DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

CRANE, CRAWLER

MOUNTED

60 TON, DIESEL DRIVEN

(HARNISCHFEGER MODEL 1125)

FSN 3810-728-9945

(WINTERIZED)

FSN 3810-701-7324 (NON-WINTERIZED)

HEADQUARTERS, DEPARTMENT OF THE ARMY

MAY 1966

SAFETY PRECAUTIONS

Before Operation

Disengage master clutch.
Be sure equipment is on firm base or mats are used under crawlers.
Make certain all adjustments have been properly made and hook block is sufficiently rigged.
Make certain equipment is free of grease, oil, or dirt.
Check lubrication levels.

During Operation

Do not allow personnel in the cab or on the load.
Watch the load constantly.
When dumping into trucks, spot the trucks, so the swing will bring the load over the tail gate of the truck. Never swing over the truck cab.
Keep loaded bucket or crane loads within safe working range, and keep sufficient clearance from high tension wires.
When load is extremely heavy, lift slightly and test brakes.
Do not smoke or use open flame in vicinity of flammable materials or when servicing the batteries.
Disengage master clutch before oiling, greasing, or making any adjustments.

After Operation

Disengage master clutch.
Park on firm, level, dry ground.
Do not leave bucket or any crane load in raised position, rest bucket or load on ground.
Do not pull boom tight against boom backstops, leave a few inches clearance in the backstops.
Block crawlers at front and rear.

CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 20 June 1973

Operator and Organizational Maintenance Manual

CRANE, CRAWLER MOUNTED, 60 TON, DIESEL DRIVEN

(HARNISCHFEGER MODEL 1125)

FSN 3810-728-9945 (WINTERIZED)

FSN 3810-701-7324 (NON-WINTERIZED)

TM 53810-231-12, 10 May 1966, is changed as follows:

Page 1. In Appendix II, Section III is deleted.

Page 3. Paragraph id is superseded as follows:

d. The reporting of errors, omissions and recommendations for improving this manual by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forward direct to Commander, US Army Troop Support Command, ATTN: AMSTS-MPP, 4300 Goodfellow Boulevard, St. Louis, MO 63120.

Page 14, paragraph 9*b*. Subparagraph (5) is added an follows.

(5) Maintenance and operating supplies required for initial 8 hours of operation are contained in table II below

Table II. Maintenance and Operating Supplies

(1) Component application	(2) Federal stock number	(3) Description	(4) Quantity required f/initial operation	(5) Quantity required f/8 operation	(6) Notes
0101 CRANKCASE (1)		OIL LUBRICATING: 5 gal pails as follows:	48 qt	88 gal (3)	(1) Includes quantity of oil to fill engine oil system as follows:
	9150-265-9435 (2)	OE-30	48 qt	(3)	48 qt crankcase
	9150-265-9428 (2)	OE-10	48. qt	(3)	10 qt air cleaner
	9150-242-7603 (2)	OES	48 qt	(3)	(2) See C9100-IL for, addition data and requisitioning procedures
0304 AIR CLEANER		OIL LUBICATING: (4)	10 qt	(3)	
0306 FUEL		FUEL OIL, DIESEL: bulk as follows			(3) See current L.O. for grade application and replenishment interval
	9140-286-5294 (2)	DF-2 Regular Grade	270 gals (5)	88 gal (6)	
	9140-286-5286 (2)	DF-1 Winter Grade	270 gals (5)	88 gal (6)	(4) Use oil as prescribed in item 1.
	9140-286-5283 (2)	DF-A Arctic Grade	270 gals (5)	88 gal (6)	
0311 PRIMING SYSTEM	2910-565-9424	TANK	1 (7)		(5) Tank capacity.
0501 RADIATOR		WATER ANTIFREEZE: 55- gal dram as follows:	88 qt		(6) Average fuel consumption is 11 gal per hour.
	6850-893-8636	ANTIFREEZE: ethylene glycol			
	6850-174-1806	ANTIFREEZE: compound arctic	88 qt		(7) Quantity indicated as the minimum required for one state when temperature is below 40 °F.
4305 HYDRAULIC CONTROLS	9150-252-6375	HYDRAULIC FLUID: 1 gal can as follows: HBA	1 qt (8)	(3)	
7416 EXPOSED GEARS		LUBRICATING OIL CHAIN-WIRE ROPE EXPOSED GEAR: 5 lb as follows			(8) Quantity of hydraulic fluid to fill reservoir.
	9150-234-5199 (2)	CW-11A	5 lb	(3)	(9) Use lubricating oil gear as prescribed in item 9.
	9150-234-5199 (2)	CW-11B	5 lb	(3)	
7420 CHAIN CASE		OIL LUBRICATING: 5 -gal pail as follows:			
	9150-265-9435 (2)	OE-30	6 qt	(3)	
	9150-265-9428 (2)	OE-10	16 qt	(3)	
	9150-242-7603 (2)	OES	16 qt	(3)	

(1) Component application	(2) Federal stock number	(3) Description	(4) Quantity required f/initial operation	(5) Quantity required f/8 operation	(6) Notes
7420 JACKSHAFT GEAR CASE		LUBRICATING OIL GEAR: 55 gal as follows::			
	9150-577-5848 (2)	GO-140	12 qt	(3)	
	9150-577-5845 (2)	GO-90	12 qt	(3)	
	9150-257-5442 (2)	GOS	12 qt	(3)	
7420 MAIN GEAR CASE		LUBRICATING OIL GEAR (9)	20 qt	(3)	
7420 PROPEL GEAR CASE		LUBRICATING OIL GEAR (9)	16 qt	(3)	
7420 BEVEL PINION GEAR CASE		LUBRICATING OIL GEAR (9)	12 qt	(3)	
		GREASY, AUTOMOTIVE AND ARTILLERY 35-lb PAIL AS FOLLOWS:		(3)	
	9150-190-0907 (2)	GAA	35 lb		

Page 135. Appendix II is superseded as follows:

APPENDIX II
BASIC ISSUE ITEM LIST AND ITEMS
TROOP INSTALLED OR AUTHORIZED

Section I. INTRODUCTION

1. Scope

This appendix lists basic issue items, items troop installed or authorized which accompany the crane and are required by the crew/operator for operation, installation, or operator's maintenance.

2. General

This basic issue items, items troop installed or authorized list is divided into the following sections:

a. *Basic Issue Items List Section II.* Not applicable.

b. *Items Troop Installed or Authorized List-Section III*. A list in alphabetical sequence of items which at the discretion of the unit commander may accompany the end item, but are NOT subject to be turned in with the end item.

3. Explanation of Columns

The following provide an explanation of columns in the tabular list of Basic Issue Items List, Section II, and Items Troop Installed or Authorized, Section m.

a. Source, Maintenance, and Recoverability Code(s) (SMR): Not applicable.

b. Federal Stock Numbers. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purpose.

c. Description This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A 2-chater alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Authorized (Items Troop Installed or Authorized Only). This column Indicates the quantity of the item authorized to be used with the equipment.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR Code	(2) Federal Stock Number	(3) Description Ref No. & Mfr Code / Usable on Code	(4) Unit of Meas	(5) Qty Auth
	7520-559-9618	CASE, MAINTENANCE AND OPERATION MANUAL	EA	1

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, Untied States Army
Chief of Staff

Official
VERNE L BOWERS
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-25B, (qty rqr block No. 353) Operator maintenance requirements for Crane-Shovel, Crawler, 60 Ton.

U.S. GOVERNMENTT PRINTING OFFICE: 1973-769620/974

TECHNICAL MANUAL
No. 53810231-12

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *16 May 1966*

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL
CRANE, CRAWLER MOUNTED
60 TON DIESEL DRIVEN (HARNISCHFEGER MODEL 1125)
FSN 3810-7289945 (WINTERIZED)
FSN 381 701-7324 (NON-WINTERIZED)

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions are published for use of the personnel to whom the Harnischfeger Model 1125 Crane is issued. They provide information on the operation and organizational maintenance of the equipment. Also included are descriptions of main units and their functions in relationship to other components.

b. Appendix I contains a list of publications applicable to this manual. Appendix II contains the list of Basic Issue Items authorized the operator of this equipment. Appendix III contains the maintenance allocation chart.

c. Numbers in parentheses on illustrations indicate quantity. Numbers preceding nomenclature callouts on illustrations indicate the preferred maintenance sequence.

d. DA Form 2028 (Recommended Changes to DA Publications) will be used for reporting discrepancies and recommendations for improving this publication. This form will be completed by the individual using the manual and forwarded direct to Commanding General, U.S. Army Mobility Equipment Center, ATTN: SMOME-MPD, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

e. Report all equipment improvement recommendations as prescribed in TM 38-750.

2. Record and Report Forms

a. DA Form 2258 (Depreservation Guide of Engineer Equipment).

b. For record and report forms applicable to the operator, crew, and organizational maintenance, refer to TM 38-750.

Note

Applicable forms, excluding Standard Form 46 which is carried by the operator, shall be kept in a canvas bag mounted on the equipment.

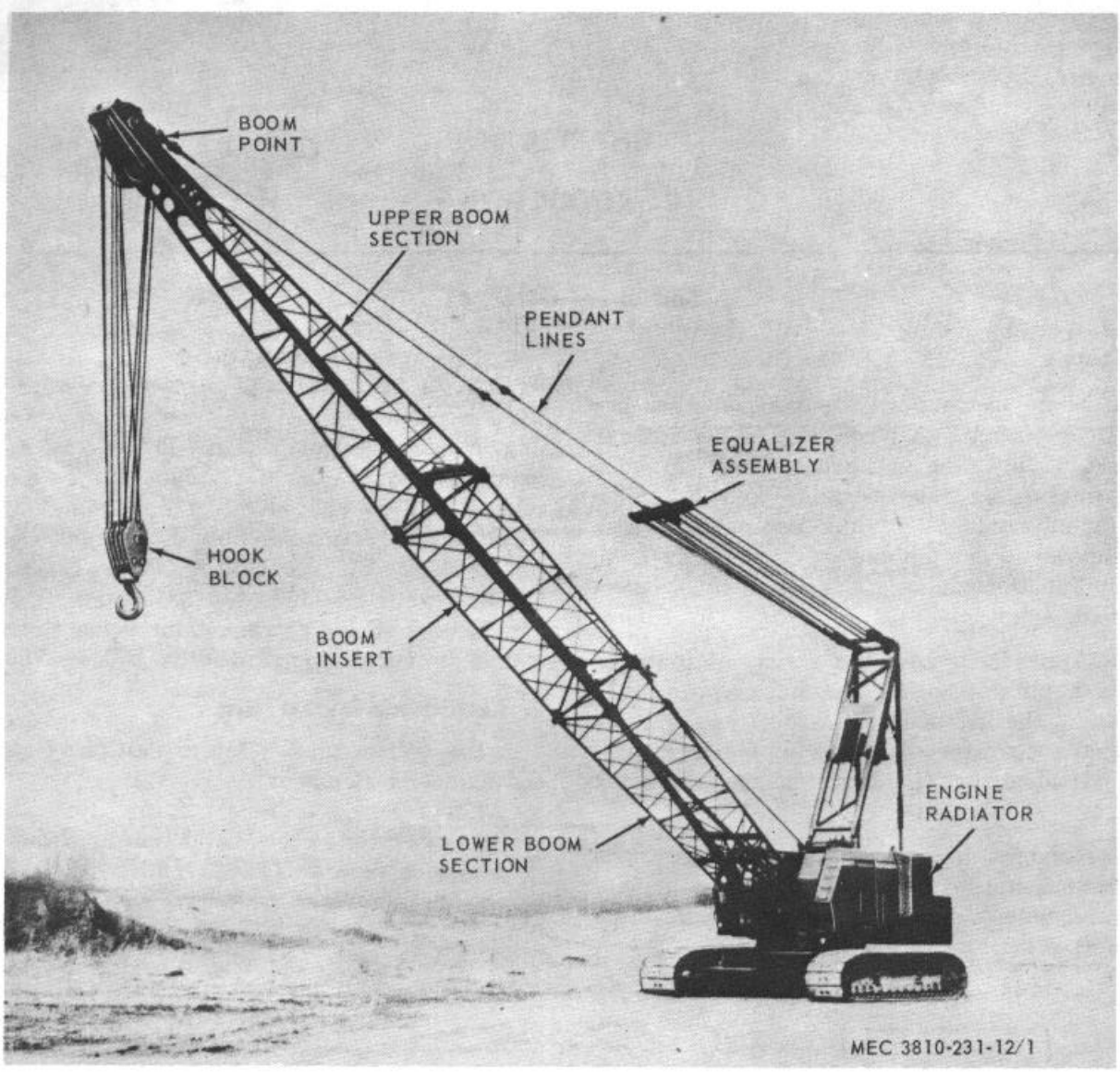


Figure 1. Crane, left front, three quarter view.

Section II. DESCRIPTION AND DATA

3. Descriptions

The Harnischfeger Model 1125 Crane is a 60 ton, diesel engine driven, crawler mounted, and is designed for use with a 60 foot boom with a 20 foot boom extension a n d boom jib.

The revolving frame (figs. 1 and 2), upon which are mounted the engine, upper section machinery, gantry and boom assembly, revolves around the center gudgeon on rollers. Hook rollers on the front and rear are to prevent tipping of the crane.

The lower (crawler) section is the foundation of the machine and is made up basically of the turret and axle assembly, ring gear, center gudgeon, crawler assemblies, and propelling mechanism.

The crane is powered by a Cummins Model NT-380-1 diesel engine. It is a single engine machine with the engine mounted on the revolving frame and used to power and operate all functions of the revolving frame and boom equipment and to furnish power to propel the unit through the lower (crawler) section.

In this manual, the terms left and right are used with respect to the operator's side as the right side. Front is the end of the crane to which the boom is mounted. Rear is the end of the crane upper which contains the engine and counterweight.

4. Identification and Tabulated Data

a. Identification. The Model 1125 60 to n crawler crane has seven major identification plates. The information contained on these plates is listed below.

