Remove connector (13) and preformed packing (14). Discard preformed packing (14).
- 7. Remove connector (15) and preformed packing (16). Discard preformed packing (16).
- 8. Remove bolt (17), washer (18) and valve assembly (19).

## **CLEANING**

Clean all parts. Refer to Chapter 2.



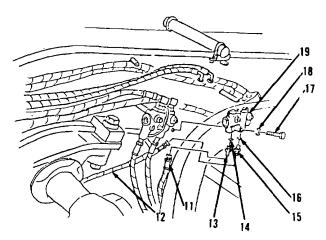


Figure 15-19.

## **HYDRAULIC SYSTEM MAINTENANCE**. (cont)

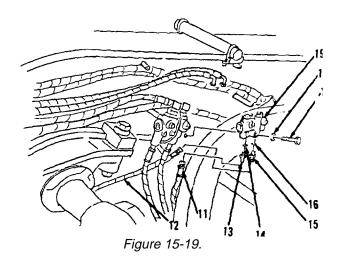
## **15-13.** Centershift Check Valve. (Sheet 3 of 4)

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install valve assembly (19), washer (18) and bolt (17, Figure 15-19).
- 2. Install new preformed packing (16) and connector (15).
- 3. Install new preformed packing (14) and connector (13).
- 4. Connect hose assemblies (12 and 11).



Go to Sheet 4

## 15-13. Centershift Check Valve. (Sheet 4 of 4)

#### **INSTALLATION**

- 5. Install new preformed packing (10) and connector (9, Figure 15-18).
- 6. Install new preformed packing (8) an connector (7).
- 7. Connect hose assemblies (6 and 5).

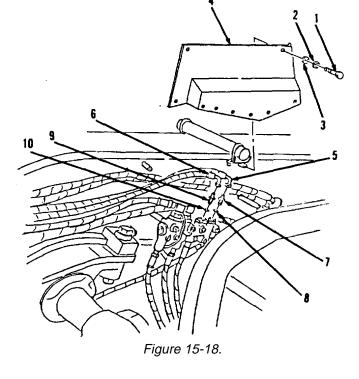
## **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 8. Start engine. Refer to TM 5-3805-261-10.
- Operate circle centershift control lever. Move system through at least five full movements of travel to bleed air from the system.
- 10. Stop engine.
- 11. Inspect hose assemblies and connections for leaks.
- 12. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.
- 13. Install frame cover (4), nine washers (3 and 2) and bolts (1).

#### NOTE

Return 130G Grader to original equipment condition.



End of Task

## **HYDRAULIC SYSTEM MAINTENANCE.** (cont)

## 15-14. Right Blade Lift Check Valve. (Sheet 1 of 4)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Detergent, Item 8, Appendix C Preformed packings, Items 8, 10, 12, 14 Caps Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off. Hydraulic pressure relieved.

Go to Sheet 2

## 15-14. Right Blade Lift Check Valve. (Sheet 2 of 4)

#### **REMOVAL**

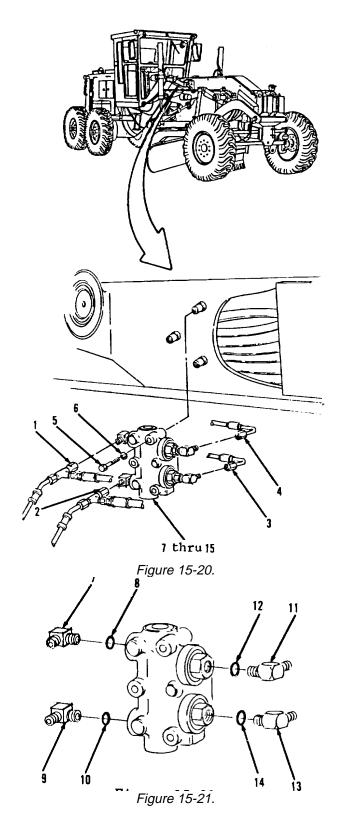
#### **NOTE**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 1. Disconnect tee (1, Figure 15-20).
- 2. Disconnect tee (2).
- 3. Disconnect hose assembly (3).
- 4. Disconnect hose assembly (4).
- 5. Remove three bolts (5), washers (6) and items 7 thru 15 as an assembly.
- 6. Remove elbow (7) and preformed packing (8, Figure 15-21). Discard preformed packing (8).
- 7. Remove elbow (9) and preformed packing (10). Discard preformed packing (10).
- 8. Remove elbow (11) and preformed packing (12). Discard preformed packing (12).
- 9. Remove elbow (13) and preformed packing (14). Discard preformed packing (14).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.



## **HYDRAULIC SYSTEM MAINTENANCE.** (cont.)

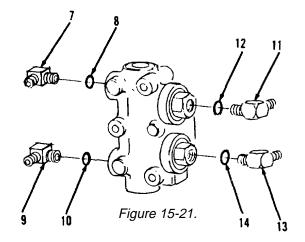
## 15-14. Right Blade Lift Check Valve. (Sheet 3 of 4)

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install new preformed packing (14) and elbow (13) to valve assembly (15, Figure 15-21).
- 2. Install new preformed packing (12) and elbow (11) to valve assembly (15).
- 3. Install new preformed packing (10) and elbow (9) to valve assembly (15).
- 4. Install new preformed packing (8) and elbow (7) to valve assembly (15).
- 5. Position items 15 thru 7 as an assembly (Figure 15-20) with two holes facing front of vehicle on right side of front frame.
- 6. Install three washers (6) and bolts (5).
- 7. Connect hose assembly (4).
- 8. Connect hose assembly (3).
- 9. Connect tee (2).
- 10. Connect tee (1).



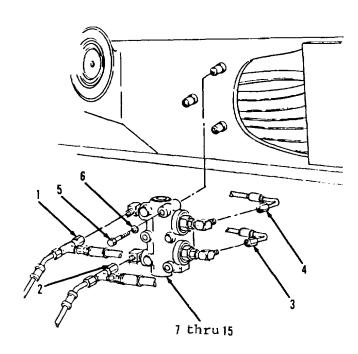


Figure 15-20.

Go to Sheet 4

## 15-14. Right Blade Lift Check Valve. (Sheet 4 of 4)

## **INSTALLATION**

#### WARNING

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 11. Start engine. Refer to TM 5-3805-261-10.
- 12. Operate right blade lift control. Move through at least five full movements of travel to bleed air from system.
- 13. Stop engine.
- 14. Inspect hose assemblies and connections for leaks.
- 15. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

#### NOTE

Return 1300 Grader original equipment condition.

End of Task

## **HYDRAULIC SYSTEM MAINTENANCE**. (cont.)

## 15-15. Articulation Check Valve. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΔII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent,
 Item 14, Appendix C
Clean cloths, Item 39,
 Appendix C
Detergent, Item 8, Appendix C
Small tags, Item 41,
 Appendix C
Preformed packings, Items 4,
 7, 10, 13

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

Troubleshooting References

None

Caps

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off. Hydraulic pressure relieved.

Go to Sheet 2

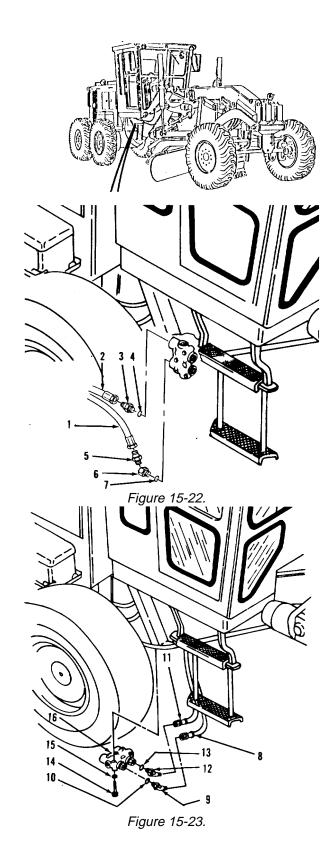
## 15-15. Articulation Check Valve. (Sheet 2 of 4)

#### **REMOVAL**

#### NOTE

All host and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- Disconnect hose assemblies (1 and 2) from fitting (3) and elbow (5, Figure 15-22) under center, right side of operator's compartment.
- 2. Remove fitting (3) and preformed packing (4). Discard preformed packing (4).
- 3. Remove elbow (5), fitting (6) and preformed packing (7). Discard preformed packing (7).
- 4. Disconnect hose assembly (8, Figure 15-23).
- 5. Remove elbow (9) and preformed packing (10). Discard preformed packing (10).
- 6. Disconnect hose assembly (11).
- 7. Remove elbow (12) and preformed packing (13). Discard preformed packing (13).
- 8. Remove three bolts (14), washers (15) and valve assembly (16).



## **HYDRAULIC SYSTEM MAINTENANCE.** (cont)

## 15-15. Articulation Check Valve. (Sheet 3 of 4)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- Install valve assembly (16), three washers (15) and bolts (14, Figure 15-23) under center, right side of operator's compartment.
- 2. Install new preformed packing (13) and elbow (12).
- 3. Connect hose assembly (11).
- 4. Install new preformed packing (10) and elbow (9).
- 5. Connect hose assembly (8).
- 6. Install new preformed packing (7), fitting (6) and elbow (5, Figure 15-22).
- 7. Install new preformed packing (4) and fitting (3).
- 8. Connect hose assemblies (2 and 1) to elbow (5) and fitting (3).

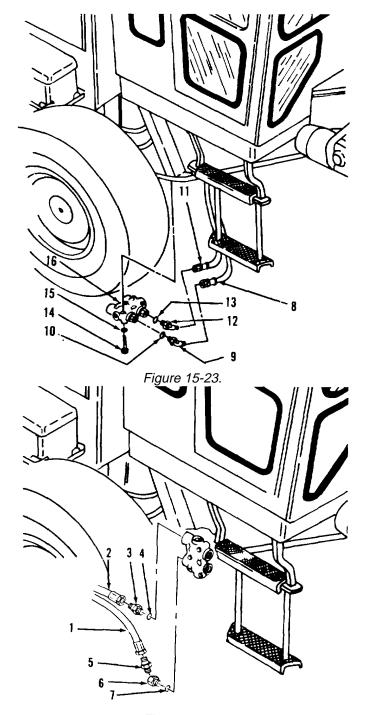


Figure 15-22.

## **15-15.** Articulation Check Valve. (Sheet 4 of 4)

#### **INSTALLATION**

#### WARNING

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 9. Start engine. Refer to TM 5-3805-261-10.
- 10. Operate articulation control lever. Move system through at least five full movements of travel to bleed air from system.
- 11. Stop engine.
- 12. Inspect hose assemblies and connections for leaks.
- 13. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

NOTE

Return 130G Grader to original equipment condition.

End of Task

## 15-16. Left Blade Lift Check and Relief Valve. (Sheet 1 of 4)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

## INITIAL SETUP:

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Detergent, Item 8, Appendix C Small tags, Item 41, Appendix C Preformed packings, Items 9, Personnel Required

Construction equipment repairer MOS. 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

Troubleshooting References

11, 13, 15

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off. Hydraulic pressure relieved.

Go to Sheet 2

## 15-16. Left Blade Lift Check and Relief Valve. (Sheet 2 of 4)

#### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 1. Disconnect hose assemblies (1 and 2, Figure 15-24).
- 2. Disconnect tees (3 and 4).
- 3. Remove three bolts (5), washers (6) and clamp (7).
- 4. Remove items 8 thru 16 as an assembly.
- 5. Remove elbow (8) and preformed packing (9, Figure 15-25). Discard preformed packing (9).
- 6. Remove elbow (10) and preformed packing (11). Discard preformed packing (11).
- 7. Remove elbow (12) and preformed packing (13). Discard preformed packing (13).
- 8. Remove elbow (14) and preformed packing (15). Discard preformed packing (15).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

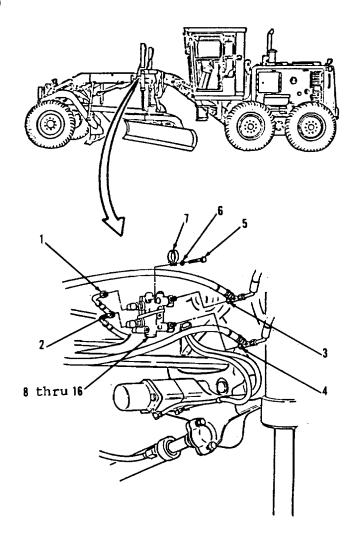


Figure 15-24.

13

14

Figure 15-25.

## **HYDRAULIC SYSTEM MAINTENANCE**. (cont.)

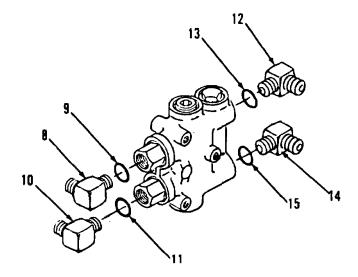
## 15-16. Left Blade Lift Check and Relief Valve. (Sheet 3 of 4)

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- 1. Install new preformed packing (15) and elbow (14) to valve assembly (16, Figure 15-25).
- 2. Install new preformed packing (13) and elbow (12) to valve assembly (16).
- 3. Install new preformed packing (11) and elbow (10) to valve assembly (16).
- 4. Install new preformed packing (9) and elbow (8) to valve assembly (16).
- 5. Position items 16 thru 8 as an assembly (Figure 15-24) with two bolt holes facing front of vehicle on left side of front frame.
- 6. Install clamp (7), three washers (6) and bolts (5).
- 7. Connect tees (4 and 3).
- 8. Connect hose assemblies (2 and 1).



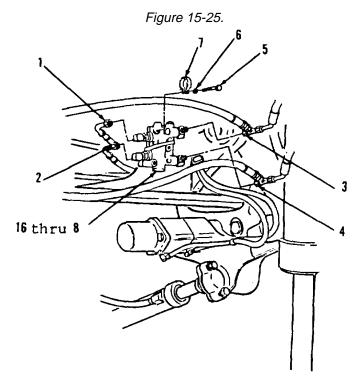


Figure 15-24.

Go to Sheet 4

# 15-16. Left Blade Lift Check and Relief Valve. (Sheet 4 of 4)

#### **INSTALLATION**

#### WARNING

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 9. Start engine. Refer to TM 5-3805-261-10.
- 10. Operate left blade lift control. Move through at least five full movements of travel to bleed air from system.
- 11. Stop engine.
- 12. Inspect hose assemblies and connections for leaks.
- 13. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

NOTE

Return 130G Grader to original equipment condition.

End of Task

# 15-17. Hydraulic Control Valve Group. (Sheet 1 of 12)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

**INITIAL SETUP:** 

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent,
 Item 14, Appendix C
Clean cloths, Item 39,
 Appendix C
Detergent, Item 8, Appendix C
Small tags, Item 41,
 Appendix C
Preformed packings, Items 4,
 11, 13, 15, 17, 19, 24, 26,
 28, 45, 51, 53, 55, 57, 60,
 63, 66
Caps

Personnel Required

Two construction equipment repairers MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

Troubleshooting References

None

Plugs

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped.

Master disconnect switch off. Hydraulic pressure relieved.

Hydraulic tank drained.

Paragraph 15-20 Hydraulic control rods disconnected

from control valves.

Go to Sheet 2

# 15-17. Hydraulic Control Valve Group. (Sheet 2 of 12)

#### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all opened hydraulic ports to prevent contamination.

- 1. Disconnect two hose assemblies (1, Figure 15-26) under front, right side of cab.
- 2. Remove tee (2), connector (3) and preformed packing (4). Discard preformed packing (4).
- 3. Disconnect five hose assemblies (5, 6, 7, 8 and 9).
- 4. Remove two connectors (10) and preformed packings (11, Figure 15-27). Discard two preformed packings (11).
- Remove two connectors (12) and preformed packings (13). Discard two preformed packings (13).
- 6. Remove two connectors (14) and preformed packings (15). Discard two preformed packings (15).
- 7. Remove two elbows (16) and preformed packings (17). Discard two preformed packings (17).
- 8. Remove two elbows (18) and preformed packings (19). Discard two preformed packings (19).

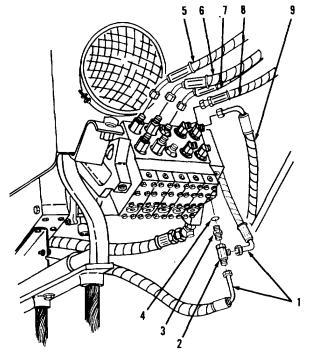


Figure 15-26.

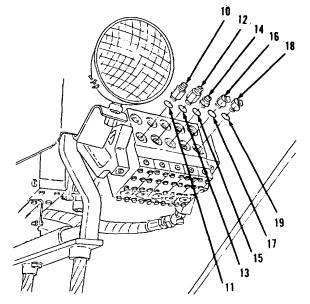


Figure 15-27.

### 15-17. Hydraulic Control Valve Group. (Sheet 3 of 12)

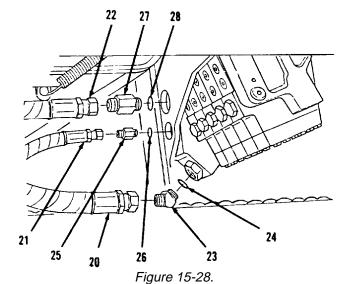
### **REMOVAL** (cont)

- 9. Disconnect hose assemblies (20, 21 and 22, Figure 15-28).
- 10. Remove elbow (23) and preformed packing (24). Discard preformed packing (24).
- 11. Remove connector (25) and preformed packing (26). Discard preformed packing (26).
- 12. Remove connector (27) and preformed packing (28). Discard preformed packing (28).
- 13. Remove bolt (29), washer (30) and mounting (31, Figure 15-29).

#### NOTE

Step 14 requires two mechanics. Weight of valve group is approximately 85 lbs.

- 14. One mechanic removes two bolts (32), washers (33) and mountings (34), while second mechanic holds valve group items 35 thru 41 as an assembly.
- 15. Remove items 35 thru 41 as an assembly.



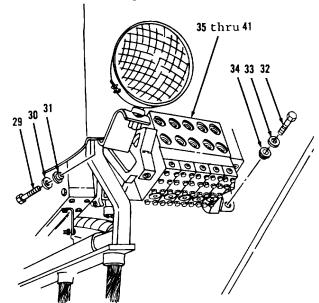


Figure 15-29.

Go to Sheet 4

# 15-17. Hydraulic Control Valve Group. (Sheet 4 of 12)

### **REMOVAL**

- 16. Remove bolt (35), washer (36) and bracket (37) from valve group (41, Figure 15-30).
- 17. Remove three bolts (38), washers (39) and bracket (40) from valve group (41).
- 18. Disconnect two hoses assemblies (42, Figure 15-31) under front, left of cab.
- 19. Remove tee (43), connector (44) and preformed packing (45). Discard preformed packing (45).
- 20. Disconnect four hose assemblies (46, 47, 48 and 49).

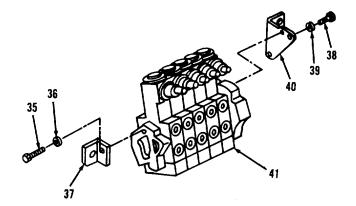


Figure 15-30.

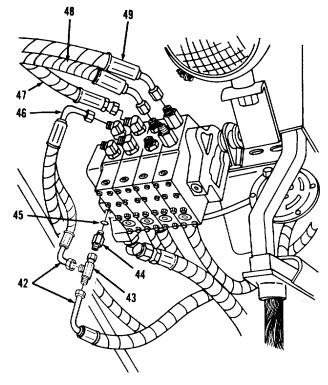


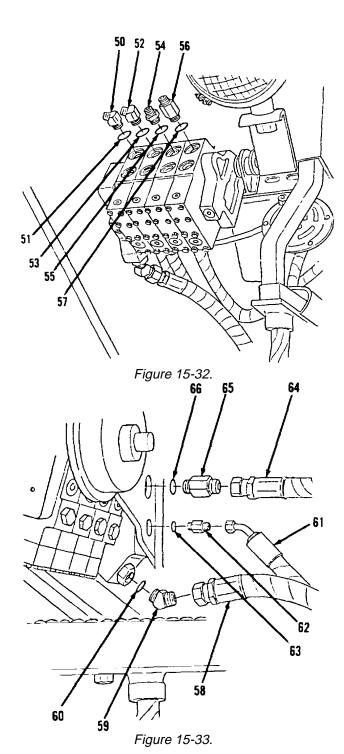
Figure 15-31.

Go to Sheet 5

### 15-17. Hydraulic Control Valve Group. (Sheet 5 of 12)

### **REMOVAL** (cont)

- 21. Remove two elbows (50) and preformed packings (51, Figure 15-32). Discard two preformed packings (51).
- 22. Remove two elbows (52) and preformed packings (53). Discard two preformed packings (53).
- 23. Remove two connectors (54) and preformed packings (55). Discard two preformed packings (55).
- 24. Remove two connectors (56) and preformed packings (57). Discard two preformed packings (57).
- 25. Remove hose assembly (58), elbow (59) and preformed packing (60, Figure 15-33). Discard preformed packing (60).
- 26. Remove hose assembly (61), connector (62) and preformed packing (63). Discard preformed packing (63).
- 27. Remove hose assembly (64), connector (65) and preformed packing (66). Discard preformed packing (66).



### 15-17. Hydraulic Control Valve Group. (Sheet 6 of 12)

#### **REMOVAL**

28. Remove bolt (67) and washer (68, Figure 15-34).

#### **NOTE**

Step 29 requires two mechanics. Weight of valve group is approximately 85 lbs.

- 29. One mechanic removes two bolts (69), washers (70) and mountings (71), while second mechanic holds valve group items 72 thru 79 as an assembly.
- 30. Remove items 72 thru 79 as an assembly.
- 31. Remove three bolts (72), washers (73) and bracket (74) from valve group (79, Figure 15-35).
- 32. Remove bolt (75), washer (76), mounting (77) and bracket (78) from valve group (79).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

# **INSPECTION**

Inspect all parts. Refer to Chapter 2.

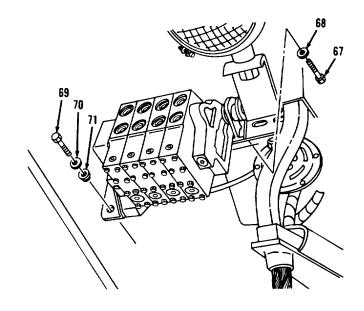


Figure 15-34.

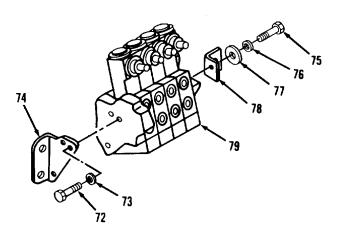


Figure 15-35.

Go to Sheet 7

# **15-17.** Hydraulic Control Valve Group. (Sheet 7 of 12)

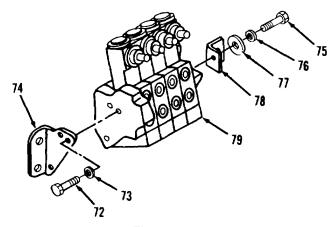
### **INSTALLATION**

- 1. Install bracket (78), mounting (77) washer (76) and bolt (75) on valve group (79, Figure 15-35).
- 2. Install bracket (74), washer (73) and bolt (72).

### **NOTE**

Step 3 requires two mechanics. Weight of valve group is approximately 85 lbs.

- One mechanic positions items 79 thru 72 as an assembly while the second mechanic installs two mountings (71), washers (70) and bolts (69, Figure 15-34).
- 4. Install washer (68) and bolt (67).



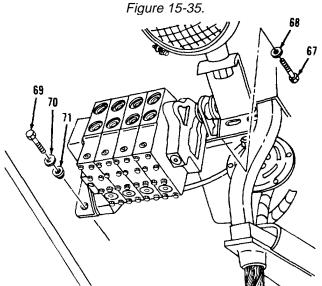


Figure 15-34.

Go to Sheet 8

### 15-17. Hydraulic Control Valve Group. (Sheet 8 of 12)

### **INSTALLATION**

- 5. Install new preformed packing (66), connector (65) and hose assembly (64, Figure 15-33).
- 6. Install new preformed packing (63), connector (62) and hose assembly (61).
- 7. Install new preformed packing (60), elbow (59) and hose assembly (58).
- 8. Install two new preformed packings (57) and connectors (56, Figure 15-32).
- 9. Install two new preformed packings (55) and connectors (54).
- 10. Install two new preformed packings (53) and elbows (52).
- 11. Install two new preformed packings (51) and elbows (50).

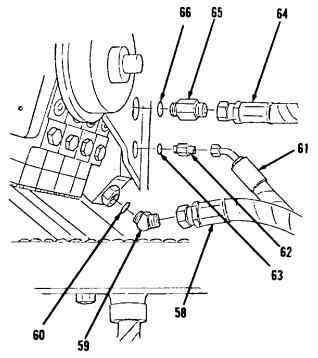


Figure 15-33.

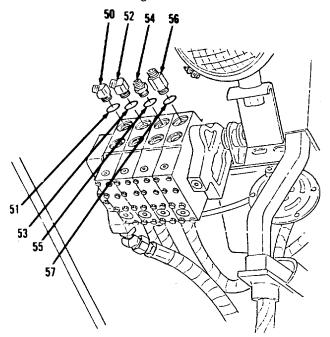
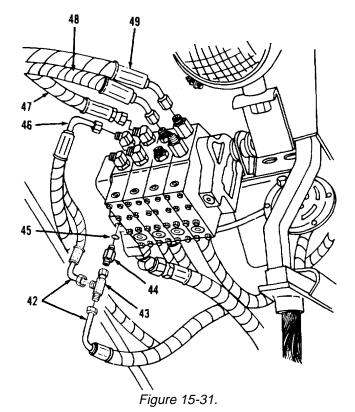


Figure 15-32.

# 15-17. Hydraulic Control Valve Group. (Sheet 9 of 12)

### **INSTALLATION**

- 12. Install four hose assemblies (49, 48, 47 and 46, Figure 15-31).
- 13. Install new preformed packing (45), connector (44) and tee (43).
- 14. Connect two hose assemblies (42) to tee (43).
- 15. Install bracket (40), three washers (39) and bolts (38) on valve group (41, Figure 15-30).
- 16. Install bracket (37), washer (36) and bolt (35) to valve group (41).



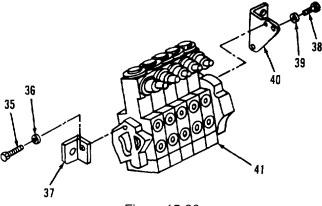


Figure 15-30.

Go to Sheet 10

### 15-17. Hydraulic Control Valve Group. (Sheet 10 of 12)

### **INSTALLATION**

#### NOTE

Step 17 requires two mechanics. Weight of valve group is approximately 85 lbs.

- 17. One mechanic positions items 41 thru 35 as an assembly, while the second mechanic installs two mountings (34), washers (33) and bolts (32, Figure 15-29).
- 18. Install mounting (31), washer (30) and bolt (29).
- 19. Install new preformed packing (28) and connector (27, Figure 15-28).
- 20. Install new preformed packing (26) and connector (25).
- 21. Install new preformed packing (24) and elbow (23).
- 22. Connect hose assemblies (22, 21 and 20).

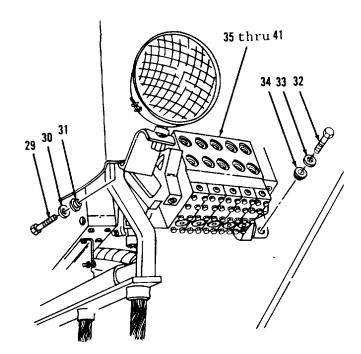


Figure 15-29.

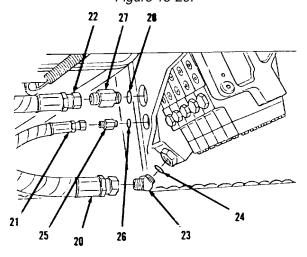


Figure 15-28.

Go to Sheet 11

### 15-17. Hydraulic Control Valve Group. (Sheet 11 of 12)

# **INSTALLATION** (cont)

- 23. Install two new preformed packings (19) and elbows (18, Figure 15-27).
- 24. Install two new preformed packings (17) and elbows (16).
- 25. Install two new preformed packings (15) and connectors (14).
- 26. Install two new preformed packings (13) and connectors (12).
- 27. Install two new preformed packings (11) and connectors (10).
- 28. Connect five hose assemblies (9, 8, 7, 6 and 5, Figure 15-26).
- 29. Install new preformed packing (4), connector (3) and tee (2).
- 30. Connect two hose assemblies (1).

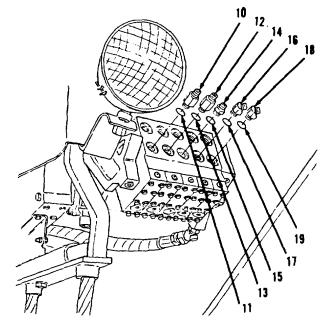


Figure 15-27.

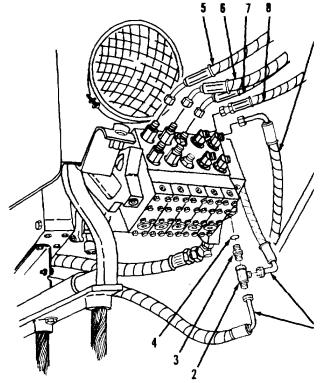


Figure 15-26.

### 15-17. Hydraulic Control Valve Group. (Sheet 12 of 12)

# **INSTALLATION** (cont)

#### WARNING

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 31. Start engine. Refer to TM 5-3805-261-10.
- Operate all hydraulic implement controls. Move controls through at least five full movements of travel. This will bleed the air out of the system.
- 33. Inspect hose assemblies and connections for leaks.
- 34. Stop engine.
- 35. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

### NOTE

Return 130C Grader to original equipment condition.

End of Task

### 15-18. Hydraulic Control Linkages. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

Cotter pin, Item 5

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 7-56 Blade float limit switch linkage

plate removed.

Go to Sheet 2

# 15-18. Hydraulic Control Linkages. (Sheet 2 of 3)

#### **REMOVAL**

#### NOTE

The following is a maintenance procedure for the scarifier control lever. The maintenance procedure for the remaining control levers is identical.

- 1. Remove bolt (1) and lockwasher (2, Figure 15-36) from steering console in cab.
- 2. Remove rod end (3) and nut (4) from rod (7).

#### NOTE

- Control levers must be out of alignment to provide adequate clearance for removal of pins and bolts.
- Tag both blade float control lever pins to aid in installation.
  - 3. Remove cotter pin (5), pin (6) and rod (7). Discard cotter pin (5).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

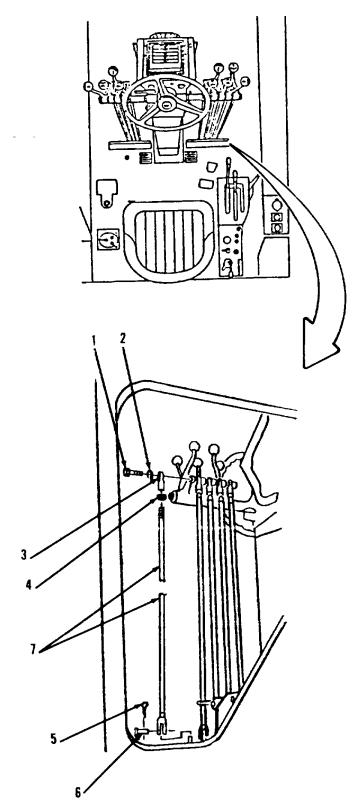


Figure 15-36.

### 15-18. Hydraulic Control Linkages. (Sheet 3 of 3)

### **INSTALLATION**

- 1 Install rod (7), pin (6) and cotter pin (5, Figure 15-36).
- 2. Install nut (4) and rod end (3).
- 3. Install lockwasher (2) and bolt (1).

#### **ADJUSTMENT**

#### NOTE

The following is an adjustment procedure for the scarifier control lever. The adjustment procedure for the remaining control levers is identical.

- 1. Remove bolt (1, Figure 15-36) and lockwasher (2) in steering console in cab.
- 2. Loosen nut (4) on rod (7).
- 3. Adjust rod end (3) on rod (7) so that bolt (1) will slide through rod end (3) without putting tension on bolt (1) when installed.
- 4. Install lockwasher (2) and bolt (1).
- 5. Tighten nut (4) on rod (7) against rod end (3).

#### NOTE

Return 130G Grader to original equipment condition.

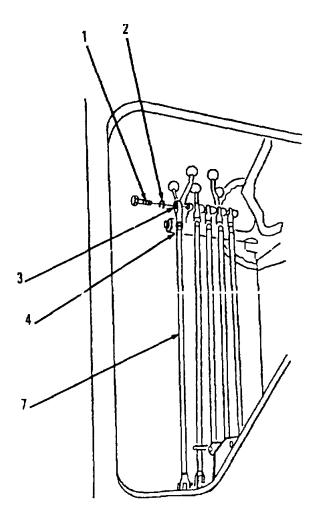


Figure 15-36.

End of Task

### 15-19. Hydraulic Control Levers. (Sheet 1 of 11)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit Automotive (NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

Go to Sheet 2

# 15-19. Hydraulic Control Levers. (Sheet 2 of 11)

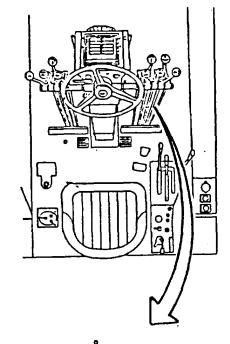
### **REMOVAL**

1. Remove bolt (1), washer (2), retainer (3), shim (4) and bearing (5, Figure 15-37) on left side of steering console.

### NOTE

Control levers must be out of alignment to provide adequate clearance for removal of bolts.

- 2. Remove bolt (6) and lockwasher (7).
- 3. Disconnect linkage (8).
- 4. Loosen nut (10).
- 5. Remove blade lift knob (9) and nut (10).



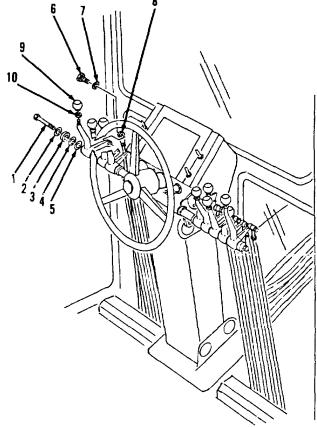


Figure 15-37.

# 15-19. Hydraulic Control Levers. (Sheet 3 of 11)

### **REMOVAL**

- 6. Remove lever (11) and bearings (12 and 13, Figure 15-38).
- 7. Remove bolt (14) and lockwasher (15).
- 8. Disconnect linkage (16).
- 9. Loosen nut (18).
- 10. Remove sideshift knob (17) and nut (18).
- 11. Remove lever (19) and bearings (20 and 21).
- 12. Remove bolt (22) and lockwasher (23, Figure 15-39).
- 13. Disconnect linkage (24).
- 14. Loosen nut (26).
- 15. Remove circle drive knob (25) and nut (26).
- 16. Remove lever (27) and bearings (28 and 29).

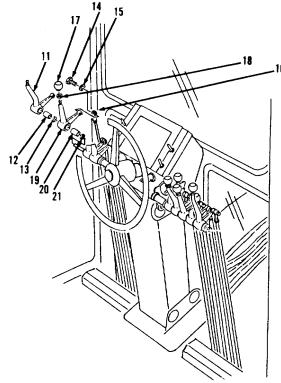


Figure 15-38.

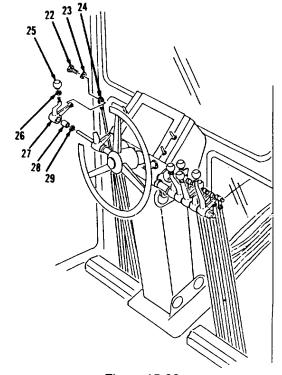
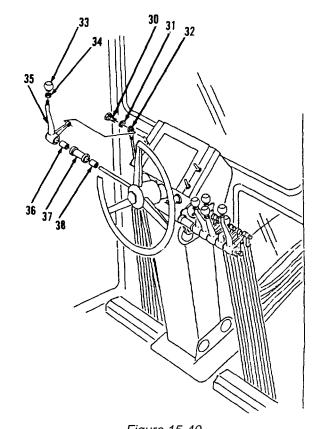


Figure 15-39.

# 15-19. Hydraulic Control Levers. (Sheet 4 of 11)

# **REMOVAL** (cont)

- 17. Remove bolt (30) and lockwasher (31, Figure 15-40).
- 18. Disconnect linkage (32).
- 19. Loosen nut (34).
- 20. Remove blade tip knob (33) and nut (34).
- 21. Remove lever (35), bearing (36), spacer (37) and bearing (38).
- 22. Remove bolt (39). washer (40), retainer (41), shim (42) and bearing (43, Figure 15-41) from right side of steering console.
- 23. Remove bolt (44) and lockwasher (45).
- 24. Disconnect linkage (46).
- 25. Loosen nut (48).
- 26. Remove scarifier knob (47) and nut (48).



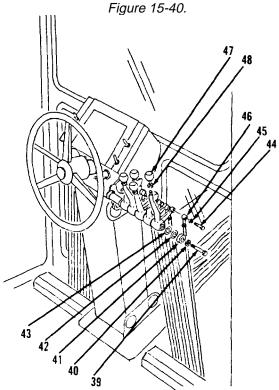


Figure 15-41.

# 15-19. Hydraulic Control Levers. (Sheet 5 of 11)

### **REMOVAL**

- 27. Remove lever (49) and bearings (50 and 51, Figure 15-42).
- 28. Remove bolt (52) and lockwasher (53).
- 29. Disconnect linkage (54).
- 30. Loosen nut (56).
- 31. Remove blade lift knob (55), nut (56) and lever (57).
- 32. Remove bearings (58 and 59, Figure 15-43).
- 33. Remove bolt (60) and lockwasher (61).
- 34. Disconnect linkage (62).
- 35. Loosen nut (64).
- 36. Remove leaning wheel knob (63) and nut (64).
- 37. Remove lever (65) and bearings (66 and 67).

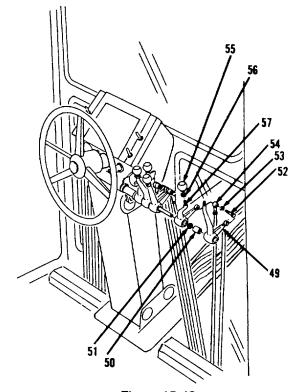


Figure 15-42.

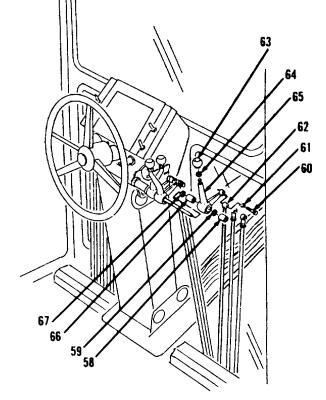


Figure 15-43.

# 15-19. Hydraulic Control Levers. (Sheet 6 of 11)

# **REMOVAL** (cont)

- 38. Remove bolt (68) and lockwasher (69, Figure 15-44).
- 39. Disconnect linkage (70).
- 40. Loosen nut (72).
- 41. Remove centershift knob (71) and nut (72).
- 42. Remove lever (73) and bearings (74 and 75).
- 43. Remove bolt (76) and lockwasher (77, Figure 15-45).
- 44. Disconnect linkage (78).
- 45. Loosen nut (80).
- 46. Remove articulation knob (79) and nut (80).
- 47. Remove lever (81), bearing (82), spacer (83), bearing (84) and shaft (85).