(1) *Fuel tank capacity plate*. This plate is located outside on the right side of the cab just below the fuel filter cap and shows the fuel tank capacity in U.S. gallons.

(2) *Control levers instruction plate*. This plate is located in the operator's cab, on the lower panel, directly in front

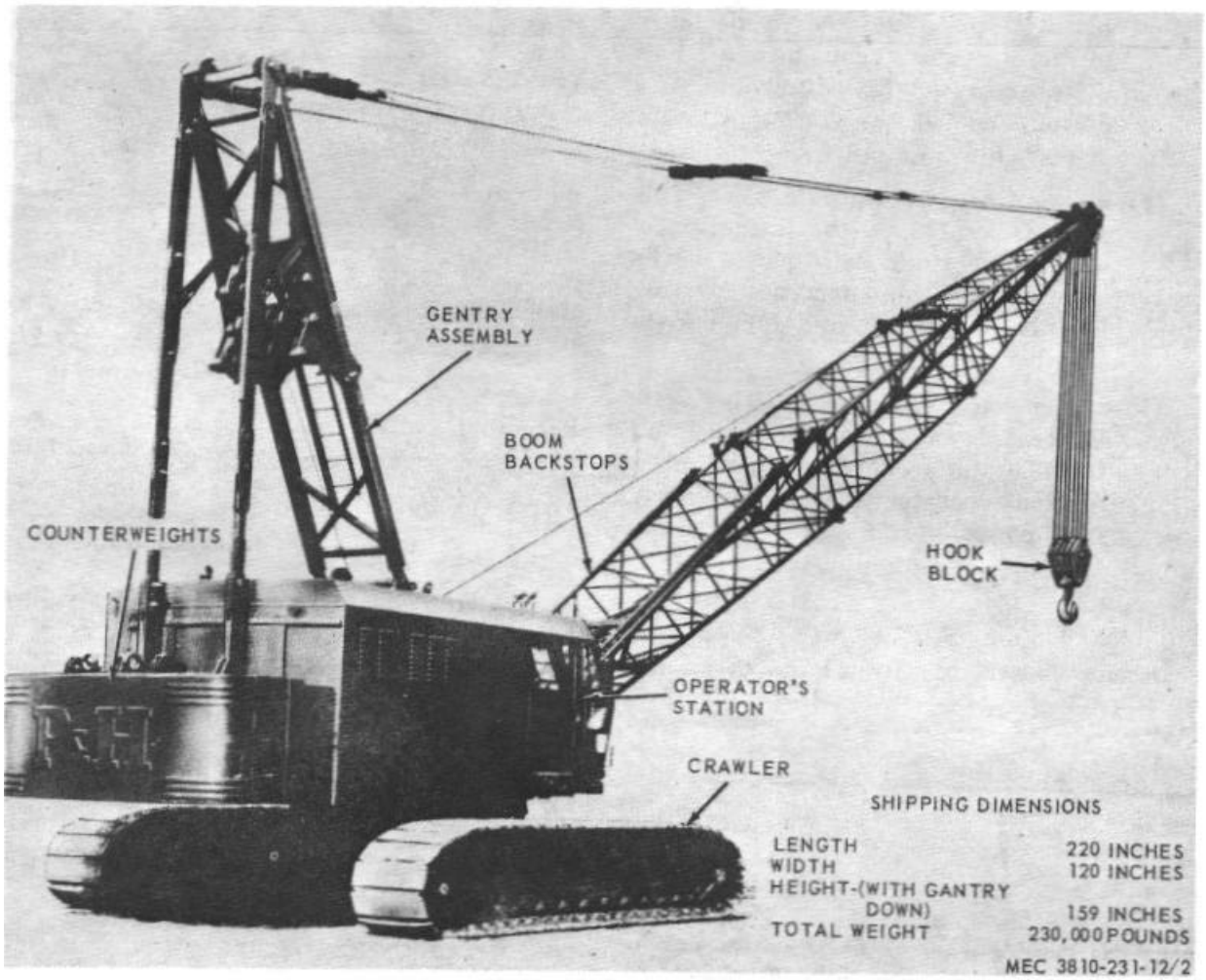


Figure 2. Crane, right-rear, three-quarter view, with shipping dimensions.

of the control lever stand, and give instructions for operating the controls.

(3) *Counterweight handling procedure instruction plate*. This plate is located inside panel of the operator's cab door. This plate gives instruction for the removal and installation of the counterweights.

(4) *Transportation data plate*. This plate is located on the inside panel of the operator's cab door. This plate gives instruction for the disassembly of the crane for transportation.

(5) *Loading procedure data plate*. This plate is located on the inside panel of the operator's cab door. This plate gives weight, lifting and tie down points of the various crane components.

(6) *Rating and capacity data plate*. This plate is located on the inside panel of the operator's cab door. This plate gives lifting capacities for various boom lengths and for boom jib when used.

(7) *Power line caution plate*. This plate is located on the inside panel of the operator's cab door. This plate cautions operator to keep boom away from power lines.

b. Tabulated Data.

(1) *Crane.*

Manufacturer ..... Harnischfeger Corporation
Model 1125
Type .....Crawler Mounted

(2) *Engine.*

Manufacturer ..... Cummins
Type .....Diesel
Model NT380-1
Bore ..... 5.5 in. (inches)
Stroke .....6 in.
Total displacement ..... 855 cu. in. (cubic inch)
Governed speed ..... 2100 rpm at full load
Horsepower 335
Number of cylinders 6
Compression 15:1
Cooling .....Liquid
Fan belt deflection .....1/2 in.
Rotation at flywheel end ..... R.H. (Right hand)
Clutch adjustment ..... Adjust to contact.

(3) *Alternator (Crane).*

Manufacturer .....Leece-Neville
Type .....37.5 volt
Model 5420G
Amperage ..... 70 Amp.

(4) *Engine accessories.*

(a) Starting motor.

Manufacturer .....Leece-Neville
Model ..... 7066 MP
Volts 24

(b) Battery charging alternators

Manufacturer .....Leece-Neville
Model 3002AA
Volts..... 27
Amperage ..... 60 Amp.

(c) Fuel filter.

Manufacturer.....Fram
Model F-1126CU

(d) Air cleaner.

Manufacturer.....Vortex
Model G160E2

(e) Lubricating oil filter.

Manufacturer .....Fram
Model.....121222

(f) Batteries.

1. *Winterized model.*

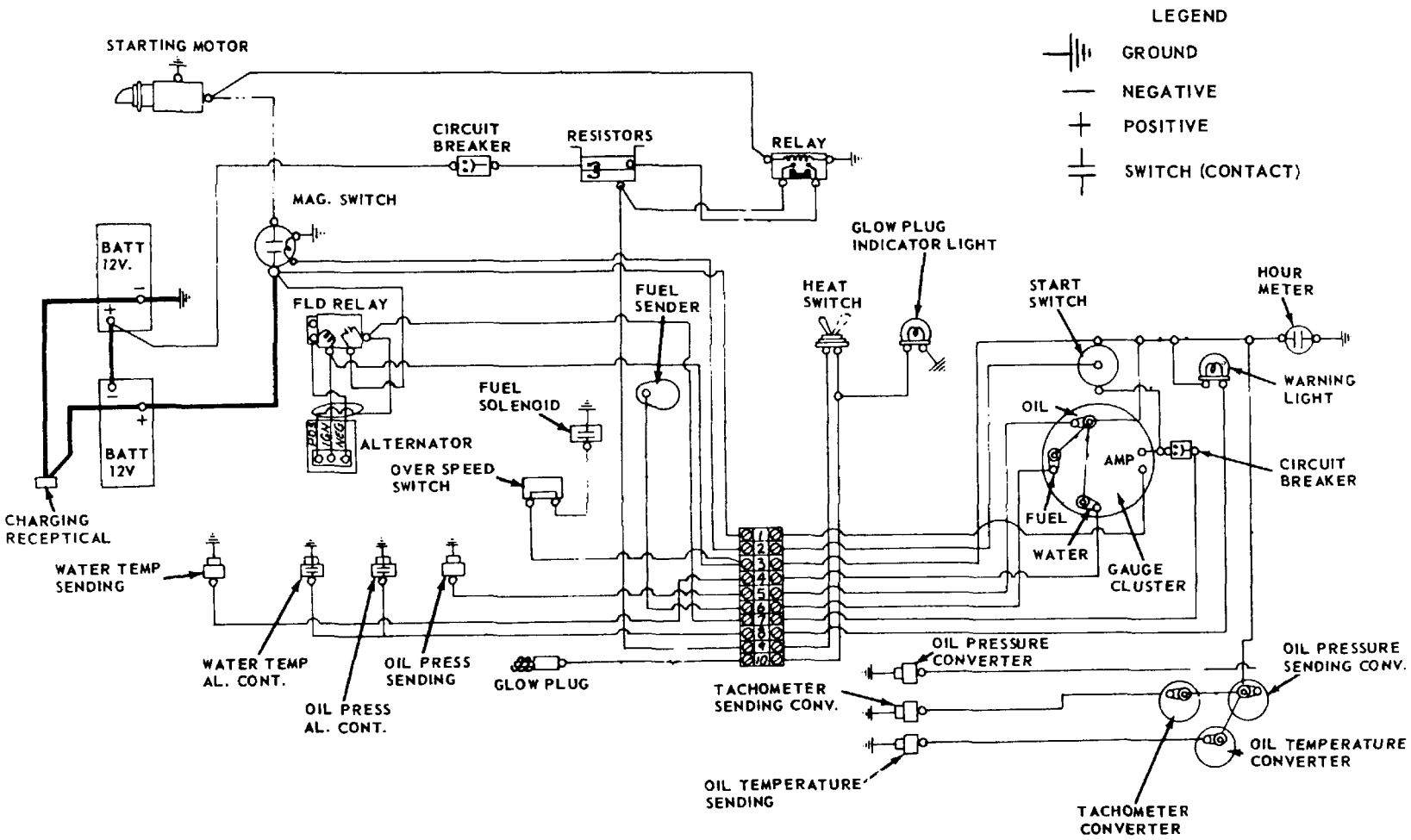
Manufacturer .....Globe Union
Type ..... Dry charge
Volts 12
Quantity 4

2. *Non-winterized Model.*

Manufacturer .....Globe Union
Type ..... Dry charge
Volts 12
Quantity 2

(5) *Capacities.*

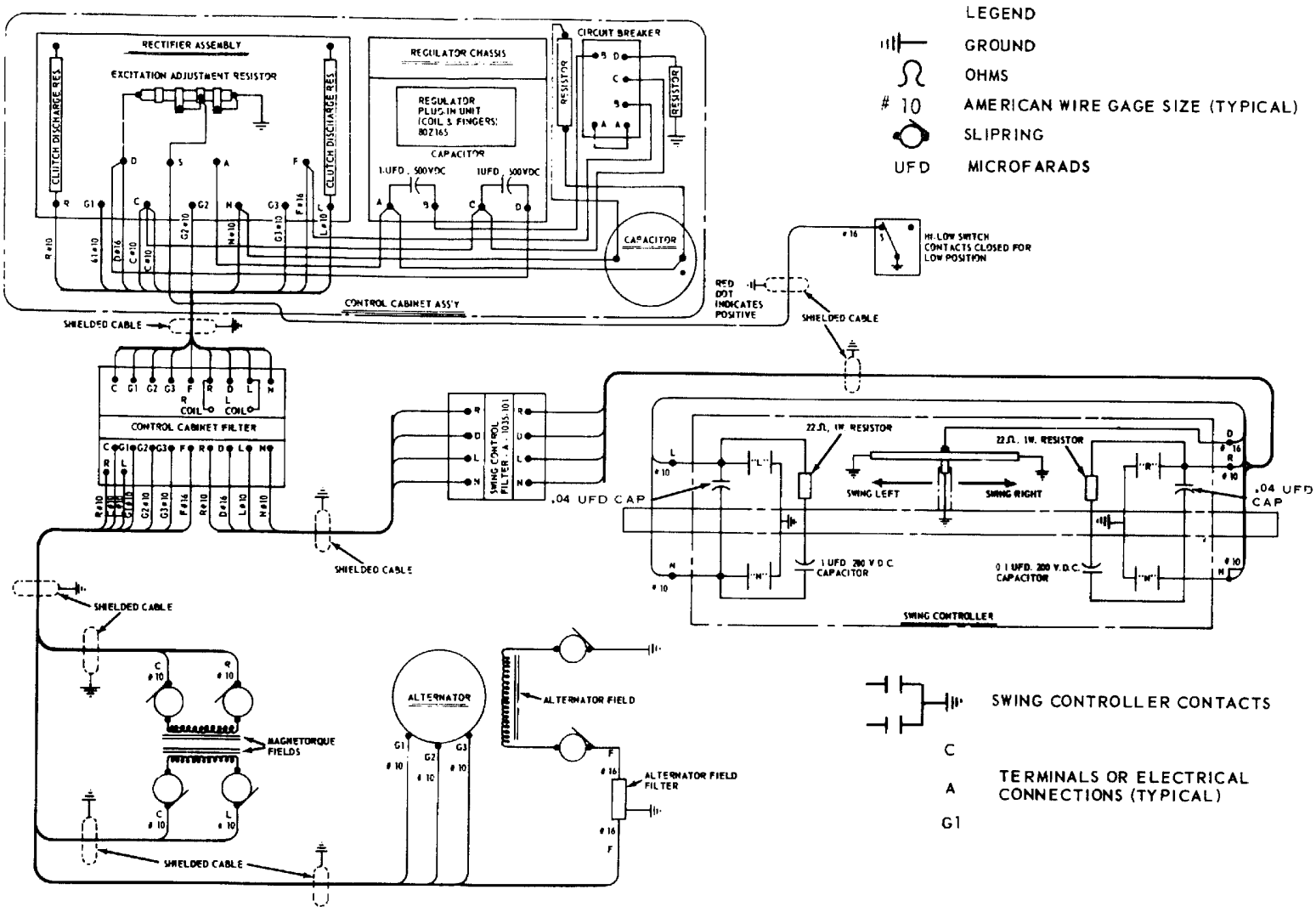
Fuel tank .....270 gal.
Engine crankcase .....48 qts.
Air cleaner .....10 qts.
Radiator .....22 gal.