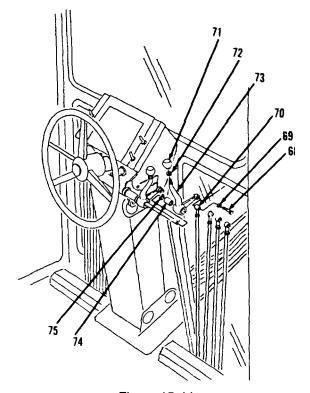


Figure 15-44.

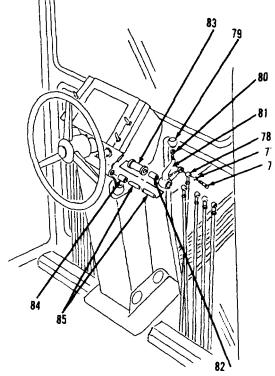


Figure 15-45.

# 15-19. Hydraulic Control Levers. (Sheet 7 of 11)

### **INSTALLATION**

- 1. Install shaft (85), bearing (84), spacer (83), bearing (82) and lever (81, Figure 15-45) on right side of steering console.
- 2. Install nut (80) and articulation knob (79).
- 3. Connect linkage (78).
- 4. Install lockwasher (77) and bolt (76).

#### NOTE

Control levers must be out of alignment to provide adequate clearance for installation of bolts.

- 5. Install bearings (75 and 74) and lever (73, Figure 15-44).
- 6. Install nut (72) and centershift knob (71).
- 7. Connect linkage (70).
- 8. Install lockwasher (69) and bolt (68).

Go to Sheet 8

# 15-19. Hydraulic Control Levers. (Sheet 8 of 11)

# **INSTALLATION** (cont)

- 9. Install bearings (67 and 66) and lever (65, Figure 15-43).
- 10. Install nut (64) and leaning wheel knob (63).
- 11. Connect linkage (62).
- 12. Install lockwasher (61) and bolt (60).
- 13. Install bearings (59 and 58).
- 14. Install lever (57, Figure 15-42).
- 15. Install nut (56) and blade lift knob (55).
- 16. Connect linkage (54).
- 17. Install lockwasher (53) and bolt (52).
- 18. Install bearings (52 and 51) and lever (49).

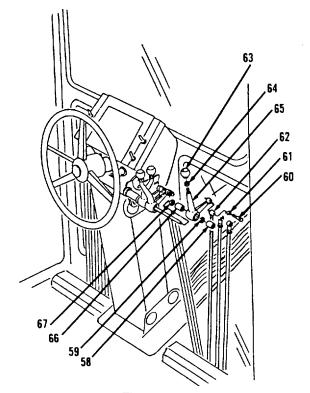


Figure 15-43.

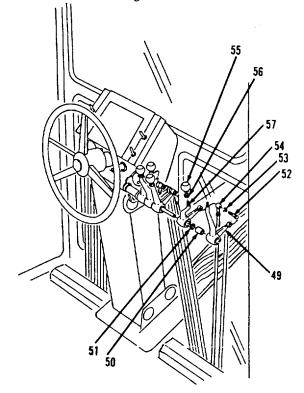


Figure 15-42.

# 15-19. Hydraulic Control Levers. (Sheet 9 of 11)

### **INSTALLATION**

- 19. Install nut (48) and scarifier knob (47, Figure 15-41).
- 20. Connect linkage (46).
- 21. Install lockwasher (45) and bolt (44).
- 22. Install bearing (43), shim (42), retainer (41), washer (40) and bolt (39).
- 23. Install bearing (38), spacer (37), bearing (36) and lever (35, Figure 15-40) on left side of steering console.
- 24. Install nut (34) and blade tip knob (33).
- 25. Connect linkage (32).
- 26. Install lockwasher (31) and bolt (30).

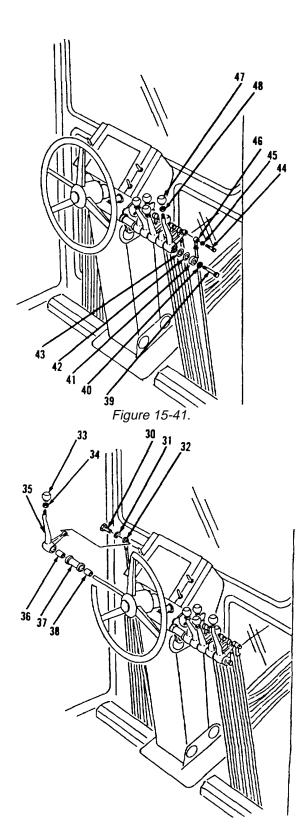
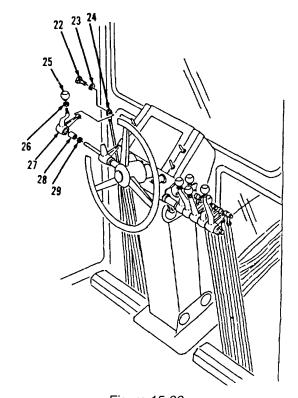


Figure 15-40.

# 15-19. Hydraulic Control Levers. (Sheet 10 of 11)

# **INSTALLATION** (cont)

- 27. Install bearings (29 and 28) and lever (27, Figure 15-39).
- 28. Install nut (26) and circle drive knob (25).
- 29. Connect linkage (24).
- 30. Install lockwasher (23) and bolt (22).
- 31. Install bearings (21 and 20) and lever (19, Figure 15-38).
- 32. Install nut (18) and sideshift knob (17).
- 33. Connect linkage (16).
- 34. Install lockwasher (15) and bolt (14).
- 35. Install bearings (13 and 12) and lever (11).



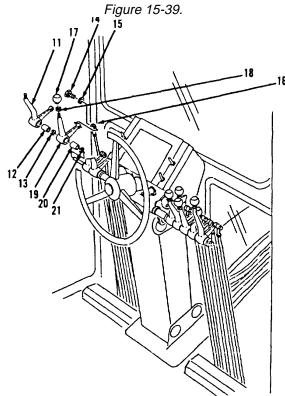


Figure 15-38.

# 15-19. Hydraulic Control Levers. (Sheet 11 of 11)

### **INSTALLATION**

- 36. Install nut (10) and blade lift knob (9, Figure 15-37).
- 37. Connect linkage (8).
- 38. Install lockwasher (7) and bolt (6).
- 39. Install bearing (5), shim (4), retainer (3), washer (2) and bolt (1).

#### NOTE

Return 130G Grader to original equipment condition.

### **NOTE**

Pages 15-84 thru 15-100 are deleted. The tasks covered on these pages are now found in TM 5-3805-261-34.

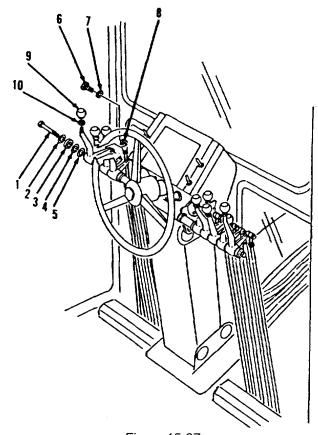


Figure 15-37.

End of Task

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PAGES 15-84 THRU 15-100

#### 15-22. Hydraulic Pump Assembly, Junction Block and Steering Control Valve Lines. (Sheet 1 of 10)

This task covers: a. Removal b. Cleaning c. Inspection d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Small tags, Item 41, Appendix C Detergent, Item 8, Appendix C Preformed packings, Item 2, 7, 9, 12, 14, 17, 20, 26, 50, 51, 52

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

Caps Plugs

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped.

Master disconnect switch off.

LO 5-3805-261-12

Main hydraulic oil line brackets

removed.

Go to Sheet 2

### 15-22. Hydraulic Pump Assembly, Junction Block and Steering Control Valve Lines. (Sheet 2 of 10)

#### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

- 1. Disconnect hose assembly (6, Figure 15-67) from steering control valve.
- 2. Remove connector (1) and preformed packing (2). Discard preformed packing (2).
- 3. Remove four bolts (3) and washers (4).
- 4. Remove two flange halves (5).
- 5. Remove hose assembly (6).
- 6. Remove and discard preformed packing (7) from hydraulic pump assembly.
- 7. Disconnect hose assembly (10) from steering control valve.
- 8. Remove elbow (8) and preformed packing (9). Discard preformed packing (9).

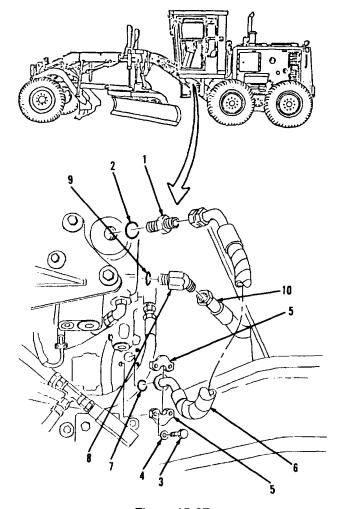


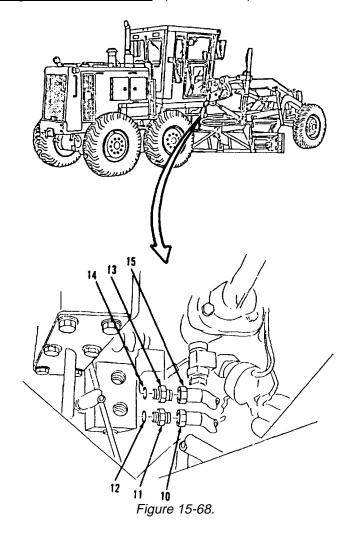
Figure 15-67.

Go to Sheet 3

# 15-22. Hydraulic Pump Assembly, Junction Block and Steering Control Valve Lines. (Sheet 3 of 10)

### **REMOVAL**

- 9. Disconnect hose assembly (10, Figure 15-68).
- 10. Remove connector (11) and preformed packing (12) from junction block. Discard preformed packing (12).
- 11. Disconnect hose assembly (15) from junction block.
- 12. Remove connector (13) and preformed packing (14). Discard preformed packing (14).

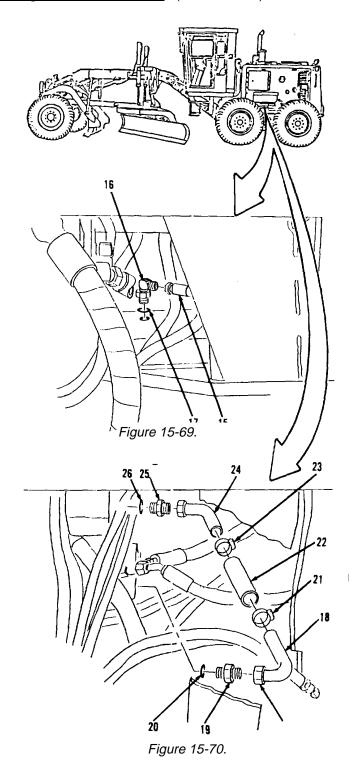


Go to Sheet 4

### 15-22. Hydraulic Pump Assembly, Junction Block and Steering Control Valve Lines. (Sheet 4 of 10)

### **REMOVAL** (cont)

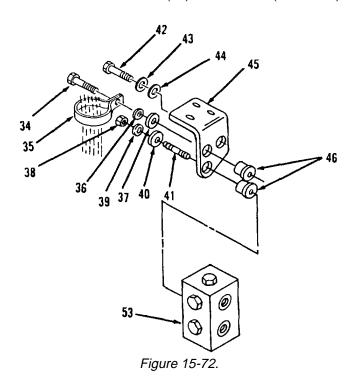
- 13. Disconnect tube assembly (15, Figure 15-69) from hydraulic pump assembly.
- 14. Remove elbow (16) and preformed packing (17). Discard preformed packing (17).
- 15. Disconnect tube assembly (18, Figure 15-70) from hydraulic pump assembly.
- 16. Remove connector (19) and preformed packing (20). Discard preformed packing (20).
- 17. Loosen clamps (21 and 23).
- 18. Remove clamp (21), hose (22) and clamp (23).
- 19. Disconnect tube assembly (24) from junction block.
- 20. Remove connector (25) and preformed packing (26). Discard preformed packing (26).



# 15-22. Hydraulic Pump Assembly, Junction Block and Steering Control Valve Lines. (Sheet 5 of 10)

### **REMOVAL**

- 21. Disconnect hose assemblies (27 and 28, Figure 15-71) from junction block (53).
- 22. Remove bolt (34), clamp (35), washer (36) and washer (37, Figure 15-72) from junction block (53).
- 23. Remove bolt (42) and washers (43 and 44).



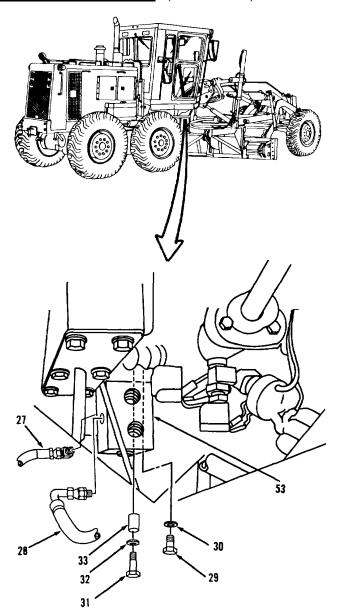


Figure 15-71.

Go to Sheet 6

# 15-22. Hydraulic Pump Assembly, Junction Block and Steering Control Valve Lines. (Sheet 6 of 10)

#### **REMOVAL** (cont)

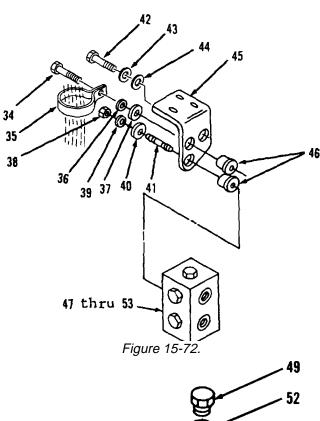
- 24. Remove nut (38), washers (39 and 40) and stud (41).
- 25. Remove items 47 thru 53 as an assembly.
- 26. Remove bolt (29) and washer (30, Figure 15-71).
- 27. Remove bolt (31), washer (32) and spacer (33).
- 28. Remove plate (45) and three grommets (46, Figure 15-72) from junction block.
- 29. Remove plugs (47, 48 and 49) and preformed packings (50, 51 and 52, Figure 15-73). Discard preformed packings (50, 51 and 52).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.



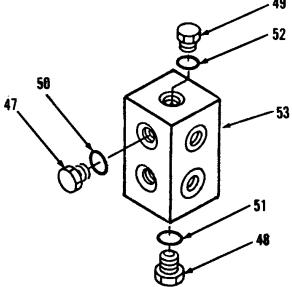


Figure 15-73.

Go to Sheet 7

# 15-22. Hydraulic Pump Assembly, Junction Block and Steering Control Valve Lines. (Sheet 7 of 10)

#### **INSTALLATION**

- 1. Install new preformed packings (52, 51 and 50) and plugs (49, 48 and 47, Figure 15-73).
- 2. Position three grommets (46) and plate (45, Figure 15-72) on junction block.
- 3. Install spacer (33), washer (32) and bolt (31, Figure 15-71),
- 4. Install washer (30) and bolt (29).
- 5. Position items 53 thru 47 (Figure 15-72) as an assembly to vehicle.
- 6. Install stud (41), washers (40 and 39) and nut (38).

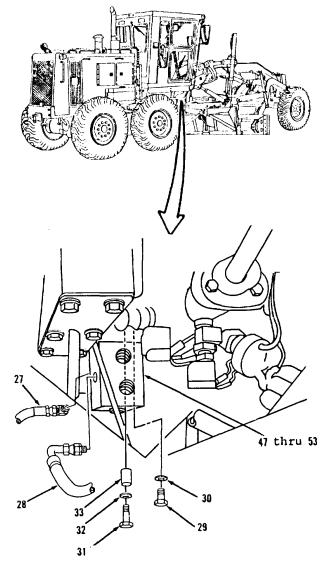
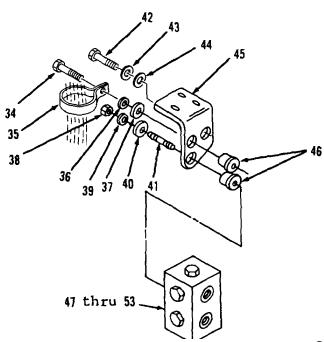


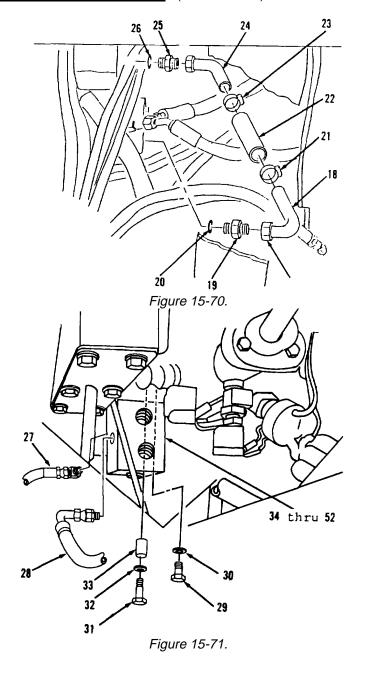
Figure 15-71.

# 15-22. Hydraulic Pump Assembly, Junction Block and Steering Control Valve Lines. (Sheet 8 of 10)

### **INSTALLATION** (cont)

- 7. Install washers (43) and (44) and bolt (42, Figure 15-72).
- 8. Install washer (37), washer (36)clamp (35) and bolt (34) to junction block,
- 9. Connect hose assemblies (28 and 27).
- 10. Install new preformed packing (26) and connector (25, Figure 15-70).
- 11. Connect tube assembly (24) to junction block.
- 12. Install clamp (23), hose (22) an clamp (21).
- 13. Tighten clamps (23 and 21).
- 14. Install new preformed packing (20) and connector (19).
- 15. Connect tube assembly (18) on hydraulic pump assembly.





# 15-22. Hydraulic Pump Assembly, Junction Block and Steering Control Valve Lines. (Sheet 9 of 10)

### **INSTALLATION**

- 16. Install new preformed packing (17) and elbow (16, Figure 15-69).
- 17. Connect tube assembly (15) on top of hydraulic pump assembly.
- 18. Install new preformed packing (14) and connector (13, Figure 15-68).
- 19. Connect hose assembly (15) to junction block.
- 20. Install new preformed packing (12) and connector (11).
- 21. Connect hose assembly (10).

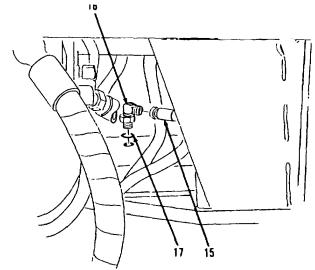


Figure 15-69.

Figure 15-68.

Go to Sheet 10

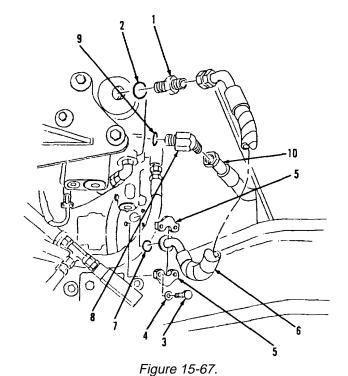
# 15-22. Hydraulic Pump Assembly, Junction Block and Steering Control Valve Lines. (Sheet 10 of 10)

## **INSTALLATION** (cont)

- 22. Install new preformed packing (9) and elbow (8, Figure 15-67).
- 23. Connect hose assembly (10) to steering control valve.
- 24. Install new preformed packing (7).
- 25. Install hose assembly (6).
- 26. Install two flange halves (5).
- 27. Install four washers (4) and bolts (3).
- 28. Install new preformed packing (2) and connector (1).
- 29. Connect hose assembly (6) to steering control valve.
- 30. Start engine. Refer to TM 5-3805-261-10.
- 31. Turn steering wheel. Move wheels back and forth at least five times to bleed air from the system.
- 32. Stop engine.
- 33. Check hydraulic pump, junction block and steering control valve connections for leaks.
- 34. Fill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

# NOTE Return 130G Grader to original equipment condition.

End of Task



# 15-23. Blade Float Lines, Fittings and Hoses. (Sheet 1 of 5)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΔII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 38, Appendix C Detergent, Item 8, Appendix C Small tags, Item 41, Appendix C Preformed packings, Items 4, 6, 10, 14, 21, 24, 33, 36 Caps Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

Troubleshooting References

None

Plugs

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. Hydraulic pressure relieved.

Paragraph 15-7 Blade float pilot valve removed.

Go to Sheet 2

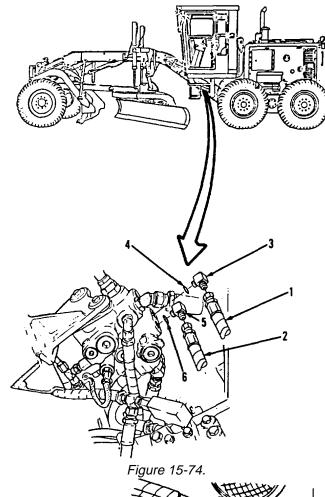
# 15-23. Blade Float Lines, Fittings and Hoses. (Sheet 2 of 5)

### **REMOVAL**

## NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

- 1. Remove hose assemblies (1 and 2, Figure 15-74) from under side of cab.
- 2. Remove elbow (3) and preformed packing (4). Discard preformed packing (4).
- 3. Remove elbow (5) and preformed packing (6). Discard preformed packing (6).
- 4. Disconnect hose assemblies (7 and 34, Figure 15-75).
- 5. Remove tee (8), connector (9) and preformed packing (10). Discard preformed packing (10).



34 8

Figure 15-75.

# 15-23. Blade Float Lines, Fittings and Hoses. (Sheet 3 of 5)

#### **REMOVAL**

- 6. Disconnect hose assemblies (11 and 22, Figure 15-76).
- 7. Remove tee (12), connector (13) and preformed packing (14). Discard preformed packing (14).
- 8. Remove two bolts (15), washers (16), clamps (17) and spacers (18, Figure 15-77).
- 9. Remove hose assembly (19), elbow (20) and preformed packing (21). Discard preformed packing (21).
- 10. Remove hose assembly (22), elbow (23) and preformed packing (24). Discard preformed packing (24).
- 11. Remove two bolts (25), washers (26), clamps (27) and spacers (28, Figure 15-78).
- 12. Remove bolt (29) and clip (30).
- 13. Remove hose assembly (31), elbow (32) and preformed packing (33). Discard preformed packing (33).
- 14. Remove hose assembly (34), elbow (35) and preformed packing (36). Discard preformed packing (36).

## **CLEANING**

Clean all parts. Refer to Chapter 2.

### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

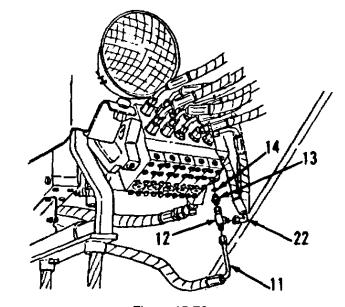


Figure 15-76.

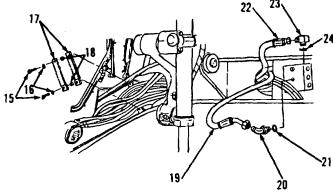


Figure 15-77.

35

36

26

25

33

31

29

Figure 15-78.

# 15-23. Blade Float Lines, Fittings and Hoses. (Sheet 4 of 5)

#### **INSTALLATION**

- 1. Install new preformed packing (36), elbow (35) and hose assembly (34, Figure 15-78) to left side valve.
- 2. Install new preformed packing (33), elbow (32) and hose assembly (31) to right side valve.
- 3. Install clip (30) and bolt (29).
- 4. Install two spacers (28), clamps (27), washers (26) and bolts (25).
- 5. Install new preformed packing (24), elbow (23) and hose assembly (22, Figure 15-77).
- 6. Install new preformed packing (21), elbow (20) and hose assembly (19).
- 7. Install two spacers (18), clamps (17), washers (16) and bolts (15).
- 8. Install new preformed packing (14), connector (13) and tee (12, Figure 15-76) to control valve group.
- 9. Connect hose assemblies (22 and 11).

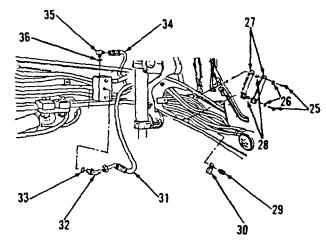


Figure 15-78.

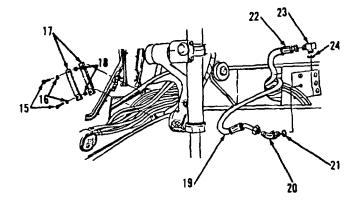


Figure 15-77.

Figure 15-76.

# 15-23. Blade Float Lines, Fittings and Hoses. (Sheet 5 of 5)

#### **INSTALLATION**

- 10. Install new preformed packing (10), connector (9) and tee (8, Figure 15-75) to control valve group.
- 11. Connect hose assemblies (34 and 7).
- 12. Install new preformed packing (6) and elbow (5, Figure 15-74).
- 13. Install new preformed packing (4) and elbow (3).
- 14. Install hose assemblies (2 and 1).

## **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 15. Start engine. Refer to TM 5-3805-261-10.
- 16. Inspect hose assemblies and connections for leaks.
- 17. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

#### NOTE

Return 130G Grader to original equipment condition.

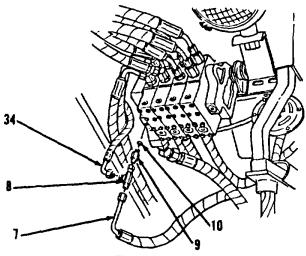
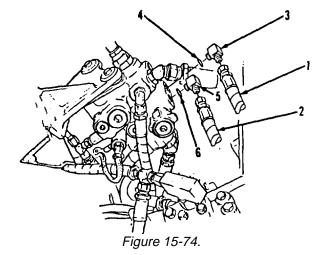


Figure 15-75.



End of Task

# 15-24. Blade Lift Lines, Fittings and Hoses. (Sheet 1 of 10)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent,
Item 14, Appendix C
Clean cloths, Item 38,
Appendix C
Detergent, Item 8, Appendix C
Small tags, Item 41,
Appendix C
Preformed packings, Items 14,
27, 30, 44, 57, 60
Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off. Hydraulic pressure relieved.

Go to Sheet 2

# 15-24. Blade Lift Lines, Fittings and Hoses. (Sheet 2 of 10)

### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 1. Disconnect two hose assemblies. Refer to paragraph 15-33, steps 1 and 2.
- 2. Disconnect two hose assemblies (8, Figure 15-79) from right control valve group.
- 3. Remove two connectors (1) and preformed packings (2, Figure 15-80). Discard two preformed packings (2).
- 4. Remove two bolts (3), washers (4), clamp (5), two spacers (6) and clamp (7, Figure 15-81).

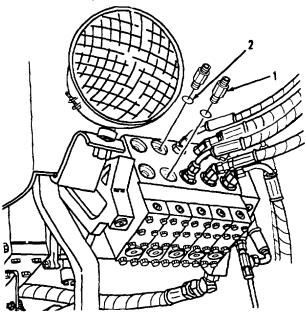


Figure 15-80.

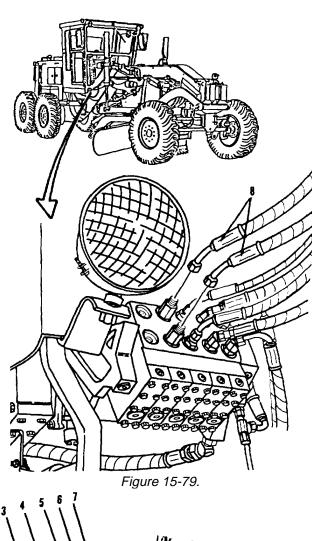


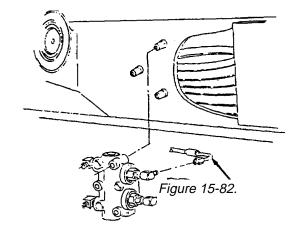
Figure 15-81.

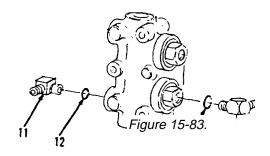
## **HYDRAULIC SYSTEM MAINTENANCE.** (cont)

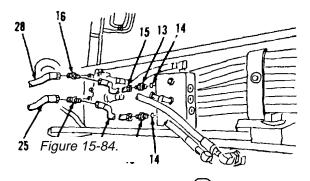
# 15-24. Blade Lift Lines, Fittings and Hoses. (Sheet 3 of 10)

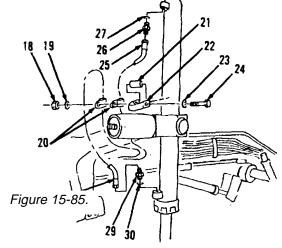
## **REMOVAL** (cont)

- Remove two hose assemblies (8, Figure 15-82) from right blade lift check and relief valve. Refer to paragraph 15-16, steps 6 thru 9.
- 6. Remove items 9 thru 12 (Figure 15-83) from right blade lift check and relief valve. Refer to paragraph 15-16, steps 6 9.
- 7. Disconnect two hose assemblies (15, Figure 15-84).
- 8. Remove two connectors (13) and preformed packings (14) from right valve. Discard two preformed packings (14).
- 9. Remove two hose assemblies (15) from tees (16 and 17).
- 10. Disconnect hose assemblies (25 and 28) from tees (16 and 17).
- 11. Remove tees (16 and 17).
- 12. Remove nut (18), washer (19), two clips (20), spacer (21), clamp (22), washer (23) and bolt (24, Figure 15-85) from right blade lift cylinder.
- 13. Remove hose assembly (25).
- 14. Remove connector (26) and preformed packing (27) from top of right blade lift cylinder. Discard preformed packing (27).
- 15. Remove hose assembly (28).
- 16. Remove connector (29) and preformed packing (30) from bottom of right blade lift cylinder. Discard preformed packing (30).









Go to Sheet 4

# 15-24. Blade Lift Lines, Fittings and Hoses. (Sheet 4 of 10)

### **REMOVAL**

- 17. Disconnect two hose assemblies (38, Figure 15-86) from left control valve group.
- 18. Remove two connectors (31) and preformed packings (32, Figure 15-87). Discard two preformed packings (32).
- 19. Remove two bolts (33), washers (34), clamp (35), two spacers (36) and clamp (37, Figure 15-88).
- 20. Remove two hose assemblies (38,Figure 15-89) from left blade lift check and relief valve.

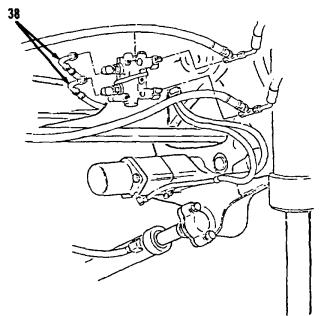


Figure 15-89.

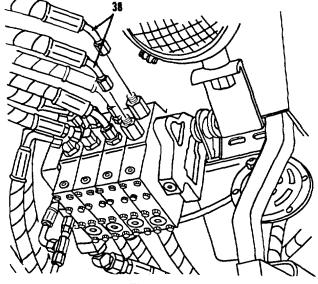


Figure 15-86.

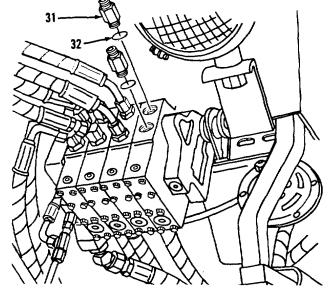


Figure 15-87.

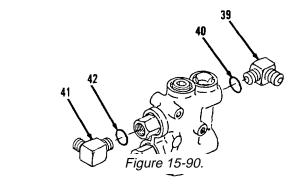
Figure 15-88.

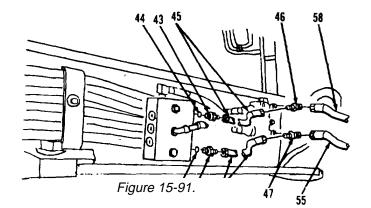
## **HYDRAULIC SYSTEM MAINTENANCE.** (cont)

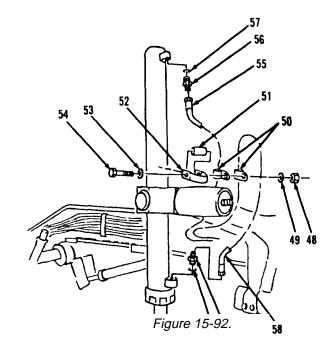
# 15-24. Blade Lift Lines, Fittings and Hoses. (Sheet 5 of 10)

## **REMOVAL** (cont)

- 21. Remove items 39 thru 42 as an assembly (Figure 15-90) from left blade lift check and relief valve. Refer to paragraph 15-18, steps 7 10.
- 22. Disconnect two hose assemblies (45, Figure 15-91).
- 23. Remove two connectors (43) and preformed packings (44) from left valve. Discard two preformed packings (44).
- 24. Remove two hose assemblies (45) from tees (46 and 47).
- 25. Disconnect hose assemblies (55 and 58) from tees (46 and 47).
- 26. Remove tees (46 and 47).
- 27. Remove nut (48), washer (49), two clips (50), spacer (51), clamp (52), washer (53) and bolt (54, Figure 15-92) from left blade lift cylinder.
- 28. Remove hose assembly (55).
- 29. Remove connector (56) and preformed packing (57) from top of left blade lift cylinder. Discard preformed packing (57).
- 30. Remove hose assembly (58).
- 31. Remove connector (59) and preformed packing (60) from bottom of left blade lift cylinder. Discard preformed packing (60).







# 15-24. Blade Lift Lines, Fittings and Hoses. (Sheet 6 of 10)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

### **INSTALLATION**

- 1. Install new preformed packing (60) and connector (59, Figure 15-92).
- Install hose assembly (58) on bottom of left blade lift cylinder.
- 3. Install new preformed packing (57) and connector (56).
- 4. Install hose assembly (55) on top of left blade lift cylinder.
- 5. Install bolt (54), washer (53), clamp (52), spacer (51), two clips (50), washer (49) and nut (48) on left blade lift cylinder.
- 6. Install tees (47 and 46, Figure 15-91).
- 7. Connect hose assemblies (58 and 55) to tees (47 and 46).
- 8. Install two hose assemblies (45) on tees (47 and 46).
- 9. Install two new preformed packings (44) and connectors (43).
- Connect two hose assemblies (45) to left valve.

Go to Sheet 7

# 15-24. Blade Lift Lines, Fittings and Hoses. (Sheet 7 of 10)

## **INSTALLATION** (cont)

- 11. Install items 42 thru 39 as an assembly (Figure 15-90) on left blade lift check and relief valve. Refer to paragraph 15-16, steps 1 thru 4.
- 12. Install two hose assemblies (38, Figure 15-89) on left blade lift check and relief valve.
- 13. Install clamp (37), two spacers (36), clamp (35), two washers (34) and bolts (33, Figure 15-88).
- 14. Install two new preformed packings (32) and connectors (31,Figure 15-87) to left control valve.

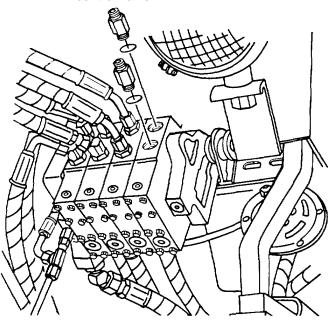


Figure 15-87.

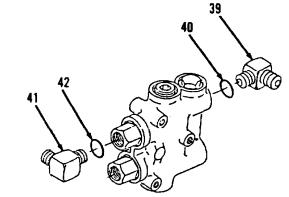


Figure 15-90.

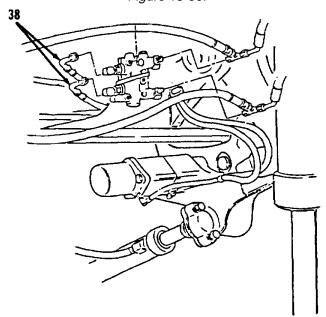


Figure 15-89.

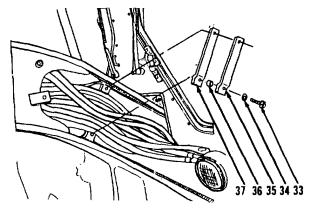


Figure 15-88.

# 15-24. Blade Lift Lines, Fittings and Hoses. (Sheet 8 of 10)

## **INSTALLATION** (cont)

- 15. Connect two hose assemblies (38, Figure 15-86) to left control valve group.
- 16. Install new preformed packing (30) and connector (29, Figure 15-85).
- 17. Install hose assembly (28) on bottom of right blade lift cylinder.
- 18. Install new preformed packing (27) and connector (26).
- 19. Install hose assembly (25) on top of right blade lift cylinder.
- 20. Install bolt (24), washer (23), clamp (22), spacer (21), two clips (20), washer (19) and nut (18).
- 21. Install tees (17 and 16, Figure 15-84).
- 22. Connect hose assemblies (28 and 25) to tees (17 and 16).
- 23. Install two hose assemblies (15) on tees (17 and 16).
- 24. Install two new preformed packings (14) and connectors (13).
- 25. Connect two hose assemblies (15) on right valve.

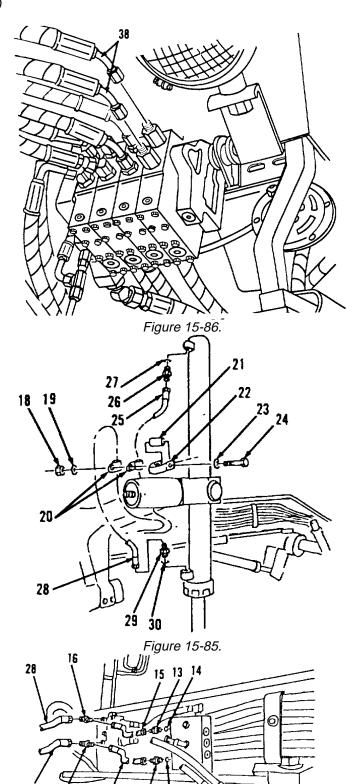


Figure 15-84.

# **HYDRAULIC SYSTEM MAINTENANCE.** (cont)

# 15-24. Blade Lift Lines, Fittings and Hoses. (Sheet 9 of 10)

# **INSTALLATION** (cont)

- Install items 12 thru 9 as an assembly (Figure 15-83) on right blade lift check and relief valve. Refer to paragraph 15-16, steps 1 - 4.
- 27. Install two hose assemblies (8, Figure 15-82) on right blade lift check and relief valve.
- 28. Install clamp (7), two spacers (6), clamp (5), two washers (4) and bolts (3, Figure 15-81).
- 29. Install two new preformed packings (2) and connectors (1,Figure 15-80) to right hand control valve.

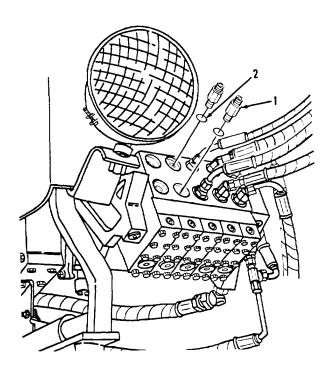


Figure 15-80.

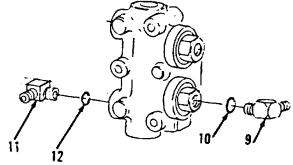


Figure 15-83.

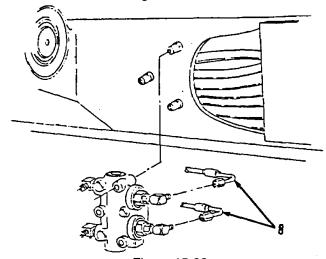


Figure 15-82.

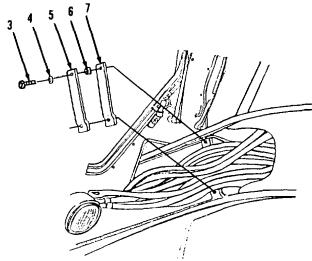


Figure 15-81.