A. ENGINE INSTRUMENTS WIRING DIAGRAM

MEC 3810-231-12/3 ①

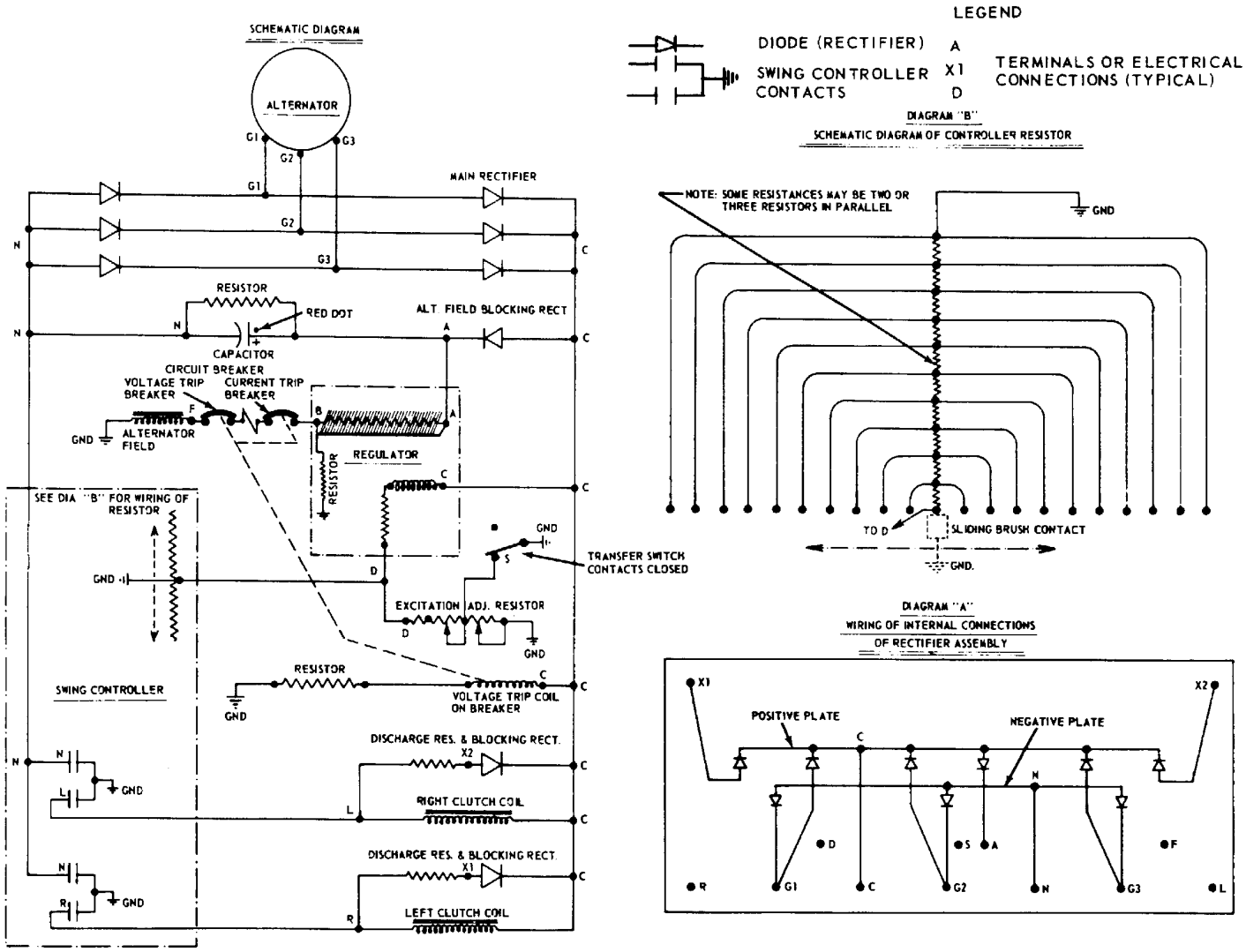
Figure 3. Wiring diagram.



B. CONTROLS WIRING DIAGRAM

MEC 3810-231-12/3 ②

Figure 3 -Continued.



C. SWING CONTROLLER WIRING DIAGRAM

MEC 3810-231-12/3 ③

Figure 3 - Continued.

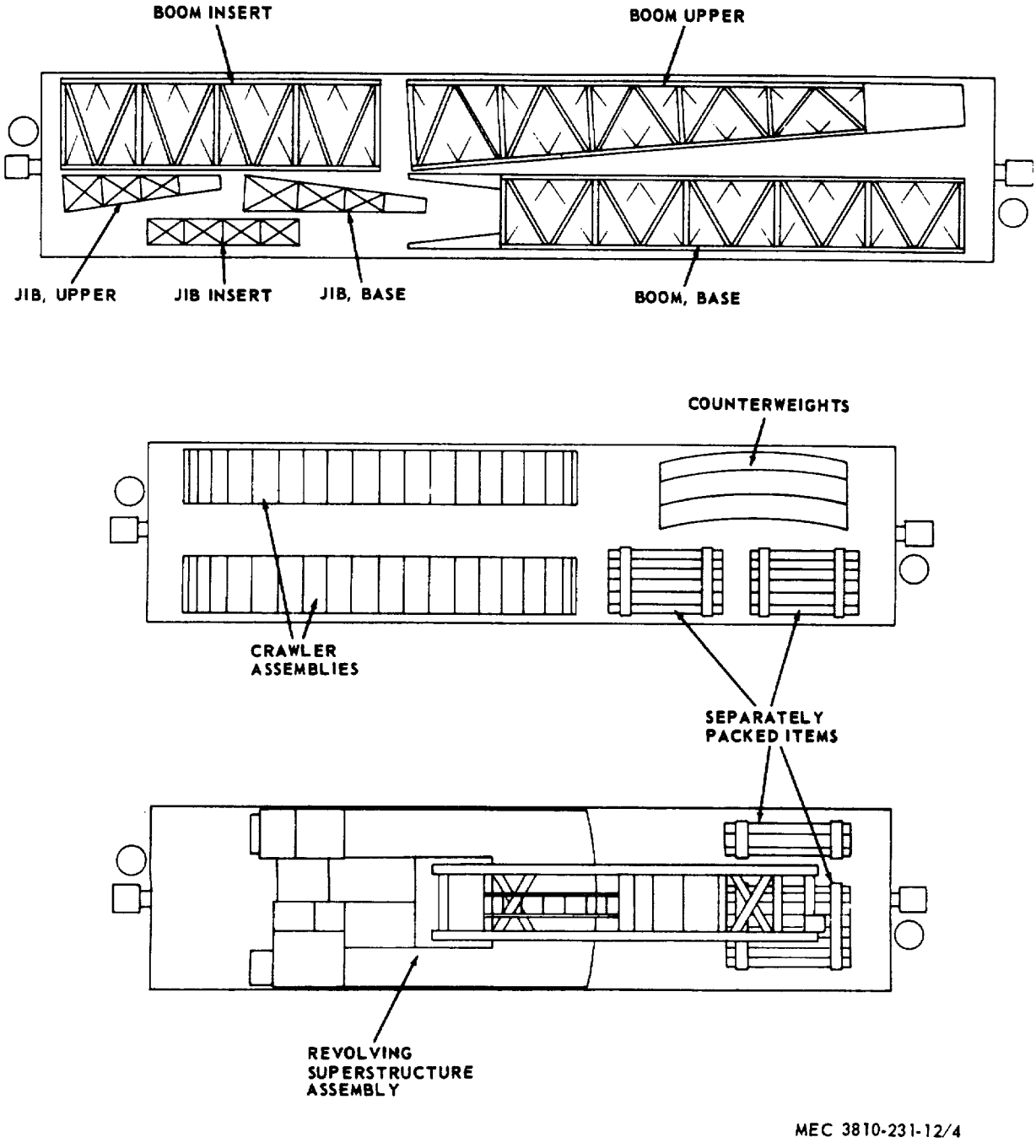


Figure 4. Base plan.

(6) *Nut and bolt torque data.*

SAE Grade No.	1 or 2	5
Bolt body size (inches) - (thread)	Torque foot pounds	Torque foot pounds
1/4-20	6	8
-28	6	10
5/16-18	11	17
-24	13	19
3/8-16	18	31
-24	20	35
7/16-14	28	49
-20	30	55
1/2-13	39	75
-20	41	85
9/16-12	51	110
-18	55	120
5/811	83	150
-18	95	170
3/4-10	105	270
-16	115	295
7/8-9	160	395
-14	175	435
1-8	235	590

(7) *Adjustment data.*

(a) Valves. Intake valves cold or warm, 0.016 inch; Net, 0.014 inch. Exhaust valves cold or warm, 0.029 inch; Net, 0.027 inch.

(b) Belt Tension.

Belt ..... Deflection per foot of span
Fluid pump drive ..... 13/32 inch
Engine alternator drive ..... 13/32 inch
Fan drive ..... 1/2 inch
Crane alternator drive ..... 7/16 inch
Water pump drive ..... 13/32 inch

(8) *Dimensions and weight (fig. 2).*

WEIGHT:
Upper & lower structures less crawlers 94,000 lbs.
Crawlers (26,000 each) ..... 52,000 lbs.
Counterweight ..... 24,400 lbs.
Counterweight ..... 21,250 lbs.
Counterweight ..... 18,900 lbs.
Block ..... 2,550 lbs.
Lower boom section ..... 4,000 lbs.
Upper boom section ..... 4,900 lbs.
20 ft. boom insert ..... 1,950 lbs.
Boom jib ..... 1,533 lbs.
Parts box ..... 3,500 lbs.
DIMENSIONS:
Revolving superstructure less counterweight gantry and boom .....18 ft. 4 in.
Crawler assemblies (length) .....22 ft. 0 in.
Crawler assemblies (tread width) .....27 in.
Revolving superstructure (width) .....10 ft. 0 in.

(9) *Wiring diagram (fig. 3)*

(10) *Base Plan (fig. 4)*

5. Difference in Models

This manual covers the Harnischfeger, Model 1125, Crane, Crawler Mounted, 60 ton. Known unit differences (winterization), is covered in chapter 4.

CHAPTER 2.

INSTALLATION AND OPERATION INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

6. Unloading the Equipment

a. Blocking and Tiedown Removal. Remove the blocking and tiedowns as instructed in figure 5.

b. Removal of Separately Packed Components. Using suitable lifting device remove boom, boom extension, boom jib, crawler assemblies, counterweights, and separately packed components.

c. Removal of Crane Unit by Overhead Crane. Attach the necessary slings to t he hook of the overhead crane and remove crane unit from flat car or carrier. Refer to figure 6.

Caution

Be sure the overhead crane has a lifting capacity of 70 tons or over.

7. Unpacking the Equipment

a. Unpacking. Crane accessories such a s lights, batteries and accessories are wrapped in waterproof paper and packed in boxes. Use care in removing cover from boxes; pull nails to remove boards. Gouging with a bar might damage contents of boxes. The remaining items are wrapped in waterproof and pressure-sensitive tape and stored in the tool box. Inspect the equipment against the packing list and report all discrepancies to t he proper authority.

b. Removal of Protective Material and Devices. Prepare the crane for inspection and for operating as outlined on DA Form 2258.

8. Installation or Setting-up Instructions

The crane is shipped semi-assembled. Installation or setting-up instructions consist of installing the crawler assemblies (fig. 6), and boom assembly (para 42), raising gantry (para 18) and installing counterweights (para 41) on the basic unit.

9. Inspecting and Servicing Equipment

a. Inspecting New Equipment.

(1) Make a complete visual inspection to make sure the required tools, repair parts, and publications are with the equipment.

(2) Visually inspect the crane engine and mounted components for missing items or damage that may have occurred during loading, shipment or unloading.

(3) Inspect wiring, fuel and oil lines, radiator and hoses, fuel tank, gages, instruments, and lights for missing items- broken, loose, or damaged parts.

(4) Inspect the drain plugs, breathers, filler caps and drain cocks to be sure they are secured and not leaking or damaged.

(5) Inspect air and hydraulic hoses and lines, and electrical leads for cuts, breaks, cracks, or signs of deterioration. Correct or report any deficiencies noted and corrected to field maintenance.

b. Servicing New Equipment.

(1) Perform the necessary daily preventive maintenance services (para 35).

(2) When the crane is received with new, dry-charge batteries, and electrolyte is packed separately, perform the following services:

(a) Remove the battery box cover and battery filler caps.
(b) Pour electrolyte into each battery cell to a depth of 3/8 inch above the separators.
(c) Install the filler caps and battery box cover.

Caution

Do not smoke or un open flame in the vicinity, as batteries generate explosive gas during charging.

Refer to TM 96140200-15 for additional battery service data.

Caution

Exercise care when filling the batteries with electrolyte to prevent splashing or spilling the acid on clothing and body.

(3) Fill the engine cooling system with water or the proper mixture of antifreeze solution (table 1). See that the drain valves on en)gine block and radiator are closed.
(4) Fill fuel tanks to capacity, for fuel oil is used in operation of torque converter. Fill frequently.

Caution

Keep fuel tanks full. When level is below 100 gallons, there is a danger of fuel cavity.