## **HYDRAULIC SYSTEM MAINTENANCE.** (cont)

# 15-24. Blade Lift Lines, Fittings and Hoses. (Sheet 10 of 10)

## **INSTALLATION** (cont)

- 30. Connect two hose assemblies (8,Figure 15-79) to right control valve group.
- 31. Connect two hose assemblies. Refer to paragraph 15-33, steps 11 and 10.

## **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 32. Start engine. Refer to TM 5-3805-261-10.
- Operate left and right blade lift controls. Move system through at least five full movements of travel to bleed air from system.
- 34. Stop engine.
- 35. Inspect hose assemblies and connections for leaks.
- 36. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

## **NOTE**

Return 130G Grader to original equipment condition.

End of Task

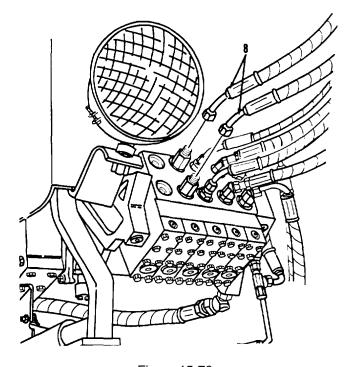


Figure 15-79.

# 15-25. Blade Tip Lines, Fittings and Hoses. (Sheet 1 of 10)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent,
 Item 14, Appendix C
Clean cloths, Item 39,
 Appendix C
Detergent, Item 8, Appendix C
Small tags, Item 41,
 Appendix C
Preformed packings, Items 2,
 25, 27, 40, 42, 44, 50, 52
Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

Troubleshooting References

None

Plugs

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off. Hydraulic pressure relieved.

Go to Sheet 2

# **15-25.** Blade Tip Lines, Fittings and Hoses. (Sheet 2 of 10)

### **REMOVAL**

## NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

- Disconnect two hose assemblies (23, Figure 15-93) from control valve group (second assembly from outside) under front, left side of cab.
- 2. Remove two elbows (1) and performed packings (2, Figure 15-94). Discard two preformed packings (2).
- Remove two nuts (3), washers (4) and clamp (5, Figure 15-95) under, left side of cab.

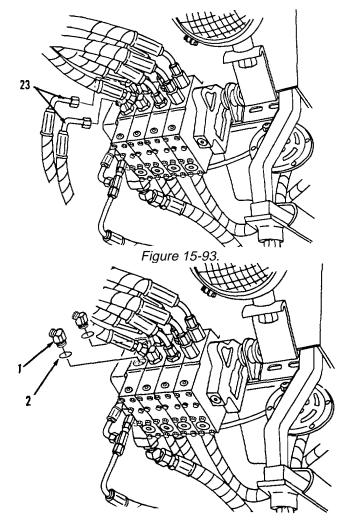


Figure 15-94.

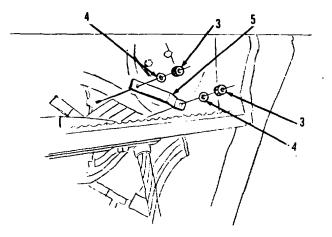


Figure 15-95.

# **15-25.** Blade Tip Lines, Fittings and Hoses. (Sheet 3 of 10)

## **REMOVAL** (cont)

- 4. Remove two bolts (6), washers (7), clamp (8), two spacers (9),shim (10) and two spacers (11, Figure 15-96) in front, right side of cab.
- 5. Remove two bolts (12), washers (13), clamp (14) and two spacers (15).
- 6. Remove two bolts (16), washers (17), clamps (18) and four spacers (19, Figure 15-97) in rear, right side of front frame.
- 7. Remove two bolts (20), washers (21) and clamps (22, Figure 15-98) in center, right side of front frame.

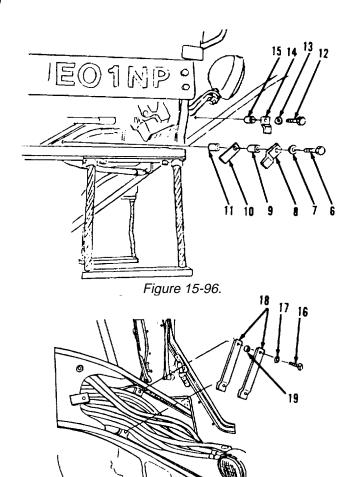


Figure 15-97.

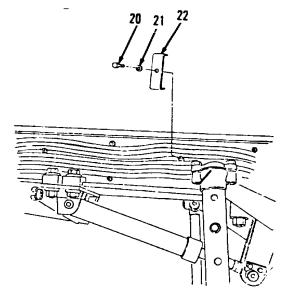
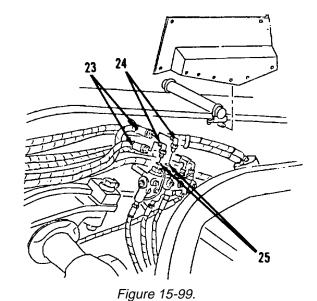


Figure 15-98.

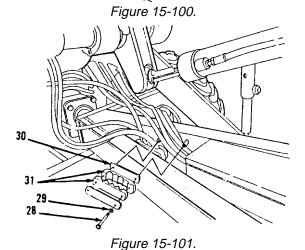
# **15-25.** Blade Tip Lines, Fittings and Hoses. (Sheet 4 of 10)

### **REMOVAL**

- 8. Remove two hose assemblies (23,Figure 15-99) from blade tip check and relief valve in front, right side of front frame.
- Remove two elbows (24) and preformed packings (25) from blade tip check and relief valve. Discard two preformed packing (25).
- 10. Disconnect two hose assemblies (38, Figure 15-100).
- 11. Remove two connectors (26) and preformed packings (27). Discard two preformed packings (27).
- 12. Remove two bolts (28), washers (29), plate (30) and clamp (31, Figure 15-101) from front, right side of drawbar.



27



# 15-25. Blade Tip Lines, Fittings and Hoses. (Sheet 5 of 10)

## **REMOVAL** (cont)

- 13. Remove bolt (32), washer (33) and clamp (34, Figure 15-102).
- 14. Remove bolt (35), washer (36) and clamp (37) from inner, right side of drawbar.
- 15. Remove two hose assemblies (38,Figure 15-103) from rear of drawbar.
- 16. Remove two elbows (39) and preformed packings (40) from circle drive swivel. Discard two preformed packings (40).
- 17. Disconnect hose assembly (47).
- 18. Disconnect hose assembly (48).
- 19. Remove elbow (41) and preformed packing (42). Discard preformed packing (42).
- 20. Remove elbow (43) and preformed packing (44). Discard preformed packing (44).
- 21. Remove two bolts (45) and clamps (46, Figure 15-104).

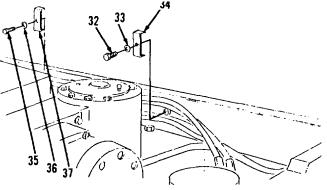
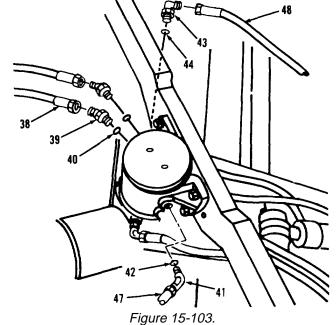


Figure 15-102.



15 46

Figure 15-104.

## **HYDRAULIC SYSTEM MAINTENANCE.** (cont)

# **15-25.** Blade Tip Lines, Fittings and Hoses. (Sheet 6 of 10)

## **REMOVAL** (cont)

- 22. Remove hose assembly (47, Figure 15-105) from rear, right side of drawbar.
- 23. Remove hose assembly (48) from blade tip cylinder.
- 24. Remove elbow (49) and preformed packing (50). Discard preformed packing (50).
- 25. Remove connector (51) and preformed packing (52). Discard preformed packing (52).

# **CLEANING**

Clean all parts. Refer to Chapter 2.

### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

### **INSTALLATION**

- 1. Install new preformed packing (52) and connector (51, Figure 15-105) to blade tip cylinder in rear, right side of drawbar.
- 2. Install new preformed packing (50) and elbow (49) in blade tip cylinder.
- 3. Install hose assembly (48).
- 4. Install hose assembly (47).
- 5. Install two clamps (46) and bolts (45, Figure 15-104) in rear of drawbar.

Go to Sheet 7

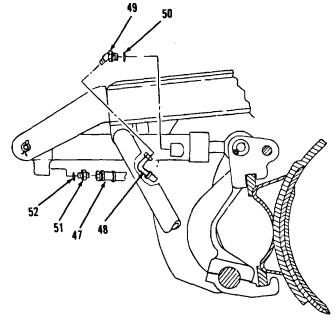
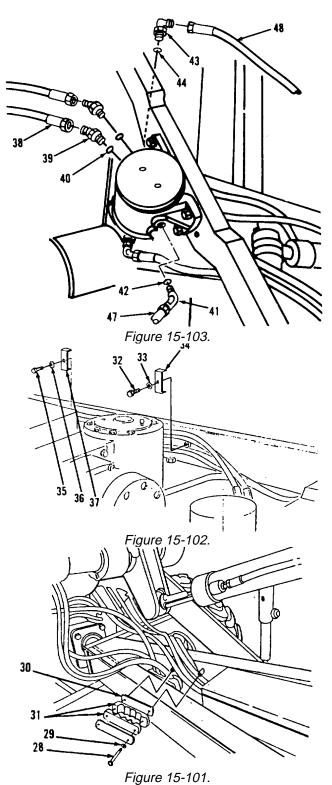


Figure 15-105.

# **15-25.** Blade Tip Lines, Fittings and Hoses. (Sheet 7 of 10)

## **INSTALLATION** (cont)

- 6. Install new preformed packing (44) and elbow (43, Figure 15-103) to circle drive swivel assembly.
- 7. Install new preformed packing (42) and elbow (41) in circle drive swivel assembly.
- 8. Connect hose assembly (48).
- 9. Connect hose assembly (47).
- 10. Install two new preformed packings (40) and elbows (39).
- 11. Install two hose assemblies (38).
- 12. Install clamp (37), washer (36) and bolts (35, Figure 15-102) in inner, right side of drawbar.
- 13. Install clamp (34), washer (33) and bolt (32) in front, right side of drawbar.
- 14. Install clamp (31), plate (30), two washers (29) and bolts (28, Figure 15-101).



# **15-25.** Blade Tip Lines, Fittings and Hoses. (Sheet 8 of 10)

### **INSTALLATION**

- 15. Install two new preformed packings (27) and connectors (26, Figure 15-100) to blade tip check and relief valve in front right side of front frame. Refer to paragraph 15-13, steps 2-4.
- 16. Connect two hose assemblies (38) in blade tip check and relief valve.
- 17. Install two new preformed packings (25) and elbows (24, Figure 15-99).
- 18. Install two hose assemblies (23).
- 19. Install two clamps (22), washers (21) and bolts (20, Figure 15-98) in center, right side of front frame.

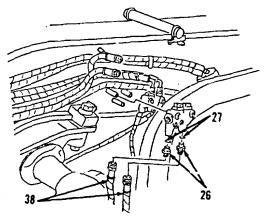
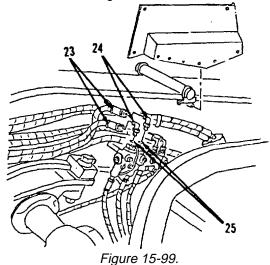


Figure 15-100.



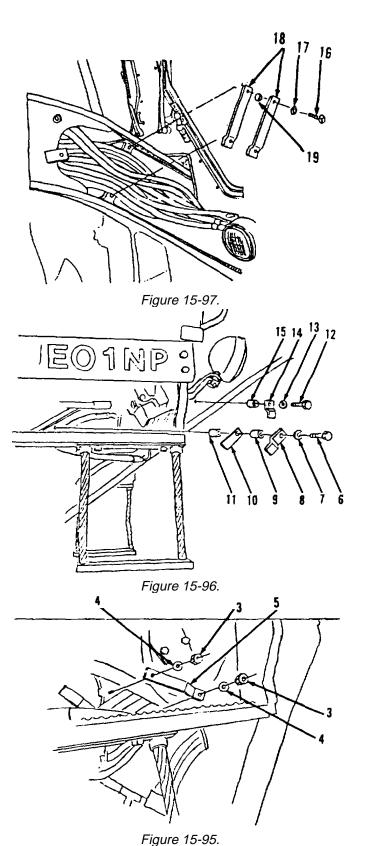
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Figure 15-98.

# **15-25.** Blade Tip Lines, Fittings and Hoses. (Sheet 9 of 10)

# **INSTALLATION** (cont)

- 20. Install two spacers (19), clamps (18), washers (17) and bolts (16, Figure 15-97) in rear, right side of front frame.
- 21. Install two spacers (15), clamp (14), two washers (13) and bolts (12, Figure 15-96) under front, right side of cab.
- 22. Install two spacers (11), shim (10), two spacers (9), clamp (8), two washers (7) and bolts (6).
- 23. Install clamp (5), two washers (4) and nuts (3, Figure 15-95) under left side of cab.



Go to Sheet 10

# 15-25. Blade Tip Lines, Fittings and Hoses. (Sheet 10 of 10)

#### **INSTALLATION**

- 24. Install two new preformed packings (2) and elbows (1, Figure 15-94) to control valve group (second assembly from outside) under front, left side of cab.
- 25. Connect two hose assemblies (23, Figure 15-93).

## **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 26. Start engine. Refer to TM 5-3805-261-10.
- 27. Operate blade tip control. Move system through at least five full movements of travel to bleed air from the system.
- 28. Stop engine.
- 29. Inspect hose assemblies and connections for leaks.
- 30. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

#### NOTE

Return 130G Grader to original equipment condition.

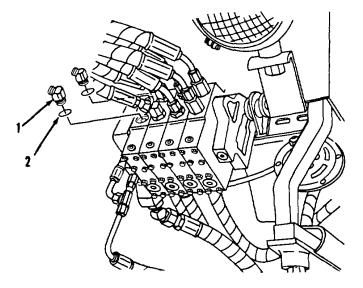


Figure 15-94.

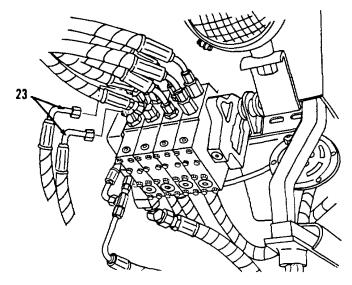


Figure 15-93.

End of Task

## **HYDRAULIC SYSTEM MAINTENANCE.** (cont)

# 15-26. Leaning Wheel Hoses and Fittings. (Sheet 1 of 7)

d. Installation

This task covers: a. Removal b. Cleaning c. Inspection

# INITIAL SETUP:

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment
None

Materials/Parts

Dry cleaning solvent,
Item 14, Appendix C
Clean cloths, Item 39,
Appendix C
Detergent, Item 8, Appendix C
Small tags, Item 41,
Appendix C
Preformed packings, Items 2,
4, 22, 24, 26, 28, 33, 35
Strap, Item 29
Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

### Troubleshooting References

None

Plugs

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. Hydraulic pressure relieved. Leaning wheel lock pin installed.

Paragraph 12-3 Right side front frame cover removed.

Go to Sheet 2

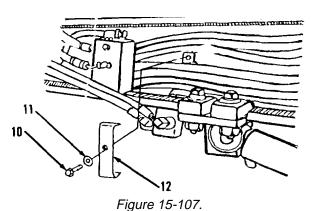
# 15-26. Leaning Wheel Hoses and Fittings. (Sheet 2 of 7)

### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

- 1. Disconnect four hose assemblies. Refer to paragraph 15-24, steps 1 and 2 and paragraph 15-32, steps 1 and 2.
- 2. Disconnect hoses (19 and 20, Figure 15-106) from right control valve group.
- Remove connector (1), preformed packing
   (2), connector (3) and preformed packing
   (4). Discard preformed packings (2 and 4).
- 4. Remove two bolts (5), washers (6), clamp (7), two spacers (8) and clamp (9, Figure 15-107).
- 5. Remove bolt (10), washer (11) and clamp (12, Figure 15-108) from right side, center section of frame.



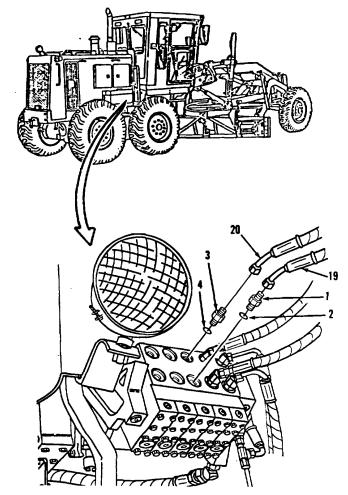


Figure 15-106.

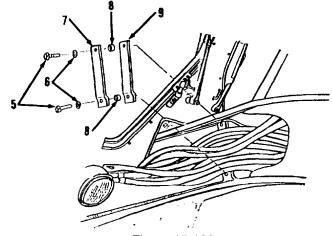


Figure 15-108.

# 15-26. Leaning Wheel Hoses and Fittings. (Sheet 3 of 7)

### **REMOVAL**

- 6. Remove bolt (13), washer (14) and clamp (15, Figure 15-109) from right side, forward section of frame.
- 7. Remove bolt (16), washer (17) and clip (18, Figure 15-110) from frame.
- 8. Remove hoses (19 and 20) from top of leaning wheel check and relief valve.
- 9. Remove elbow (21), preformed packing (22), elbow (23) and preformed packing (24). Discard preformed packings (22 and 24).

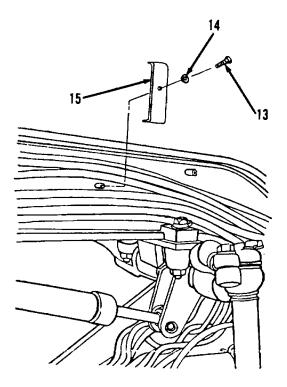


Figure 15-109.

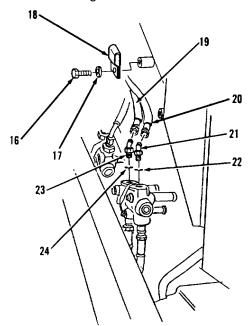


Figure 15-110.

# 15-26. Leaning Wheel Hoses and Fittings. (Sheet 4 of 7)

### **REMOVAL**

- 10. Disconnect hoses (30 and 31, Figure 15-111) from bottom of leaning wheel check and relief valve.
- 11. Remove connector (25), preformed packing (26), connector (27) and preformed packing (28). Discard preformed packings (26 and 28).
- 12. Remove and discard strap (29). Cut to remove.
- 13. Remove hoses (30 and 31) from leaning hydraulic cylinder.
- 14. Remove elbow (32), preformed packing (33), elbow (34) and preformed packing (35) from leaning wheel hydraulic cylinder. Discard preformed packings (33 and 35).

### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

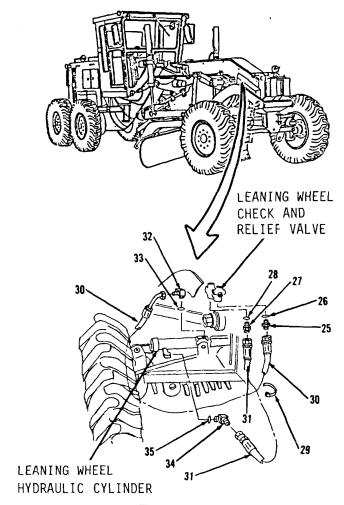


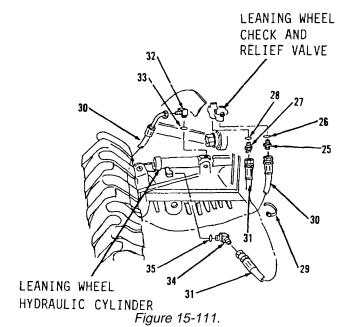
Figure 15-111.

Go to Sheet 5

# 15-26. Leaning Wheel Hoses and Fittings. (Sheet 5 of 7)

### **INSTALLATION**

- Install new preformed packing (35), elbow (34), new preformed packing (33) and elbow (32, Figure 15-111) on leaning wheel hydraulic cylinder.
- 2. Install hoses (31 and 30).
- 3. Install new strap (29).
- 4. Install new preformed packing (28), connector (27), new preformed packing (26) and connector (25).
- 5. Connect hoses (31 and 30) to bottom of leaning wheel check and relief valve.
- 6 .Install new preformed packing (24), elbow (23), new preformed packing (22) and elbow (21, Figure 15-110).
- 7. Install hoses (20 and 19) to top of leaning wheel check and relief valve.
- 8. Install clip (18), washer (17) and bolt (16) to frame.



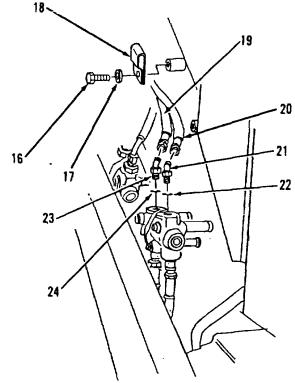


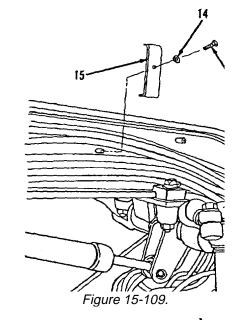
Figure 15-110.

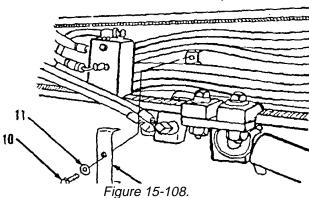
Go to Sheet 6

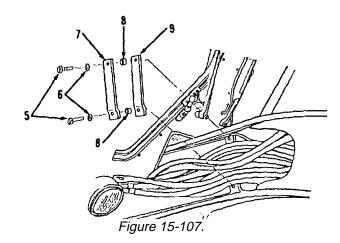
# 15-26. Leaning Wheel Hoses and Fittings. (Sheet 6 of 7)

## **INSTALLATION**

- 9. Install clamp (15), washer (14) and bolt (13, Figure 15-109) to right side, forward section of frame.
- 10. Install clamp (12), washer (11) and bolt (10, Figure 15-108) to right side, center section of frame.
- 11. Install clamp (9), two spacers (8), clamp (7), two washers (6) and bolts (5, Figure 15-107).







# 15-26. Leaning Wheel Hoses and Fittings. (Sheet 7 of 7)

#### **INSTALLATION**

- 12. Install new preformed packing (4), connector (3), new preformed packing (2) and connector (1, Figure 15-106).
- 13. Connect hoses (20 and 19) to right control valve group.
- 14. Connect four hose assemblies. Refer to paragraph 15-32, steps 11 and 10 and paragraph 15-24, steps 29 and 30.

### **WARNING**

Only a qualified operator may perform the next procedure. All other 'personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 15. Start engine. Refer to TM 5- 3805-261-10.
- 16. Operate scarifier control lever. Move system through at least five full movements of travel to bleed air from the system.
- 17. Stop engine.
- 18. Inspect all hoses and connections for leaks.
- 19. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

## **NOTE**

Return 130G Grader to original equipment condition.

End of Task

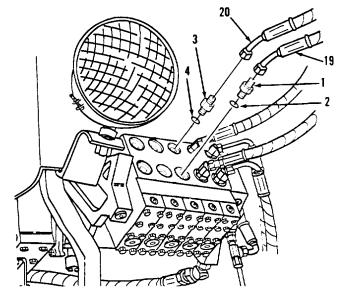


Figure 15-106.

# 15-27. Circle Drive Motor Hoses and Fittings. (Sheet 1 of 6)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

INITIAL SETUP:

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent,
Item 14, Appendix C
Clean cloths, Item 39,
Appendix C
Small tags, Item 41,
Appendix C
Detergent, Item 8, Appendix C
Preformed packings, Items 2,
4, 32
Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TH 5-3805-261-10

Vehicle parked on level ground.
Parking/emergency brake applied.
Equipment lowered to the ground.
Engine stopped.

Master disconnect switch off. Hydraulic pressure relieved.

Paragraph 12-3

Left side front frame covers removed.

Go to Sheet 2

# 15-27. Circle Drive Motor Hoses and Fittings. (Sheet 2 of 6)

### **REMOVAL**

### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 1. Disconnect hose assemblies (12 and 13, Figure 15-112).
- Remove connector (1), preformed packing (2), connector (3) and preformed packing (4). Discard preformed packings (2 and 4).
- 3. Remove bolt (5), washer (6) and clamp (7, Figure 15-113).
- Remove two bolts (8), washers (9), plates (10) and clamps (11, Figure 15-114). TM 5-3805-261-20

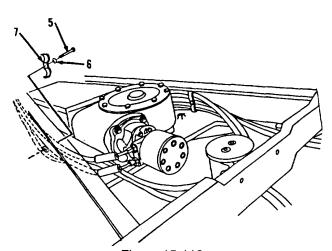


Figure 15-113.

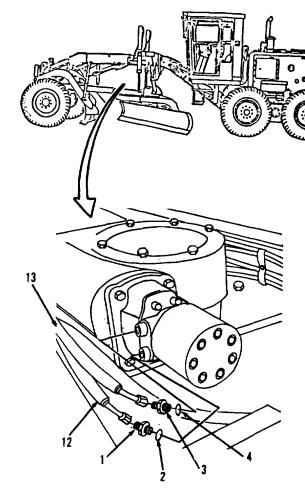


Figure 15-112.

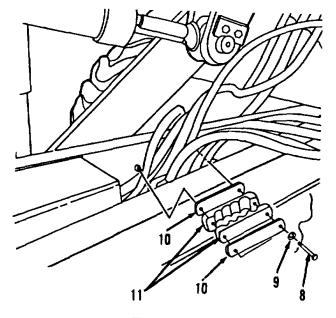


Figure 15-114.

# 15-27. Circle Drive Motor Hoses and Fittings. (Sheet 3 of 6)

#### **REMOVAL**

- 5. Remove hose assemblies (12 and 13, Figure 15-115).
- 6. Remove items 14 thru 17 from bottom of check valve. Refer to paragraph 15-8, steps 5 thru 7.
- 7. Disconnect hose assemblies (29 and 30, Figure 15-116).
- 8. Remove items 18 thru 21 from top of check valve. Refer to paragraph 15-8, steps 2 4.
- 9. Remove two bolts (22), washers (23) and clamps (24, Figure 15-117).

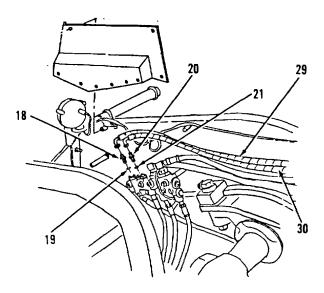


Figure 15-116.

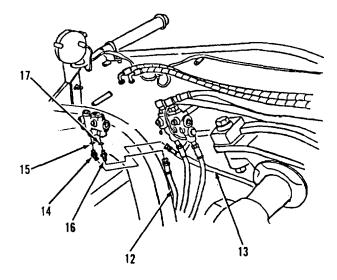


Figure 15-115.

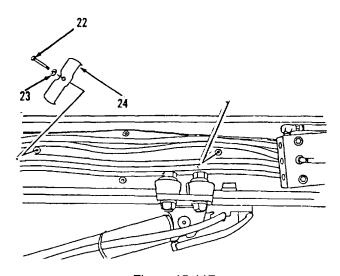


Figure 15-117.

Go to Sheet 4

## 15-27. Circle Drive Motor Hoses and Fittings. (Sheet 4 of 6)

#### **REMOVAL** (cont)

- 10. Remove two bolts (25), washers (26), clamps (27) and spacers (28, Figure 15-118).
- 11. Disconnect two hose assemblies. Refer to paragraph 15-25, steps 1 and 2.
- 12. Remove hose assemblies (29 and 30, Figure 15-119) from left control valve group.
- 13. Remove two elbows (31) and preformed packings (32, Figure 15-120). Discard preformed packings (32).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- Install two new preformed packings (32) and elbows (31, Figure 15-120) to left control valve group.
- 2. Install hose assemblies (30 and 29, Figure 15-119) on left control valve group.
- 3. Connect two hose assemblies. Refer to paragraph 15-25, steps 24 and 25.
- 4. Install two spacers (28), clamps (27), washers (26) and bolts (25, Figure 15-118).

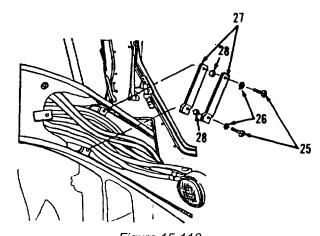


Figure 15-118.

29

30

Figure 15-119.

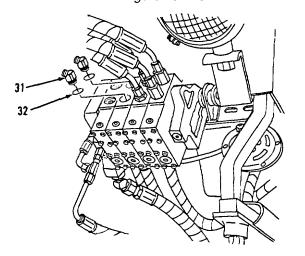


Figure 15-120.

# 15-27. Circle Drive Motor Hoses and Fittings. (Sheet 5 of 6)

## **INSTALLATION**

- 5. Install two clamps (24), washers (23) and bolts (22, Figure 15-117).
- 6. Install items 21 thru 18 (Figure 15-116).
- 7. Connect hose assemblies (30 and 29) to top of check valve. Refer to paragraph 15-8, steps 5 7.
- 8. Install items 17 thru 14 (Figure 15-115).
- 9. Install hose assemblies (13 and 12) on bottom of check valve. Refer to paragraph 15-8, steps 2 thru 4.

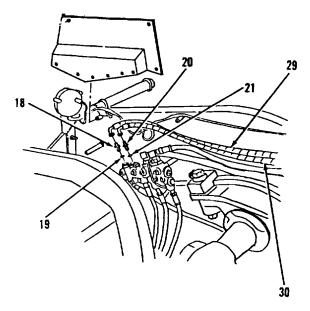


Figure 15-116.

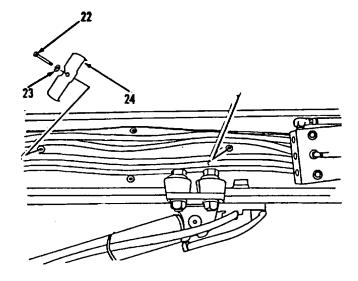


Figure 15-117.

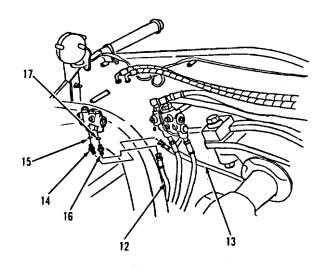


Figure 15-115.

Go to Sheet 6

## **15-27.** Circle Drive Motor Hoses and Fittings. (Sheet 6 of 6)

#### **INSTALLATION** (cont)

- 10. Install two clamps (11), plates (10), washers (9) and bolts (8, Figure 15-114).
- 11. Install clamp (7), washer (6) and bolt (5, Figure 15-113).
- 12. Install new preformed packing (4), connector (3), new preformed packing (2) and connector (1,Figure 15-112).
- 13. Connect hose assemblies (13 and 12).

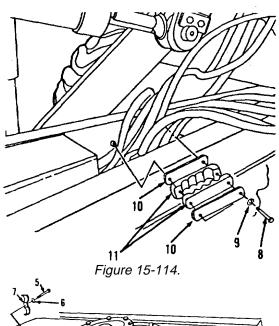
#### **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 14. Start engine. Refer to TM 5-3805-261-10.
- 15. Operate circle drive motor control. Move system through at least five full movements of travel to bleed air from system.
- 16 Stop engine.
- 17. Inspect hose assemblies and connections for leaks.
- 18. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

# NOTE

Return 130G Grader to original equipment condition.



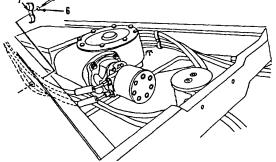


Figure 15-113.

Figure 15-112.

End of Task

## 15-28. Centershift Lines, Fittings and Hoses. (Sheet 1 of 7)

a. Removal b. Cleaning This task covers: c. Inspection

d. Installation 

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Detergent, Item 8, Appendix C Small tags, Item 41, Appendix C Preformed packings, Items 2, 11, 38, 41

Personnel Required Construction equipment

repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

Caps

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. Hydraulic pressure relieved.

Paragraph 12-3 Frame covers, right side removed.

Go to Sheet 2

## 15-28. Centershift Lines, Fittings and Hoses. (Sheet 2 of 7)

#### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- 1. Disconnect two hose assemblies. Refer to paragraph 15-29, steps 1 and 2.
- 2. Disconnect two hose assemblies (9, Figure 15-121) from right control valve group.
- 3. Remove two elbows (1) and preformed packings (2, Figure 15-122).
- 4. Remove two bolts (3), washers (4) and clamps (5, Figure 15-123).
- 5. Remove two bolts (6), washers (7) and clamps (8, Figure 15-124).

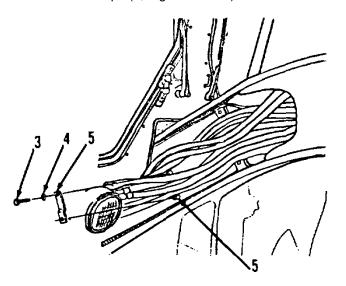
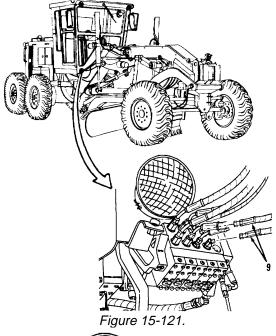


Figure 15-123.



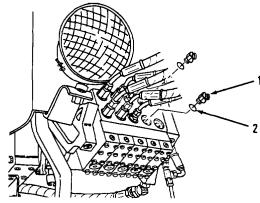


Figure 15-122.

Figure 15-124.

## **15-28.** Centershift Lines, Fittings and Hoses. (Sheet 3 of 7)

#### **REMOVAL**

- 6. Remove two hose assemblies (9), connectors (10) and preformed packings (11, Figure 15-125) from top of centershift check valve. Discard two preformed packings (11).
- Disconnect two hose assemblies (36 and 39) and remove items 12 thru 15 (Figure 15-126) from bottom of centershift check valve. Refer to paragraph 15-13, steps 5 -7.
- 8. Remove two bolts (16), washers (17), plates (18) and clamps (19, Figure 15-127).
- 9. Remove bolt (20), washer (21), clamp (22), bolt (23), washer (24) and clamp (25, Figure 15-128).

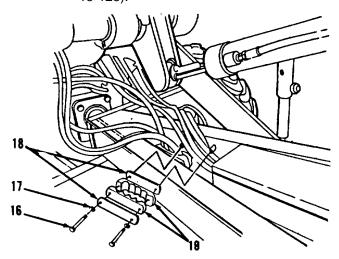


Figure 15-127.

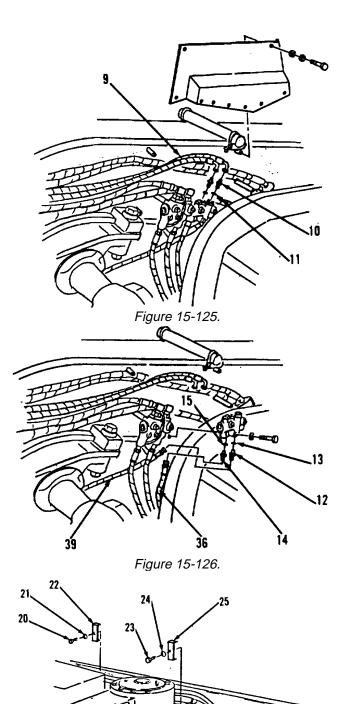


Figure 15-128.

Go to Sheet 4

## **15-28.** Centershift Lines, Fittings and Hoses. (Sheet 4 of 7)

#### **REMOVAL** (cont)

- 10. Remove bolt (26), washer (27) and clamp (28, Figure 15-129).
- 11. Remove bolt (29), washer (30) and two clips (31, Figure 15-130).
- 12. Remove nut (32), two clips (33), washer (34) and bolt (35).
- 13. Remove hose assembly (36), elbow (37) and preformed packing (38) from bottom of centershift cylinder. Discard preformed packing (38).
- Remove hose assembly (39), connector (40) and preformed packing (41, Figure 15-131) from top of centershift cylinder. Discard preformed packing (41).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

1. Install new preformed packing (41), connector (40) and hose assembly (39, Figure 15-131) to top of centershift cylinder.

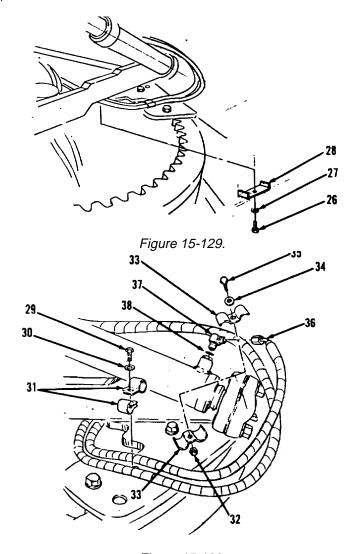


Figure 15-130.

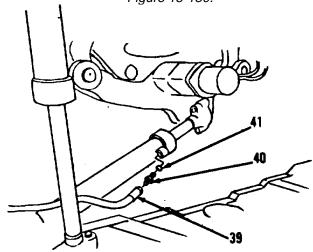
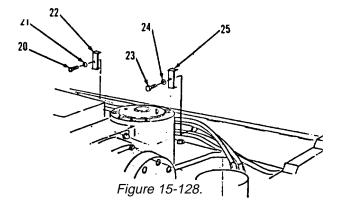


Figure 15-131.

## **15-28.** Centershift Lines, Fittings and Hoses. (Sheet 5 of 7)

#### **INSTALLATION**

- 2. Install new preformed packing (38), elbow (37) and hose assembly (36, Figure 15-130) to bottom of centershift cylinder.
- 3. Install bolt (35), washer (34), two clips (33) and nut (32).
- 4. Install two clips (31), washer (30) and bolt (29).
- 5. Install clamp (28), washer (27) and bolt (26, Figure 15-129).
- 6. Install clamp (25), washer (24), bolt (23), clamp (22), washer (21) and bolt (20, Figure 15-128).
- 7. Install two clamps (19), plates (18), washers (17) and bolts (16, Figure 15-127).



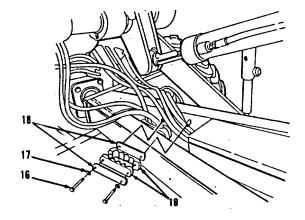


Figure 15-127.

Go to Sheet 6

## 15-28. Centershift Lines, Fittings and Hoses. (Sheet 6 of 7)

## **INSTALLATION** (cont)

- Install items 15 thru 12 and connect two hose assemblies (39 and 36, Figure 15-126) to bottom of centershift check valve. Refer to paragraph 15-13, steps 2 thru 4.
- Install two new preformed packings (11), connectors (10) and hose assemblies (9, Figure 15-125) to top of centershift check valve.
- 10. Install two clamps (8), washers (7) and bolts (6, Figure 15-124).
- 11. Install two clamps (5), washers (4) and bolts (3, Figure 15-123).

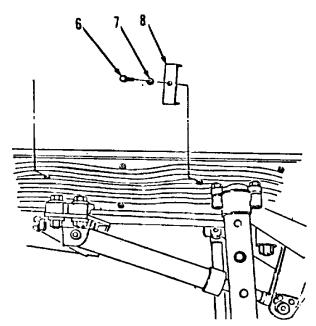


Figure 15-124.

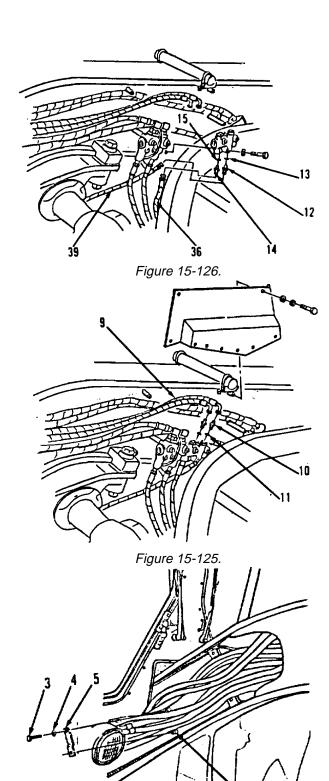


Figure 15-123.