Table 1. Freezing Points, Composition and Specific Gravities of Military Antifreeze Materials

Lowest expected ambient temp. of	Pints of inhibited glycol per gal. of coolant[1]	Compound, Antifreeze Atctic[2]	Ethylene glycol coolant solution specific gravity at 68°F.[3]
+20	1 1/2	Issued full strength and ready mixed for 0°	1.022
+10	2	to -65°F. temperatures for both initial	1.036
0	2 8/4	installation and replenishment of losses	1.047
-10	8 1/4		1.056
-20	8 1/2		1.062
-80	4		1.067
-40	4 1/4		1.078
-60	Arctic anti	DO NOT DILUTE WITH WATER OR	
-60	freeze pre	ANY OTHER SUBSTANCE	
-76	ferred		

1. Maximum protection is obtained at 60 percent by volume (4.8 pints of ethylene glycol per gallon of solution).
2. Military specification MIL-C-11755 Arctic type, nonvolatile antifreeze compound is intended for use in the cooling system of liquid-cooled internal combustion engines. It is used for protection against freezing primarily in Arctic regions where the ambient temperature remains for extended periods close to -40°F. Or drops below, to as low as -90°F.
3. Use an accurate hydrometer. To test hydrometer, use 1 part ethylene glycol antifreeze to 2 parts water. This should produce a hydrometer reading of 0°F.

Note. Fasten a tag near the radiator filler cap indicating the type antifreeze.

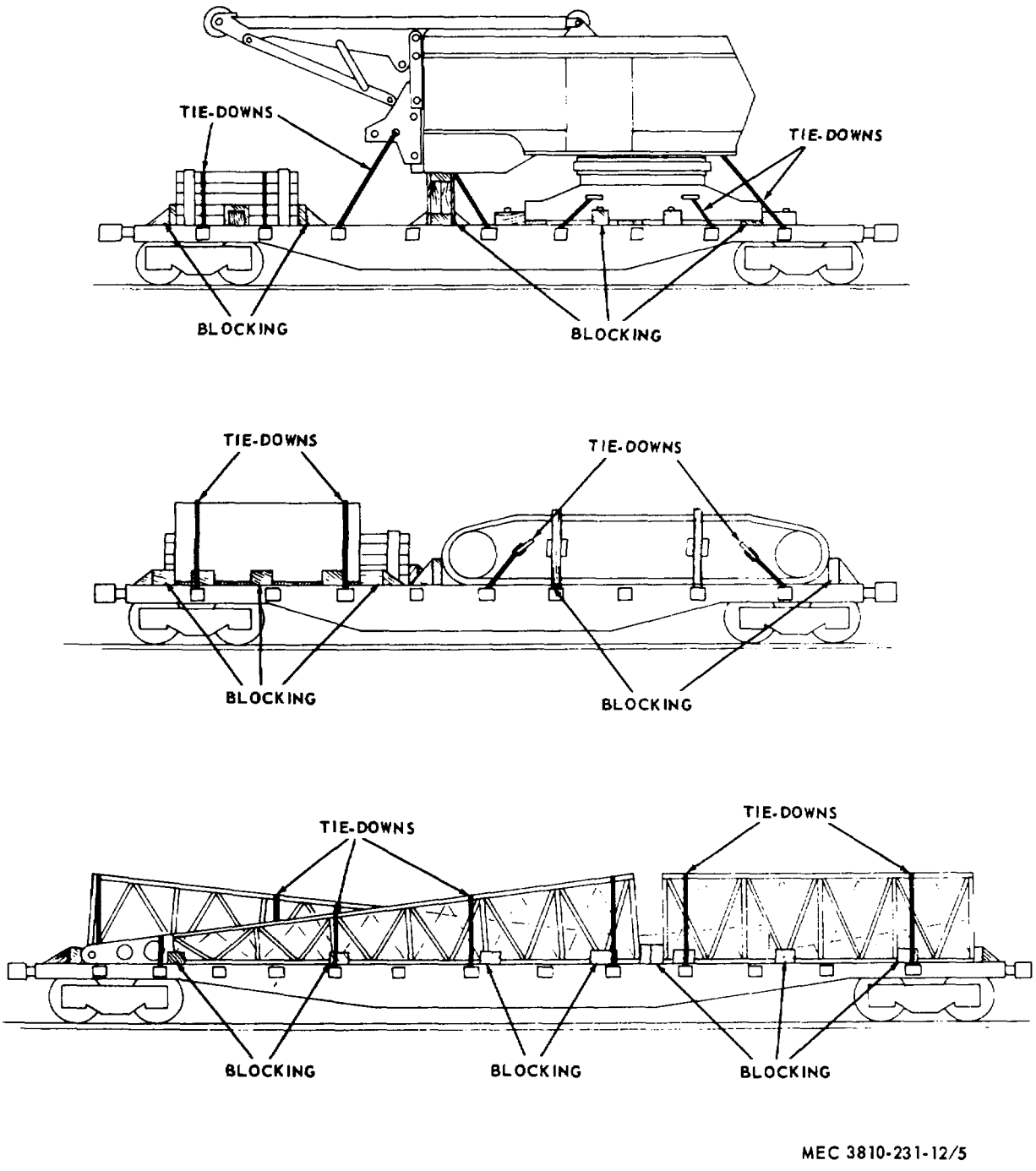


Figure 5. Block and tie-down removal.

Section II. MOVEMENT TO A NEW WORKSITE

10. General

The crawlers of the crane are designed primarily for the working function of the machine. But for relatively short distance moves, over permissible terrain (off highway), the unit may be moved under its own power to save dismantling for transportation.

Note

When moving the crane, the lower (crawler) section components should be lubricated quite frequently. Refer to Lubrication Order (para 32).

11. Dismantling for movement

A movement of any distance requires a railroad flatcar or machinery trailer capable of handling 95,000 lbs. (pounds) for transporting the crane, The boom assembly (para 42), crawler assemblies (fig. 6), and counterweights (para 41), must be removed and gantry lowered (para 18) to provide clearance.

12. Deinstallation After Movement

Refer to paragraph 8.

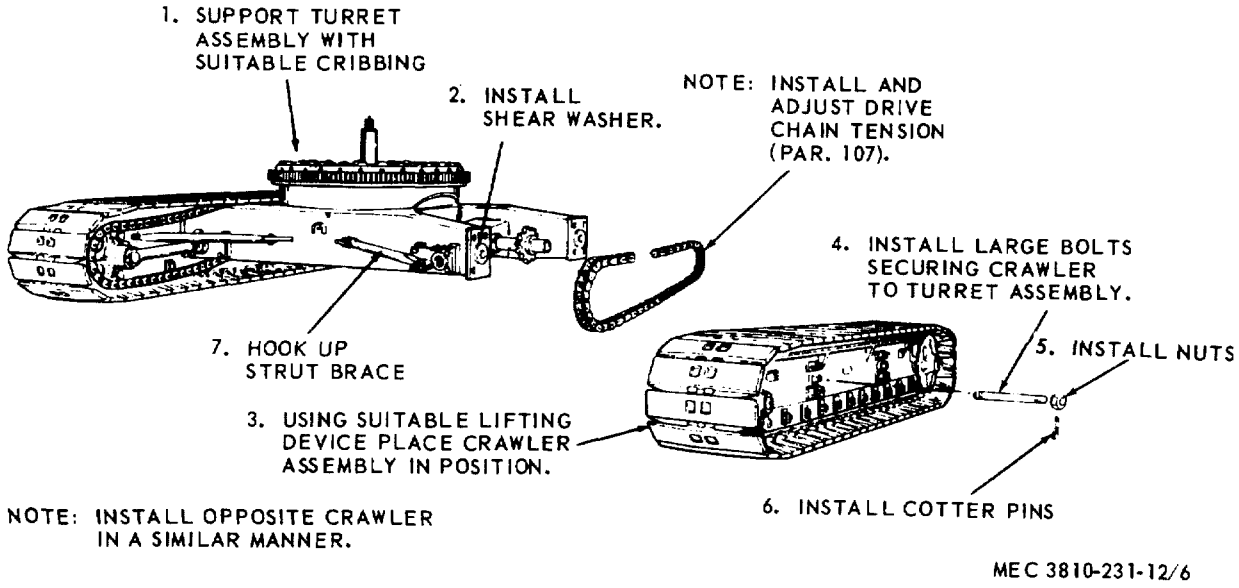


Figure 6. Unloading crane and installing crawler assemblies.

Section III. CONTROLS AND INSTRUMENTS

13. General

This section describes, locates, illustrates, and furnishes the operator, crew, or organizational maintenance personnel sufficient information about the various controls and instruments for proper operation of the Model 1125, 60 Ton Crawler Crane.

14. Controls and Instruments The purpose of the controls and instruments and the normal and maximum reading of the instruments are illustrated in figure 7.

a. Swing Clutch Lever (1, fig. 7B). Pull this lever toward the operator to swing the machine to the right. Push this lever away from the operator to swing the machine to the left.

b. Engine Hand Throttle (2). Twist hand grip clockwise to increase engine speed and counterclockwise to decrease engine speed.

c. Horn Button (3). Press button to actuate horn.

d. Main Hoist Lever (4). Pull this lever toward the operator to rotate the forward

drum to wrap the line on the drum. Push this lever away from the operator to reverse the direction of the drum rotation to run off the line.

e. Secondary Hoist and Swing Brake Lever (5). Pull this lever toward the operator to rotate the rear drum to wrap the line on the drum. Push this lever away from the operator to apply the swing brake.

f. Boom Hoist Lever (6). Pull this lever toward the operator to rotate the boom hoist line drum and raise the boom (or auxiliary gantry where used) Push this lever away from the operator to release the boom hoist brake and allow the boom to lower by gravity.

g. Boom Hoist Hydraulic Control (7). Squeeze this handle toward the boom hoist lever to close the pressure retaining valve connected to the boom hoist hydraulic line. The boom hoist lever can then be "pumped" (pulled toward the operator more than once) to engage the boom hoist clutch more firmly on the drum.

h. Propel Lever (8). When this lever is in a neutral position the propel brakes are set. Push this lever forward away from the operator, which will release the spring set brakes and engage the travel clutch. Th e machine will travel forward. Bringing the lever back to the neutral position will disengage the travel clutch and set the propel brakes. Push lever to left and pull back to travel in reverse motion.

i. Main Hoist Brake Pedal (9). Push this pedal down to apply the main hoist brake.

j. Secondary Hoist Brake Pedal (10). Push this pedal down to apply the hoist brake.

k. Foot Throttle (11) Press down on the throttle plate for desired speed. Release foot pressure on throttle plate to reduce speed.

l. Pressure Reducing Valve (1, fig. 7C). This valve controls the air pressure applied to the air hydraulic booster system on the secondary hoist brake and the main hoist brake. (Refer to Hydraulic Section for additional information concerning this control).

m. Boom Hoist Pawl Control (2). When the control is down the pawl is engaged in the ratchet of the boom. hoist drum. To release the pawl from the ratchet, raise the boom slightly by pulling the boom hoist lever toward the operator. Depress the button in the center of the handle and pull up on the control.

Note

Keep pawl engaged at all times except when lowering boom.

n. Main Hoist Brake Lock (3). Push this handle down to engage the pressure retaining valve connected to the main hoist brake hydraulic line. This retains the pressure applied to the main hoist brake when the brake is pushed down. To release the pressure retaining valve, apply pressure to the brake pedal then raise the handle and gradually release pressure on the brake.

o. Magnetic Clutch Switch (4). This switch is used to increase the excitation to the clutch fields to decrease the amount of "slip" when swinging with an extremely long boom.

p. Engine Hand Throttle (5). Pull back to increase engine speed. Push forward to idle engine.

q. Engine Clutch Lever (6). The engine clutch is disengaged with the lever in the rear position as shown. Push the lever forward to engage the engine clutch and start the machinery in motion.

r. Swing Lock Lever (7). With the lever in the upper position as shown, the swing lock is disengaged. Move the lever forward or away from the operator to engage t he swing lock and prevent the upper from turning or swinging.

s. Quick Release Valve (8). This valve is used as a quick release of the air to the propel brakes. Push down to actuate valve.

t. Steering Control Lever (9). When this is in the center position both crawlers are engaged and the machine will travel straight forward or backward. Push the lever forward toward the operator to engage the left-hand crawler and the machine will travel to t he right. When the lever is back away from the operator, the machine will travel to the left.

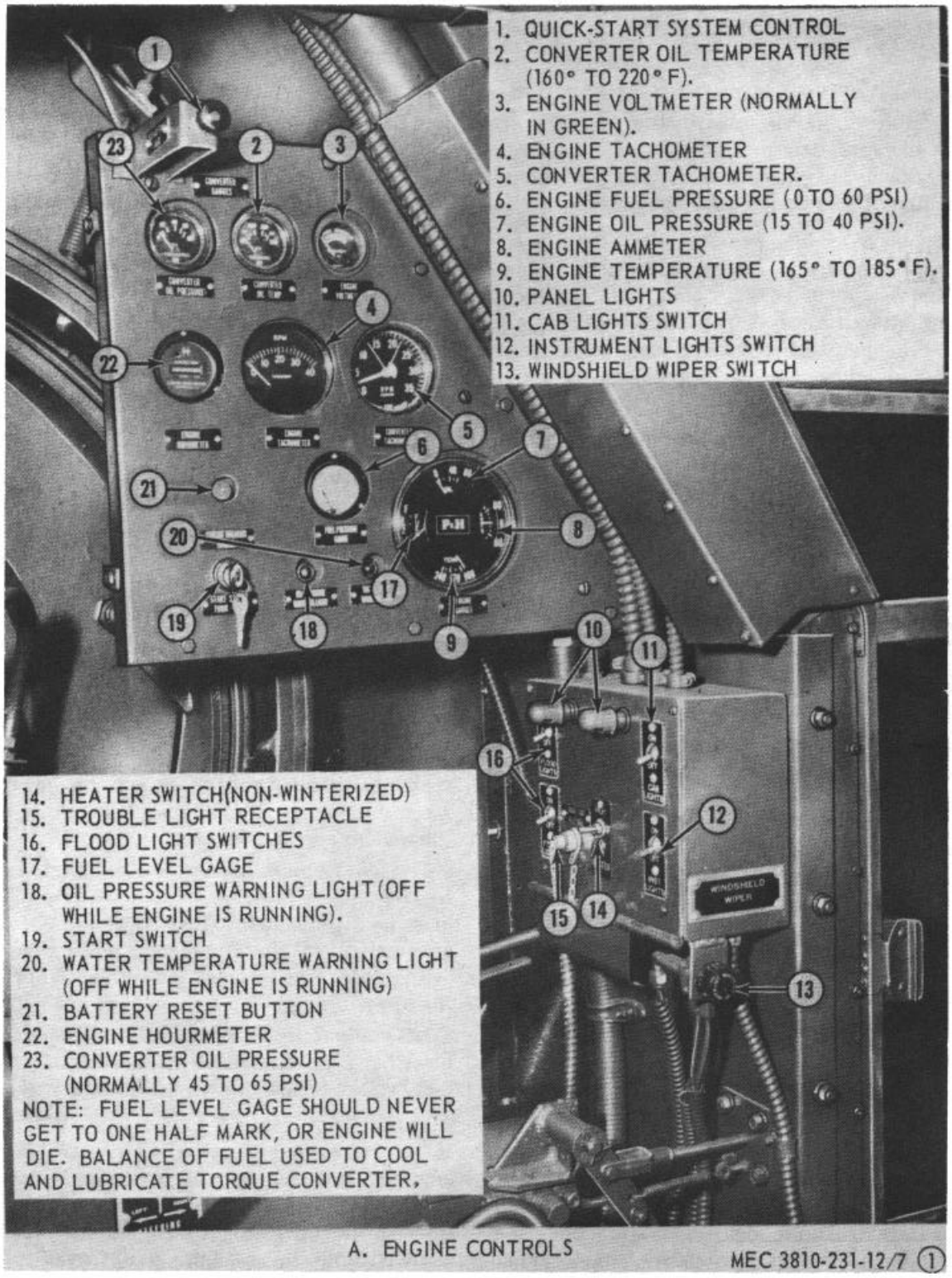


Figure 7. Controls and instruments.

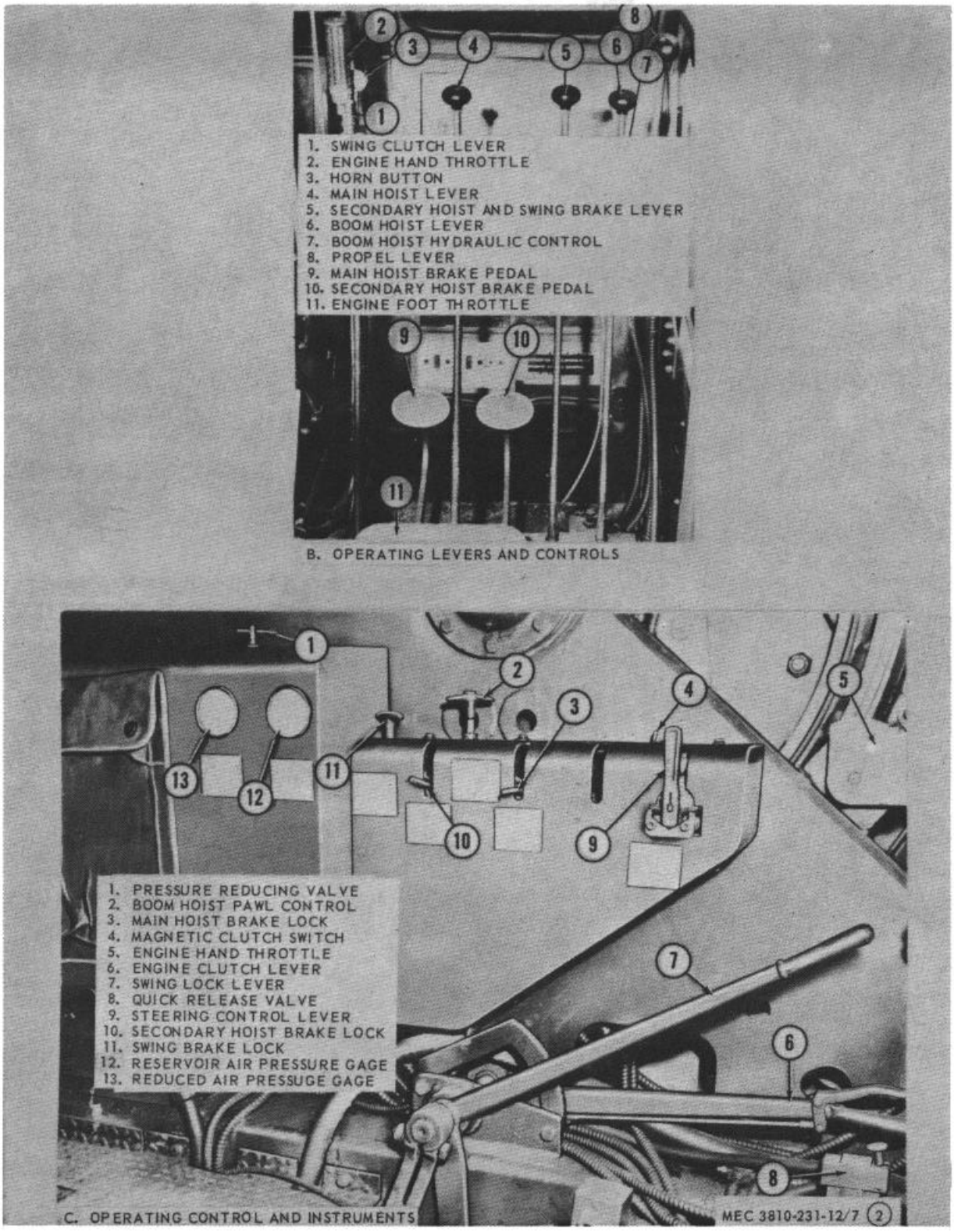


Figure 7 - Continued.

u. Secondary Hoist Brake Lock (10). Push this handle down to engage the pressure retaining valve connected to the secondary hoist brake hydraulic line. This retains the pressure applied to the secondary hoist brake when the brake pedal is pushed down. To release the pressure retaining valve, apply pressure to the brake pedal, then raise the handle and gradually release pressure on the brake.

v. Swing Brake Lock (11). Push this handle down to engage the pressure retaining valve connected to the swing brake hydraulic line. This retains the pressure applied to the swing brake when the swing lever is pushed forward or away from the operator. To release the pressure retaining valve, apply pressure to the swing brake lever, then raise the handle and gradually release pressure on the brake.

w. Reservoir Air Pressure Gage (12).

x. Reduced Air Pressure Gage (13).

Section IV. OPERATION OF EQUIPMENT

15. General

a. The instructions in this section are published for the guidance of the personnel responsible for operation of the Model 1125 Crane.

b. The operator must know how to perform every operation of which the Crane is capable. This Section gives instructions on starting and stopping the Crane, basic motions of the crane, and co-ordinating the basic motions to perform the specific tasks for which the equipment is designed. Since nearly every job presents a different problem, the operator may have to vary procedures to fit the individual job.

16. Starting

a. Preparation for Starting. Perform the necessary daily preventive maintenance services (para 35).

b. Starting. Refer to figure 8 and start the engine.

17. Stopping

a. Refer to figure 9 and stop the engine.

b. Perform the necessary daily preventive maintenance services (para 35).

18. Operation Under Usual Conditions

a. Start the engine (para 16).

b. Raise the gantry.

Note

The lowered position of the gantry (fig. 10) is for shipping only. An auxiliary lifting device is required when raising or lowering the gantry from this position.

Raise gantry to the intermediate position and install reeving (para. 42), then raise gantry using crane hoisting power, to operating position (fig. 11). Install compression members and secure with connector pins as shown on figure 11.

Figure 8. Starting the engine.

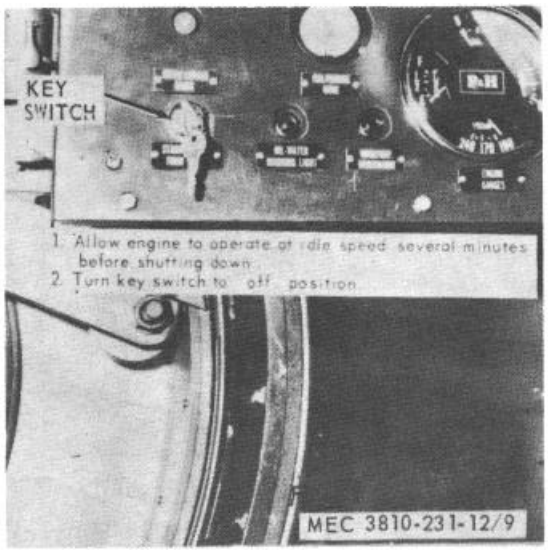


Figure 9. Stopping the engine.

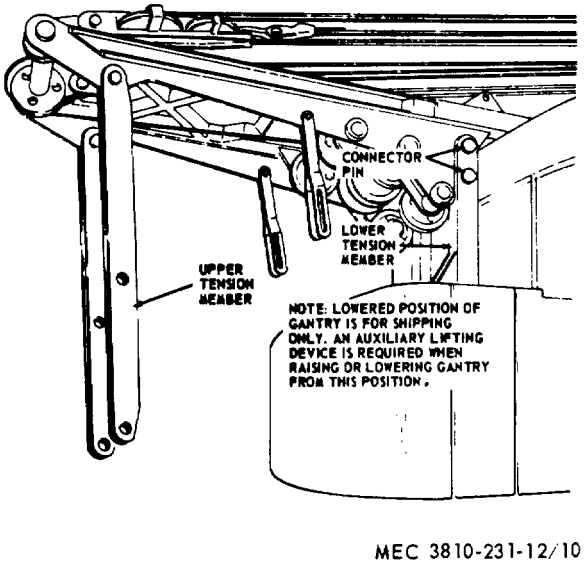


Figure 10. Gantry in lowered position.

c. To Raise the Boom. Pull boom hoist lever (6, fig. 7B) toward operator to rotate the boom hoist line drum and raise boom. Be sure boom hoist pawl control is engaged.

Warning

Under no circumstances should the boom be pulled tight against the stops while supporting a load. If the load is lowered with the boom against the stops, the tension within the boom hoist cable will collapse the boom over the backstops. Always keep a few inches of clearance in the backstops.

d. To Hold Boom in Position. Allow boom hoist lever to return to neutral position. This sets boom hoist brake. Make sure boom hoist pawl control is engaged.

e. To Lower the Boom. Disengage boom hoist pawl. Push boom hoist lever away from operator to release the boom hoist brake and allow the boom to lower by gravity. (See Caution note above).

f. To Raise the Load. Pull the main hoist lever (4, fig. 7B) toward operator.

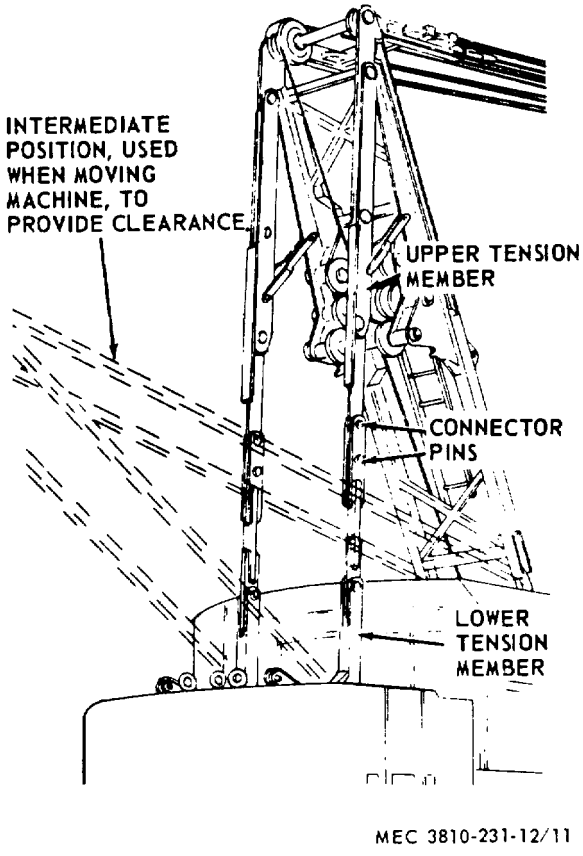


Figure 11. Gantry in working position

g. To Hold the Load. Allow the main hoist lever to return to neutral and apply main hoist brake.

Warning

Never leave the crane with bucket or any crane load in a raised position. The brake may loosen just enough to cause the load to fall on personnel or equipment.

h. To Lower the Load (Power Lowering). Push the main hoist lever away from the operator. This applies power to the main hoist drum through the planetary gearing. Drum rotation is reversed to lower the load.

i. To Raise or Lower a Load Attached to the Jib Hoist Line (Whip Line). Pull the secondary hoist lever toward the operator. The secondary hoist drum is not equipped with planetary lowering. To lower the load return the hoist lever to the neutral position and apply just enough pressure to the secondary hoist brake pedal to slip the brake on the secondary hoist drum, and lower the load by gravity.

j. To Swing the Load. Release swing brake lock and disengage swing lock. Pull swing clutch lever toward the operator to swing the machine to the right. Push this lever away from the operator to swing the machine to the left. When the load has reached the desired position allow swing clutch lever to return to neutral and apply swing brake by pushing swing brake lever away from the operator.

k. To Propel the Machine Forward or Backward. When the propel lever is in neutral position the propel brakes are set. Push this lever forward away from the operator, which will release the spring set brake a n d engage the travel clutch. The machine will travel forward. Bringing the lever back to the neutral position will disengage the travel clutch and set the propel brakes. Push the lever to the left and pull back to travel in reverse.

Caution

Do not move the lever from forward to reverse position too rapidly as starting the travel clutch should be gradual to allow the jaws to engage.

I. To Steer When Propelling the Machine. When the steering control lever is in the center position both crawlers are engaged and the machine will travel straight forward or backward. With the front of the upper over the front of the lower (propel) chains are in the rear of the lower) push the lever forward toward the operator to engage the lefthand crawler and the machine will travel to the right. When the lever is pushed back away from the operator, the machine will travel to the right. When the lever is pushed back away from the operator, the machine)will travel to the left. The crawlers can be "cut" in either direction from either position of the steering control lever by reversing the direction of travel of the machine.