## 15-28. Centershift Lines, Fittings and Hoses. (Sheet 7 of 7)

#### **INSTALLATION**

- 12. Install two new preformed packings (2) and elbows (1, Figure 15-122) to right control valve group.
- 13. Connect two hose assemblies (9, Figure 15-121) to right control valve group.
- 14. Connect two hose assemblies. Refer to paragraph 15-29, steps 16 and 17.

#### **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 15. Start engine. Refer to TM 5-3805-261-10.
- 16. Stop engine.
- 17. Inspect hose assemblies and connections for leaks.
- 18. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

#### NOTE

Return 130G Grader to original equipment condition.

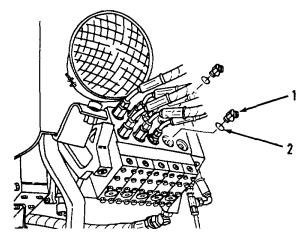


Figure 15-122.

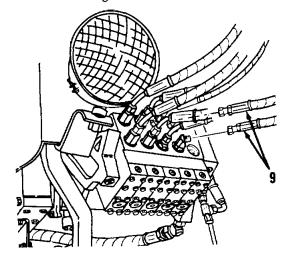


Figure 15-121.

End of Task

## 15-29. Articulation Lines, Fittings and Hoses. (Sheet 1 of 7)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

#### **INITIAL SETUP:**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent,
Item 14, Appendix C
Clean cloths, Item 39,
Appendix C
Detergent, Item 8, Appendix C
Small tags, Item 41,
Appendix C
Preformed packings, Items 2,
4, 8, 10, 12, 15, 20, 23,
26, 29, 33, 35, 42, 44
Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

Troubleshooting References

None

Plugs

**Equipment Condition** 

TM 5-3805-26f-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off. Hydraulic pressure relieved.

Go to Sheet 2

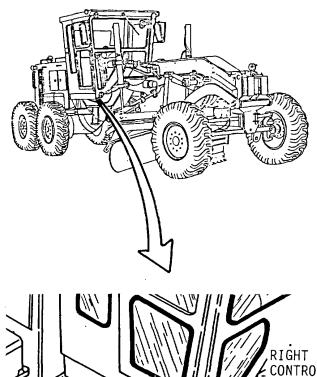
## 15-29. Articulation Lines, Fittings and Hoses. (Sheet 2 of 7)

#### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

- Disconnect hose assemblies (5 and 6, Figure 15-132) from right control valve group (inner most valve) under right side of cab.
- 2. Remove elbow (1), preformed packing (2), elbow (3) and preformed packing (4). Discard preformed packings (2 and 4).
- 3. Remove hose assemblies (5 and 6) from articulation check valve (45).
- 4. Remove elbow (7), preformed packing (8), elbow (9) and preformed packing (10). Discard preformed packings (8 and 10).



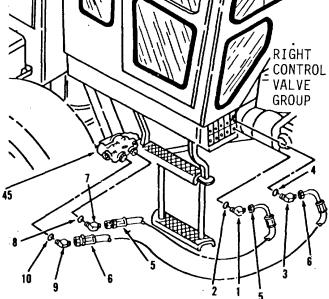


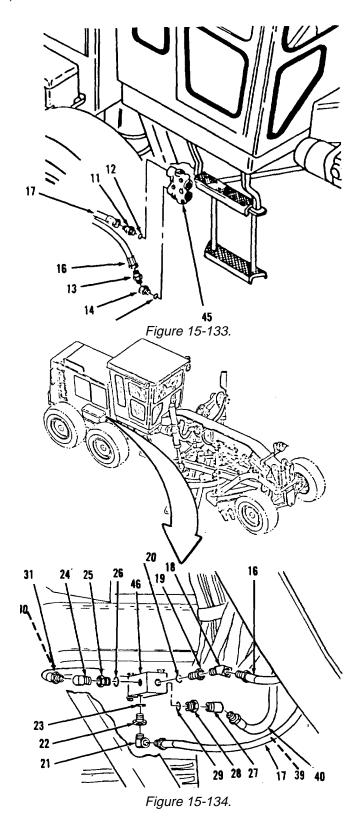
Figure 15-132.

Go to Sheet 3

## 15-29. Articulation Lines, Fittings and Hoses. (Sheet 3 of 7)

#### **REMOVAL** (cont)

- Disconnect hose assemblies (16 and 17) from articulation check valve (45, Figure 15-133).
- 6. Remove fitting (11), preformed packing (12), elbow (13), fitting (14) and preformed packing (15). Discard preformed packings (12 and 15).
- 7. Remove hose assemblies (16 and 17) from centering valve (46, Figure 15-134) under right side of cab.
- 8. Remove elbow (18), fitting (19), preformed packing (20), elbow (21), fitting (22) and preformed packing (23). Discard preformed packings (20 and 23).
- 9. Disconnect hose assemblies (30 and 31) from centering valve (46) on front side.
- 10. Remove two elbows (24), fittings (25) and preformed packings (26). Discard two preformed packings (26).
- 11. Disconnect hose assemblies (39 and 40) from centering valve (46) on rear side.
- 12. Remove two elbows (27), fittings (28) and preformed packings (29). Discard two preformed packings (29).



## 15-29. Articulation Lines, Fittings and Hoses. (Sheet 4 of 7)

#### **REMOVAL**

- 13. Remove hose assemblies (30 and 31, Figure 15-135) from articulation cylinder from under right side of engine compartment.
- 14. Remove connector (32), preformed packing (33), connector (34) and preformed packing (35). Discard preformed packings (33 and 35).
- 15. Remove bolt (36), washer (37) and clamp (38, Figure 15-136).
- 16. Remove hose assemblies (39 and 40) from articulation cylinder from under left side of engine compartment.
- 17. Remove connector (41), preformed packing (42), connector (43) and preformed packing (44). Discard preformed packings (42 and 44).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

## **INSTALLATION**

- Install new preformed packing (44), connector (43), new preformed packing (42) and connector (41, Figure 15-136) to articulation cylinder under left side of engine compartment.
- 2. Install hose assemblies (40 and 39).
- 3. Install clamp (38), washer (37) and bolt (36).

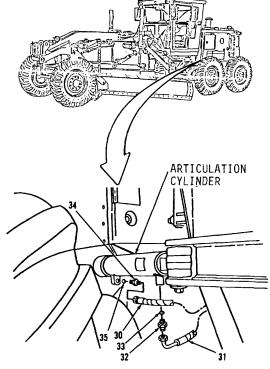


Figure 15-135

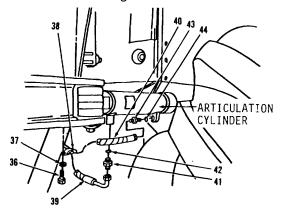
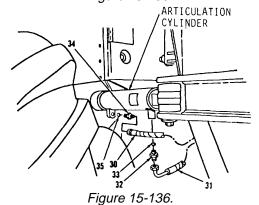


Figure 15-135.

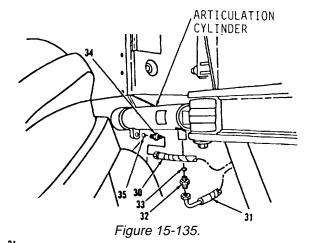


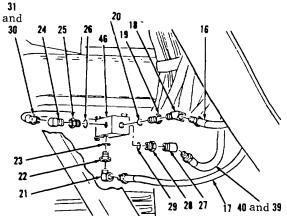
Go to Sheet 5

## 15-29. Articulation Lines, Fittings and Hoses. (Sheet 5 of 7)

#### **INSTALLATION** (cont)

- Install new preformed packing (35), connector (34), new preformed packing (33) and connector (32, Figure 15-135) to articulation cylinder under right side of engine compartment.
- 5. Install hose assemblies (31 and 30).
- 6. Install two new preformed packings (29), fittings (28) and elbows (27) to centering valve (46, Figure 15-134) under right rear side of cab.
- 7. Connect hose assemblies (40 and 39).
- 8. Install two new preformed packings (26), fittings (25) and elbows (24) to centering valve (46) on front side.
- 9. Connect hose assemblies (31 and 30).
- 10. Install new preformed packing (23), fitting (22), elbow (21), new preformed packing (20), fitting (19) and elbow (18) to centering valve (46).
- 11. Install hose assemblies (17 and 16).
- Install new preformed packing (15), fitting (14), elbow (13), new preformed packing (12) and fitting (11) to articulation check valve (45, Figure 15-133).
- 13. Connect hose assemblies (17 and 16).





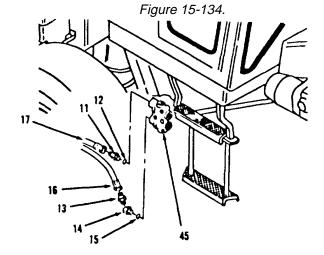


Figure 15-133.

Go to Sheet 6

## 15-29. Articulation Lines, Fittings and Hoses. (Sheet 6 of 7)

#### **INSTALLATION**

- Install new preformed packing (10), elbow (9), new preformed packing (8) and elbow (7) td articulation check valve (45, Figure 15-132).
- 15. Install hose assemblies (6 and 5).
- 16. Install new preformed packing (4), elbow (3), new preformed packing (2) and elbow (1) to right control valve group (inner most valve) under right side of cab.
- 17. Connect hose assemblies (6 and 5).

#### **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

#### **CAUTION**

Blade and scarifier teeth must be in raised position and differential unlocked before vehicle can be articulated.

- 18. Start engine. Refer to TM 5- 3805-261-10.
- 19. Articulate vehicle slowly left and right. Move system through at least five full movements of travel to bleed air from system.



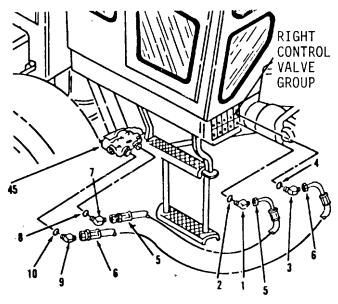


Figure 15-132.

# 15-29. Articulation Lines, Fittings and Hoses. (Sheet 7 of 7)

# **INSTALLATION** (cont)

- 21. Inspect hose assemblies and connections for leaks.
- 22. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

NOTE
Return 130G Grader to original equipment condition.

End of Task

## 15-30. Sideshift Lines. (Sheet 1 of 8)

This task covers: b. Cleaning a. Removal c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Detergent, Item 8, Appendix C Small tags, Item 41, Appendix C Preformed packings, Items 37, 38, 41, 42, 71, 73 Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to Appendix E.

#### <u>Troubleshooting References</u>

None

Plugs

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped.

Master disconnect switch off.

Paragraph 12-3

Frame covers, left side removed.

Go to Sheet 2

## 15-30. Sideshift Lines. (Sheet 2 of 8)

#### **REMOVAL**

#### **WARNING**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

- 1. Disconnect two hose assemblies. Refer to paragraph 15-24, steps16 and 17.
- 2. Disconnect hose assemblies (13 and 14, Figure 15-137) from left control valve group.
- 3. Remove connectors (1 and 2) and preformed packings (3 and 4, Figure 15-138).
- 4. Remove two bolts (5), washers (6), clamp (7), two spacers (8) and clamp (9, Figure 15-139).
- 5. Remove two bolts (10), washers (11) and clamps (12, Figure 15-140).

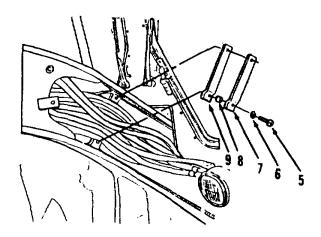
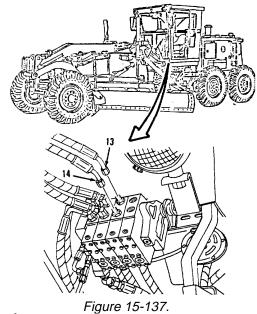
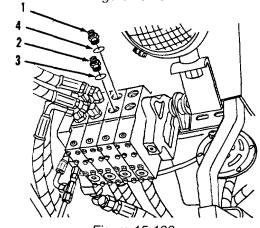


Figure 15-139.





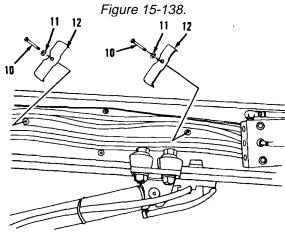
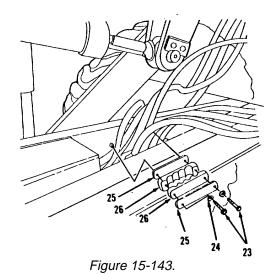


Figure 15-140.

## 15-30. Sideshift Lines. (Sheet 3 of 8)

#### **REMOVAL**

- 6. Remove hose assemblies (13 and 14) and items 15 thru 18 (Figure 15-141) from top of blade tip check valve. Refer to paragraph 15-11, steps 1 4.
- 7. Disconnect hose assemblies (33 and 34) and remove items 19 thru 22 (Figure 15-142) from bottom of blade tip check valve. Refer to paragraph 15-11, steps 5 7.
- **8.** Remove two bolts (23), washers (24), plates (25) and clamps (26, Figure 15-143).
- **9.** Remove bolt (27), washer (28), clamp (29), bolt (30), washer 31) and clamp (32, Figure 15-144).



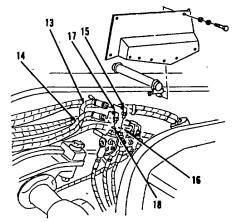
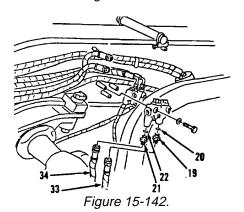


Figure 15-141.



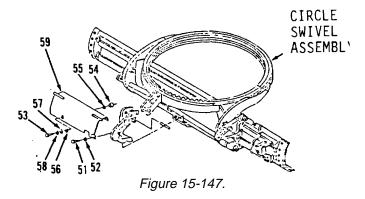
29 28 27 32 31 30

Figure 15-144.

#### 15-30. Sideshift Lines. (Sheet 4 of 8)

## **REMOVAL** (cont)

- **10.** Remove hose assemblies (33 and 34), elbows (35 and 36) and preformed packings (37 and 38, Figure 15-145) from circle swivel assembly. Discard preformed packings (37 and 38).
- **11.** Disconnect hose assemblies (69 and 72, Figure 15-146) from circle swivel assembly.
- **12.** Remove connectors (39 and 40) and preformed packings (41 and 42). Discard preformed packings (41 and 42).
- **13.** Remove nuts (43 and 44), washers (45 and 46), bolts (47 and 48) and clips (49 and 50) from guide assembly.
- **14.** Remove bolt (51), washer (52), bolt (53), spacer (54), washer (55), spacer (56), washers (57 and 58) and guard assembly (59, Figure 15-147).
- **15.** Remove bolt (60), washer (61), bolt (62), spacer (63), washer (64), spacer (65), washers (66 and 67) and guard assembly (68, Figure 15-148).



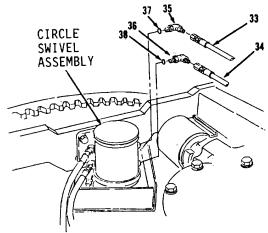


Figure 15-145.

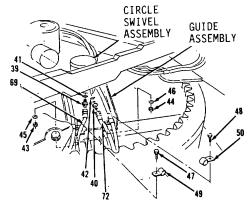


Figure 15-146.

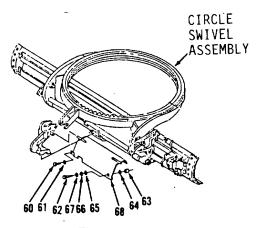


Figure 15-148.

#### 15-30. Sideshift Lines. (Sheet 5 of 8)

#### **REMOVAL**

- **16.** Remove hose assembly (69), connector (70) and preformed packing (71, Figure 15-149) from left end of blade shift hydraulic cylinder. Discard preformed packing (71).
- **17.** Remove hose assembly (72), connector (73) and preformed packing (74) from right end of blade shift hydraulic cylinder. Discard preformed packing (73).

#### **CLEANING**

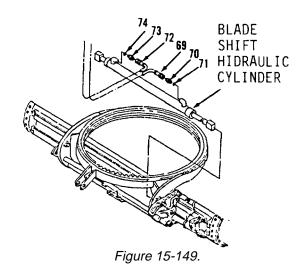
Clean all parts. Refer to Chapter 2.

## **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

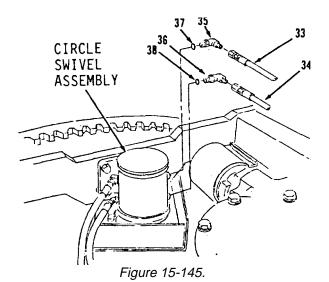
- 1. Install new preformed packing (74), connector (73) and hose assembly (72, Figure 15-149) on right end of blade shift hydraulic cylinder.
- 2. Install new preformed packing (71), connector (70) and hose assembly (69) on left end of blade shift hydraulic cylinder.
- Install guard assembly (68), washers (67 and 66), spacer (65), washer (64), spacer (63), bolt (62), washer (61) and bolt (60, Figure 15-148.



#### 15-30. Sideshift Lines. (Sheet 6 of 8)

## **INSTALLATION** (cont)

- **4.** Install guard assembly (59), washers (58 and 57), spacer (56), washer (55), spacer (54), bolt (53), washer (52) and bolt (51, Figure 15-147).
- 5. Install clips (50 and 49), bolts (48 and 47), washers (46 and 45) and nuts (44 and 43, Figure 15-146) on guide assembly.
- Install new preformed packings (42 and 41) and connectors (40 and 39) on circle swivel assembly.
- 7. Connect hose assemblies (72 and 69).
- 8. Install new preformed packings (38 and 37), elbows (36 and 35) and hose assemblies (34 and 33, Figure 15-145) on circle swivel assembly.
- **9.** Install clamp (32), washer (31), bolt (30), clamp (29), washer (28) and bolt (27, Figure 15-144).



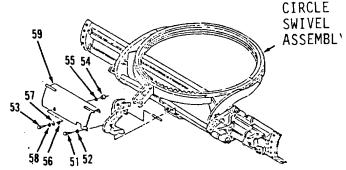


Figure 15-147.

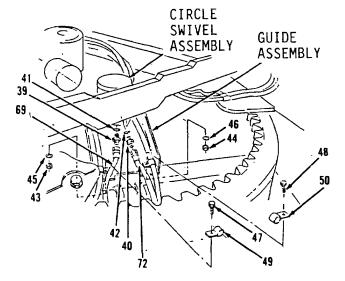


Figure 15-146.

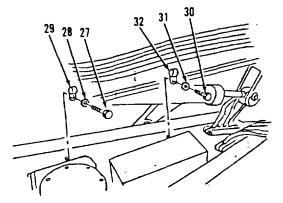


Figure 15-144.

## 15-30. Sideshift Lines. (Sheet 7 of 8)

## **INSTALLATION**

- **10.** Install two clamps (26), plates (25), washers (24) and bolts (23, Figure 15-143).
- **11.** Install items 22 thru 19 and connect hose assemblies (34 and 33, Figure 15-142) to bottom of blade tip check valve. Refer to paragraph 15-11, steps 2 thru 4.
- **12.** Install items 18 thru 15 and hose assemblies (14 and 13, Figure 15-141) to top of blade tip check valve. Refer to paragraph 15-11, steps 5 7.
- **13.** Install two clamps (12), washers (11) and bolts (10, Figure 15-140).

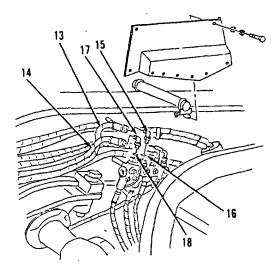


Figure 15-141.

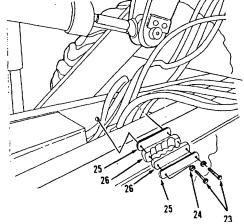


Figure 15-143.

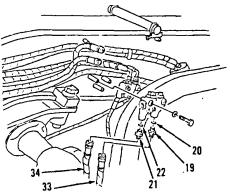


Figure 15-142.

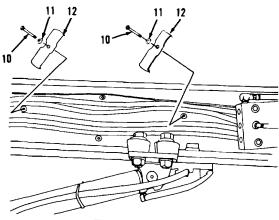


Figure 15-140.

15-30. Sideshift Lines. (Sheet 8 of 8)

## **INSTALLATION** (cont)

- **14.** Install clamp (9), two spacers (8), clamp (7), two washers (6) and bolts (5, Figure 15-139).
- **15.** Install new preformed packings (4 and 3) and connectors (2 and 1, Figure 15-138) to left control valve group.
- **16.** Connect hose assemblies (14 and 13, Figure 15-137) to left control valve group.
- **17.** Connect two hose assemblies. Refer to paragraph 15-24, steps 14 and 15.

## **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 18. Start engine. Refer to TM 5-3805-261-10.
- **19.** Operate side shift control lever. Move system through at least five full movements of travel to bleed air from system.
- 20. Stop engine.
- **21.** Inspect hose assemblies and connections for leaks.
- **22.** Refill hydraulic tank to proper level. Refer to LO 5-3805-261-2.

#### NOTE

Return 130G Grader to original equipment condition.

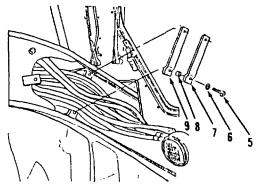


Figure 15-139.

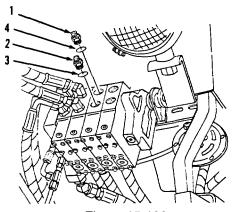


Figure 15-138.

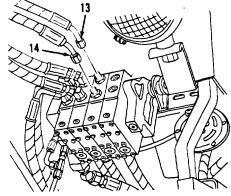


Figure 15-137.

End of Task

#### 15-31. Scarifier Lines, Fittings and Hoses. (Sheet 1 of 5)

This task covers: a. Removal b. Cleaning c. Inspection
d. Installation

## **INITIAL SETUP**

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent,
Item 14, Appendix C
Clean cloths, Item 39,
Appendix C
Detergent, Item 8, Appendix C
Small tags, Item 41,
Appendix C
Preformed packings, Item 2,
7, 9, 14, 16
Tie strap, Item 10
Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

General Safety Instructions

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

Plugs

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off. Hydraulic pressure relieved.

## 15-31. Scarifier Lines, Fittings and Hoses. (Sheet 2 of 5)

#### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

- 1. Disconnect two hose assemblies (5, Figure 15-150) from right hand control valve on right side of front cab.
- **2.** Remove two connectors (1) and preformed packings (2, Figure 15-151). Discard two preformed packings (2).
- 3. Remove bolt (3) and clip (4, Figure 15-152) from right side center, front frame.



Figure 15-150.



Figure 15-151.

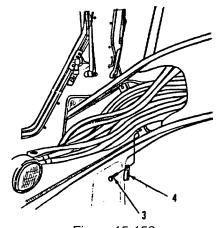


Figure 15-152.

## 15-31. Scarifier Lines, Fittings and Hoses. (Sheet 3 of 5)

#### **REMOVAL**

- **4.** Remove two hose assemblies (5, Figure 15-153) from scarifier check and relief valve.
- **5.** Remove two elbows (6) and preformed packings (7) from check and relief valve on scarifier. Discard two preformed packings (7).
- 6. Disconnect hose assemblies (11 and 12).
- 7. Remove two connectors (8) and preformed packings (9). Discard two preformed packings (9).
- **8.** Remove and discard tie strap (10, Figure 15-154) from scarifier hydraulic cylinder on center, front frame.
- **9.** Remove hose assemblies (11 and 12) on scarifier hydraulic cylinder.
- **10.** Remove connector (13) and preformed packing (14). Discard preformed packing (14).
- **11.** Remove elbow (15) and preformed packing (16). Discard preformed packing (16).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

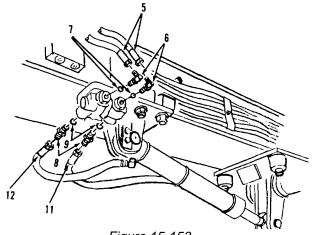


Figure 15-153.

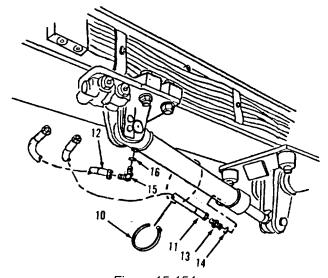


Figure 15-154.

## 15-31. Scarifier Lines, Fittings and Hoses. (Sheet 4 of 5)

## **INSTALLATION**

- 1. Install new preformed packing (16) and elbow (15, Figure 15-154) to scarifier hydraulic cylinder on center, front frame.
- 2. Install new preformed packing (14) and connector (13) to scarifier hydraulic cylinder.
- 3. Install hose assemblies (12 and 11).
- 4. Install new tie strap (10).
- 5. Install two new preformed packings (9) and connectors (8, Figure 15-153) on scarifier check and relief valve to under, front, center of frame.
- **6.** Connect hose assemblies (12 and 11).
- 7. Install two new preformed/packings (7) and elbows (6).
- 8. Install two hose assemblies (5).
- **9.** Install clip (4) and bolt (3, Figure 15-152) to under, center of front frame.

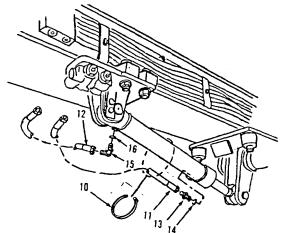


Figure 15-154.

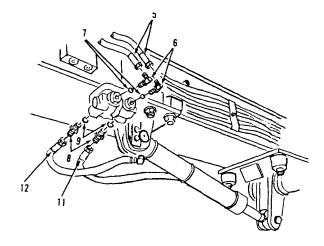


Figure 15-153.

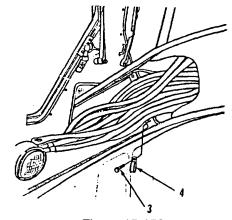


Figure 15-152.

## **15-31.** Scarifier Lines, Fittings and Hoses. (Sheet 5 of 5)

#### **INSTALLATION**

- **10.** Install two new preformed packings (2) and connectors (1, Figure 15-151) on right hand control valve; first valve assembly on outside of right side front cab.
- **11.** Connect two hose assemblies (5, Figure 15-150).

#### **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

- 12. Start engine. Refer to TM 53805-261-10.
- 13. Operate scarifier control. Move system through at least five full movements of travel to bleed air from system.
- 14. Stop engine.
- 15. Inspect hose assemblies and connections for leaks.
- 16. Refill hydraulic tank to proper level. Refer to LO 5-3805-261-12.

#### NOTE

Return 130G Grader to original equipment condition.

End of Task

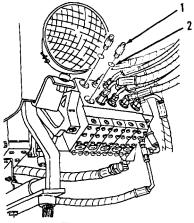


Figure 15-151.

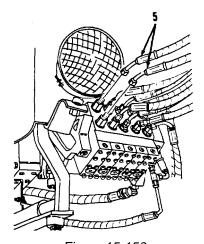


Figure 15-150.

#### 15-32. Hydraulic Oil Cooler. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP**

**Applicable Configurations** 

All

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Suitable container

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39,

Appendix C

Detergent, Item 8, Appendix C

Small tags, Item 41, Appendix C

Two preformed packings, Item 4 Seal (Bulk material), Item 13

Two bolts, Item 8

Caps Plugs Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. Hydraulic pressure relieved.

Paragraph 6-35 Shields, baffles and plates removed.

Paragraph 6-46 Fan removed.

Paragraph 7-82 Vehicle rear signal lights removed.

## 15-32. Hydraulic Oil Cooler. (Sheet 2 of 4)

#### **REMOVAL**

- 1. Remove two plugs (1) to drain core assembly (12, Figure 15-155). Bold suitable container under two plugs (1).
- Install two plugs (1) to prevent contamination.

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open oil ports to prevent contamination.

- 3. Disconnect two hose assemblies (2).
- **4.** Remove two connectors (3) and preformed packings (4). Discard two preformed packings (4).
- **5.** Remove two nuts (5), washers (6) and brackets (7).

## **NOTE**

Remove two bolts only if inspection indicates replacement is necessary. If bolts must be removed, it will first be necessary to remove radiator support. Refer to paragraph 6-36.

**6.** Remove two bolts (8) and washers (9, Figure 15-156) through cut-outs for vehicle rear signal lights in radiator grille. Discard two bolts (8), if necessary.

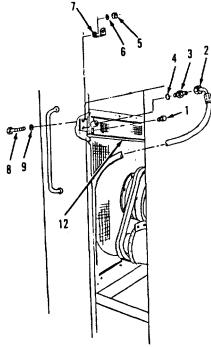


Figure 15-155.

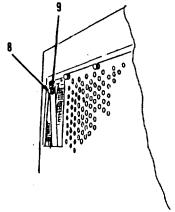


Figure 15-156.

# 15-32. Hydraulic Oil Cooler. (Sheet 3 of 4)

# **REMOVAL** (cont)

- 7. Support core assembly (12, Figure 15-155).
- **8.** Remove two bolts (10) and washers (11).
- **9.** Remove core assembly (12).

## NOTE

# Remove seal only if inspection indicates replacement is necessary.

**10.** Remove and discard seal (13) on front of radiator, if necessary. Remove all old seal material from mounting surfaces.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

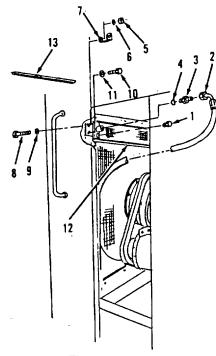


Figure 15-155.

## 15-32. Hydraulic Oil Cooler. (Sheet 4 of 4)

## **INSTALLATION**

- Install new seal (13, Figure 15-155) to front radiator, if removed. Cut bulk seal to size. Remove adhesive covering and apply on clean, cool radiator surface.
- 2. Position core assembly (12) on radiator.
- 3. Install two washers (11) and bolts (10).
- Install two washers (9) and new bolts (8, Figure 15-156) through vehicle rear signal light cut-outs in radiator grille, if removed.
- **5.** Install two brackets (7), washers (6) and nuts (5, Figure 15-155).
- **6.** Install two new preformed packings (4) and connectors (3).
- 7. Connect two hose assemblies (2) to left and right front core assembly (12).
- **8.** Refill hydraulic system reservoir to correct level. Refer to LO 5-3805-261-12.

#### NOTE

Return 130G Grader to original equipment condition.

End of Task

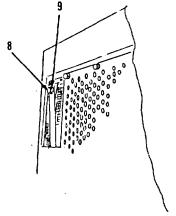


Figure 15-156.

#### 15-33. Hydraulic Tank Filters. (Sheet 1 of 4)

This task covers: a. Removal b. Cleaning c. Inspection d. Installation

## **INITIAL SETUP**

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Two elements, Item 7 Ring, Item 13 Preformed packings, Items 8,

**Troubleshooting References** 

None

TM 5-3805-261-10

**Equipment Condition** 

Go to Sheet 2

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10 LO 5-3805-261-12

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

9, 12

All fasteners are tightened to standard torques. Refer to

Appendix E.

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off.

#### HYDRAULIC SYSTEM MAINTENANCE.

#### 15-33. Hydraulic Tank Filters. (Sheet 2 of 4)

#### **REMOVAL**

#### WARNING

- Hydraulic fluid flammable. Make sure open flames or sparks cannot ignite fluid when working on the hydraulic system. Do not smoke when working on the hydraulic system. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.
- Hot hydraulic fluid can cause serious burns. Use caution when changing filters or draining oil from any hydraulic system component or line. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.
  - 1. At top of hydraulic tank behind cab, remove cover (1) and cap (2, Figure 15-162) as an an assembly slowly to relieve vapor pressure in tank.
  - 2. Remove four bolts (2), washers (3), bolts (4), washers (5) and manifold (6).
  - **3.** Remove and discard two elements (7) and preformed packings (8)

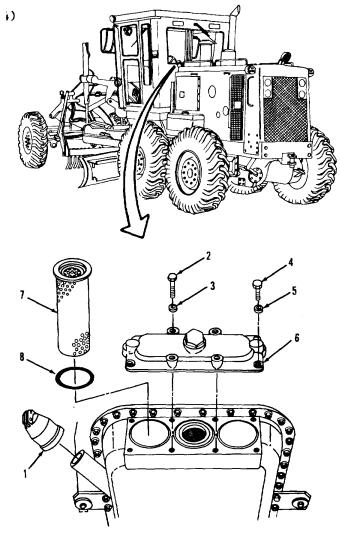


Figure 15-157.

#### **HYDRAULIC SYSTEM MAINTENANCE.** (cont)

### 15-33. Hydraulic Tank Filters. (Sheet 3 of 4)

#### **REMOVAL** (cont)

- **4.** Remove and discard preformed packing (9, Figure 15-158).
- 5. Remove screen (10) and tube (11).
- **6.** Remove and discard preformed packing (12).
- 7. Remove and discard ring (13).
- **8.** Remove strainer (14) from neck of tank (15).

#### NOTE

# Do not disassemble cover unless inspection indicates it is necessary.

**9.** Remove ring (16), gasket (17), plate (18), ball (19) and cap (20) from cover (1, Figure 15-159).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

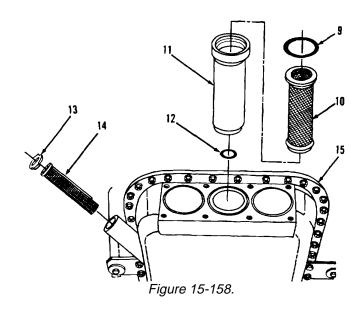
#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- Install cap (20), ball (19), plate (18), gasket (17) and ring (16) to cover (1, Figure 15-159).
- 2. Install strainer (14) and new ring (13) on neck of tank (15, Figure 15-158).
- 3. Install new preformed packing (12), tube (11), screen (10) and new preformed packing (9).





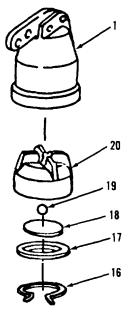


Figure 15-159.

# **HYDRAULIC SYSTEM MAINTENANCE.** (cont)

# **15-33.** Hydraulic Tank Filters. (Sheet 4 of 4)

# **INSTALLATION** (cont)

- 4. Install two new preformed packings (8) and new elements (7, Figure 15-158).
- 5. Install manifold (6), four washers (5), bolts (4), washers (3) and bolts (2).
- 6. Install cover (1).
- 7. Check oil level. Refer to LO 5-3805-261-12.

#### NOTE

Return 130C Grader to original equipment condition.

End of Task

15-183 (15-184 blank)

# **CHAPTER 16**

# GAGES AND INDICATORS (NON-ELECTRICAL) TROUBLESHOOTING AND MAINTENANCE

#### **CHAPTER OVERVIEW**

The purpose of this chapter is to help the technician efficiently troubleshoot and repair malfunctioning equipment and to perform authorized organizational support level maintenance procedures on the 130G Grader.

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GAGES AND INDICATORS (NON-ELECTRICAL) MAINTENANCE PROCEDURES		
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#### Section I. GAGES AND INDICATORS (NON-ELECTRICAL) TROUBLESHOOTING.

- **16-1. GENERAL INFORMATION**. This section lists the common gages and indicators (non-electrical) malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **16-2. GAGES AND INDICATORS (NON-ELECTRICAL) TROUBLESHOOTING PROCEDURES.** This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

GAGES AND INDICATORS (NON-ELECTRICAL) TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

a. AIR CLEANER INDICATOR FAILS TO SHOW AIR FILTER CONDITION.

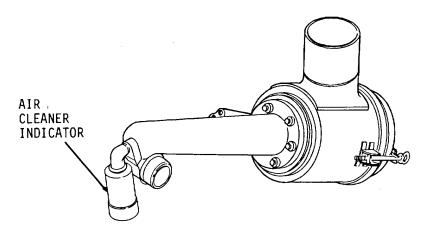


Figure 16-1.

Check the condition of air filter (Figure 16-1).

If the air filter needs replacement--replace. Refer to paragraph 6-19. If the indicator has failed--replace. Refer to paragraph 16-4.

# GAGES AND INDICATORS (NON-ELECTRICAL) TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

b. AIR PRESSURE GAGES FAIL TO OPERATE. Vehicle must be articulated left to view air pressure gages.

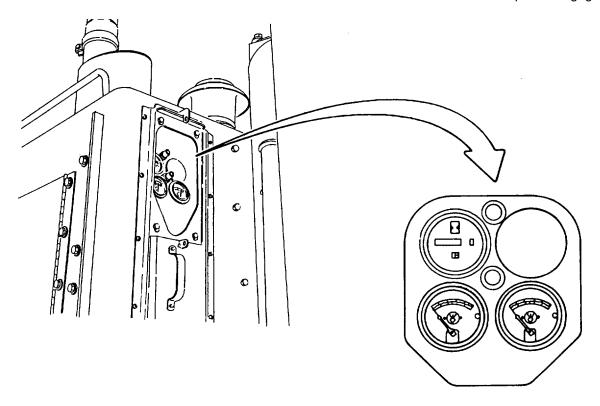


Figure 16-2.

Check air lines with a pressure gage of known accuracy (Figure 16-2).

If the system is pressurized--replace defective air pressure gage. Refer to paragraph 16-5.

# Section II. GAGES AND INDICATORS (NON-ELECTRICAL) MAINTENANCE.

# 16-3. GAGES AND INDICATORS (NON-ELECTRICAL) MAINTENANCE PROCEDURES.

- a. The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the gages and indicators (non-electrical) and its components in good repair.
- b. This section is arranged by functional group code and provides a list of gage and indicator components to be maintained and step-by-step maintenance procedures.

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Air Pressure Gages	16-5	16-7
Articulation Indicator Mechanism	16-6	16-10
Instrument Panel	16-7	16-16

# GAGES AND INDICATORS (NON-ELECTRICAL) MAINTENANCE.

#### **16-4.** Air Cleaner Indicator. (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP**

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Element, Item 4

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

.....

**Troubleshooting References** 

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

# GAGES AND INDICATORS (NON-ELECTRICAL) MAINTENANCE. (cont)

### **16-4.** Air Cleaner Indicator. (Sheet 2 of 2)

#### **REMOVAL**

- 1. Open right side engine door.
- **2.** Remove indicator (1, Figure 16-3) by hand from right rear engine compartment.
- 3. Remove elbow (2).
- 4. Remove nipple (3).
- 5. Remove and discard element (4).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- **1.** Install new element (4, Figure 16-3) to right rear engine compartment.
- 2. Install nipple (3) in elbow (2).
- 3. Install elbow (2).
- **4.** Install indicator (1) by hand on nipple (3).
- 5. Close right side engine door.

#### **NOTE**

Return 130G Grader to original equipment condition.

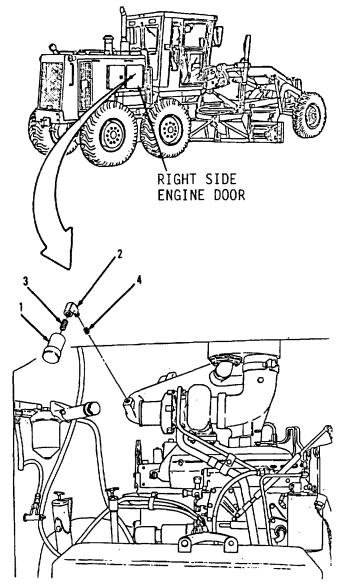


Figure 16-3.

End of Task

16-6

# GAGES AND INDICATORS (NON-ELECTRICAL) MAINTENANCE.

#### **16-5.** Air Pressure Gages. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP**

**Applicable Configurations** 

All

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

**Test Equipment** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39,

Appendix C

Detergent, Item 8, Appendix C

Small tags, Item 41, Appendix C

Thread sealant, Item 29,

Appendix C

Caps

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied.

Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

# GAGES AND INDICATORS (NON-ELECTRICAL) MAINTENANCE. (cont)

### **16-5.** Air Pressure Gages. (Sheet 2 of 3)

#### **REMOVAL**

#### **NOTE**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends to prevent contamination.

- **1.** Disconnect two hose assemblies (1, Figure 16-4) from instrument panel, right side of engine compartment.
- 2. Remove two elbows (2).
- **3.** Remove four nuts (3), lockwashers (4) and two brackets (5).
- **4.** Remove two air pressure gages (6) and seals (7, Figure 16-5) from outside of vehicle, right side of engine compartment.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### INSPECTION

Inspect all parts. Refer to Chapter 2.

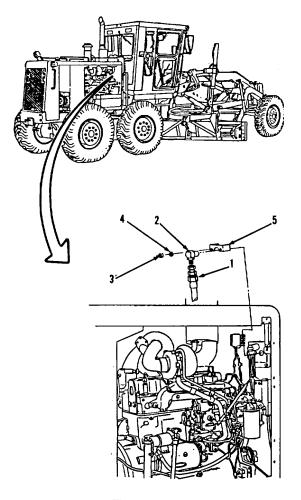


Figure 16-4.

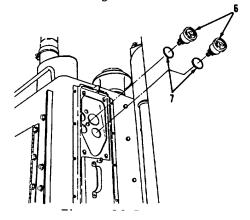


Figure 16-5.

# GAGES AND INDICATORS (NON-ELECTRICAL) MAINTENANCE.

#### **16-5. Air Pressure Gages.** (Sheet 3 of 3)

#### **INSTALLATION**

- **1.** Apply thread sealant to two air pressure gages (6, Figure 16-5).
- Install two seals (7) and air pressure gages
   (6) on outside of vehicle, right side of engine compartment.
- **3.** Install two brackets (5), four lockwashers (4) and nuts (3, Figure 16-4) on instrument panel, right side of engine compartment.
- 4. Install two elbows (2).
- **5.** Apply thread sealant and connect two hose assemblies (1).

#### NOTE

Return 130G Grader to original equipment condition.

End of Task

16-9

# GAGES AND INDICATORS (NON-ELECTRICAL) MAINTENANCE. (cont)

#### Articulation Indicator Mechanism. (Sheet 1 of 6) 16-6.

b. Cleaning This task covers: a. Removal c. Inspection

d. Installation

.....

**INITIAL SETUP** 

Applicable Configurations Personnel Required

Construction equipment ΑII repairer MOS 62B

Tools

General Mechanic's Tool Kit: References

Automotive (NSN 5180-00-177-TM 5-3805-261-10

7033)

**Special Environmental Conditions** None

Test Equipment

None **General Safety Instructions** 

Materials/Parts

Dry Cleaning solvent, Item 14, Appendix C **Torques** 

Clean cloths, Item 39, All fasteners are tightened to

standard torques. Refer to Appendix C

Small tags, Item 41, Appendix C Appendix E. 

None

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Go to Sheet 2

16-10

# GAGES AND INDICATORS (NON-ELECTRICAL) MAINTENANCE

#### **16-6.** Articulation Indicator Mechanism. (Sheet 2 of 6)

#### **REMOVAL**

- **1.** Remove two screws (1), indicator (2) and two nuts (3, Figure 16-6) from steering console hood.
- **2.** Remove steering console hood. Refer to paragraph 13-18, step 1.
- **3.** Remove seven screws (4), plates (5 and 6) from steering console on interior, right side of cab.
- **4.** Remove cotter pin (7), washer (8) and pin (9, Figure 16-7).
- **5.** Remove nut (10), washer (11), bolt (12) and link (13).
- **6.** Remove link (14), spring (15) and pointer (16).
- **7.** Remove two screws (17), lockwashers (18) and guide (19).

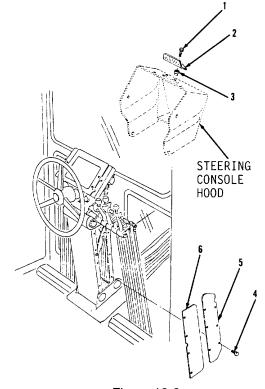
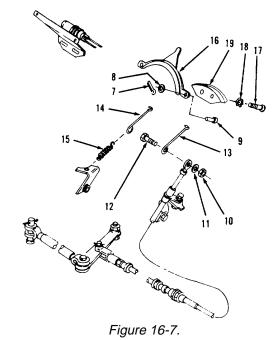


Figure 16-6.



Go to Sheet 3

# GAGES AND INDICATORS (NON-ELECTRICAL) MAINTENANCE. (cont.)

# 16-6. Articulation Indicator Mechanism. (Sheet 3 of 6)

#### **REMOVAL** (cont.)

#### NOTE

All wire, cable and harness assemblies must be tagged before disconnecting to aid in installation.

- **8.** Disconnect two wire assemblies (20) at terminals from lamp assembly (24, Figure 16-8).
- **9.** Remove lock nut (21), lockwasher (22), spacer (23) and lamp assembly (24) from bracket (27).
- **10.** Remove two nuts (25), washers (26) and bracket (27).
- **11.** Remove nut (28), washer (29), bolt (30) and bracket (31).
- **12.** Remove nut (32), washer (33) and bolt (34, Figure 16-9).
- **13.** Remove nut (35), washer (36) and bracket (38).
- **14.** Remove cotter pin (39) and pin (40) from front, left side of rear frame.
- 15. Loosen two nuts (52).
- 16. Remove cable (41).
- **17.** Remove rod end (42) and nut (43, Figure 16-10).
- **18.** Remove cotter pin (44), pin (45), cotter pin (46), pin (47) and rod (48).
- **19.** Remove lock nut (49), bolt (50) and lever (51).

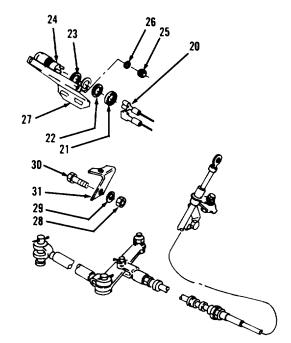


Figure 16-8.

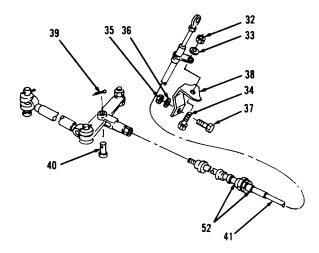


Figure 16-9.

# GAGES AND INDICATORS (NON-ELECTRICAL) MAINTENANCE.

# 16-6. Articulation Indicator Mechanism. (Sheet 4 of 6)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install lever (51), bolt (50) and lock nut (49, Figure 16-10) to front, left side of rear frame.
- 2. Install rod (48), pin (47), cotter pin (46), pin (45) and cotter pin (44).
- 3. Install nut (43) and rod end (42).
- **4.** Install cable (41, Figure 16-9).
- **5.** Tighten two nuts (52).
- 6. Install pin (40) and cotter pin (39).
- 7. Install bracket (38), bolt (37), washer (36) and nut (35) to steering console on cab interior.
- 8. Install bolt (34), washer (33) and nut (32).

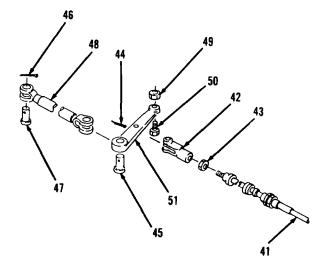


Figure 16-10.

# GAGES AND INDICATORS (NON-ELECTRICAL) MAINTENANCE. (cont.)

#### 16-6. Articulation Indicator Mechanism. (Sheet 5 of 6)

#### **INSTALLATION** (cont.)

- **9.** Install bracket (31), bolt (30), washer (29) and nut (28, Figure 16-8).
- **10.** Install bracket (27), two washers (26) and nuts (25).
- **11.** Install lamp assembly (24), spacer (23), lockwasher (22) and nut (21) on bracket (27).
- **12.** Connect two wire assemblies (20) at terminals to lamp assembly (23).
- **13.** Install guide (19), two lockwashers (18) and screws (17, Figure 16-7).
- 14. Install pointer (16), spring (15) and link (14).
- **15.** Install link (13), bolt (12), washer (11) and nut (10).
- 16. Install pin (9), washer (8) and cotter pin (7).
- **17.** Install plates (6 and 5) and seven screws (4, Figure 16-6) to steering console, on interior right side of cab.

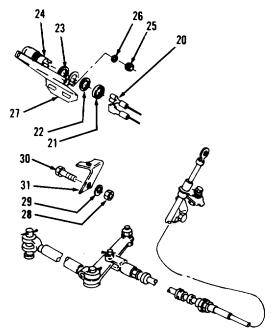
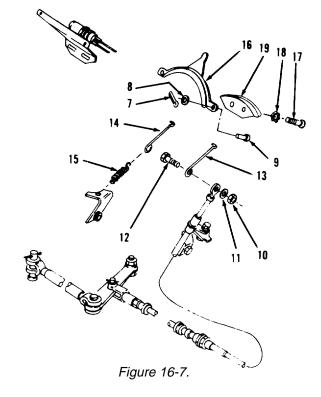


Figure 16-8.



Go to Sheet 6 16-14

# GAGES AND INDICATORS (NON-ELECTRICAL) MAINTENANCE.

# 16-6. Articulation Indicator Mechanism. (Sheet 5 of 6)

# **INSTALLATION**

- **18.** Install steering console hood. Refer to paragraph 13-18, step 1.
- **19.** Install two nuts (3), indicator (2) and two screws (1).

# NOTE

Return 130G Grader to original equipment condition.

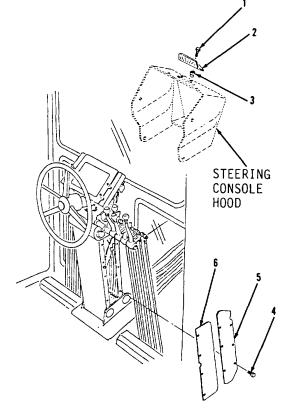


Figure 16-6.

End of Task

16-15

# GAGES AND INDICATORS (NON-ELECTRICAL) MAINTENANCE. (cont.)

#### **16-7. Instrument Panel.** (Sheet 1 of 2)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

.....

#### **INITIAL SETUP**

Applicable Configurations
All
Personnel Required
Construction equipment

repairer MOS 62B

<u>Tools</u>

General Mechanic's Tool Kit: References
Automotive (NSN 5180-00-177- TM 5-3805-261-10

7033)

Special Environmental Conditions

None

Test Equipment

None

**General Safety Instructions** 

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

<u>Torques</u>

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

None

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. Air pressure dropped to zero.

Paragraph 7-38 Hourmeter removed.

Paragraph 7-39 Panel lamps removed.

Paragraph 16-5 Air pressure gages removed.

Go to Sheet 2

16-16

# GAGES AND INDICATORS (NON-ELECTRICAL) MAINTENANCE

# **16-7. Instrument Panel.** (Sheet 2 of 2)

#### **REMOVAL**

- 1. Remove four bolts (1) and mountings (2, Figure 16-11) from right, front of engine compartment.
- **2.** Remove panel (3).
- 3. Remove plug (4).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- **1.** Install plug (4) in panel (3, Figure 16-11).
- 2. Install panel (3) to right, front of engine compartment.
- 3. Install four mountings (2) and bolts (1).

#### NOTE

Return 130G Grader to original equipment condition.

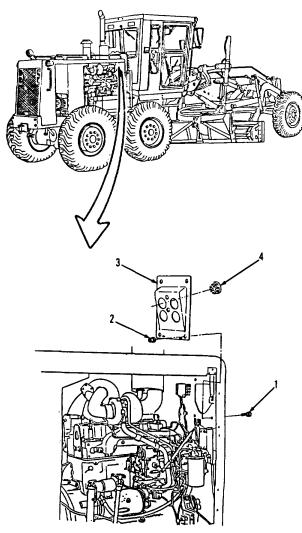


Figure 16-11.

End of Task

16-17/(16-18 blank)

#### **CHAPTER 17**

# EARTHMOVING EQUIPMENT TROUBLESHOOTING AND MAINTENANCE

# **CHAPTER OVERVIEW**

The purpose of this chapter is to help the technician efficiently troubleshoot and repair malfunctioning equipment and to perform authorized organizational support level maintenance procedures on the 130G Grader.

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III	SCARIFIER ASSEMBLY TROUBLESHOOTING		
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#### Section I. BLADE TROUBLESHOOTING.

- **17-1. GENERAL INFORMATION**. This section lists the common blade malfunctions which may occur during the operation of the 130G Grader. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **17-2. BLADE TROUBLESHOOTING PROCEDURES**. This section cannot list all possible malfunctions, nor can it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### BLADE TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

a. BLADE CUTTING EDGES OR END TIPS ARE BROKEN OR MISSING.

Check to see if cutting edge or two end tips are broken or missing (Figure 17-1).

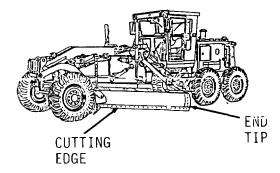


Figure 17-1.

If the cutting edge or two end tips are damaged or defective--contact Direct Support.

- b. CENTERSHIFT LOCK ASSEMBLY FAILS TO OPERATE.
  - Step 1. Check the centershift lock assembly hoses for air leaks.

If the hoses are loose--tighten. If hoses are damaged or defective--replace. Refer to paragraph 17-6.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

# b. CENTERSHIFT LOCK ASSEMBLY FAILS TO OPERATE.

Step 2. Check for air pressure at the centershift control valve (Figure 17-2).

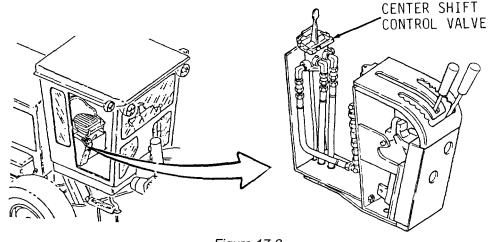


Figure 17-2

If the centershift control valve is damaged or defective--replace. Refer to paragraph 17-6.

Step 3. Check for air pressure at the centershift lock assembly (Figure 17-3).

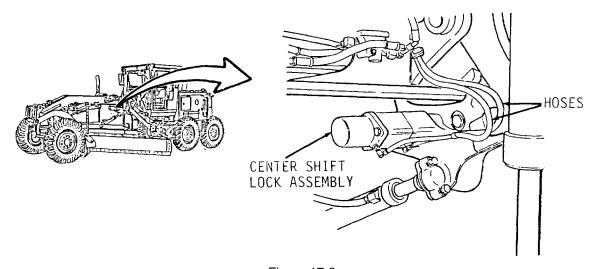


Figure 17-3

If the centershift lock assembly is damaged or defective--replace. Refer to paragraph 17-4.

# Section II. BLADE MAINTENANCE.

#### 17-3. BLADE MAINTENANCE PROCEDURES.

- **a.** The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the blade and its components in good repair.
- **b.** This section is arranged by functional group code and provides a list of blade components to be maintained and step-by-step maintenance procedures.

# **INDEX**

<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
Centershift Lock Assembly	17-4	17-5
Centershift Lock Control Valve Assembly	17-5	17-10
Centershift Lock and Lock Valve Lines		
and Fittings	17-6	17-13
Circle Drive Swivel Assembly	17-7	17-19

c. Inspection

#### **BLADE MAINTENANCE.**

#### 17-4. Centershift Lock Assembly. (Sheet 1 of 5)

This task covers: a. Removal

d. Installation

#### **INITIAL SETUP**

**Applicable Configurations** 

ΑII

**Tools** 

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

**Test Equipment** 

None

Materials/Parts

Small tags, Item 41,
Appendix C
Clean cloths, Item 39,
Appendix C
Dry cleaning solvent,
Item 14, Appendix C

Lubricating oil, Item 31, Appendix C

Preformed packing, Item 14

Caps Plugs Personnel Required

b. Cleaning

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

**Troubleshooting References** 

Paragraph 17-2b.

Centershift lock assembly fails to

operate.

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

# **BLADE MAINTENANCE.** (cont.)

# 17-4. Centershift Lock Assembly. (Sheet 2 of 5)

#### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

- 1. Disconnect hose assembly (1, Figure 17-4).
- 2. Remove elbow (2) and adapter (3).
- **3.** Disconnect hose assembly (4, Figure 17-5).
- 4. Remove elbow (5).

#### **WARNING**

Spring is compressed under high tension. Remove bolts slowly to relieve tension on spring gradually. Failure to follow this procedure may cause INJURY. If injured, seek medical aid immediately.

- **5.** Remove two bolts(6), washers (7), items 8 thru 12 as an assembly and spring (13, Figure 17-6).
- **6.** Remove and discard preformed packing (14).

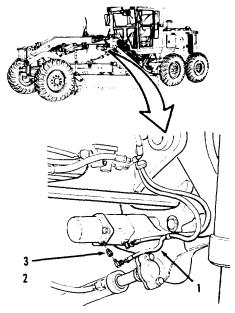


Figure 17-4.

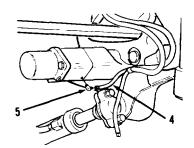


Figure 17-5.

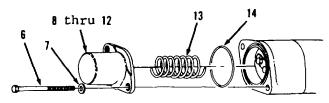


Figure 17-6.

#### **BLADE MAINTENANCE.**

# 17-4. Centershift Lock Assembly. (Sheet 3 of 5)

# **REMOVAL**

- **7.** Remove three washers (8, 9 and 10) from housing (12, Figure 17-7).
- **8.** Remove plug (11) from housing (12), if necessary.
- **9.** Using a hammer and brass driver, strike pin (15, Figure 17-8), to loosen it from lock bar.
- **10.** Remove pin assembly (15) and housing assembly (16, Figure 17-9) from blade lift bar

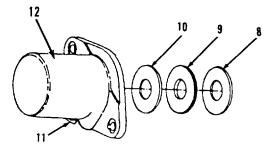


Figure 17-7.

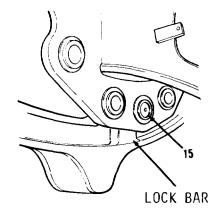
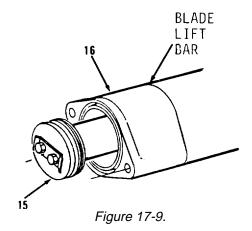


Figure 17-8.



# **BLADE MAINTENANCE**. (cont.)

# 17-4. Centershift Lock Assembly. (Sheet 4 of 5)

#### **CLEANING**

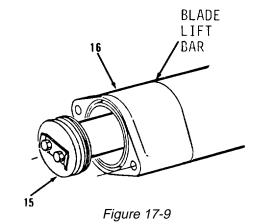
Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Coat inside surface of housing assembly (16, Figure 17-9) with lubricating oil.
- **2.** Coat outside of pin assembly (15) with lubricating oil.
- **3.** Position housing assembly (16) against blade lift bar, alining holes housing assembly (16) with holes in blade lift bar.
- **4.** Install pin assembly (15) into housing assembly (16) and blade lift bar.
- **5.** Install plug (11) into housing (12, Figure 17-7), if removed.
- 6. Install washers (10, 9 and 8).
- 7. Install new preformed packing (14, Figure 17-6).



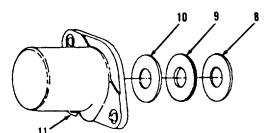


Figure 17-7.

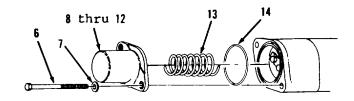


Figure 17-6.

#### **BLADE MAINTENANCE.**

# 17-4. Centershift Lock Assembly. (Sheet 5 of 5)

# **INSTALLATION**

#### **WARNING**

Bolts that hold housing to blade lift bar must be tightened evenly, a thread or two at a time, to prevent PERSONAL INJURY or DAMAGE to housing.

- **8.** Install spring (13), items 12 thru 8 as an assembly, two washers (7) and bolts (6, Figure 17-6).
- **9.** Install elbow (5, Figure 17-5).
- 10. Connect hose assembly (4).
- **11.** Install adapter (3) and elbow (2, Figure 17-4).
- 12. Connect hose assembly (1).

#### NOTE

Return 130G Grader to original equipment condition.

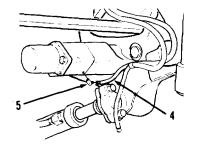


Figure 17-5.

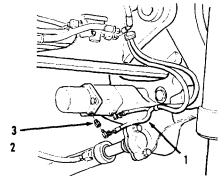


Figure 17-4.

End of Task

#### **BLADE MAINTENANCE.** (cont.)

### 17-5. Centershift Lock Control Valve Assembly. (Sheet 1 of 3)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP** 

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Test Equipment

None

Materials/Parts

Small tags, Item 41, Appendix C Clean cloths, Item 39,

Appendix C Dry cleaning solvent, Item 14, Appendix C

Strap, Item 1

Caps Plugs Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

Troubleshooting References

Paragraph 17-2b.

Centershift lock assembly fails to

operate.

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Air pressure relieved.

Paragraph 7-33

Control console cover removed.

Go to Sheet 2

17-10

#### **BLADE MAINTENANCE.**

# 17-5. Centershift Lock Control Valve Assembly. (Sheet 2 of 3)

#### **REMOVAL**

1. Cut and remove strap (1, Figure 17-10). Discard strap (1).

#### **NOTE**

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

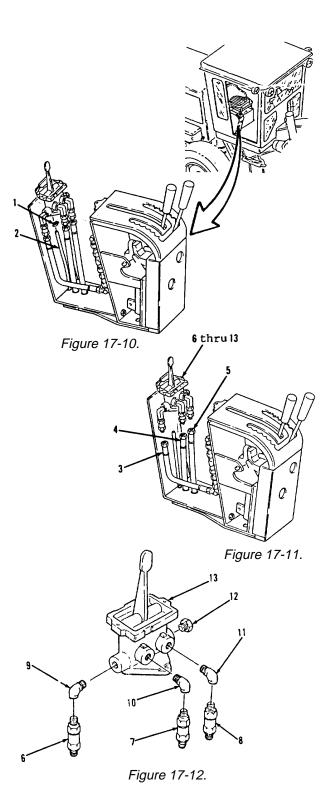
- 2. Disconnect hose assembly (2).
- **3.** Disconnect hose assemblies (3, 4 and 5, Figure 17-11).
- 4. Remove items 6 thru 13 as an assembly.
- **5.** Remove unions (6, 7 and 8), elbows (9, 10 and 11) and plug (12) from valve (13, Figure 17-12).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.



# **BLADE MAINTENANCE.** (cont.)

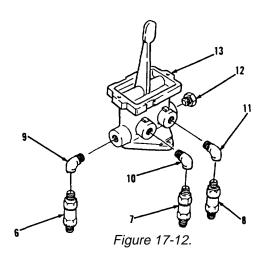
# 17-5. Centershift Lock Control Valve Assembly. (Sheet 3 of 3)

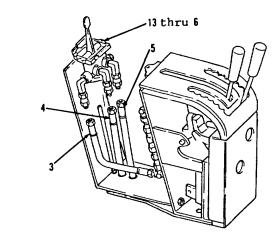
#### **INSTALLATION**

- 1. Install plug (12) and elbows (11, 10 and 9) in valve (13, Figure 17-12).
- 2. Install unions (8, 7 and 6) on elbows (11, 10 and 9).
- 3. Install items 13 thru 6 as an assembly (Figure 17-11).
- 4. Connect hose assemblies (5, 4 and 3).
- **5.** Connect hose assembly (2, Figure 17-10).
- **6.** Install new strap (1) around hose assemblies (4 and 2).

#### NOTE

Return 130G Grader to original equipment condition.





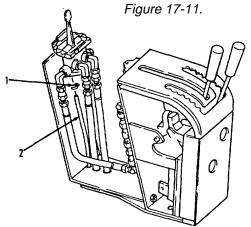


Figure 17-10.

End of Task

#### **BLADE MAINTENANCE.**

#### 17-6. Centershift Lock and Lock Valve Lines and Fittings. (Sheet 1 of 6)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

**INITIAL SETUP** 

Applicable Configurations

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C

Small tags, Item 41,
Appendix C

Strap, Item 24 Caps Plugs Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

Paragraph 17-2b. Centershift lock assembly fails to

operate.

**Equipment Condition** 

TM 5-3805-261-10 Vehicle parked on level ground.

Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 17-5 Centershift lock valve removed.

# **BLADE MAINTENANCE.** (cont.)

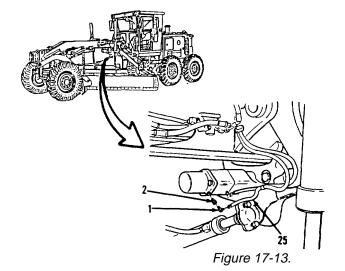
# 17-6. Centershift Lock and Lock Valve Lines and Fittings. (Sheet 2 of 6)

#### **REMOVAL**

#### NOTE

All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.

- Disconnect hose assembly (25, Figure 17-
- 2. Remove elbow (1) and adapter (2).
- 3. Disconnect hose assembly (26, Figure 17-14).
- 4. Remove elbow (3).
- 5. Remove bolt (4), lockwasher (5) and clip (6, Figure 17-15).
- Remove bolt (7), lockwasher (8)and clip (9, 6. Figure 17-16).



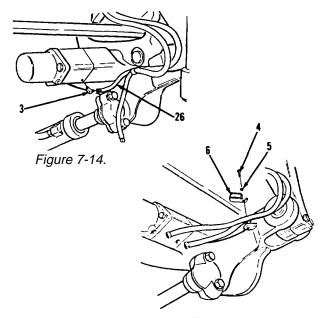


Figure 17-15.

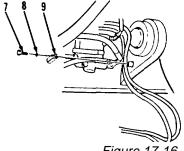


Figure 17-16.

17-14 Go to Sheet 3

#### **BLADE MAINTENANCE.**

# 17-6. Centershift Lock and Lock Valve Lines and Fittings. (Sheet 3 of 6)

# **REMOVAL**

- **7.** Remove bolt (10), lockwasher (11) and clip (12, Figure 17-17).
- 8. Remove two bolts (13), washers (14), clamp (15), two spacers (16) and clamp (17, Figure 1718).
- **9.** Remove bolt (18), washer (19) and clamp (20, Figure 17-19).
- **10.** Remove two bolts (21), washers (22) and clamp (23, Figure 17-20).

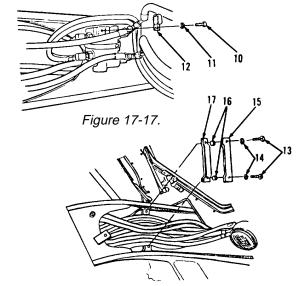


Figure 17-18.

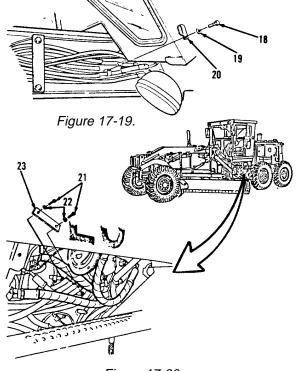


Figure 17-20.

# **BLADE MAINTENANCE.** (cont.)

# 17-6. Centershift Lock and Lock Valve Lines and Fittings. (Sheet 4 of 6)

#### REMOVAL (cont.)

- **11.** Cut and remove strap (24, Figure 17-21). Discard strap (24).
- **12.** Remove hose assemblies (25 and 26, Figure 17-22).
- **13.** Disconnect hose assembly (27) at elbow (28, Figure 17-23) and remove.
- **14.** Remove elbow (28), valve (29) and nipple (30).

#### **CLEANING**

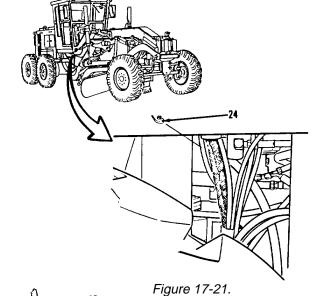
Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- **1.** Install nipple (30), valve (29) and elbow (28, Figure 17-23).
- 2. Connect hose assembly (27).
- **3.** Connect hose assemblies (26 and 25, Figure 17-22).
- 4. Install new strap (24, Figure 17-21).



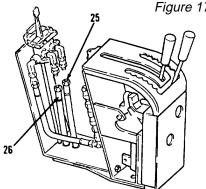
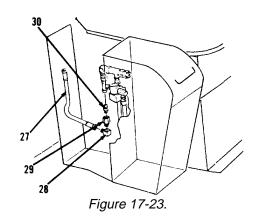


Figure 17-22.



#### **BLADE MAINTENANCE.**

## 17-6. Centershift Lock and Lock Valve Lines and Fittings. (Sheet 5 of 6)

#### **INSTALLATION**

- 5. Install clamp (23), two washers (22) and bolts (21, Figure 1720).
- **6.** Install clamp (20), washer (19) and bolt (18, Figure 17-19).
- 7. Install clamp (17), two spacers (16), clamp (15), two washers (14) and bolts (13, Figure 1718).
- **8.** Install clip (12), lockwasher (11) and bolt (10, Figure 17-17).

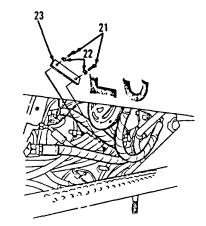
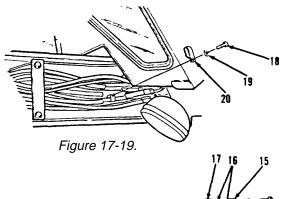
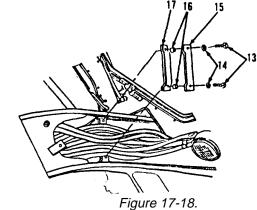


Figure 17-20.





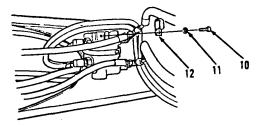


Figure 17-17.

17-17 Go to Sheet 6

## **BLADE MAINTENANCE**. (cont.)

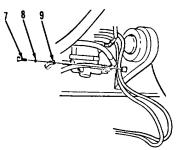
## 17-6. Centershift Lock and Lock Valve Lines and Fittings. (Sheet 6 of 6)

## **INSTALLATION** (cont.)

- **9.** Install clip (9), lockwasher (8) and bolt (7, Figure 17-16).
- **10.** Install clip (6), lockwasher (5) and bolt (4, Figure 17-15).
- **11.** Install elbow (3, Figure 17-14).
- 12. Connect hose assembly (26).
- **13.** Install adapter (2) and elbow (1, Figure 17-13).
- 14. Connect hose assembly (25).

## **NOTE**

Return 130G Grader to original equipment condition.





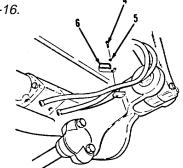


Figure 17-15.

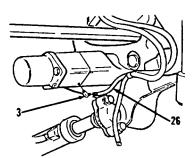


Figure 17-14.

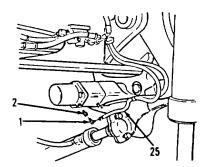


Figure 17-13.

#### **BLADE MAINTENANCE.**

### 17-7. Circle Drive Swivel Assembly. (Sheet 1 of 7)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP:**

Applicable Configurations
All

#### Tools

General Mechanic's Tool Kit:
Automotive (NSN 5180-00-177-7033)
Hoist and sling
Two 9/16-18 thread eyebolts

#### Test Equipment

None

#### Materials/Parts

Dry cleaning solvent,
Item 14, Appendix C
Clean cloths, Item 39,
Appendix C
Small tags, Item 41,
Appendix C
Preformed packings, Items 3,
6, 9, 12, 15, 18, 21, 24
Two cotter pins, Item 25
Caps
Plugs

#### Personnel Required

Construction equipment repairer MOS 62B

#### References

TM 5-3805-261-10 LO 5-3805-261-12

#### Special Environmental Conditions

None

#### **General Safety Instructions**

None

### **Torques**

All fasteners are tightened to standard torques. Refer to Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off. Hydraulic pressure relieved.

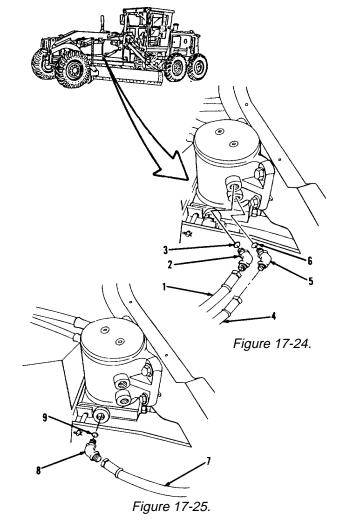
### **BLADE MAINTENANCE.** (cont.)

#### 17-7. Circle Drive Swivel Assembly. (Sheet 2 of 7)

#### **REMOVAL**

#### **NOTE**

- Blade must be horizontal to cab.
- All hose and tube assemblies must be tagged before disconnecting to aid in installation. Cap all hose and tube ends and plug all open hydraulic ports to prevent contamination.
  - **1.** Disconnect hose assembly (1, Figure 17-24).
  - 2. Remove elbow (2) and preformed packing (3). Discard preformed packing (3).
  - 3. Disconnect hose assembly (4).
  - **4.** Remove elbow (5) and preformed packing (6). Discard preformed packing (6).
  - **5.** Disconnect hose assembly (7, Figure 17-25).
  - **6.** Remove elbow (8) and preformed packing (9). Discard preformed packing (9).
  - **7.** Disconnect hose assembly (10, Figure 17-26).
  - 8. Remove connector (11) and preformed packing (12). Discard preformed packing (12).
  - **9.** Disconnect hose assembly (13).
  - **10.** Remove connector (14) and preformed packing (15). Discard preformed packing (15).



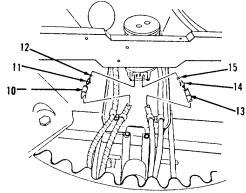


Figure 17-26.

#### **BLADE MAINTENANCE.**

#### 17-7. Circle Drive Swivel Assembly. (Sheet 3 of 7)

#### **REMOVAL**

- **11.** Disconnect hose assembly (16, Figure 17-27).
- **12.** Remove elbow (17) and preformed packing (18). Discard preformed packing (18).
- 13. Disconnect hose assembly (19).
- **14.** Remove elbow (20) and preformed packing (21). Discard preformed packing (21).
- **15.** Disconnect hose assembly (22, Figure 17-28).
- **16.** Remove elbow (23) and preformed packing (24). Discard preformed packing (24).
- **17.** Remove two cotter pins (25), washers (26) and pin (27, Figure 17-29). Discard two cotter pins (25).

#### **WARNING**

Weight of circle drive swivel assembly is approximately 70 lbs. Use adequate hoist and sling to perform this task. Failure to do so may cause INJURY. If you are injured, seek medical aid immediately.

- **18.** Install two 9/16-18 thread eyebolts into circle drive swivel assembly (30, Figure 17-30).
- **19.** Attach hoist and sling to eyebolts. Take up slack in hoist and sling.

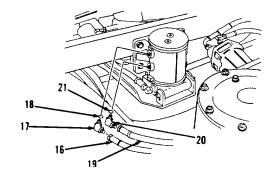


Figure 17-27.

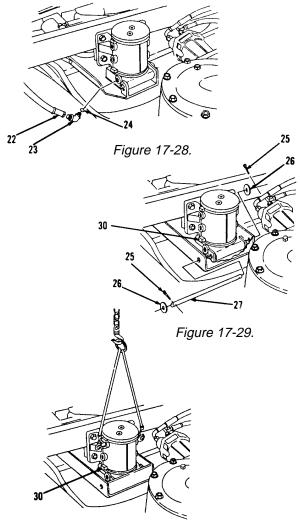


Figure 17-30.

## **BLADE MAINTENANCE.** (cont.)

### 17-7. Circle Drive Swivel Assembly. (Sheet 4 of 7)

## REMOVAL (cont.)

- **20.** Remove four bolts (28), washers (29) and circle drive swivel assembly (30, Figure 17-31).
- **21.** Remove hoist and sling and two 9/16-18 thread eyebolts.

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install two 9/16-18 thread eyebolts into circle drive swivel assembly (30, Figure 17-30).
- **2.** Attach hoist and sling to eyebolts.
- Position circle drive swivel assembly (30) in drawbar yoke, alining holes for four bolts (28, Figure 17-31).
- 4. Install four washers (29) and bolts (28).
- **5.** Remove hoist and sling and two 9/16-18 thread eyebolts.

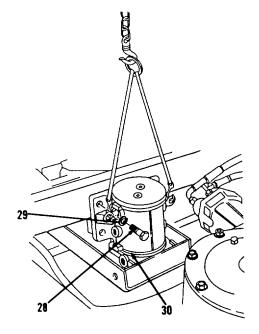


Figure 17-31.

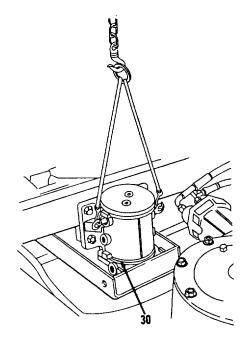


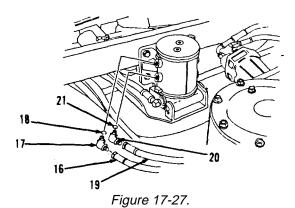
Figure 17-30.

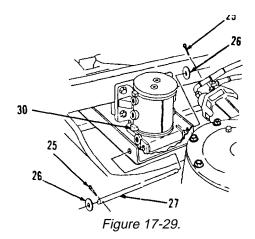
#### **BLADE MAINTENANCE.**

#### 17-7. Circle Drive Swivel Assembly. (Sheet 5 of 7)

#### **INSTALLATION**

- **6.** Install pin (27) through holes in guide assembly and circle drive swivel assembly (30, Figure 17-29).
- 7. Install two washers (26) and new cotter pins (25).
- **8.** Install new preformed packing (24) and elbow (23, Figure 17-28).
- 9. Connect hose assembly (22).
- **10.** Install new preformed packing (21) and elbow (20, Figure 17-27).
- 11. Connect hose assembly (19).
- **12.** Install new preformed packing (18) and elbow (17).
- 13. Connect hose assembly (16).
- **14.** Install new preformed packing (15) and connector (14, Figure 17-26).
- 15. Connect hose assembly (13).
- **16.** Install new preformed packing (12) and connector (11).
- 17. Connect hose assembly (10).





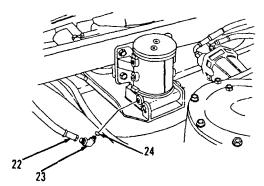
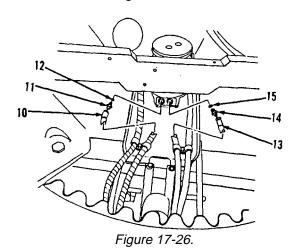


Figure 17-28.



## **BLADE MAINTENANCE**. (cont.)

### 17-7. Circle Drive Swivel Assembly. (Sheet 6 of 7)

## **INSTALLATION** (cont.)

- **18.** Install new preformed packing (9) and elbow (8, Figure 17-25).
- 19. Connect hose assembly (7).
- **20.** Install new preformed packing (6) and elbow (5, Figure 17-24).
- 21. Connect hose assembly (4).
- **22.** Install new preformed packing (3) and elbow (2).
- 23. Connect hose assembly (1).

#### **WARNING**

Only a qualified operator may perform the next procedure. All other personnel must clear the immediate area. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

24. Start engine. Refer to TM 5-3805-261-10.

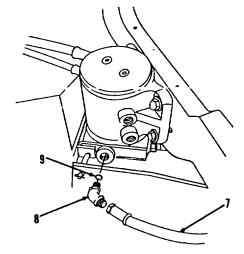


Figure 17-25.