19. Operation in Extreme Cold (below 0°F.)

a. See that antifreeze solution is correct for the lowest temperature expected.

b. Inspect cooling system. Correct or report any leaks.

c. Keep batteries fully charged. After adding water to the batteries, run the engine for at least one hour.

d. Keep the fuel tank filler cap tight to prevent water from entering the fuel tank. Service the fuel tank frequently to prevent condensation in the tank and lines.

e. Drain and service the fuel filter (para 33).

f. Lubricate in accordance with the current lubrication order.

g. Allow engine to reach normal operation temperature before applying load.

20. Operation in Extreme Heat

a. Inspect cooling system to see that it is clean and free flowing. Keep coolant level in radiator as high as possible.

b. Keep radiator fins free of insects, leaves, dirt and other obstructions.

c. Keep fan belt adjusted properly and see that there is no obstruction of air to the fan.

d. Open all sliding panels of the cab to provide as much ventilation as possible.

e. Keep the fuel tank filler cap tight to prevent water from entering the fuel tank. Service the fuel tank frequently to prevent condensation in the tank and lines.

21. Operation in Dusty or Sandy Areas

a. Keep the unit clean and clear of dust and as much as possible. Lubricate in accordance with the current lubrication order.

b. Operating under extreme dusty or sandy conditions will require more frequent inspections of the roller circle assembly. Never allow lubricant to collect on the roller path, as it will collect sand and grit and cause rollers to wear.

c. Inspect clutch and brake bands frequently and blow out or wipe off accumulations of sand and dirt.

d. Keep all unused cables in boxes. Clean operating cables frequently with an approved solvent to prevent excessive cable wear and to insure satisfactory operation.

e. After operation blow loose grit out of machinery or wash lubricant and foreign matter from open gears and chains with an approved solvent and allow to dry and apply new lubricant. (Refer to Lubrication Order).

f. Service the air cleaner and air breathers more often than under normal conditions.

g. Keep the fuel tank filler cap tight to prevent water from entering the fuel tank. Service the fuel tank frequently to prevent condensation in the tank and lines.

22. Operation Under Rainy or Humid Conditions

a. Keep the fuel tank filler cap tight to prevent water from entering the fuel tank. Service the fuel tank frequently to prevent condensation in the tank and lines.

b. Inspect gear cases, crankcase and lubrication fittings to see that no water has entered the gear case or crankcase.

c. Frequent inspection of the electrical wiring for corrosion, loose connections, or deteriorated insulation should be made, which, unless repaired could cause a short circuit.

d. Lubricate in accordance with the current Lubrication Order.

23. Operation in Salt Water Areas

a. Inspect the unit for rust and corrosion. Rust and corroded conditions at any point on the unit must be corrected immediately. Remove all rust, and paint the bare surfaces. Place a light film of lubricant on polished or machined metal surfaces.

b. Although the wiring of the crane ha d been specially treated to resist fungus and rot, frequent inspection is necessary. Inspect all wiring for corrosion or deteriorated insulation and correct any deficiencies immediately.

c. Keep thoroughly lubricated to prevent entry of water into bearings and polished metal surfaces. Keep lifting cables lubricated. Lubricate as directed in current lubrication order.

24. Operation at High Altitudes

a. Operation at high altitudes present operational problems due to lower atmospheric pressure and wide temperature ranges.

b. Keep air cleaner clean and free of obstructions and service frequently.

c. Maximum performance can be maintained by carefully following the operator's daily preventative maintenance services (para 35).

Caution

Check the unit frequently for overheating of the engine at high altitude operation.

Section V. OPERATION OF MATERIAL USED IN CONJUCTION WITH THE EQUIPMENT

25. General

This section covers the description and operation of the auxiliary equipment supplied for use with the crane but not necessary for the basic functioning of the crane.

26. Fire Extinguisher (Dry Chemical Type)

a. Description. The dry chemical type fire extinguisher is suitable for use on all types of fire and is effective in areas where ambient temperature is -25°F. and above. If winterized (pressurized with nitrogen)

the fire extinguisher may be used in temperatures below -25°F. The fire extinguisher is a 2-1/2 pound, stored pressure, lever-operated extinguisher.

b. Operation. Remove the fire extinguisher from its location, lift the handle, press lever, and direct the powder at the base of the flame using a side-to-side sweeping motion.

c. Maintenance. Weigh the fire extinguisher every 6 months and replace the extinguisher if weight is less than 4-1/2 pounds, or if pressure is below 125 pounds. Refer to SB111. The dry chemical fire extinguishers will be serviced at installation level through Repair and Utilities facilities, with filling agent supplied by local procurement through Troop Supply Channels.

27. Cold Weather Starting Aid

a. General. The Harnischfeger Model 1125 Crawler Crane is equipped with a liquid propane quick start system for aid in cold weather starting. System fuel tank is pressurized and contains 20 ounces of liquid propane by weight. Empty fuel tank weights 17 ounces. Replace an empty tank (fig. 12).

b. Description. The quick-start system consists of a fuel tank, valve, manifold and fittings, and control cable. The starting aid control is mounted on engine control panel (fig. 12A). Fuel tank, valve, and manifold and fittings are mounted on engine at intake manifold area (fig. 12B).

c. Operation. With full fuel tank in position (fig. 12B), pull control (fig. 12A) out for one to two seconds, filling chamber of control valve. Push in on control to release

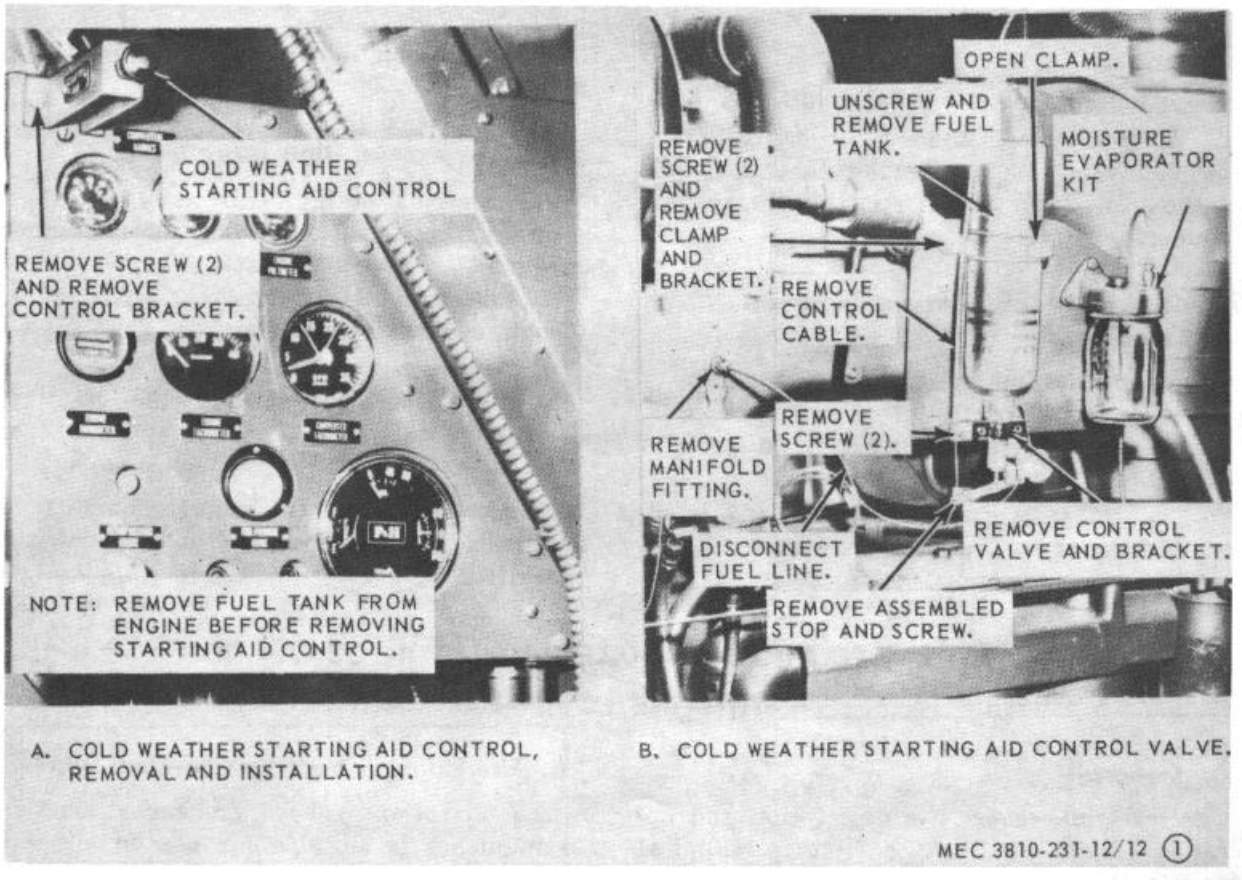
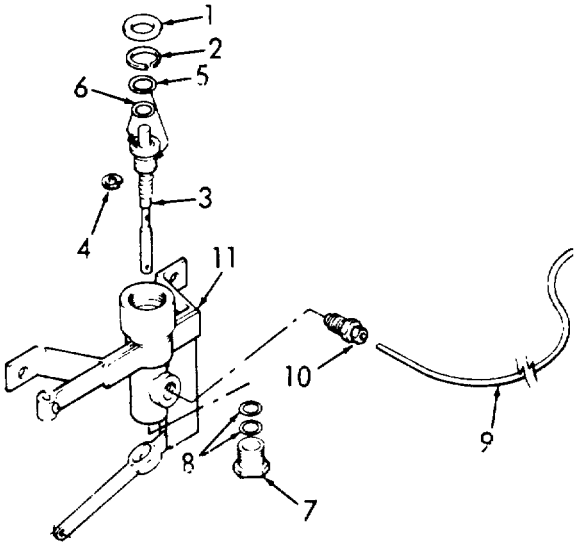


Figure 12. Cold weather starting aid and moisture evaporator kit.



1 Gasket
2 Ring, retaining
3 Pusher pin assembly
4 Ring, retaining
5 Packing
6 Packing
7 Bushing
8 Packing
9 Tube
10 Fitting, coupler
11 Valve and bracket

C—Cold weather starting aid control valve, disassembly and reassembly.

Figure 12 - Continued.

fuel into intake manifold. Wait three seconds, then engage starter. Repeat a second shot while starter is turning engine. If engine falters after starting, give it extra shots to keep it running.

Caution

Do not turn engine with starter for more than 30 seconds at one time. Let starter cool for at least two minutes before trying another start, and avoid damage to starter.

28. Maintenance

a. Removal. Refer to figures 12A and 12B and remove cold weather starting aid.

b. Disassembly. Refer to figure 12C and disassemble starting aid control valve.

c. Cleaning, Inspection, and Repair.

(1) Clean all parts with an approved cleaning solvent and wipe dry with a lint-free cloth, or air dry with low pressure compressed air.

(2) Use low pressure compressed air to remove foreign particles lodged in screen of orifice.

(3) Inspect all parts for distortion, deterioration, or other damage.

(4) Replace all damaged or defective parts.

d. Reassembly. Refer to figure 12C and reassemble starting aid control valve.

e. Installation. Refer to figures 12A and 12B and install cold weather starting aid.

28.1 Moisture Evaporator Kit

a. General. The moisture evaporator kit filters moisture from system air before it enters forward control system.

b. Service. Refer to figure 12B and remove bowl, fill with alcohol, and replace.

c. Removal. Disconnect tubing, remove mounting hardware, and remove moisture evaporator from mounting bracket.

d. Installation. Install moisture evaporator on mounting bracket and secure with mounting hardware. Connect tubing. Fill bowl as directed in *b.* above.

CHAPTER 3

OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SPECIAL TOOLS AND EQUIPMENT

29. Special Tools and Equipment

No special tools or equipment are required by the operator or organizational maintenance personnel for maintenance of the Model 1125, 60 Ton Crawler Crane.

30. Basic Issue Tools and Equipment

Tools and repair parts issued with or authorized for the Model 1125, 60 Ton, Crawler Crane are listed in the Basic Issue Items List, Appendix II of this manual.

31. Organizational Maintenance Repair Parts

Organizational maintenance repair parts are listed and illustrated in TM 5-3810-231-20P.

Section II. LUBRICATION

32. General Lubrication Information

a. This section contains a reproduction of the Lubrication Order and lubrication instructions which are supplemental to, and not specifically covered in the Lubrication Order.

b. The Lubrication Order shown in figure 13 is an exact reproduction of the approved Lubrication Order for the Model 1125 Crane.

33. Detailed Lubrication Information

a. General. Keep all lubricants in closed container and store in a clean, dry place away from external heat. Allow no dust, dirt or other foreign material to mix with the lubricants. Keep all lubrication equipment clean and ready for use.

b. Cleaning. Keep all external parts not requiring lubrication clean of lubricants. Before lubricating the equipment, wipe all lubrication points free of dirt and grease. Clean all lubrication points after lubricating to prevent accumulation of foreign matter.

c. Points of Lubrication. Service the lubrication points at proper intervals as illustrated in figure 13.

Caution
Over lubrication may cause equipment failure or damage to working parts.

d. OSE Oil.

(1) The crankcase oil level must be checked frequently, as oil consumption may increase.

(2) The oil may require changing more frequently than usual because contamination by dilution and sludge formation will increase under cold weather operation conditions.

e. Oil Filter Service. Service the oil filters as illustrated in figure 14.

f. Air Cleaner Service. Service the air cleaner as illustrated in figure 15.

g. Water Corrosion Resistor Service. Service the engine water corrosion resistor as illustrated in figure 16.

LUBRICATION ORDER

LO 5-3810-231-12-1

29 APRIL 1966

CRANE, CRAWLER MOUNTED, 60 TON, DIESEL DRIVEN (HARNISCHFEGER MODEL 1125) W/ENGINE CUMMINS MODEL NT-380-1 WINTERIZED AND NON WINTERIZED

Reference: LO 5-3810-231-12-2, LO 5-3810-231-12-3, and C9100-IL.