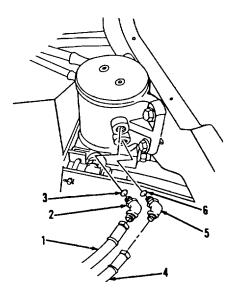


Figure 17-24.

## **BLADE MAINTENANCE.**

## 17-7. Circle Drive Swivel Assembly. (Sheet 7 of 7)

#### **INSTALLATION**

- **25.** Operate side shift blade tip controls. Move blade through at least five full movements of travel to bleed air from system.
- 26. Stop engine.
- **27.** Inspect hose assemblies and connections. Check for leaks.
- **28.** Refill hydraulic tank to proper level. Refer to LO 5-3805- 261-12.

#### NOTE

Return 130G Grader to original equipment condition.

End of Task

17-25

#### Section III. SCARIFIER ASSEMBLY TROUBLESHOOTING.

- **17-8. GENERAL INFORMATION**. This section lists the common scarifier assembly malfunctions which may occur during the operation of the 130G Grader. You should perform the tests, inspections and corrective actions in the order listed. Follow the troubleshooting procedures listed below step-by-step until you can go no further.
- **17-9. SCARIFIER ASSEMBLY TROUBLESHOOTING PROCEDURES**. This section cannot list all possible malfunctions, nor can-it list all possible tests, inspections or corrective actions. If a malfunction is not listed, contact your supervisor.

#### SCARIFIER ASSEMBLY TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

## MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

a. SCARIFIER SHANKS ARE BROKEN OR MISSING.

Check to see if the scarifier shanks (1) and teeth (2, Figure 17-32) are missing or broken.

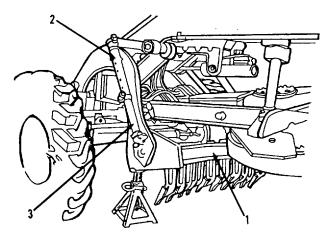


Figure 17-32.

If the scarifier shanks or teeth are damaged or defective--replace. Refer to paragraph 17-12.

## SCARIFIER ASSEMBLY TROUBLESHOOTING AND MAINTENANCE PROCEDURES.

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

b. SCARIFIER BLOCK, SLEEVE OR LINK ASSEMBLY IS DAMAGED.

Check block (1), sleeve (2) or link assembly (3, Figure 17-33).

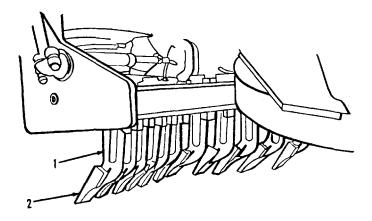


Figure 17-33.

If block (1), sleeve (2) or link assembly (3) is damaged or defective--replace. Refer to paragraph 17-13.

End of Task

17-27

## Section IV. SCARIFIER ASSEMBLY MAINTENANCE.

#### 17-10. SCARIFIER ASSEMBLY MAINTENANCE PROCEDURES.

- **a.** The purpose of this section is to provide you with all needed instructions and additional information to help you at the organizational support level to keep the scarifier assembly and its components in good repair.
- **b.** This section is arranged by functional group code and provides a list of scarifier assembly components to be maintained and step-by-step maintenance procedures.

#### **INDEX**

<u>Title</u>	<u>Paragraph</u>	<u>Page</u>
Scarifier Assembly	17-11	17-29
Scarifier Shanks and Teeth	17-12	17-38
Scarifier Actuating Assembly	17-13	17-41

17-28

#### 17-11. Scarifier Assembly. (Sheet 1 of 9)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP**

**Applicable Configurations** 

ΑII

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-

7033)

Hoist and chain, 6000 lbs. capacity Sling, 3000 lbs. capacity

Forklift truck

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39,

Appendix C

Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

Special Environmental Conditions

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

<u>Troubleshooting References</u>

None

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off.

Paragraph 17-12 Scarifier shanks and teeth removed.

## 17-11. Scarifier Assembly. (Sheet 2 of 9)

#### **REMOVAL**

#### **NOTE**

The following is a maintenance procedure for the left-side scarifier actuating assembly. The maintenance procedure for the right-side scarifier actuating assembly is identical.

- 1. Remove two bolts (1), washers (2), cap (3) and shim(s) (4, Figure 17-34).
- **2.** Position socket of link (5) over ball (6, Figure 17-35) on drawbar frame.
- 3. Install shim(s) (4), cap (3), two washers (2) and bolts (1) to retain link (5) to ball (6) of drawbar frame.

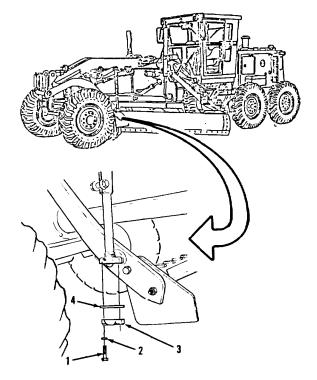


Figure 17-34.

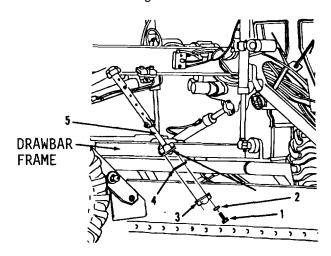


Figure 17-35.

## 17-11. Scarifier Assembly. (Sheet 3 of 9]

## **REMOVAL**

#### **WARNING**

Use adequate hoist and sling for lifting. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

#### NOTE

The following is a maintenance procedure for the left-side drawbar. The maintenance procedure for the right-side drawbar is identical.

- **4.** Attach hoist and sling to drawbar(14, Figure 17-36) and take up slack.
- **5.** Remove four nuts (7), bolts (8) and washers (9, Figure 17-37).

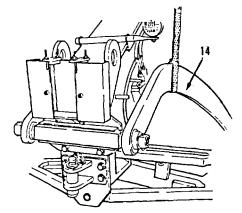


Figure 17-36.

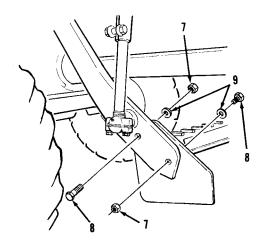


Figure 17-37.

## 17-11. Scarifier Assembly. (Sheet 4 of 9)

- **6.** Remove nut (10), washer (11) and bolt (12, Figure 17-38).
- 7. Remove collar (13) from shaft (15).
- **8.** Slide drawbar (14) off shaft (16), remove from vicinity of vehicle and lower to the ground.
- **9.** Remove hoist and sling from drawbar (14).
- **10.** Remove scarifier block (15, Figure 17-39) by using forklift truck or other suitable lifting device.
- 11. Remove shaft (16, Figure 17-40).

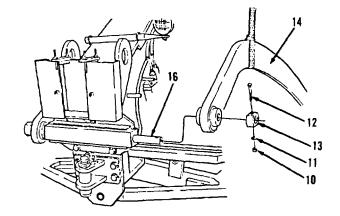


Figure 17-38.

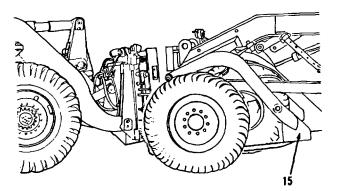


Figure 17-39.

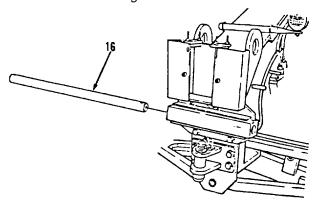


Figure 17-40.

## 17-11. Scarifier Assembly. (Sheet 5 of 9)

#### **REMOVAL**

- **12.** Remove two bolts (17) and washers (18, Figure 17-41).
- **13.** Remove two bolts (19), washers (20) and scarifier shank storage basket (21, Figure 17-42).
- **14.** Remove four nuts (22), washers (23), bolts (24), washers (25) and bolster (26, Figure 17-43).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

- 1. Install bolster (26), four washers (25), bolts (24), washers (23) and nuts (22, Figure 17-43).
- Install scarifier shank storage basket (21), two washers (20) and bolts (19, Figure 17-42).
- 3. Install two washers (18) and bolts (17, Figure 17-41).

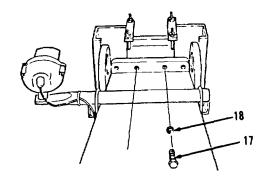


Figure 17-41.

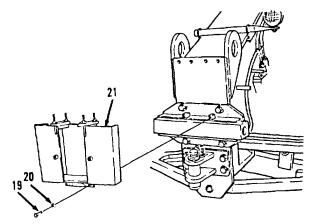
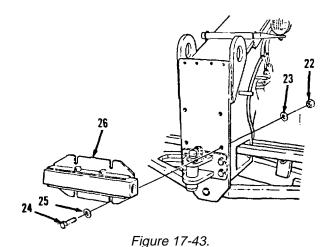


Figure 17-42.



Go to Sheet 6

## 17-11. Scarifier Assembly. (Sheet 6 of 9)

## **INSTALLATION** (cont.)

**4.** Install shaft (16, Figure 17-40).

#### NOTE

The following is a maintenance procedure for the left-side drawbar. The maintenance procedure for the right-side drawbar is identical.

**5.** Attach hoist and sling to drawbar (14, Figure 17-44).

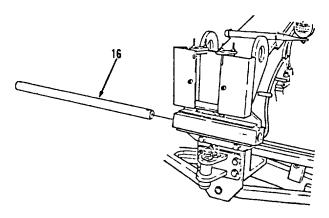


Figure 17-40.

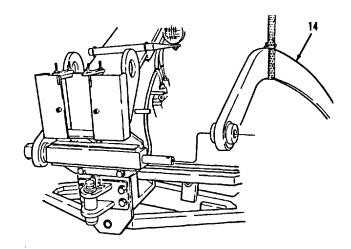


Figure 17-44.

## 17-11. Scarifier Assembly. (Sheet 7 of 9)

## **INSTALLATION**

- **6.** Install drawbar (14) onto shaft (16, Figure 17-45).
- 7. Install collar (13) onto shaft (16).
- 8. Install bolt (12), washer (11) and nut (10).
- **9.** Lower drawbar (14) and rest free end against steering tie rod.
- **10**. Using a forklift truck or other suitable lifting device, position scarifier block (15, Figure 17-39).

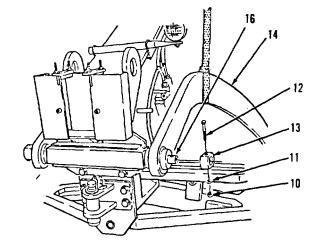


Figure 17-45.

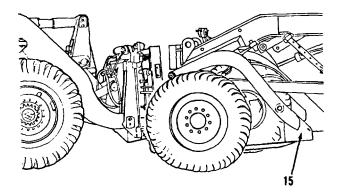


Figure 17-39.

### 17-11. Scarifier Assembly. (Sheet 8 of 9)

#### **INSTALLATION**

- **11.** Lift drawbar (14), aligning holes in drawbar (14) with holes in scarifier block (15, Figure 17-37).
- **12.** Install four washers (9), bolts (8) and nuts (7).
- 13. Remove hoist and sling.

#### NOTE

The following is a maintenance procedure for the left-side scarifier actuating assembly. The maintenance procedure for the right-side scarifier actuating assembly is identical.

- **14.** Remove two bolts (1), washers (2), cap (3) and shim(s) (4, Figure 17-35).
- **15.** Move link (5) of scarifier actuating assembly away from ball (6) of drawbar frame and position socket of link (5) over drawbar ball.

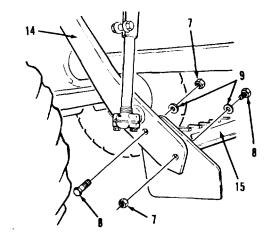
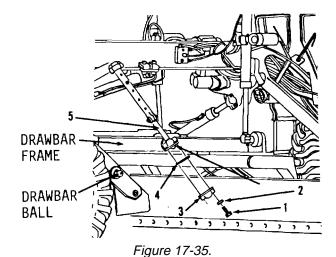


Figure 17-37.



#### 17-11. Scarifier Assembly. (Sheet 9 of 9)

#### **INSTALLATION**

#### **NOTE**

## Tighten bolts hand-tight only.

**16.** Install shim(s) (4), cap (3), two washers (2) and bolts (1, Figure 17-34).

#### **CAUTION**

For proper final assembly, ball inside cap must have free play (clearance) of 0.015 to 0.045 inch after bolts are fully tightened. Failure to obtain the correct clearance could result in damage to the vehicle.

- **17.** Tighten two bolts (1) evenly only until there is no free play (clearance) between ball and cap (3, Figure 17-46). Do not overtighten.
- 18. Examine cap (3) and link (5) from the side. If cap (3) is touching link (5), two bolts (1) are too tight. Remove two bolts (1), washers (2) and cap (3). Add one shim (4) and repeat steps 16 and 17 until two bolts (1) can be tightened far enough to remove free play without allowing cap (3) to touch link (5, Figures 17-46 and 17-47).
- **19.** Install cap (3), two washers (2) and bolts (1).

#### **NOTE**

Return 130G Grader to original equipment condition.

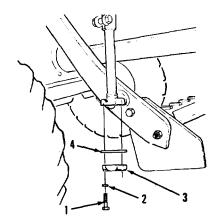
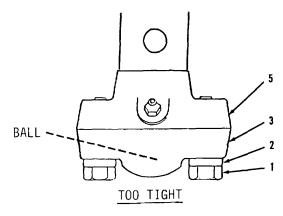
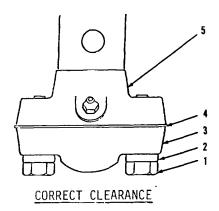


Figure 17-34.



(CAP TOUCHING LINK) Figure 17-46.



(TYPICAL)
Figure 17-47.

End of Task

#### 17-12. Scarifier Shanks and Teeth. (Sheet 1 of 3)

This task covers:

a. Removal
b. Cleaning
c. Inspection
d. Installation

#### **INITIAL SETUP**

**Applicable Configurations** 

All

Tools

General Mechanic's Tool Kit: Automotive (NSN 5180-00-177-7033)

Wood blocks

Tooth removing tool 6B3260

Test Equipment

None

Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C Personnel Required

Construction equipment repairer MOS 62B

References

TM 5-3805-261-10

**Special Environmental Conditions** 

None

**General Safety Instructions** 

None

**Torques** 

All fasteners are tightened to standard torques. Refer to

Appendix E.

.....

**Troubleshooting References** 

Paragraph 17-9a.

Scarifier shanks or teeth are broken or missing.

**Equipment Condition** 

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Scarifier blocks in raised position supported with wood blocks or iack stands.

Equipment lowered to the ground.

Engine stopped.

Master disconnect switch off. Hydraulic pressure relieved.

## 17-12. Scarifier Shanks and Teeth. (Sheet 2 of 3)

#### **REMOVAL**

- 1. Using a tooth removing tool and a 12 lb. hammer, remove 11 teeth (1) from shanks (4, Figure 17-48).
- 2. Remove 11 items 2 thru 3 as assemblies (Figure 17-49).
- **3.** Remove 11 grommets (2) from locking pins (3, Figure 17-50).
- **4.** Remove 11 shanks (4) by pulling downward from scarifier block (5, Figure 17-51).

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

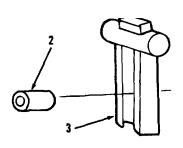


Figure 17-50.

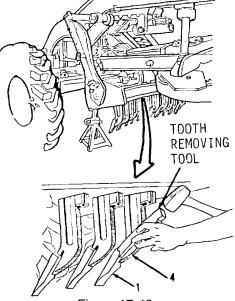


Figure 17-48.

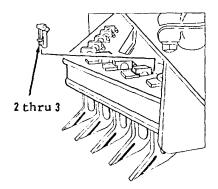


Figure 17-49.

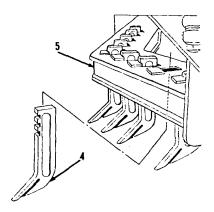


Figure 17-51.

## 17-12. Scarifier Shanks and Teeth. (Sheet 3 of 3)

#### **INSTALLATION**

- **1.** Install 11 shanks (4) from below into scarifier block (5, Figure 17-51).
- 2. Install 11 grommets (2) into locking pins (3, Figure 17-50).
- **3.** Install 11 items 3 and 2 as assemblies (Figure 17-49).
- Using a 12 lb hammer and a wood block, install 11 teeth (1) onto shanks (4, Figure 17-48).

#### **NOTE**

Return 130C Grader to original equipment condition.

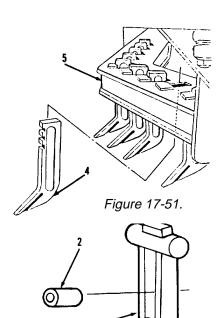


Figure 17-50.

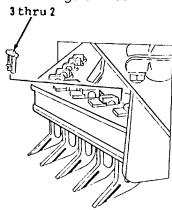


Figure 17-49.

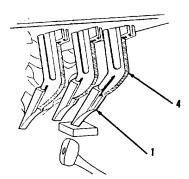


Figure 17-48.

End of Task

## 17-13. Scarifier Actuating Assembly. (Sheet 1 of 9)

This task covers: a. Removal b. Cleaning c. Inspection

d. Installation

#### **INITIAL SETUP**

## **Applicable Configurations**

ΑII

#### Tools

General Mechanic's Tool Kit:
Automotive (NSN 5180-00-177-7033)
Two slings, 500 lbs. capacity
Hoist and chain, 500 lbs.
minimum capacity

#### Test Equipment

None

#### Materials/Parts

Dry cleaning solvent, Item 14, Appendix C Clean cloths, Item 39, Appendix C General purpose grease, Item 24, Appendix C Small tags, Item 41, Appendix C Four seals, Item 31

#### Personnel Required

Two construction equipment repairers MOS 62B

#### References

TM 5-3805-261-10

#### **Special Environmental Conditions**

None

#### **General Safety Instructions**

None

#### **Torques**

.....

Except for special torques shown, all fasteners are tightened to standard torques. Refer to Appendix E.

#### **Troubleshooting References**

None

#### **Equipment Condition**

TM 5-3805-261-10

Vehicle parked on level ground. Parking/emergency brake applied. Equipment lowered to the ground. Engine stopped. Master disconnect switch off. Hydraulic pressure relieved.

#### 17-13. Scarifier Actuating Assembly. (Sheet 2 of 9)

#### **REMOVAL**

#### NOTE

The following is a maintenance procedure for the right scarifier actuating assembly. The maintenance procedure for the left scarifier actuating assembly is identical.

1. Remove two bolts (1), washers (2) and lock (3, Figure 17-52).

#### NOTE

## Step 2 requires two mechanics.

- 2. One mechanic supports scarifier actuating assembly hydraulic cylinder (4) while second mechanic drives out pin (5).
- 3. Set free end of scarifier actuating assembly hydraulic cylinder (4) down on drawbar frame tool box.
- **4.** Remove pin assembly (6) and pin (7) from right side sleeve (20, Figure 17-53).
- 5. Remove nut (8) and bolt (9).

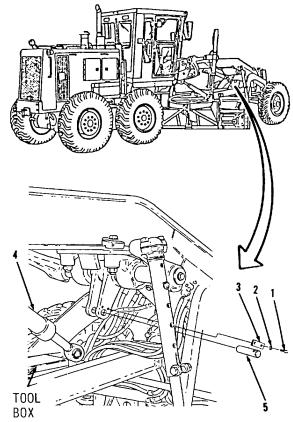


Figure 17-52.

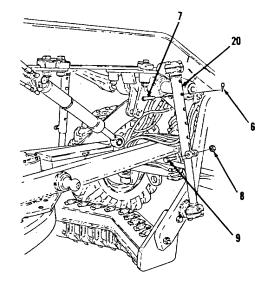


Figure 17-53.

## 17-13. Scarifier Actuating Assembly. (Sheet 3 of 9)

#### **REMOVAL**

- Remove two bolts (10), washers (11), cap (12), shim(s) (13) and link (14, Figure 17-54). Tie shim(s) (13) together and tag for identification.
- Remove lubrication fitting (15) from link (14).

#### NOTE

## Step 8 requires two mechanics.

- 8. One mechanic supports sleeve (20) while second mechanic removes two bolts (16), washers (17), cap (18) and shim(s) (19, Figure 17-55). Tie shim(s) (19) together and tag for identification.
- 9. Remove sleeve (20).
- **10.** Remove lubrication fitting (21) from sleeve (20).
- **11.** Remove bolt (22) and washers (23 and 24, Figure 17-56).

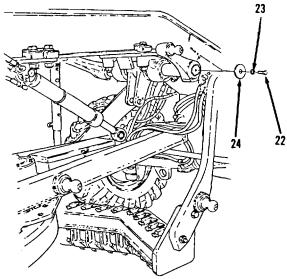


Figure 17-56.

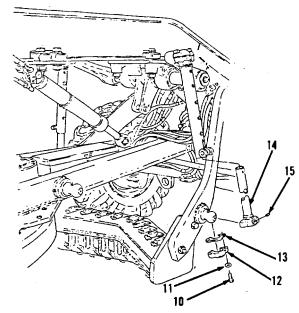
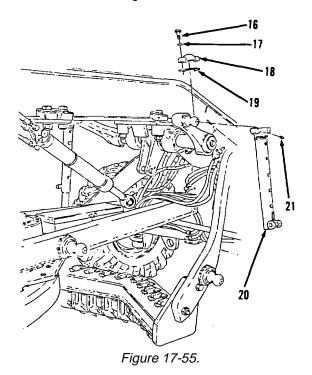


Figure 17-54.



Go to Sheet 4

## 17-13. Scarifier Actuating Assembly. (Sheet 4 of 9)

## REMOVAL (cont.)

- **12.** Scribe alignment marks on arm (25) and end of shaft (36, Figure 17-57), to aid in installation.
- **13.** Remove arm (25) from shaft (36, Figure 17-58).

#### **WARNING**

Weight of shaft is 500 lbs. Use adequate hoist and sling for lifting. Failure to follow this procedure may cause INJURY. If you are injured, seek medical aid immediately.

**14.** Attach a hoist and sling to each end of shaft (36, Figure 17-59) and take up slack.

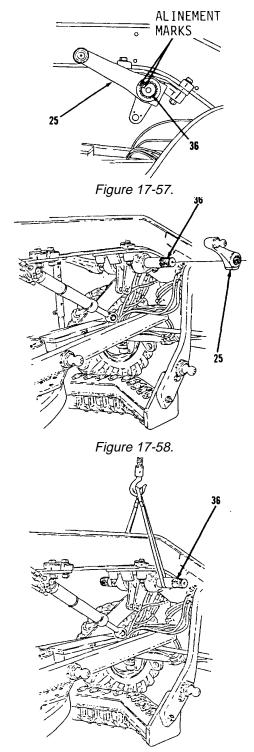


Figure 17-59.

## 17-13. Scarifier Actuating Assembly.

## **REMOVAL** (Sheet 5 of 9)

- **15.** Remove four nuts (26), washers (27), bolts (28) and blocks (29) from plate (30, Figure 17-60).
- **16.** Lower both hoist and slings just enough to allow removal of plate (30).

## NOTE

## Step 17 requires two mechanics.

**17.** Remove plate (30), with aid of second mechanic.

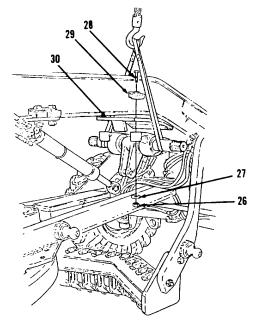


Figure 17-60.

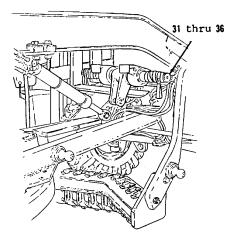


Figure 17-61.

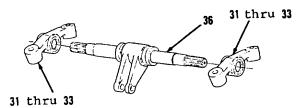


Figure 17-62.

### 17-13. Scarifier Actuating Assembly. (Sheet 6 of 9)

#### **CLEANING**

Clean all parts. Refer to Chapter 2.

#### **INSPECTION**

Inspect all parts. Refer to Chapter 2.

#### **INSTALLATION**

#### NOTE

## Step 1 requires two mechanics.

- **1.** Position plate (30) over two brackets (33, Figure 17-60).
- 2. Install four blocks (29), bolts (28), washers (27) and nuts (26) to secure plate (30) to frame. Tighten bolts (28) to 900 ft-lb torque.
- 3. Remove hoist and slings.

#### **NOTE**

If installing an arm without alignment marks, install arm at a 90-degree angle to the shaft drive arm (Figure 17-68).

**4.** Install arm (25) on shaft (36, Figure 17-57), making sure that scribed alignment marks are aligned.

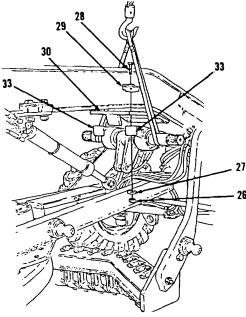
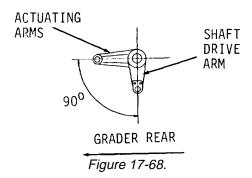


Figure 17-68.



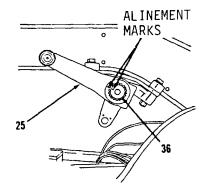


Figure 17-57.

#### 17-13. Scarifier Actuating Assembly. (Sheet 7 of 9)

### **INSTALLATION** (cont.)

- **5.** Install washers (24 and 23) and bolt (22, Figure 17-56) on arm (25).
- **6.** Install lubrication fitting (21) into sleeve (20, Figure 17-55).

#### **NOTE**

#### Step 14 requires two mechanics.

- 7. One mechanic supports socket of sleeve (20) positioning over ball of arm (25) while second mechanic installs shim(s) (19), cap (18), two washers (17) and bolts (16, Figure 17-55). Tighten bolts (16) hand-tight only. For proper final assembly, ball inside cap must have free play (clearance) of 0.015 to 0.045 inch after bolts are fully tightened. Failure to obtain the correct clearance could result in damage to the vehicle.
- **8.** Tighten two bolts (16) evenly only until there is no free play (clearance) between the ball and cap (18). Do not overtighten.
- **9.** Examine cap (18) and sleeve (20, Figure 17-69) from the side. If cap (18) is touching sleeve (20), cap (18) is too tight.
- **10.** Remove two bolts (16), washer (17) and cap (18).

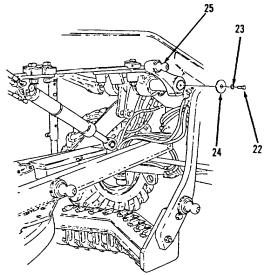


Figure 17-56.

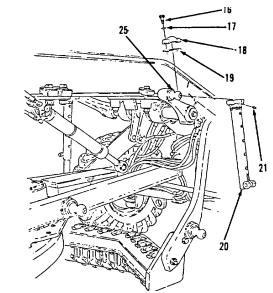


Figure 17-55.

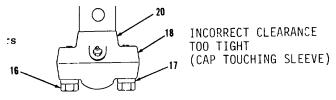


Figure 17-69.

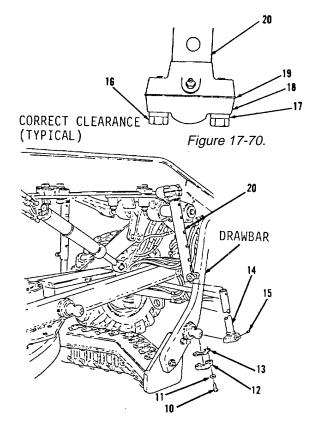
### 17-13. Scarifier Actuating Assembly. (Sheet 8 of 9)

### **INSTALLATION** (cont.)

#### NOTE

Addition of one more shim to shims removed results in proper amount of free play between ball and cap.

- 11. Add one shim (19, Figure 17-70) and repeat steps 14 thru 18 until two bolts (16) can be tightened to remove free play without allowing cap (18) to touch sleeve (20).
- **12.** Install cap (18), two washers (17) and bolts (16) if removed to add additional shim(s) (19).
- **13.** Install lubrication fitting (15) in link (14, Figure 17-54).
- **14.** Install link (14) in sleeve (20) and position socket of link (14) over ball of drawbar.
- **15.** Install shim(s) (13), cap (12), two washers (11) and bolts (10).
- **16.** Repeat steps 16 thru 19 to adjust free play (clearance) between cap (12) and ball.
- 17. Install bolt (9) and nut (8, Figure 17-53).
- 18. Install pin (7) and pin assembly (6).



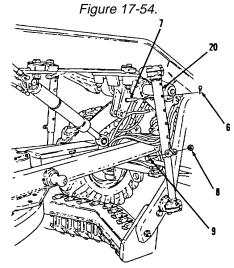


Figure 17-53.

## 17-13. Scarifier Actuating Assembly. (Sheet 9 of 9)

## **INSTALLATION** (cont.)

- **20.** One mechanic aligns scarifier actuating assembly hydraulic cylinder (4) with holes in arm (35) while second mechanic installs pin (5, Figure 17-52).
- 21. Install lock (3), two washers (2) and bolts (1).

## NOTE

Return 130G Grader to original equipment condition.

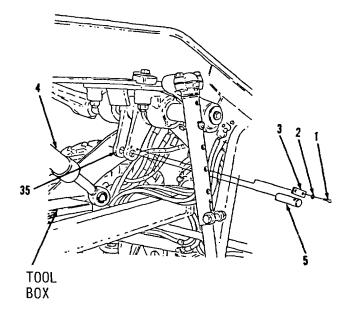


Figure 17-52.

17-49 (17-50 blank)

#### **APPENDIX A**

#### **REFERENCES**

#### A-1. PUBLICATION INDEXES AND GENERAL REFERENCES.

Indexes should be consulted frequently for latest changes or revisions of references given in this appendix and for new publications relating to material covered in this publication.

	a.	MILITARY PUBLICATION INDEXES. Consolidated Index of Publications and Blank Forms		
	b.	GENERAL REFERENCES.  Dictionary of United States Army Terms		
A-2. OTHER PUBLICATIONS.				
The following publications contain information pertinent to the major item materiel and associated equipment.				
	a.	VEHICLE. Grader, Heavy, Road, Motorized (Caterpillar Model 130G)		

b. CAMOUFLAGE.

Chemical, Biological, and Radiological (CBR)	
Decontamination	TM 3-220
Chemical, Biological, Radiological, and Nuclear Defense	FM 21-40

Camouflage......FM 5-20

#### **APPENDIX B**

#### **MAINTENANCE ALLOCATION CHART**

#### Section I. INTRODUCTION

#### B-1. GENERAL.

- **a.** This section provides a general explanation of all maintenance and repair functions authorized at various maintenance categories.
- **b.** The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance categories.
- **c.** Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.
  - **d.** Section IV contains supplemental instructions and explanatory notes for a particular function.

#### **B-2. MAINTENANCE FUNCTIONS.** Maintenance functions will be limited to and defined as follows:

- **a. Inspect.** To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).
- **b. Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic or electrical characteristics of an item and comparing those characteristics with prescribed standards.
- **c. Service**. Operations required periodically to keep an item in proper operating condition (i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint or to replenish fuel, lubricants, chemical fluids or gases).
- **d. Adjust.** To maintain or regulate, within prescribed limits, by bringing into proper or exact position or by setting the operating characteristics to specified parameters.
  - **e. Aline**. To adjust specified variable elements of an item to bring about optimum or desired performance.

#### **APPENDIX B**

#### **INTRODUCTION.** (cont.)

### B-2. MAINTENANCE FUNCTIONS. (cont.)

- **f.** Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.
- **g. Remove/Install**. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating or fixing into position a spare, repair part or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.
- **h. Replace**. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the 3rd position code of the SMR code.
- i. Repair. The application of maintenance services<sup>1</sup>, including fault location/troubleshooting<sup>2</sup>, removal installation and disassembly/assembly<sup>3</sup>, procedures and maintenance actions<sup>4</sup> to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction or failure in a part, subassembly, module (component or assembly), end item or system.
- **j. Overhaul**. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army.Overhaul usually does not return an item to like new condition.
- **k. Rebuild.** Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

<sup>2</sup>Fault location/troubleshooting-The process of investigating and detecting the cause of equipment malfunctioning: the act of isolating a fault within a system or unit under test (UUT).

<sup>3</sup>Disassemble/assemble-encompasses the step-by-step taking apart (or breakdown) of a spare/functional group coded item to the level of its least componency identified as maintenance significant (i.e., assigned as SMR code) for the category of maintenance under consideration.

<sup>4</sup>Actions-welding, grinding, riveting, straightening, facing, remachining, and/or resurfacing.

<sup>&</sup>lt;sup>1</sup>Services-inspect, test, service, adjust, aline, calibrate and/or replace.

#### **APPENDIX B**

#### **INTRODUCTION.** (cont.)

#### B-3. EXPLANATION OF COLUMNS IN THE MAC.

- **a.** Column 1, Group Number. Lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies and modules with the next higher assembly.
- **b.** Column 2, Component/Assembly. Contains the names of components, assemblies, subassemblies and modules for which maintenance is authorized.
- **c. Column 3, Maintenance Function**. Lists the functions to be performed on the item listed in Column 2. (For detailed explanation of these functions, refer to paragraph B-2.)
- d. Column 4, Maintenance Category. Specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category. The work time figure represents the average time required to restore an item (e.g., assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), fault location/trouble-shooting time and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance categories are as follows:

C	Operator or Crew
O	Organizational
F	Direct Support
H	General Support
D	Depot

- **e.** Column 5, Tools and Equipment. Specifies, by code, those common tool sets (not individual tools) and special tools, TMDE and support equipment required to perform the designated function.
- **f. Column 6, Remarks**. This column will, when applicable, contain a letter code, in alphabetic order, keyed to the remarks contained in Section IV.

#### **APPENDIX B**

#### B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III.

- **a.** Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.
- **b.** Column 2, Maintenance Category. The lowest category of maintenance authorized to use the tool or test equipment.
  - **c.** Column 3, Nomenclature. Name or identification of the tool or test equipment.
  - d. Column 4, National Stock Number. The National Stock Number of the tool or test equipment.
  - e. Column 5, Tool Number. The manufacturer's part number.

## B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV.

- a. Column 1, Reference Code. The code recorded in column 6, Section II.
- **b.** Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

(1)	(2)	(3)			(4)			(5)	(6)
GROUP		MAINTENANCE			IANCE			TOOLS AND	
NUMBER	COMPONENT ASSEMBLY	FUNCTION	С	0	F	Н	D	EQUIPMENT	REMARKS
01	<u>ENGINE</u>							1,2,3,4,5	
0100	ENGINE ASSEMBLY	INSPECT TEST	0.2	0.5	1.5				
	DIESEL	SERVICE REPLACE	0.2	1.0	14.0				
		REPAIR OVERHAUL			14.0	5.0	90.0		
0101	CRANKCASE,								
	BLOCK CYLINDER HEADS								
	CYLINDER HEAD	REPLACE REPAIR			5.0	10.0			
	CYLINDER BLOCK	REPLACE REPAIR				16.0	21.0		
0103	FLYWHEEL ASSEMBLY	REPLACE REPAIR			16.0	1.5		1,2,4	
0105	VALVES, CAMSHAFT & TIMING SYSTEM							1,2,3,4,5	
	ROCKER ARM ASSEMBLY	ADJUST REPLACE		1.5	1.5 3.0				
	/ NOCEMBET	REPAIR			1.0				
	VALVES	REPLACE REPAIR			4.0 3.0				
	COVER, FRONT HOUSING	REPLACE REPAIR				3.0 1.5			
0106	ENGINELUBRI- CATION SYSTEM							1	
	ENGINE OIL PUMP	REPLACE REPAIR OVERHAUL			4.0	1.0	2.0		
	CRANKCASE BREATHER	SERVICE REPLACE		0.3 0.7					
03	FUEL SYSTEM							1,2,3,4	
0301	FUEL INJECTOR NOZZLE	TEST REPLACE REPAIR			1.0 1.0 1.0				
		B-5							

(1)	(2)	(3)			(4)			(5)	(6)
GROUP		MAINTENANCE			ANCE			TOOLS AND	
NUMBER	COMPONENT ASSEMBLY	FUNCTION	С	0	F	Н	D	EQUIPMENT	REMARKS
03	FUEL SYSTEM (CONT'D)							1,2,3,4	
0302	FUEL PUMP								
	PUMP, INJECTION	ADJUST REPLACE OVERHAUL			2.0 2.0		2.5		
	PRIMING PUMP	REPLACE REPAIR			0.5 1.5				
0304	AIR CLEANER	SERVICE REPLACE	0.5	0.5					
0305	TURBOCHARGER	REPLACE REPAIR			1.5	2.0			
0306	TANKS, LINES & FITTINGS								
	FUEL TANK	SERVICE REPLACE REPAIR	0.3		2.0 2.0				
0308	ENGINE SPEED GOVERNOR AND CONTROLS	ADJUST REPLACE REPAIR			1.0 2.0 3.0				
0311	ENGINE STARTING AIDS								
	COLD START KIT	SERVICE REPLACE		0.5 1.0					
04	EXHAUST SYSTEM							1,2,3	
0401	MUFFLER & PIPES	REPLACE		2.0					
05	COOLING SYSTEM							1,2,3,4	
0501	RADIATOR ASSEMBLY	INSPECT TEST SERVICE REPLACE REPAIR	0.2	0.5 1.0 0.5 3.0	3.0				
		B-6							

(1)	(2)	(3)	(4)					(5)	(6)
GROUP		MAINTENANCE	MAINTENANCE LEVEL					TOOLS AND	
NUMBER	COMPONENT ASSEMBLY	FUNCTION	С	0	F	Н	D	EQUIPMENT	REMARKS
05	COOLING SYSTEM (CONT'D)							1,2,3,4	
0504	WATER PUMP								
	PUMP ASSEMBLY	REPLACE REPAIR		2.5	1.0				
0505	FAN ASSEMBLY	KEPAIK			1.0				
	BELT, PUMP/FAN	INSPECT ADJUST REPLACE		0.1 0.2 0.5					
06	ELECTRICAL SYSTEM	THE ENGL		0.5				1,2,3,4	
0601	ALTERNATOR	TEST REPLACE REPAIR		0.5 1.5	1.0				
	DRIVE BELT	INSPECT ADJUST REPLACE		0.1 0.4 0.4	1.0				
0603	STARTING MOTOR	TEST REPLACE REPAIR		0.5 1.0	1.0				
0607	INSTRUMENT OR ENGINE CONTROL PANEL	REPLACE REPAIR		1.0	1.0				
	OPERATOR'S CONSOLE ASSEMBLY	REPLACE REPAIR		0.4 1.0					
0609	LIGHTS								
	HEADLIGHTS	TEST REPLACE	0.1	0.5					
	TAILLIGHTS	REPAIR TEST REPLACE	0.1	0.5					
	STOPLIGHTS	REPAIR TEST REPLACE REPAIR	0.1	0.5 0.5 0.5					
		B-7							

(1)	(2)	(3)			(4)			(5)	(6)
GROUP		MAINTENANCE	MAINTENANCE LEVEL				TOOLS AND		
NUMBER	COMPONENT ASSEMBLY	FUNCTION	С	0	F	Н	D	EQUIPMENT	REMARKS
06	ELECTRICAL SYSTEM (CONT'D)							1,2,3,4	
	FLOODLIGHTS	TEST REPLACE REPAIR	0.1	0.5 0.5					
0612	BATTERIES, STORAGE								
	BATTERIES	INSPECT TEST SERVICE REPLACE	0.2	0.5 0.5 0.5					
	BATTERY BOX	REPLACE REPAIR		0.5 0.5					
	BATTERY CABLES	REPLACE REPAIR		0.3 0.3					
0613	HULL OR CHASSIS WIRING								
	WIRING HARNESS	REPLACE REPAIR		1.0	10.0 2.5				
07	TRANSMISSION							1,2,3,4,5	
0705	CONTROL LINKAGE	SERVICE ADJUST REPLACE		0.5 1.0 2.0					
0710	TRANSMISSION ASSEMBLY	NEI LAOL		2.0					
	TRANSMISSION	INSPECT TEST SERVICE REPLACE REPAIR OVERHAUL	0.2	0.5 0.2 0.5	1.0	12.0	30.0		
0714	CONTROL VALVE & LINKAGE	OVERNINGE					00.0		
	CONTROL VALVE	REPLACE REPAIR				1.0 2.0			
		B-8							

(1)	(2)	(3)	(4)					(5)	(6)
GROUP		MAINTENANCE			ANCE			TOOLS AND	
NUMBER	COMPONENT ASSEMBLY	FUNCTION	С	0	F	Н	D	EQUIPMENT	REMARKS
07	TRANSMISSION (CONT'D)							1,2,3,4,5	
0719	TRANSFER SHAFT, ENGINE TO TRANSMISSION	REPLACE REPAIR			2.0	2.0			
0721	OIL COOLER, PUMP & FILTERS								
	OIL COOLERS	REPLACE REPAIR		1.0 1.0					
	OIL PUMP	REPLACE REPAIR		2.0	3.0				
	OIL FILTER ASSEMBLY	SERVICE REPLACE		0.5 1.7					
09	PROPELLER & PROPELLER SHAFTS							1, 2, 4	
0900	DRIVE SHAFTS	SERVICE REPLACE REPAIR		0.5 1.5 2.0					
10	FRONT AXLE							1,2,3,4,5	
1000	FRONT AXLE	SERVICE REPLACE REPAIR		0.3	3.0	5.0			
	STEERING ARM ASSEMBLIES	ADJUST REPLACE REPAIR			0.3 5.0 2.0				
1004	STEERING & LEANING WHEEL MECHANISM	SERVICE REPLACE REPAIR		0.4	3.0 6.0				
	LEANING WHEEL CYLINDER	REPLACE REPAIR			0.5	2.0			
11	REAR AXLE							1,2,3,4,5	
1100	REAR AXLE ASSEMBLY	SERVICE REPLACE REPAIR		0.3	10.0	5.0			
		B-9							

(1)	(2)	(3)	(4)					(5)	(6)
GROUP		MAINTENANCE			IANCE			TOOLS AND	
NUMBER	COMPONENT ASSEMBLY	FUNCTION	С	0	F	Н	D	EQUIPMENT	REMARKS
11	REAR AXLE (CONT'D)							1,2,3,4,5	
1102	DIFFERENTIAL	SERVICE REPLACE REPAIR		0.5	1.0	2.0			
	DIFFERENTIAL LOCK & CONTROL	SERVICE REPLACE REPAIR		0.5	1.0 1.0				
1103	FINAL DRIVE ASSEMBLY	SERVICE REPLACE REPAIR		0.5	18.0	21.0			
1105	TANDEM DRIVE & CHAIN ASSEMBLIES								
	TANDEM DRIVE HOUSING	SERVICE REPLACE REPAIR		0.3	8.5	8.0			
	CHAIN ASSEMBLIES	REPLACE REPAIR			4.5 3.0				
12	BRAKES							1,2,3,4	
1201	PARKING BRAKE ACTUATOR & CONTROL ASSEMBLIES								
	PARKING BRAKE ACTUATOR	REPLACE REPAIR			1.0 1.0				
	PARKING BRAKE CONTROL	ADJUST REPLACE			0.5 1.0				
1202	SERVICE BRAKES	ADJUST REPLACE REPAIR			0.8 1.5	2.0			
1206	CONTROL	REPLACE			0.5				
1208	AIR BRAKE SYSTEM	REPAIR			1.5				
	VALVE	REPLACE REPAIR			0.3 1.0				
	RESERVOIR	SERVICE REPLACE		0.3	0.8				
		B-10							

(1)	(2)	(3)			(4)			(5)	(6)
GROUP		MAINTENANCE	MA	INTEN	ANCE	LEVEL		TOOLS AND	
NUMBER	COMPONENT ASSEMBLY	FUNCTION	С	0	F	Н	D	EQUIPMENT	REMARKS
12	BRAKES (CONT'D)							1,2,3,4	
1209	AIR COMPRESSOR	SERVICE REPLACE		0.3 4.0	0.0				
13	WHEELS	REPAIR			2.0			1,2,3	
1313	TIRES	SERVICE REPLACE REPAIR	0.3	2.0 1.0					
14	STEERING	112171111		1.0				1,2,3,4,5	
1401	STEERING WHEEL, SHAFT DRAG LINKS & ARMS	SERVICE REPLACE REPAIR		0.6	2.5 3.0				
1410	STEERING CONTROL PUMP	REPLACE REPAIR		1.0	4.0				
1412	HYDRAULIC CYLINDERS	REPLACE REPAIR			0.5 2.0				
1414	RELIEF VALVE REPAIR	REPLACE			0.8	3.0			
15	FRAME. TOWING ATTACHMENTS & ARTICULATION SYSTEM							1,2,3,4,5	
1501	FRONT FRAME ASSEMBLY	REPAIR				3.0			
	FRAME & CASE ASSEMBLY (REAR)	REPAIR				3.0			
1503	PINTLE & TOWING ATTACHMENTS								
	ARTICULATION ASSEMBLY	SERVICE REPLACE REPAIR		0.5	5.0 2.0				
18	BODY. CAB. HOOD & HULL	KEFAIK			2.0			1,2,3,4	
1801	HOOD ASSEMBLIES	REPLACE REPAIR		1.0 1.5					
		B-11							

(1)	(2)	(3)			(4)			(5)	(6)
GROUP		MAINTENANCE	MAINTENANCE LEVEL			TOOLS AND			
NUMBER	COMPONENT ASSEMBLY	FUNCTION	С	0	F	Н	D	EQUIPMENT	REMARKS
18	BODY. CAB. HOOD & HULL (CONT'D)							1,2,3,4,5	
1801	HOOD ASSEMBLIES	REPLACE REPAIR		1.0 1.5					
	CAB ASSEMBLY	REPLACE REPAIR		4.0 2.0					
	ROLLOVER PRO- TECTION STRUCTURE (ROPS)	INSPECT REPLACE		0.2 2.0					
	OPERATOR'S CONSOLE ASSEMBLY	REPLACE REPAIR		0.8 1.0					
1806	SEAT ASSEMBLY	REPLACE		0.8					
22	BODY. CHASSIS & HULL ACCESSORY ITEMS	REPAIR		1.0				1,2,3	
2202	ACCESSORY ITEMS								
	WINDSHIELD WIPER ASSEMBLY	REPLACE REPAIR		1.0 2.0					
	DEFROSTERS	REPLACE REPAIR		1.0 1.0					
2207	HEATER ASSEMBLY	REPLACE REPAIR		1.5 1.5					
24	HYDRAULIC & FLUID SYSTEM	TXET / IIIX		1.0				1,2,3,4,5,7	
2401	HYDRAULIC PUMP ASSEMBLY	REPLACE REPAIR		2.5	1.5				
	CIRCLE DRIVE MOTOR ASSEMBLY	REPLACE REPAIR		1.0	1.5				
2402	CONTROL VALVES	ADJUST REPLACE REPAIR		3.0	1.0 2.5				
2403	HYDRAULIC HAND CONTROL AND LINKAGE	ADJUST REPLACE REPAIR		1.5 2.0 2.0					
2406	STRAINERS, FILTERS, LINES & FFITINGS	REPLACE REPAIR		2.0 1.0					
		B-12							

COMPONENT ASSEMBLY	MAINTENANCE							
COMPONENT ASSEMBLY					LEVEL		TOOLS AND	
	FUNCTION	С	0	F	Н	D	EQUIPMENT	REMARKS
BODY. CHASSIS AND HULL ACCESSORY ITEMS (CONT'D)								
HYDRAULIC CYLINDERS	REPLACE REPAIR			1.5 3,0				
HYDRAULIC TANK & MOUNTING ASSEMBLY	SERVICE REPLACE REPAIR	0.2	0.2	2.0 2.0				
GAGES. NON- ELECTRICAL								
GAGES	REPLACE		0.5					
CRANES. SHOVELS & EARTHMOVING EOUIPMENT COMPONENTS							1,2,3,4,5	
MOLDBOARD ASSEMBLY	SERVICE REPLACE REPAIR		0.3	3.0 2.0				
MOLDBOARD LIFT ARMS & PIVOT ASSEMBLY	SERVICE REPLACE REPAIR		0.3	2.4 3.0				
DRAWBAR ASSEMBLY	SERVICE REPLACE REPAIR		0.3	2.4 3.4				
CIRCLE TURN ASSEMBLY	SERVICE REPLACE REPAIR		0.3	2.0 3.0				
CENTERSHIFT LOCK ASSEMBLY	REPLACE REPAIR		1.0	1.5				
SCARIFIER ASSEMBLY	SERVICE REPLACE REPAIR		0.3 2.0	3.0				
	B-13							
	HULL ACCESSORY ITEMS (CONT'D)  HYDRAULIC CYLINDERS  HYDRAULIC TANK & MOUNTING ASSEMBLY  GAGES. NON- ELECTRICAL  GAGES  CRANES. SHOVELS & EARTHMOVING EOUIPMENT COMPONENTS  MOLDBOARD ASSEMBLY  MOLDBOARD LIFT ARMS & PIVOT ASSEMBLY  DRAWBAR ASSEMBLY  CIRCLE TURN ASSEMBLY  CENTERSHIFT LOCK ASSEMBLY  SCARIFIER	HULL ACCESSORY ITEMS (CONT'D)  HYDRAULIC CYLINDERS  HYDRAULIC TANK & MOUNTING ASSEMBLY  GAGES. NON- ELECTRICAL  GAGES  CRANES. SHOVELS & EARTHMOVING EOUIPMENT COMPONENTS  MOLDBOARD ASSEMBLY  REPLACE	HULL ACCESSORY ITEMS.(CONT'D)  HYDRAULIC CYLINDERS  HYDRAULIC TANK & MOUNTING ASSEMBLY  GAGES. NON- ELECTRICAL  GAGES. NON- ELECTRICAL  GAGES  CRANES. SHOVELS & EARTHMOVING EOUIPMENT COMPONENTS  MOLDBOARD ASSEMBLY  MOLDBOARD LIFT ARMS & PIVOT ASSEMBLY  DRAWBAR ASSEMBLY  CIRCLE TURN ASSEMBLY  CENTERSHIFT LOCK ASSEMBLY  SERVICE REPLACE REPLAC	HULL ACCESSORY ITEMS (CONTD)  HYDRAULIC CYLINDERS  HYDRAULIC TANK & MOUNTING ASSEMBLY  GAGES. NON- ELECTRICAL  GAGES  GREPLACE REPAIR  GAGES  REPLACE REPAIR  0.2 0.2  0.2  REPLACE REPAIR  O.5  CRANES. SHOVELS & EARTHMOVING EOUIPMENT COMPONENTS  MOLDBOARD ASSEMBLY  MOLDBOARD ASSEMBLY  MOLDBOARD ASSEMBLY  REPLACE REPAIR  MOLDBOARD ASSEMBLY  REPLACE REPAIR  MOLDBOARD ASSEMBLY  CIRCLE TURN ASSEMBLY  CIRCLE TURN ASSEMBLY  CENTERSHIFT LOCK ASSEMBLY  REPLACE REPAIR  CENTERSHIFT LOCK REPLACE REPAIR  CENTERSHIFT LOCK ASSEMBLY  SERVICE REPAIR  1.0  CENTERSHIFT LOCK ASSEMBLY  REPLACE REPAIR  CENTERSHIFT LOCK REPLACE REPAIR  CENTERSHIFT LOCK ASSEMBLY  REPLACE REPAIR  CENTERSHIFT LOCK REPLACE REPAIR  CENTERSHIFT LOCK REPLACE REPAIR  1.0  CENTERSHIFT LOCK REPLACE REPAIR  CENTERSHIFT LOCK REPLACE REPAIR  CENTERSHIFT LOCK REPLACE REPAIR  2.0	HULL ACCESSORY ITEMS (CONT'D)  HYDRAULIC CYLINDERS  HYDRAULIC TANK & SERVICE REPAIR  SERVICE REPAIR  0.2 0.2 2.0  REPLACE REPAIR  GAGES. NON- ELECTRICAL  GAGES  CRANES. SHOVELS & EARTHMOVING EOUIPMENT  COMPONENTS  MOLDBOARD ASSEMBLY  MOLDBOARD LIFT ARMS & PIVOT ASSEMBLY  REPLACE REPAIR  SERVICE REPAIR  MOLDBOARD ASSEMBLY  REPLACE REPAIR  REPLACE REPAIR  0.3 3.0 2.0  MOLDBOARD ASSEMBLY  REPLACE REPAIR  CIRCLE TURN ASSEMBLY  REPLACE REPAIR  CENTERSHIFT LOCK ASSEMBLY  REPLACE REPAIR  SERVICE REPLACE REPAIR  1.0 1.5  SCARIFIER ASSEMBLY  REPLACE REPAIR  3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.	HULL ACCESSORY ITEMS (CONT'D)  HYDRAULIC TANK & REPAIR  HYDRAULIC TANK & MOUNTING ASSEMBLY  GAGES. NON- ELECTRICAL  GAGES. MON- ELECTRICAL  GAGES. SHOVELS & EARTHMOVING EOUIPMENT COMPONENTS  MOLDBOARD ASSEMBLY  MOLDBOARD ASSEMBLY  REPLACE REPAIR  REPLACE REPAIR  DRAWBAR ASSEMBLY  REPLACE REPAIR  REPLACE REPAIR  DRAWBAR ASSEMBLY  REPLACE REPAIR  REPLACE REPAIR  CIRCLE TURN ASSEMBLY  REPLACE REPAIR  CIRCLE TURN ASSEMBLY  REPLACE REPAIR  CIRCLE TURN ASSEMBLY  REPLACE REPAIR  SERVICE REPAIR  DRAWBAR ASSEMBLY  REPLACE REPAIR  SERVICE REPAIR  1.0 1.5  SCARIFIER ASSEMBLY  REPLACE REPAIR  1.0 3.0  3.0  3.0  3.0  3.0  3.0  3.0	HULL ACCESSORY ITEMS (CONT'D)  HYDRAULIC CYLINDERS  REPAIR  REPLACE REPAIR  0.2  0.2  0.2  0.2  0.3  0.3  0.4  HYDRAULIC TANK REPLACE	HULL ACCESSORY ITEMS (CONTD) HYDRAULIC CYLINDERS REPAIR REPAIR  SERVICE REPAIR REPLACE REPAIR  0.2 0.2 2.0 REPLACE REPAIR  GAGES NON- ELECTRICAL  GAGES  CRANES. SHOVELS & EARTHMOVING EOUIPMENT COMPONENTS  MOLDBOARD ASSEMBLY  MOLDBOARD ASSEMBLY  MOLDBOARD ASSEMBLY  REPLACE REPLA

## SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS

# FOR MODEL 130G Road Grader

TOOL OR TEST			NATIONAL/NATO	TOOL
EQUIPMENT REF CODE	CATEGORY	NOMENCLATURE	STOCK NUMBER	NUMBER
1	O, F	Tool Kit Gen. Mechanic Auto SC 5180-90-CL-N26	5180-00-177-7033	W33004
2	O ,F	Shop Equipment, Auto Maint Repair: ORG Maint Common No. 1 Less Power SC4910-95-CL-A74	4910-00-754-0654	W32730
3	O, F	Shop Equipment, Auto Maint & Repair: ORG Supplemental No. 1 SC 4910-95-CL-A73	4910-00-754-0653	W32867
4	O, F	Shop Equipment, Auto Maint & Repair: ORG Common No. 2 Less Power SC 4910-95-CL-A72	4910-00-754-0650	W32730
5	O, F	Shop Equipment Auto Maint & Repair ORG Maint Supplemental NO. 2 SC 4940-95-CLA08	4940-00-754-0743	W65747
6	O, F, H	Simplified Test Equipment for Internal Combustion Engines (STE-ICE-R) TM 9-4910-571-12&P, -34&P	4910-00-124-2554	
7	F	Hydraulic Shop Test & Repair Unit (HYSTRU) SC 4940-95-CL-B07 TM 94940-468-14	4940-01-150-5784	T3221 E6850
		B-14	l	

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#### **APPENDIX C**

#### **EXPENDABLE SUPPLIES AND MATERIALS**

#### Section I. INTRODUCTION.

**C-1. SCOPE.** This appendix lists expendable supplies and materials you will need to maintain the 621B Scraper. These items are authorized to you by CTA 50-970, Expendable Items (except Medical, Class V, Repair Parts, and Heraldic Items).

#### C-2 EXPLANATION OF COLUMNS.

- a. <u>Column 1 Item Number</u>. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use anti-seize graphite, Item 14, App. C").
  - b. <u>Column 2 Level</u>. This column identifies the lowest level of maintenance that requires the listed item:
    - C Operator/Crew
    - O Organizational Maintenance
    - F Direct Support Maintenance
    - H General Support Maintenance
- **c** <u>Column 3 National Stock Number</u>. This is the National Stock Number assigned to the item; use it to request or requisition the item.
- **d.** <u>Column 4 Description</u>. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal supply code for Manufacturer (FSCM) in parenthesis, if applicable.
- **e.** <u>Column 5 Unit of Measure (U/M).</u> Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea., in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

(1)	(2)	(3)	ENDABLE SUPPLIES AND MATERIALS LIST. (4)	(5)
(.,	(-)	NATIONAL	( )	(0)
ITEM NUMBER	LEVEL	STOCK NUMBER	DESCRIPTION	U/M
1	0	8040-00-262-9025	ADHESIVE: 4 oz tube MIL-A-5092, Type 1 (81349)	OZ
2	0	8040-00-262-9026	ADHESIVE: 1/2 pt can MIL-A-5092, Type 1 (81349)	CN
3		8040-00-573-1502	ADHESIVE, MIL-A-22010A, PVC (81349)	
4	С	6850-00-127-7193	ANTI-FOGGING KIT 1 kit MIL-S-13550 (81349)	EA
5	С	6850-00-181-7929	ANTIFREEZE, PERM 0-A-548, 1 GAL. CAN MIL-A-46153 (81349)	GL
6	С	6850-00-181-7933	ANTIFREEZE, PERM 0-A-548, 5 GAL. CAN MIL-A-46153 (81349)	GL
7	С	6850-00-174-1806	ANTIFREEZE, ARTIC TYPE 55 GAL. DRUM MIL-A-11755 (81349)	DR
8	0	6850-00-227-1328	CLEANING COMPOUND, MIL-C-10597 (81349)	QT
9	0	6850-00-224-6665	CLEANING COMPOUND, MIL-C-11090 (81349)	CN
10	0		CLOTH, ABRASIVE EMERY	
11	0	5350-00-221-0872	CLOTH, ABRASIVE CROCUS .50 SHEETS P-C-458 (81348)	PC
12			COMPOUND, RETAINING, MIL-R-46082A	
13	С	8030-00-159-8126	DEICING-DEFROSTING COMPOUND 5 GAL CAN MIL-A-8243	CN
14	0	6850-00-281-3061	DRY CLEANING SOLVENT 4 OZ CAN P-D-630 (81348)	DR
			C-2	

(1)	(2)	(3)	(4)	(5)
ITEM NUMBER	LEVEL	NATIONAL STOCK NUMBER	DESCRIPTION	U/M
15	0	8010-00-297-2105	ENAMEL, SEMIGLOSS, OLIVE DRAB TT-E-485 (81348)	GL
16	0	8010-00-297-2109	ENAMEL, SEMIGLOSS, OLIVE DRAB TT-E-485, Type 2 (81348)	PT
17	0		ENAMEL, SEMIGLOSS, CAMOUFLAGE MIL-P-6884F	GL
18	С	9150-00-935-1017	GREASE, AUTOMOTIVE, ART. 14 OZ CAN MIL-G-10924D (81349)	CN
19	С	9150-00-190-0904	GREASE, AUTOMOTIVE, ART. 1 LB CAN MIL-G-1092	LB
20	0	9150-00-190-0905	GREASE, AUTOMOTIVE, ART. 5 LB CAN MIL-G-10924D BRAYCOTE 610 (98308)	LB
21	С	9150-00-985-7246	GREASE, AIRCRAFT AND INSTRUMENT, 1 LB CAN MIL-G-23827 (81349)	LB
22	С	9150-00-985-7247	GREASE, AIRCRAFT AND INSTRUMENT, 2 LB CAN MIL-G-23827 (81349)	LB
23	0	9150-00-985-7248	GREASE, GEAR, MULTI-PURPOSE, 35 LB CAN MIL-L-2105B	LB
24	С	9150-00-985-7316	GREASE, GENERAL PURPOSE 1-3/4 LB CAN MIL-G-23549 (81349)	CN
25	О	9150-00-823-8047	GREASE, GENERAL PURPOSE 35 LB CAN MIL-G-23549 (81349)	CN
			C-3	

(1)	(2)	(3)	(4)	(5)
		NATIONAL		
NUMBER	LEVEL	STOCK NUMBER	DESCRIPTION	U/M
26	0		GREASE, #2 LITHIUM, MULTI- PURPOSE MIL-G-109240	
27	С	9150-00-935-9808	HYDRAULIC FLUID MIL-L-2104B OR MIL-L-46152	GL
28	С	6850-00-753-4967	INHIBITOR, CORROSION, 6 OZ CAN 0-I-00490B (81348)	CN
29	0		LOCKTITE 242, GRADE N, TYPE 2 MIL-S-46163	TU
30	С	9150-00-231-6689	LUBRICANT, GEAR MIL-G-10924D	
31	С	9150-00-189-6727	LUBRICATING OIL: 1 QT CAN MIL-L-2104C (81349)	QT
32	0	9150-00-188-9858	LUBRICATING OIL: 5 GAL DRUM MIL-L-2104C (81349)	CN
33	0	9150-00-186-6668	LUBRICATING OIL ENG: 5 GAL DRUM MIL-L-2104C (81349)	CN
34	С	9150-00-186-6681	LUBRICATING OIL ENG: 1 QT CAN MIL-L-2104C (81349)	QT
35	С		LUBRICATING OIL, ENG, SUB-ZERO, 1 QT CANS MIL-L-46167	QT
36	0		LUBRICATING OIL, ENG., SUB-ZERO, 5 GAL DRUM MIL-L-46167	GL
37	0		LUBRICATING OIL, GEAR MULTI-PURPOSE	CN
38	0		LUBRICATING OIL, SEMIFLUID	
			C-4	

(1)	(2)	(3)	(4)	(5)
ITEM NUMBER	LEVEL	NATIONAL STOCK NUMBER	DESCRIPTION	U/M
39	С	7920-00-205-3570	RAG. WIPING (AKA CLEAN CLOTHS' DDD-R-30 (81348) A-A-531 (58536)	BE
40	0	8030-00-159-8176	SEALANT, SILICONE, 303 TUBE MIL-S-45180	TU
41	0		TAGS, PAPER	
42	0	7510-00-584-5785	TAPE, PRESSURE SENSITIVE ADHESIVE BLACK (ELECTRICAL) 3/4" W X 60 yds lg. PPP-T-97 (81348) TAPE, MASKING	RO
43	0	8010-00-242-2089	THINNER, PAINT MIXER TT-T-291 GRI-1GL (81348)	GL
44	0	8010-00-558-7026	THINNER, PAINT, MINERAL TT-T-291 (81348)	CN
45	0	9150-00-231-9062	LUBRICATING OIL, GEN. 5 GAL CAN VV-800 (81348)	GL
46	0	9150-00-231-2361	LUBRICATING OIL, GEN. MIL-L-3150 (81349)	QT
47	0	9150-00-231-2356	LUBRICATING OIL, GEN. 5 GAL CAN MIL-L-3150 (81349)	CN
48	0	9150-00-402-2372	LUBRICATION OIL, OES, 5 GAL CAN CONOCODN 600 FLUID TYPE 1 (15445)	CN
49	0	9150-00-402-4478	LUBRICATION OIL, OES, 1 QT CAN CONOCOO 600 FLUID (15445)	QT
50	0	9150-00-543-7220	LUBRICATING OIL, MOLYBDENUM AND DISULFIDE, SILICONE, 1 LB CAN DOD-L-25681 (81349)	LB
			C-5	

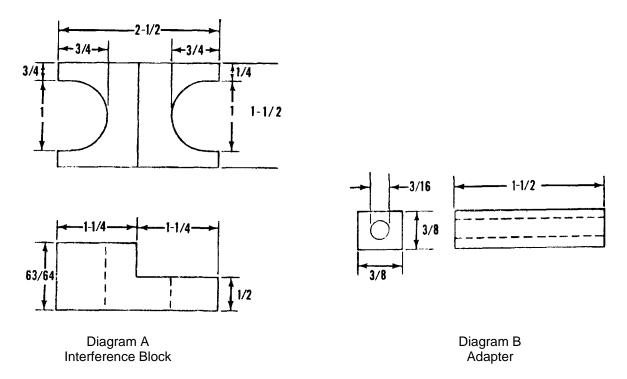
(4)	Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST. (cont.)			
(1)	(2)	(3)	(4)	(5)
ITEM NUMBER	LEVEL	NATIONAL STOCK NUMBER	DESCRIPTION	U/M
51	0	9150-00-250-0926	PETROLATUM, TECHNICAL: VV-P-236 (81348)	LB
52	0	9150-00-250-0933	PETROLATUM, TECHNICAL: 7.5 LB CAN VV-P-236 (81348)	LB
53	0	7920-00-205-3570	RAG. WIPING DDD-R-30 (81348) A-A-531 (58536)	BE
54	0	8030-00-159-8176	SEALING COMPOUND, 303 TUBE MIL-S-45180 (81349)	TU
55	0	8030-00-252-3391	SEALING COMPOUND, 11 OZ TUBE A GASKET NO. 2 (77247)	OZ
56	0	7510-00-584-5785	TAPE, PRESSURE SENSITIVE ADHESIVE BLACK (ELECTRICAL) 3/4" W X 60 YDS LG PPP-T-97 (81348)	RO
57	0	8010-00-242-2089	THINNER, PAINT MIXER TT-T-291 GRI-1GL (81348)	GL
58	0	8010-00-558-7026	THINNER, PAINT, MINERAL TT-T-291 (81348)	CN
			C-6	

#### **ILLUSTRATED LIST OF MANUFACTURED ITEMS**

**D-1. INTRODUCTION**. This appendix includes complete instructions for making items authorized to be manufactured or fabricated at organizational maintenance. A part number index in alphanumeric order is provided for cross-referencing the part number of the item to be manufactured to the figure which covers fabrication criteria. All bulk materials needed for manufacture of an item are listed by NSN in a tabular list on the illustration.

Manufacture from steel or aluminum stock to specifications below.

Manufacture from steel or aluminum stock to specifications below.



**NOTE: DIMENSIONS ARE IN INCHES** 

D-1/(D-2 blank)

#### **APPENDIX E**

#### **TORQUE LIMITS**

**E-1. GENERAL INFORMATION**. This appendix provides general torque limits for fasteners. Special torque values are indicated in the maintenance procedures for applicable components. The general torque values given in this appendix shall be used when specific torque values are not indicated in the maintenance procedures. When applying torque in tightening direction, check torque when the fastener just begins to turn. Conformance is best determined by checking immediately after assembly.

#### E-2. TORQUE LIMITS.

a. TABLE E-1. GENERAL PURPOSE TORQUE LIMITS. The torque values given in Table E-1 apply to head-treated bolts assembled into tapped holes in steel, cast iron, aluminum, brass, weld nuts, etc., nuts assembled with heat-treated bolts and studs.

TABLE E-1.

GENERAL PURPOSE TORQUE LIMITS

Thread Size (inch)	Threads per Inch	Torque LB. FT.	Thread Size	Threads per Inch	Torque LB. FT.
1/4	20 18	6-12	3/4	10 16	230-300
5/16	18 24	13-23	7/8	9 14	360-480
3/8	16 24	27-37	1	8 14	560-720
7/16	14 20	40-60	1 1/8	7 12	700-900
1/2	13 20	65-85	1 1/4	7 12	880-1120
9/16	12 18	95-125	1 3/8	6 12	1050-1350
5/8	11 18	130-170	1 1/2	6 12	1300-1700

## TORQUE LIMITS. (cont.)

b. TABLE E-2. TORQUE LIMITS FOR FASTENERS WITH DIAMETERS LESS THAN .250 INCH. The torque values given in Table E-2 apply to fasteners made of brass or manufacturer's standard steel that may or may not have been heat-treated.

TABLE E-2.

TORQUE LIMITS FOR FASTENERS WITH DIAMETERS
LESS THAN .250 INCH

Thread No.	Diameter (Inch)	Torque LBS-IN
	` '	
0	.060	0.6-0.8
1	.073	1.1-1.3
2	.086	1.8-2.2
3	.099	2.5-3.5
4	.112	3.9-4.9
5	.125	5-7
6	.138	7-9
8	.164	13-17
10	.190	18-22
12	.216	25-35

TORQUE LIMITS. (cont.)

c. TABLE E-3. TORQUE LIMITS FOR FLARED AND PREFORMED PACKING FITTINGS USED WITH STEEL TUBING. The torque values shown in Table E-3 are to be used with 37 degree flared, 45 degree flared and inverted flared fittings (when used with steel tubing), preformed packing plugs and fittings. The torque required for these fittings are based upon thread size.

TABLE E-3.

TORQUE LIMITS FOR FLARED AND PREFORMED FITTINGS
USED WITH STEEL TUBING

Tube O.D. (Inch)	Thread Size Inch	Torque LB-IN	Tube O.D. (Inch)	Thread Size Inch	Torque LB-FT
			.500	7/8	35-45
			.625	7/8	35-45
.125	5/16	35-55	.750	1 1/16	50-60
.188	3/8	90-110	.875	1 3/16 1 1/4	60-70
.250	7/16	125-165			60-70
.312	1/2	155-195	1.000	1 5/16	75-85
.375	9/16 5/18	165-245 165-245	1.250 1.500	1 5/8 1 7/8	90-100 110-130
			2.000	2 1/2	210-250

#### TORQUE LIMITS. (cont.)

#### d. TABLE E-4. TORQUE LIMITS FOR AIR FITTINGS, HOSE CLAMPS AND PLUGS.

- (1) SAE Flareless Fitting. Bottom tube into fitting body and tighten nut until sleeve grips tube firmly enough to prevent movement. Tighten nut 1 to 1 1/4 additional turn. For reassembly, tighten until a sharp rise in torque is felt, then tighten an additional 1/6 to 1/3 turn.
- (2) High-duty (Shear Sleeve) Tube Fittings. Bottom tube into the fitting body and tighten nut until a slight yield is felt, indicating that the sleeve has been sheared from the nut. Tighten nut an additional 1/2 turn.
- (3) Flex Fittings. Slide nut and sleeve over tubing. Bottom tube in counterbore of fitting body. Tighten nut until it bottoms on hex part of fitting body.

TABLE E-4.

TORQUE LIMITS FOR FLARELESS FITTINGS

Tube O.D. (Inch)	Torque for Non-Metallic and Copper Tubing	Optional Turn Tightening Turns After Finger Tightening	
	LB-IN	Tubing Non-Metallic	Tubing Copper
.250	75-125	3 Turns	2 Turns
.375	150-200	4 Turns	2 Turns
.500	250-350	4 Turns	2 Turns
.625	300-400	3 1/2 Turns	3 Turns
.750	400-500	3 1/2 Turns	3 Turns

## TORQUE LIMITS. (cont.)

- e. TABLE E-5. TORQUE LIMITS FOR PIPE FITTINGS. Sealing is the basis for acceptance of a pipe thread joint. Apply MIL-A-12352A (CE) thread sealant to all pipe threads except:
  - (1) Pipe threads in hydraulic components for which MIL-S-224730 is used.
  - (2) On grease fittings.

Insure that no thread damage occurs from too high a torque. Also ensure that joint can be disassembled after sealant has set.

TABLE E-5.

TORQUE LIMITS FOR PIPE FITTINGS

Pipe Thread	Recommended Torque (LB-FT)		
Size (Inch)	Threads with MIL-A12352A(CE) Sealant	Threads Without Sealant	
1/16-27	10	15	
1/8-27	15	20	
1/4-18	20	25	
3/4-18	25	35	
1/2-14	35	45	
3/4-14	45	55	
1-11 1/2	55	65	
1 1/4-11 1/2	70	80	
1 1/2-11 1/2	80	95	
2-11 1/2	95	120	

f. TABLE E-6. TORQUE LIMITS FOR WORM DRIVE BAND TYPE HOSE CLAMP. Inspect torque on new hose within 10 minutes. Torque should exceed minimum torque after one hour.

TABLE E-6.

TORQUE LIMITS FOR WORM-DRIVE, BAND TYPE HOSE CLAMP.

Clamp Width (Inch)	Reassembly or Tightening Torque (LB-IN)
.625	35-45
.531	20-30
.312	4-8

E-5/(E-6 blank)

#### **APPENDIX F**

#### **SCHEMATIC DIAGRAMS**

#### Section I. INTRODUCTION.

#### F-1. GENERAL.

This appendix provides the overall and specific schematic diagrams for the 130G Grader systems as an aid to troubleshooting and fault isolation. All systems are shown in a shut-down or neutral mode except where noted.

#### F-2. CONTENT.

This appendix contains schematic diagrams on the 130G Grader systems as follows:

Section II. ELECTRICAL

Section III. HYDRAULIC

Section IV. AIR

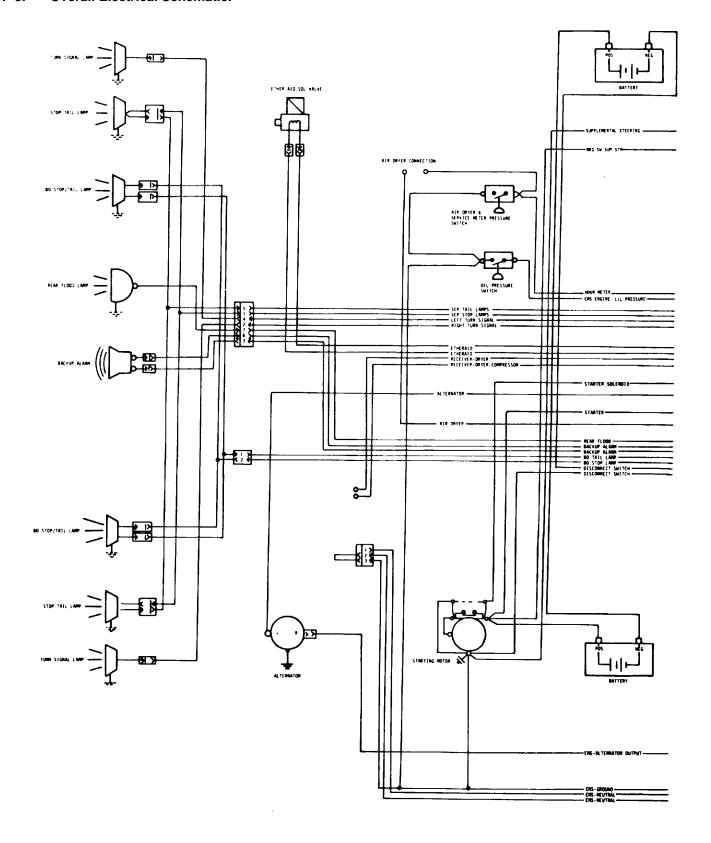
Section V. SUPPLEMENTAL STEERING

Section VI. ENGINE

Section VII. TRANSMISSION

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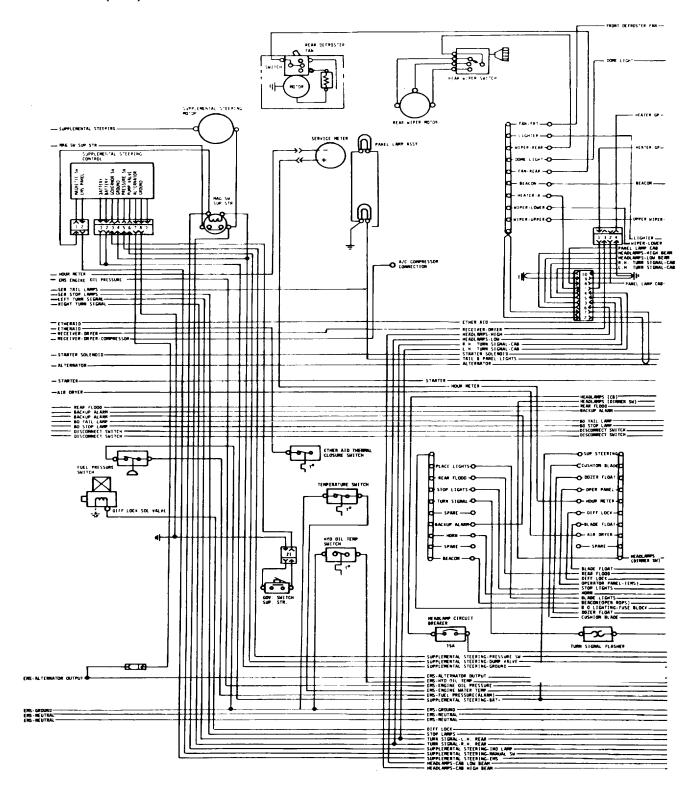
## F-3. Overall Electrical Schematic.