Intervals are based on normal hours of operation. Reduce to compensate for abnormal operation and severe conditions. During inactive periods sufficient lubrication must be performed for adequate preservation.

Clean fittings before lubricating.

Relubricate after washing or fording.

A dotted circle indicates a drain below.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

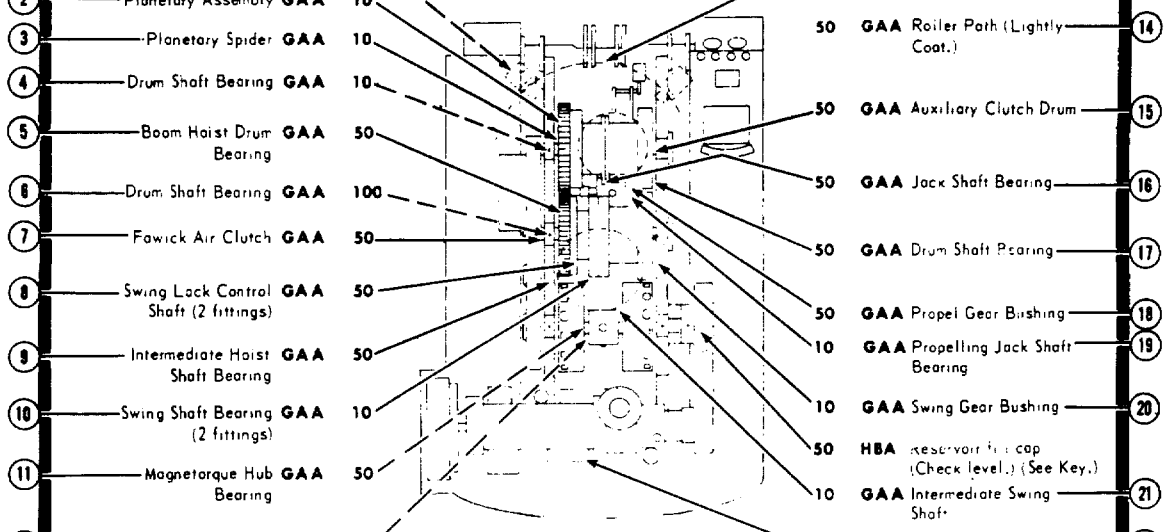
Lubricate points indicated by dotted arrow shafts on both sides of equipment.

Drain crankcase and gear cases when hot. Fill and check level.

FOLD

FOLD

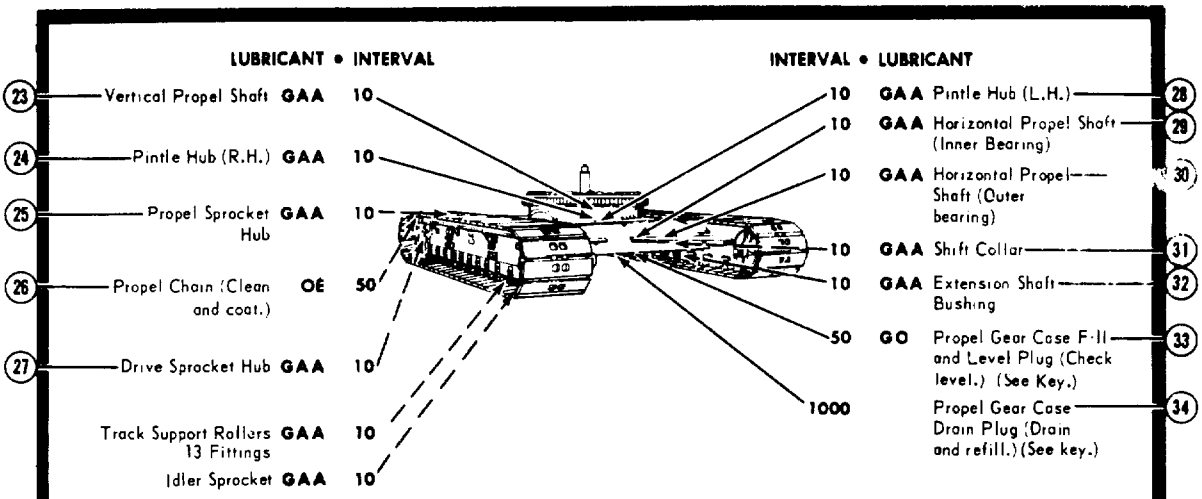
	LUBRICANT	INTERVAL
1	Front and Rear Hook Rollers GAA	50
2	Planetary Assembly GAA	10
3	Planetary Spider GAA	10
4	Drum Shaft Bearing GAA	10
5	Boom Hoist Drum Bearing GAA	50
6	Drum Shaft Bearing GAA	100
7	Fawick Air Clutch GAA	50
8	Swing Lock Control Shaft (2 fittings) GAA	50
9	Intermediate Hoist Shaft Bearing GAA	50
10	Swing Shaft Bearing (2 fittings) GAA	10
11	Magnetorque Hub Bearing GAA	50
12	Magnetorque Oil Seal GAA	50



	INTERVAL	LUBRICANT
13	10	GAA Live Roller Circles (30 fittings)
14	50	GAA Roller Path (Lightly Coat.)
15	50	GAA Auxiliary Clutch Drum
16	50	GAA Jack Shaft Bearing
17	50	GAA Drum Shaft Bearing
18	50	GAA Propel Gear Bushing
19	10	GAA Propelling Jack Shaft Bearing
20	10	GAA Swing Gear Bushing
	50	HBA Reservoir fill cap (Check level.) (See Key.)
21	10	GAA Intermediate Swing Shaft
22	100	Oil Filters (Disassemble, clean housing and renew element.) (See note 3.)

MEC 3810-231-12 13 ①

Figure 13. Lubrication Order.



- KEY -

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above 32°F	40°F to -10°F	0°F to -65°F	
OE-OIL, Engine Heavy Duty		OE 30	OE 10	OES	Interval given are in hours of normal operation
Oil Can Points					
OES-OIL, Engine, Sub-zero					
GO-LUBRICATING OIL, Gear					
Propel Gear Case	16 qt	GO 140	GO 90	GOS	
GOS-LUBRICATING OIL, Gear, Sub-zero					
HBA-FLUID, Hydraulic, Non-petroleum					
Hydraulic Reservoir	1 qt	HBA	HBA	HBA	
GAA-GREASE, Automotive and Artillery		ALL TEMPERATURES			

FOLD FOLD

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW–10° F. Remove lubricants prescribed in the key for temperatures above–10° F. Clean parts with SOLVENT, dry-cleaning. Relubricate with lubricants specified in the key for temperatures below–10° F.

2. OIL CAN POINTS. Every 50 hours lubricate all control linkage pins, clevises, pivots and all exposed adjusting threads with OE.

3. OIL FILTERS. After installing new filter elements, fill crankcase, operate engine 5 minutes, check housings for leaks, check crankcase oil level and bring to full mark.

Copy of this Lubrication Order will remain with the equipment at all times, instructions contained herein are mandatory.

BY ORDER OF THE SECRETARY OF THE ARMY:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

OFFICIAL

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

MEC 3810-231-12 13 ②

Figure 13. - Continued.

LUBRICATION ORDER

LO 5-3810-231-12-2

29 APRIL 1966

CRANE, CRAWLER MOUNTED, 60 TON, DIESEL DRIVEN (HARNISCHFEGER MODEL 1125) W/ENGINE CUMMINS MODEL NT-380-1 WINTERIZED AND NON WINTERIZED

Reference: LO 5-3810-231-12-1, LO 5-3810-231-3, and C9100-IL

Intervals are based on normal hours of operation. Reduce to compensate for abnormal operation and severe conditions. During inactive periods sufficient lubrication must be performed for adequate preservation.

Clean fittings before lubricating.

Relubricate after washing or fording.

A dotted circle indicates a drain below.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

Lubricate points indicated by dotted arrow shafts on both sides of equipment.

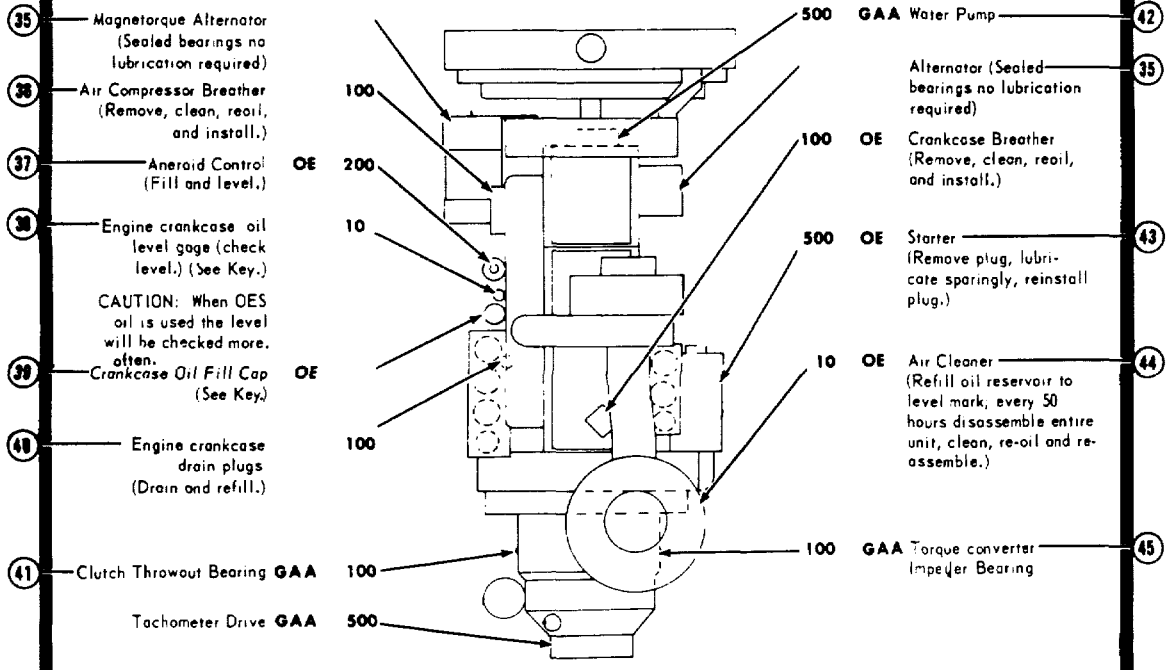
Drain crankcase and gear cases when hot. Fill and check level.

FOLD

FOLD

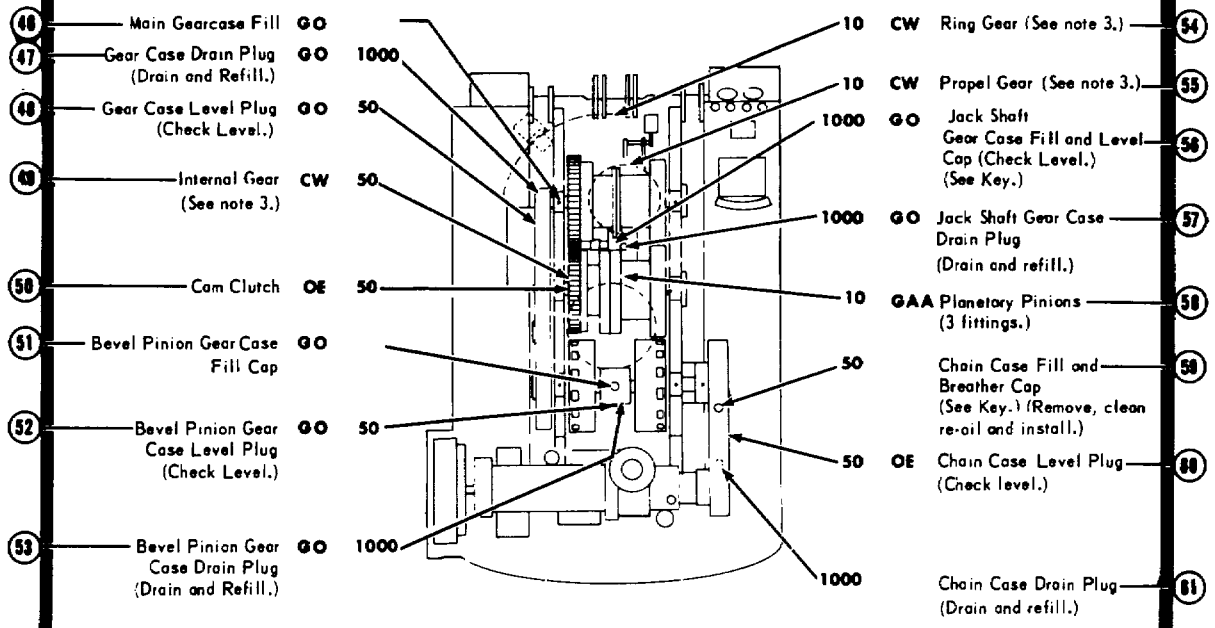
	LUBRICANT • INTERVAL		
35	Magnetorque Alternator (Sealed bearings no lubrication required)		
36	Air Compressor Breather (Remove, clean, recil, and install.)		100
37	Aneroid Control (Fill and level.)	OE	200
38	Engine crankcase oil level gage (check level.) (See Key.)		10
	CAUTION: When OES oil is used the level will be checked more. often.		
39	Crankcase Oil Fill Cap (See Key.)	OE	
40	Engine crankcase drain plugs (Drain and refill.)		100
41	Clutch Throwout Bearing	GAA	100
	Tachometer Drive	GAA	500

	INTERVAL • LUBRICANT		
42	500	GAA	Water Pump
35			Alternator (Sealed bearings no lubrication required)
	100	OE	Crankcase Breather (Remove, clean, recil, and install.)
43	500	OE	Starter (Remove plug, lubricate sparingly, reinstall plug.)
44	10	OE	Air Cleaner (Refill oil reservoir to level mark, every 50 hours disassemble entire unit, clean, re-oil and reassemble.)
45	100	GAA	Torque converter Impeller Bearing



MEC 3810-231-12/13 ③

Figure 13. - Continued.