F-3 (F-4 blank)

## **ELECTRICAL.** (cont)

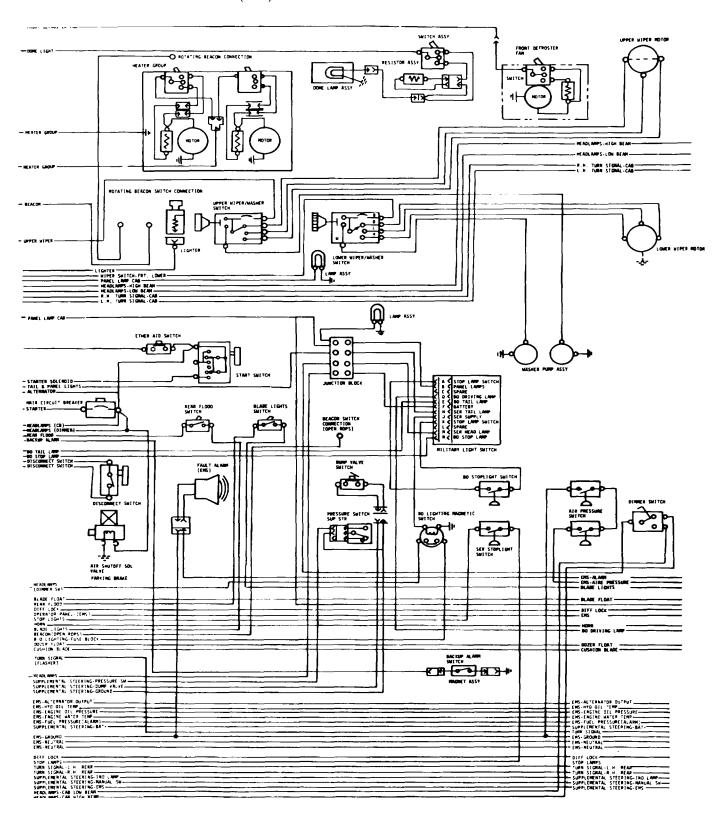
# F-3. Overall Electrical Schematic. (cont)



F-5 (F-6 blank)

## **ELECTRICAL**. (cont)

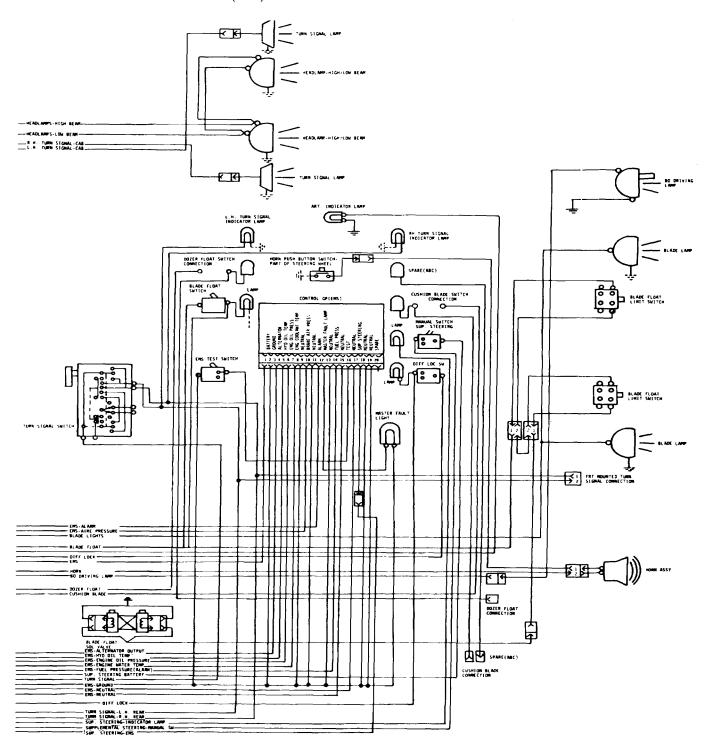
#### F-3. Overall Electrical Schematic. (cont)



F-7 (F-8 blank)

## **ELECTRICAL.** (cont)

## F-3. Overall Electrical Schematic. (cont)

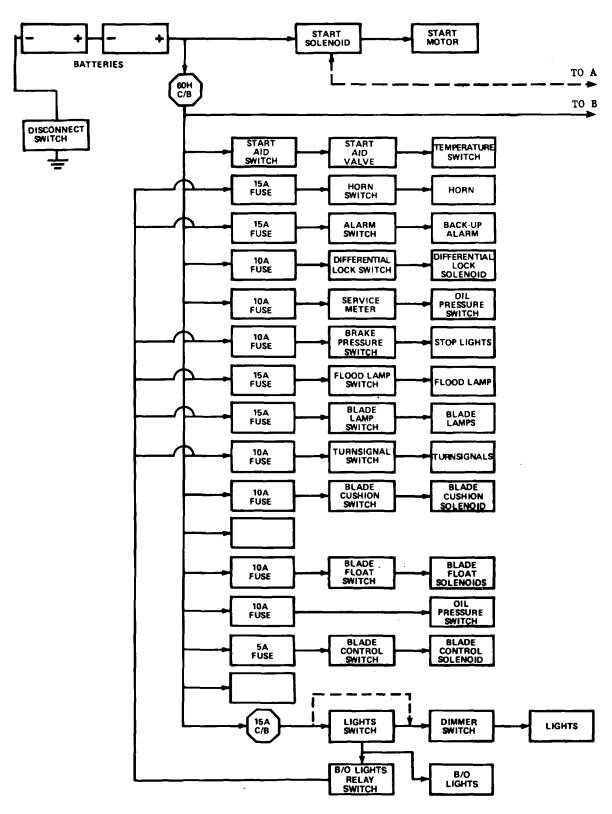


F-9 (F-10 blank)

#### F-4. Fuse and Switch Logic Schematic.

#### **OPERATOR'S STATION**

#### **ELECTRICAL TROUBLESHOOTING**

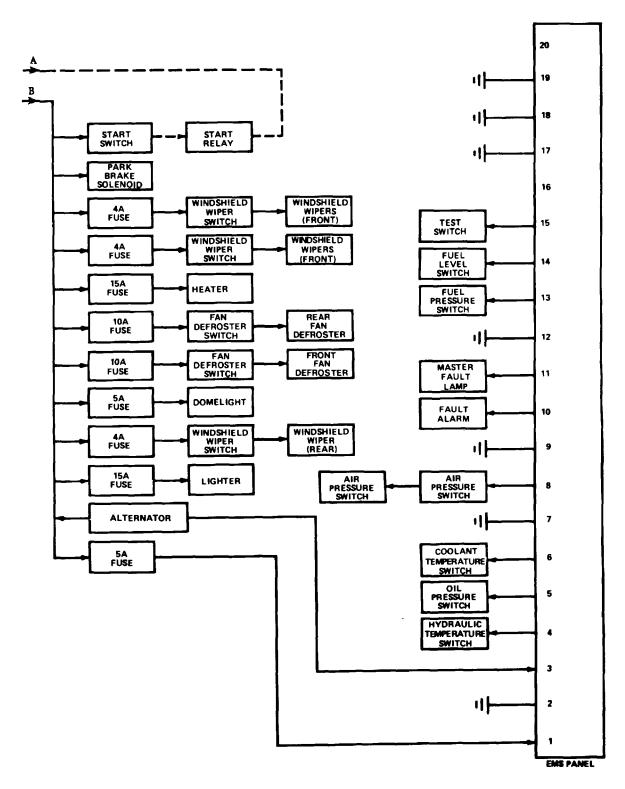


F-11 (F-12 blank)

#### F-4. Fuse and Switch Logic Schematic. (cont)

#### **OPERATOR'S STATION**

#### **ELECTRICAL TROUBLESHOOTING**



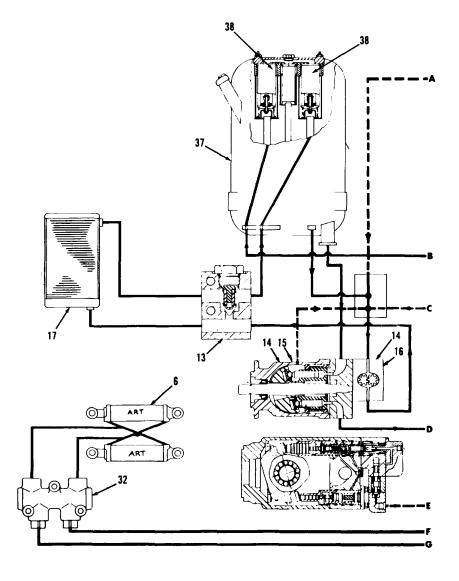
F-13 (F-14 blank)

## Section III. Hydraulic.

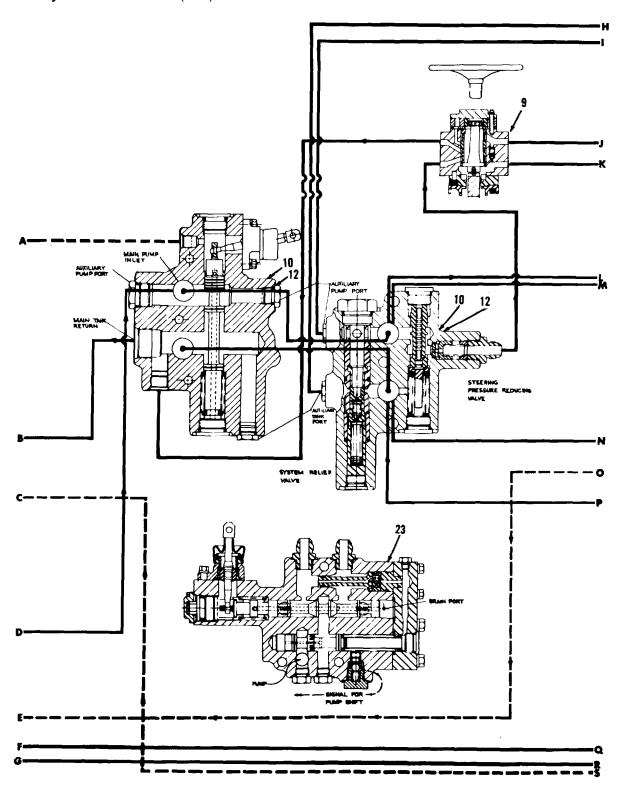
#### F-5. Overall Hydraulic Schematic.

#### Legend

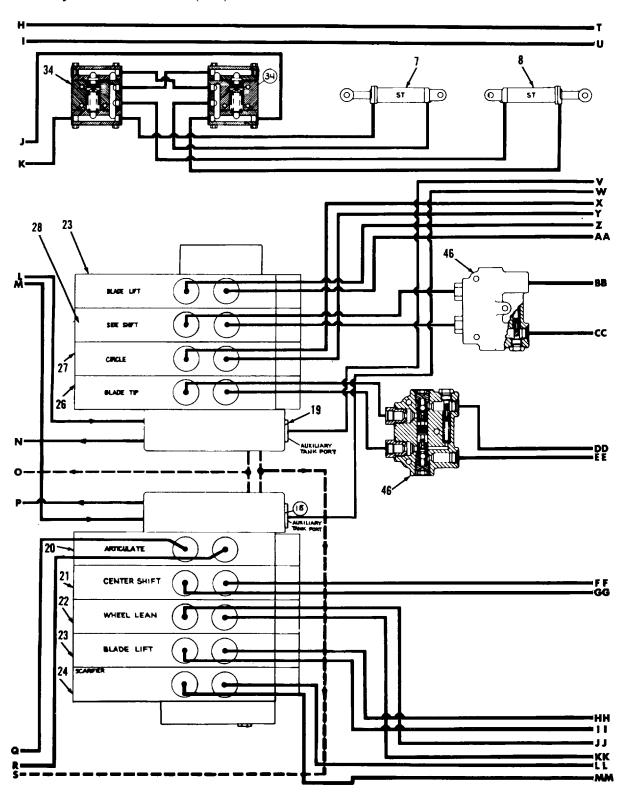
- 1. Cylinder for leaning wheel
- 2. Cylinder for center shift
- 3. Cylinders for blade lift
- 4. Cylinder for blade side shift
- 5. Cylinder for blade tip
- 6. Cylinders for articulation
- 7. Cylinder for steering (L.H.)
- 8. Cylinder for steering (R.H.)
- 9. Metering pump for steering
- 10. Combination valve
- 11. Relief and reducing valve
- 12. Unloading valve
- 13. Relief valve for cooler
- 14. Implement pump
- 15. Variable displacement pump
- 16. Pump for cooling
- 17. Cooler
- 18. Control valve group
- 19. Control valve group
- 20. Valve for articulation
- 21. Valve for center shift
- 22. Valve for wheel lean
- 23. Hydraulic pump relief valve
- 24. Valve for scarifier
- 26. Valve for blade tip
- 27. Valve for circle drive
- 28. Valve for blade side shift
- 31. Lock check valve
- 32. Lock check valve
- 33. Lock check valve
- 34. Relief valves for steering
- 35. Hydraulic motor for circle drive
- 37. Hydraulic tank
- 38. Filters
- 39. Swivel
- 41. Lock check valve
- 45. Cylinder for scarifier
- 46. Lock check valve (with relief)
- 47. Pilot valve (solenoid operated)
- 48. Lock check valves (pilot operated)



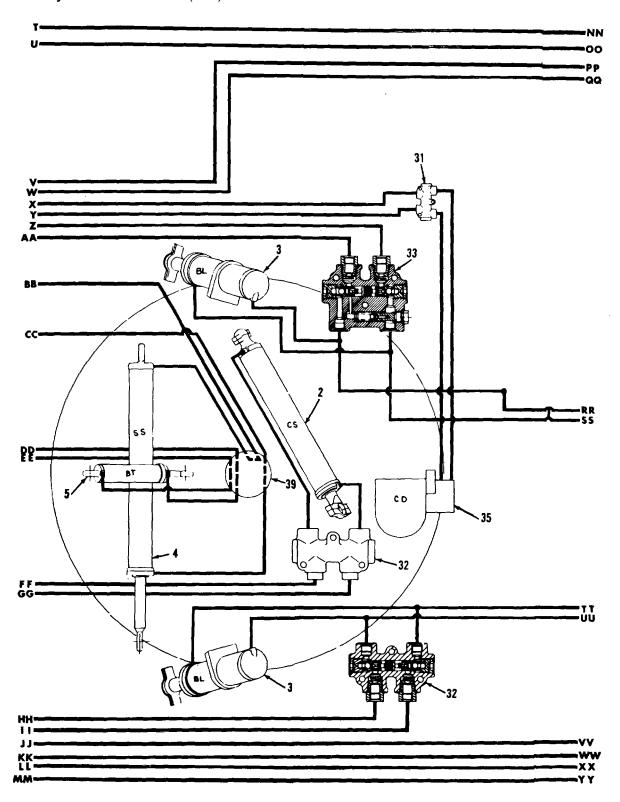
F-15 (F-16 blank)



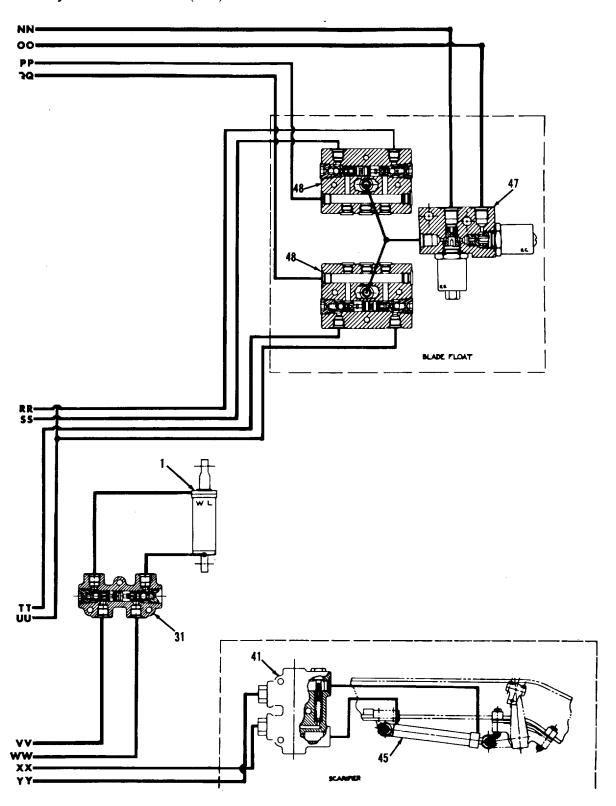
F-17 (F-18 blank)



F-19 (F-20 blank)

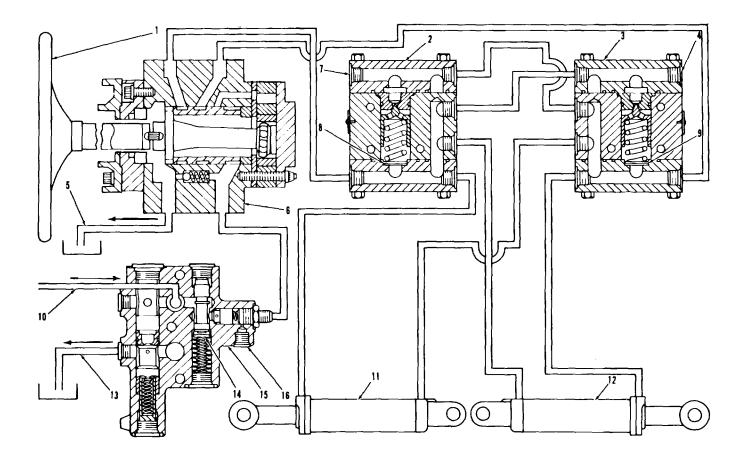


F-21 (F-22 blank)



## **HYDRAULIC.** (cont)

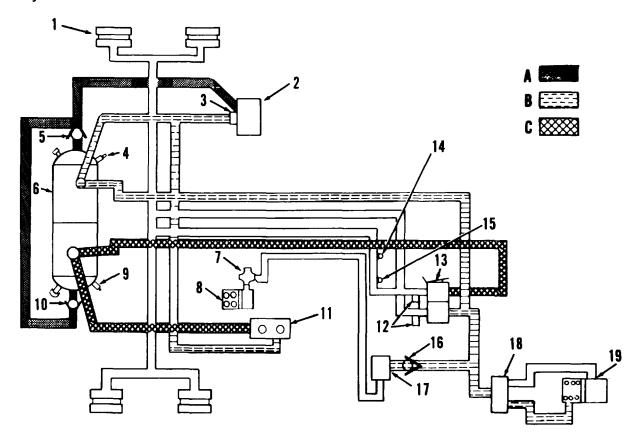
## F-6. Steering System Schematic.



- 1. Steering wheel
- 2. Crossover relief valve
- 3. Crossover relief valve
- 4. Plug
- 5. Oil return line to tank
- 6. Steering metering pump
- 7. Plug
- 8. Shims
- 9. Shims
- 10. Oil supply line from pump
- 11. Left steering cylinder
- 12. Right steering cylinder
- 13. Oil return line to tank
- 14. Shims
- 15. Steering pressure reducing valve
- 16. Plug

#### Section IV. AIR BRAKES.

## F-7. Air System Schematic.

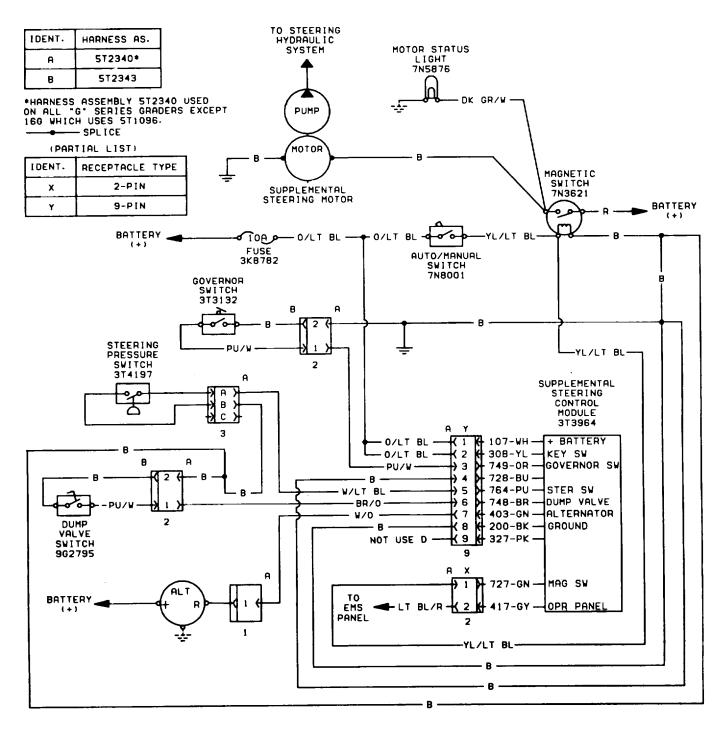


- A. System pressure
- B. System pressure from left section of air tank
- C. System pressure from right section of air tank.
- 1. Service brakes (four)
- 2. Air compressor
- 3. Air compressor governor
- 4. Safety relief valve
- 5. One-way check valve
- 6. Air tank with two sections
- 7. Quick release valve
- 8. Rotochamber for parking brake

- 9. Safety relief valve
- 10. One-way check valve
- 11. Air pressure gauges
- 12. Low air pressure sending units (to EMS)
- 13. Control valve for service brakes
- 14. Blackout stoplight switch
- 15. Stoplight switch
- 16. One-way check valve
- 17. Control valve for parking brake
- 18. Center shift control valve
- 19. Center shift lock pin

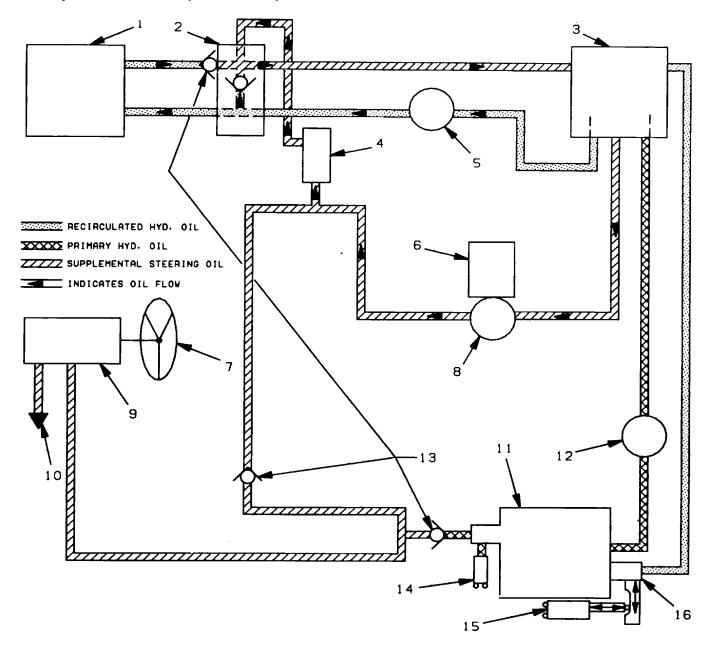
#### Section V. SUPPLEMENTAL STEERING.

#### F-8. Electrical Schematic.



### **SUPPLEMENTAL STEERING.** (cont)

### F-9. Hydraulic Schematic (Non-actuated).

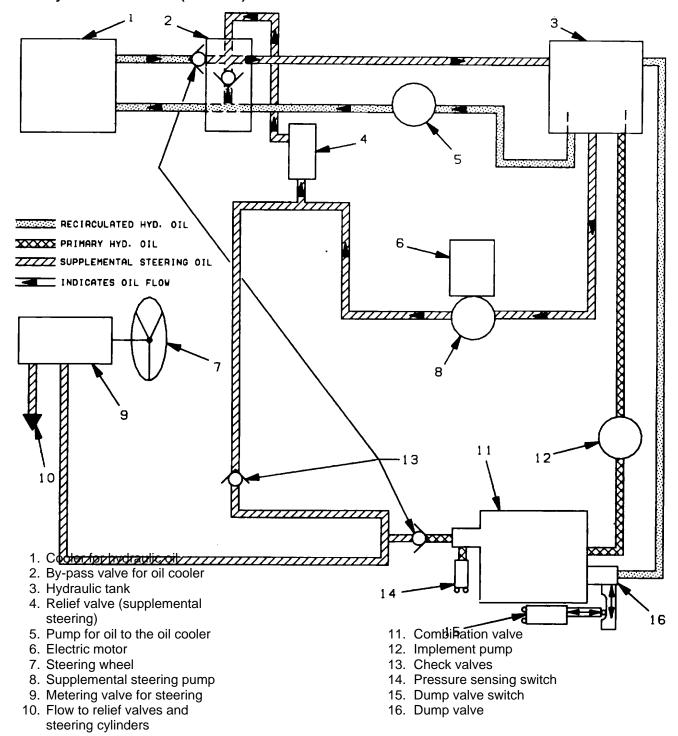


- 1. Cooler for hydraulic oil
- 2. By-pass valve for oil cooler
- 3. Hydraulic tank
- 4. Relief valve (supplemental steering)
- 5. Pump for oil to the oil cooler
- 6. Electric motor
- 7. Steering wheel
- 8. Supplemental steering pump
- 9. Metering valve for steering
- 10. Flow to relief valves and steering cylinder

- 11. Combination valve
- 12. Implement pump
- 13. Check valves
- 14. Pressure sensing switch
- 15. Dump valve switch
- 16. Dump valve

### **SUPPLEMENTAL STEERING.** (cont)

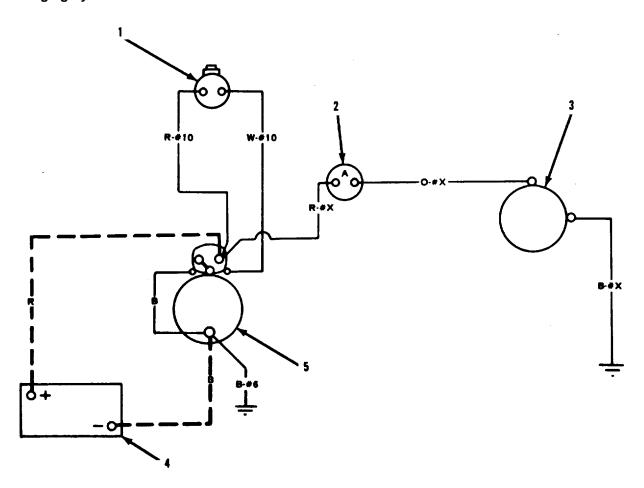
### F-10. Hydraulic Schematic (Actuated).



F-28

## Section VI. ENGINE.

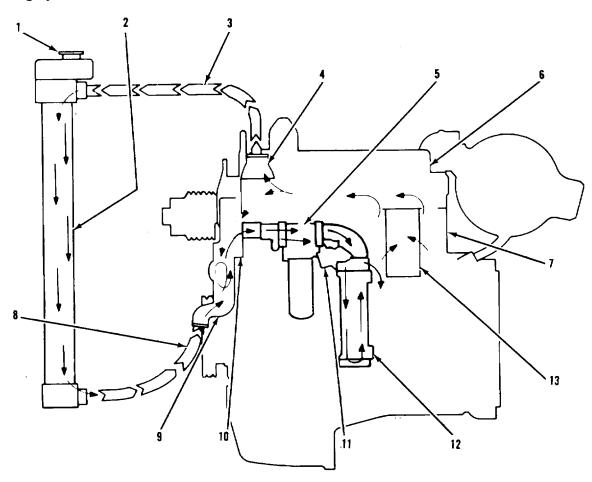
# F-11. Charging System Schematic.



- 1. Start switch
- 2. Ammeter
- 3. Alternator
- 4. Battery5. Starter motor

## ENGINE. (cont)

## F-12. Cooling System Schematic.

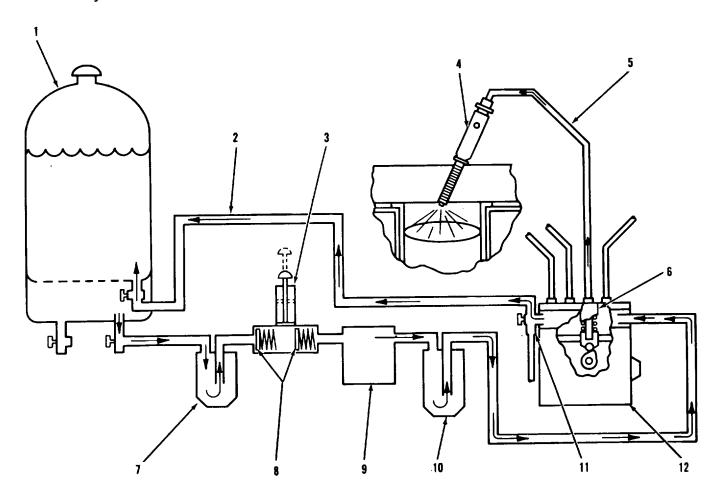


- 1. Filler cap
- 2. Radiator
- 3. Inlet line for radiator
- 4. Water temperature regulator5. Engine oil cooler6. Cylinder head

- 7. Cylinder block8. Inlet line for water pump
- 9. Water pump10. Internal bypass
- 11. Bonnet
- 12. Transmission oil cooler
- 13. Cylinder liner

## **ENGINE.** (cont)

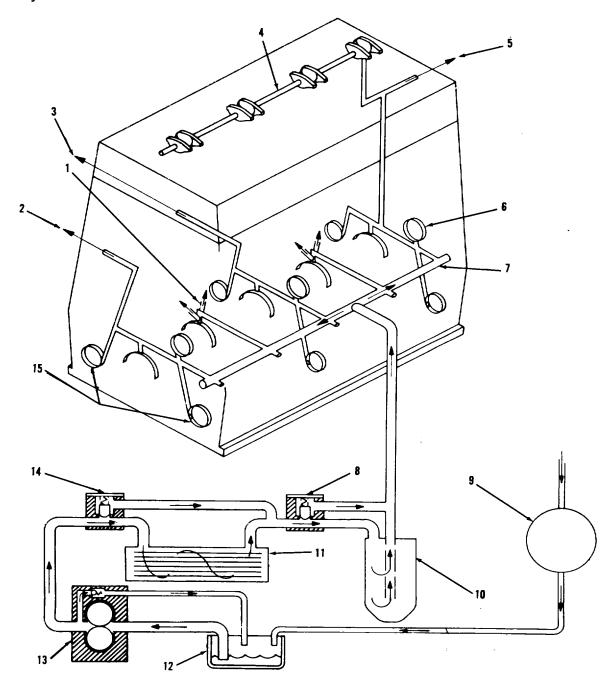
## F-13. Fuel System Schematic.



- 1. Fuel tank
- 2. Fuel return line
- 3. Priming pump
- 4. Fuel injection nozzle
- 5. Fuel injection line
- 6. Fuel injection pump
- 7. Primary fuel filter
- 8. Check valves
- 9. Fuel transfer pump
- 10. Secondary fuel filter
- 11. Constant bleed valve
- 12. Fuel injection pump housing

## ENGINE. (cont)

## F-14. Lubrication System Schematic.

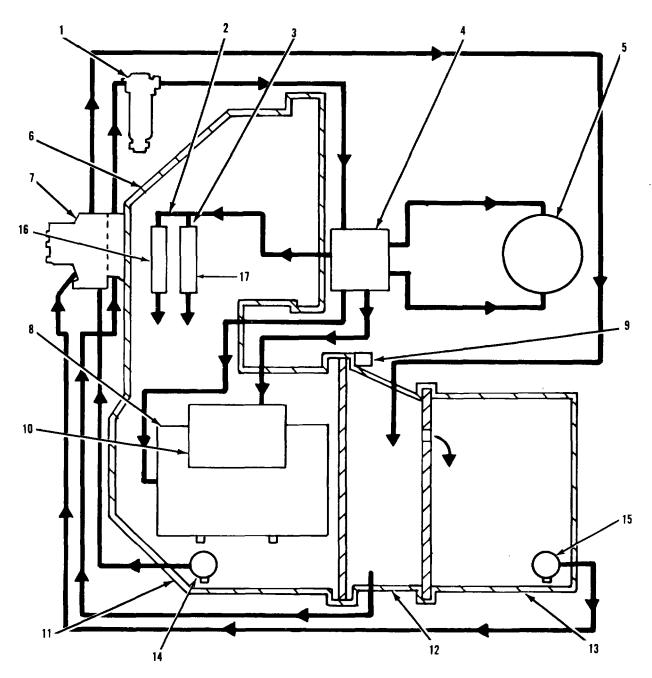


- 1. Oil pressure connection
- 2. Piston cooling orifices
- 3. Oil supply for turbocharger4. Oil passage through rocker shaft to rocker arms
- 5. Oil pressure connection6. Camshaft bores
- 7. Oil manifold

- 8. Filter bypass
- 9. Turbocharger
- 10. Oil filter
- 11. Oil cooler
- 12. Oil sump
- 13. Oil pump14. Oil cooler bypass
- 15. Balancer shaft bores

### Section VII. TRANSMISSION.

#### **Transmission Hydraulic Schematic.** F-15.

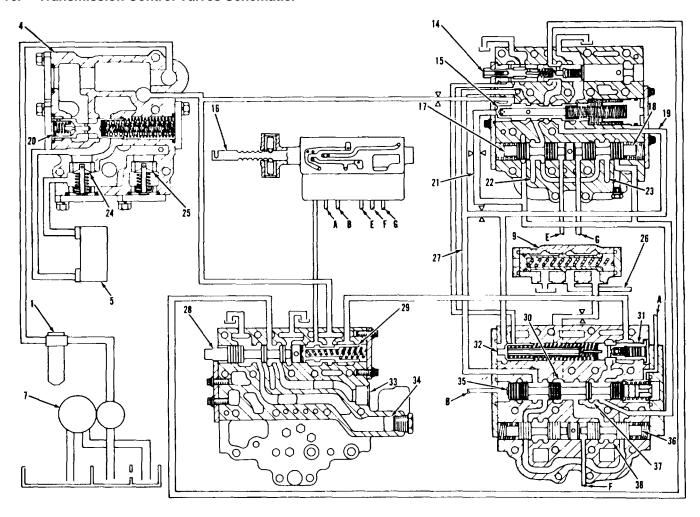


- 1. Oil filter
- 2. No. 1 clutch lubrication passage
- 3. No. 2 clutch lubrication passage
- 4. Main relief valve
- 5. Oil cooler
- 6. Housing for transfer gears
- 7. Oil pump
- 8. Planetary transmission9. Differential lock valve

- 10. Selector valve group
- 11. Transmission reservoir
- 12. Main reservoir in the intermediate housing
- 13. Differential reservoir
- 14. Magnetic screen filter
- 15. Magnetic screen filter
- 1 direction clutch 16. No.
- 2 direction clutch 17. No.

#### TRANSMISSION. (cont)

#### F-16. Transmission Control Valves Schematic.



- A. Passage for signal pressure
- B. Passage for signal pressure
- E. Passage for signal pressure
- F. Passage for signal pressure
- G. Passage for signal pressure
- 1. Oil filter
- 4. Main relief valve
- 5. Oil cooler
- 7. Oil pump
- 9. Differential lock valve
- 14. Manual modulation valve
- 15. Differential, check and safety spool
- 16. Pilot selector spool
- 17. Speed selector spool (clutch No. 4)
- 18. Speed selector spool (clutch No. 5)
- 19. Passage from load piston
- 20. Relief valve
- 21. Passage to differential, check and safety valve

- 22. Passage to No. 4 clutch
- 23. Passage to No. 5 clutch
- 24. Cooler bypass valve
- 25. Lubrication relief valve
- 26. Passage to differential lock clutch
- 27. Passage to differential, check and safety valve
- 28. Direction selector valve
- 29. Priority reducing valve
- 30. Passage to No. 6 clutch
- 31. Modulating reducing valve
- 32. Load piston
- 33. Passage to No. 1 clutch (FORWARD)
- 34. Passage to No. 2 clutch (REVERSE)
- Speed selector spool (clutches No. and No. 7)
- 36. Speed selector spool (clutch No. 3)
- 37. Passage to No. 7 clutch
- 38. Passage to No. 3 clutch

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By Order of the Secrete of the Army:

GORDON R. SULLIVAN General, United States Army Chief of Staff

Official:

MILTON H. HAMILTON Administrative Assistant to the Secretary of the Army 01576

### Distribution:

To be distributed in accordance with DA Form 12-25-E (Block 5785) Unit maintenance requirements for TM 5-3805-261-20.

**☆U.S. GOVERNMENT PRINTING OFFICE: 1995 -395-038/30657** 

### RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

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P.S.—IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

#### THE METRIC SYSTEM AND EQUIVALENTS

#### **LINEAR MEASURE**

- 1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
- 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
- 1 kilometer = 1000 Meters = 0.621 Miles

#### **WEIGHTS**

- 1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
- 1 Kilogram = 1000 Grams = 2.2 Lb.
- 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

#### LIQUID MEASURE

**TO CHANGE** 

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces

Inches .....

Feet.....

1 Liter = 1000 Milliliters 33.82 Fluid Ounces

#### **SQUARE MEASURE**

- 1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
- 1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
- 1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

#### **CUBIC MEASURE**

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches 1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

**MULTIPLY BY** 

2.540

0.305

#### **TEMPERATURE**

5/9 (°F - 32) = °C

212° Fahrenheit is equivalent to 100° Celsius 90° Fahrenheit is equivalent to 32.2° Celsius 32° Fahrenheit is equivalent to 0° Celsius

9/5 (°C + 32) = °F

#### APPROXIMATE CONVERSION FACTORS

Centimeters.....

Meters .....

reet	Meters	0.303
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
		0.473
Pints	Liters	
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609
TO CHANGE	то	MULTIPLY BY
TO CHANGE Centimeters	TO Inches	MULTIPLY BY 0.394
	-	
Centimeters	Inches	0.394
Centimeters	InchesFeet	0.394 3.280
Centimeters	Inches	0.394 3.280 1.094
Centimeters	Inches Feet Yards Miles Square Inches	0.394 3.280 1.094 0.621
Centimeters Meters Meters Kilometers Square Centimeters Square Meters	Inches Feet	0.394 3.280 1.094 0.621 0.155
Centimeters Meters Meters Kilometers Square Centimeters Square Meters Square Meters Square Meters	Inches Feet Yards Miles Square Inches Square Feet Square Yards	0.394 3.280 1.094 0.621 0.155 10.764 1.196
Centimeters Meters Meters Kilometers Square Centimeters Square Meters Square Meters Square Kilometers	Inches Feet	0.394 3.280 1.094 0.621 0.155 10.764 1.196 0.386
Centimeters Meters Meters Kilometers Square Centimeters Square Meters Square Meters Square Meters Square Kilometers Square Hectometers	Inches Feet Yards Miles Square Inches Square Feet Square Yards Square Miles Acres	0.394 3.280 1.094 0.621 0.155 10.764 1.196 0.386 2.471
Centimeters Meters Meters  Meters Kilometers Square Centimeters Square Meters Square Meters Square Hectometers Cubic Meters	Inches Feet Yards Miles Square Inches Square Feet Square Yards Square Miles Acres Cubic Feet	0.394 3.280 1.094 0.621 0.155 10.764 1.196 0.386 2.471 35.315
Centimeters  Meters  Meters  Kilometers  Square Centimeters  Square Meters  Square Meters  Square Kilometers  Square Hectometers  Cubic Meters  Cubic Meters	Inches Feet	0.394 3.280 1.094 0.621 0.155 10.764 1.196 0.386 2.471 35.315 1.308
Centimeters	Inches Feet	0.394 3.280 1.094 0.621 0.155 10.764 1.196 0.386 2.471 35.315 1.308 0.034
Centimeters	Inches Feet	0.394 3.280 1.094 0.621 0.155 10.764 1.196 0.386 2.471 35.315 1.308 0.034 2.113
Centimeters	Inches Feet	0.394 3.280 1.094 0.621 0.155 10.764 1.196 0.386 2.471 35.315 1.308 0.034 2.113 1.057
Centimeters Meters Meters Kilometers Square Centimeters Square Meters Square Meters Square Hectometers Cubic Meters Milliliters Liters Liters Liters Liters Meters Meters Meters Liters Liters Liters Liters Meters Meters Meters Liters	Inches Feet	0.394 3.280 1.094 0.621 0.155 10.764 1.196 0.386 2.471 35.315 1.308 0.034 2.113 1.057 0.264
Centimeters Meters Meters Kilometers Square Centimeters Square Meters Square Meters Square Kilometers Cupic Meters Milliliters Liters Liters Liters Grams	Inches Feet	0.394 3.280 1.094 0.621 0.155 10.764 1.196 0.386 2.471 35.315 1.308 0.034 2.113 1.057 0.264 0.035
Centimeters Meters Meters Kilometers Square Centimeters Square Meters Square Meters Square Kilometers Cubic Meters Cubic Meters Milliliters Liters Liters Liters Grams Kilograms	Inches Feet	0.394 3.280 1.094 0.621 0.155 10.764 1.196 0.386 2.471 35.315 1.308 0.034 2.113 1.057 0.264 0.035 2.205
Centimeters Meters Meters Kilometers Square Centimeters Square Meters Square Meters Square Hectometers Cubic Meters Cubic Meters Milliliters Liters Liters Liters Grams Kilograms Metric Tons	Inches Feet	0.394 3.280 1.094 0.621 0.155 10.764 1.196 0.386 2.471 35.315 1.308 0.034 2.113 1.057 0.264 0.035 2.205 1.102
Centimeters Meters Meters Kilometers Square Centimeters Square Meters Square Meters Square Meters Square Hectometers Cubic Meters Cubic Meters Liters Liters Liters Liters Kilometers Grams Kilograms Metric Tons Newton-Meters	Inches Feet	0.394 3.280 1.094 0.621 0.155 10.764 1.196 0.386 2.471 35.315 1.308 0.034 2.113 1.057 0.264 0.035 2.205 1.102 0.738
Centimeters	Inches Feet	0.394 3.280 1.094 0.621 0.155 10.764 1.196 0.386 2.471 35.315 1.308 0.034 2.113 1.057 0.264 0.035 2.205 1.102 0.738 0.145
Centimeters	Inches Feet	0.394 3.280 1.094 0.621 0.155 10.764 1.196 0.386 2.471 35.315 1.308 0.034 2.113 1.057 0.264 0.035 2.205 1.102 0.738

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