· KEY ·

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above +32°F	+40°F to −10°F	0°F to −65°F	
OE-OIL, Engine, Heavy Duty					
Crankcase	48-qt				
Air Cleaner	10-qt				
Aneroid Control	1-oz	OE 30	OE 10	OES	
Chain Case	16-qt				
Oil Can Points					
OES-OIL, Engine Sub-zero					
GO-LUBRICATING OIL, Gear,					
Main Gear Case	20-qt				
Bevel Pinion Gear Case	12-qt	GO 140	GO 90	GOS	
Jack Shaft Gear Case	12-qt				
GOS-LUBRICATING OIL, Gear, Sub-zero					
CW-LUBRICANT, Exposed Gear, Chain and Wire Rope		All Temperatures			
GAA GREASE, Automotive and Artillery					

Intervals given are in hours of normal operation.

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW−10° F. Remove lubricants prescribed in the key for temperatures above−10° F. Clean parts with SOLVENT, dry-cleaning. Relubricate with lubricants specified in the key for temperatures below−10° F.

2. OIL CAN POINTS. Every 50 hours lubricate all control linkage pins, clevises, pivots and all exposed adjusting threads with OE.

3. EXPOSED GEARS AND PINIONS. Keep all exposed gears and pinions coated with CW.

Copy of this Lubrication Order will remain with the equipment at all times; instructions contained herein are mandatory.

BY ORDER OF THE SECRETARY OF THE ARMY:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff

OFFICIAL
J. C. LAMBERT
Major General, United States Army
The Adjutant General

MEC 3810-231-12/13 ④

Figure 13. - Continued.

LUBRICATION ORDER

LO 5-3810-231-12-3

29 APRIL 1966

CRANE, CRAWLER MOUNTED, 60 TON, DIESEL DRIVEN (HARNISCHFEGER MODEL 1125) W/ENGINE CUMMINS MODEL NT-380-1 WINTERIZED AND NON WINTERIZED

Reference: LO 5-3810-231-12-1, LO 5-3810-231-12-2, and C9100-IL

Intervals are based on normal hours of operation. Reduce to compensate for abnormal operation and severe conditions. During inactive periods, sufficient lubrication must be performed for adequate preservation.

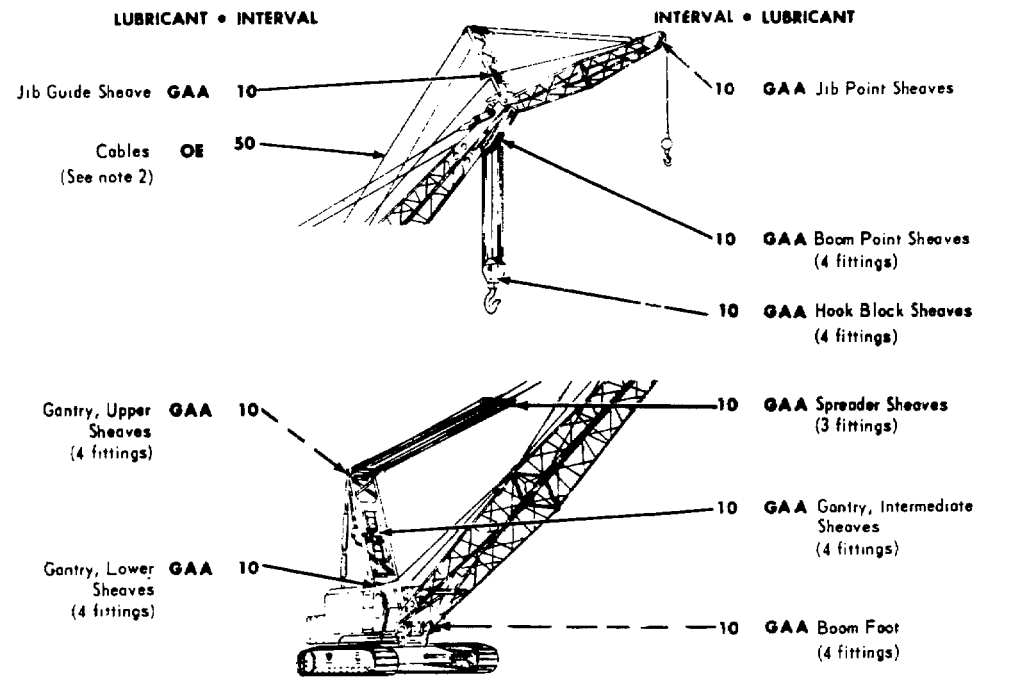
Clean fittings before lubricating.

Relubricate after washing or fording.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

Lubricate points indicated by dotted arrow shaft on both sides of equipment.

FOLD FOLD



MEC 3810-231-12/13 (5)

Figure 13. - Continued.

- KEY -

LUBRICANTS	CAPACITY	ALL TEMPERATURES	INTERVALS
Chain-Wire Rope-Exposed Gear			Intervals given are in hours of normal operation.
GAA-GREASE, Automotive and Artillery			

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW-10°F. Remove lubricants prescribed in the key for temperatures above-10°F. Clean parts with SOLVENT, Dry-cleaning. Relubricate with lubricants specified in the key for temperatures below -10°F.

2. CABLES. Keep cables clean lubricated with OE.
CAUTION: Do not lubricate cables coming in contact with excavated material.

Copy of this Lubrication Order will remain with the equipment at all times; instructions contained herein are mandatory.

BY ORDER OF THE SECRETARY OF THE ARMY:

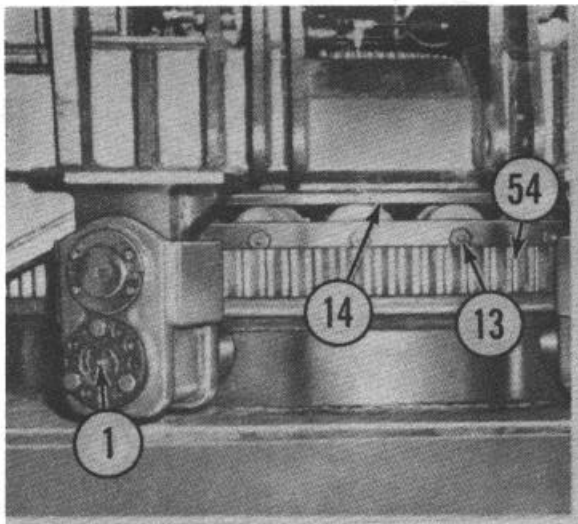
HAROLD K. JOHNSON
General, United States Army,
Chief of Staff

OFFICIAL:
J. C. LAMBERT,
Major General, United States Army,
The Adjutant General

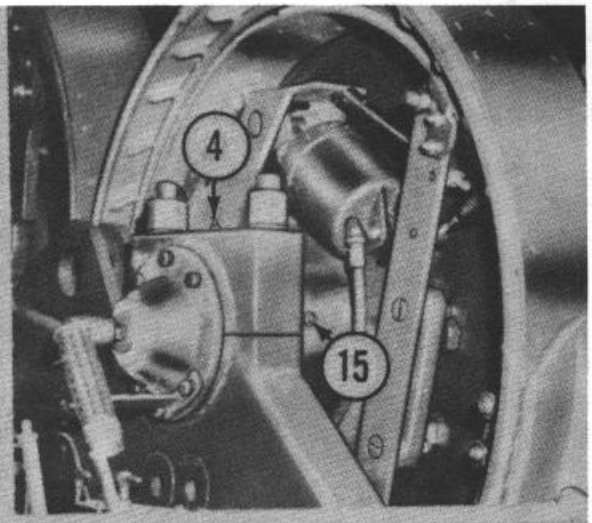
FOLD FOLD

MEC 3810-231-12 13 (6)

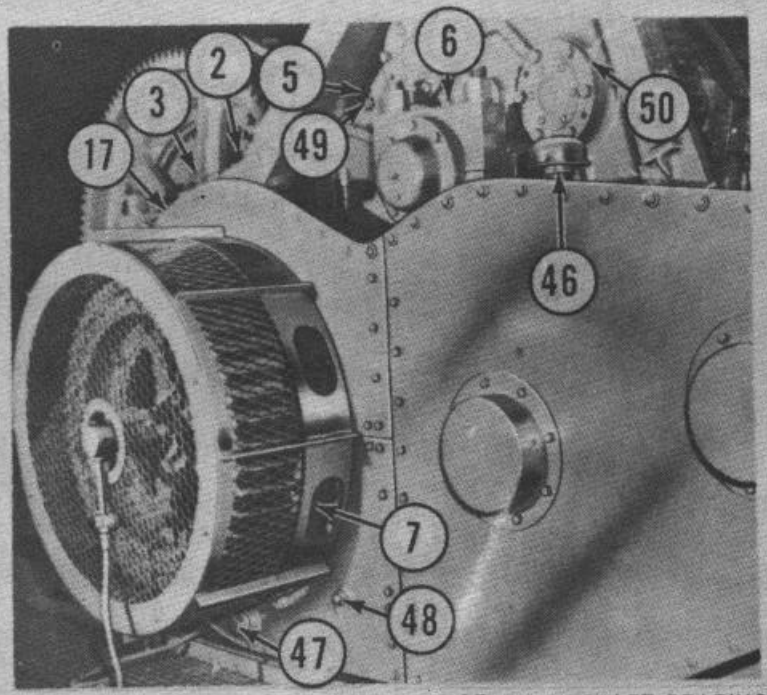
Figure 13. - Continued.



REF 1. FRONT AND REAR HOOK ROLLERS.
REF 13. LIVE ROLLER CIRCLE.
REF 14. ROLLER PATH.
REF 54. RING GEAR.



REF 4. DRUM SHAFT BEARING.
REF 15. AUXILIARY CLUTCH DRUM.

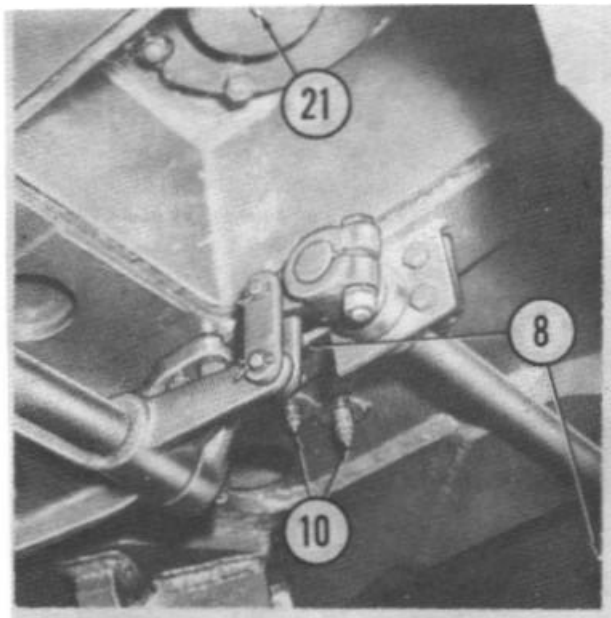


REF 2. PLANETARY ASSEMBLY.
REF 3. PLANETARY SPIDER.
REF 5. BOOM HOIST DRUM BEARING (FITTINGS BEHIND HOLE).
REF 6. DRUM SHAFT BEARING.
REF 7. FAWICK AIR CLUTCH.

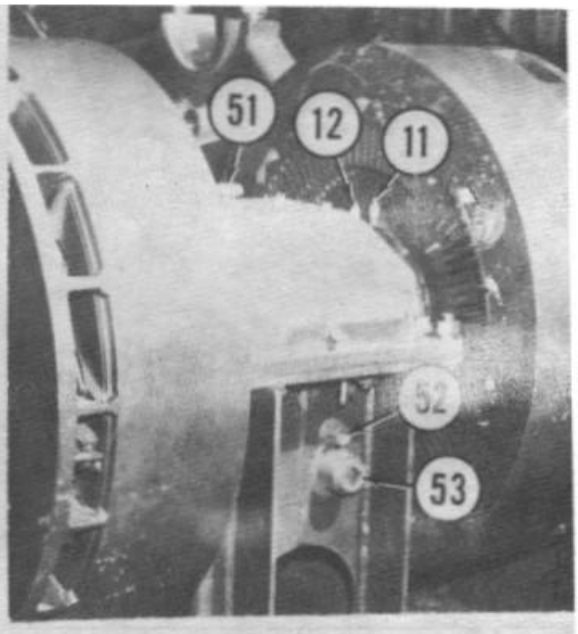
REF 17. DRUM SHAFT BEARING.
REF 46. MAIN GEARCASE FILL.
REF 47. GEARCASE DRAIN PLUG.
REF 48. GEARCASE LEVEL PLUG.
REF 49. INTERNAL GEAR.
REF 50. CAM CLUTCH.

MEC 3810-231-12/13-7

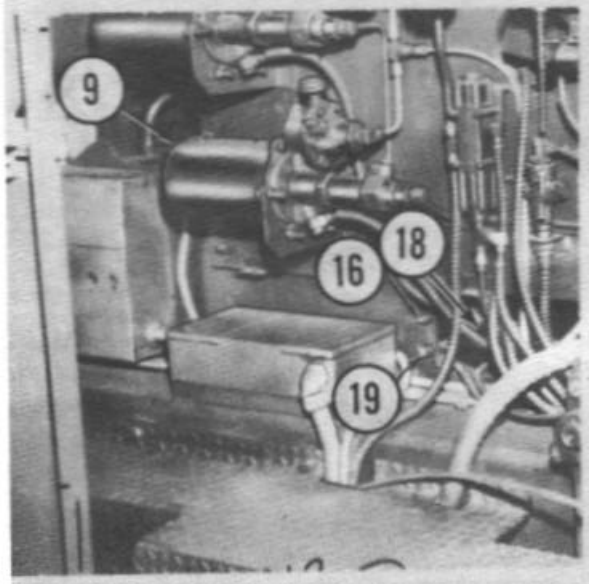
Figure 13. - Continued.



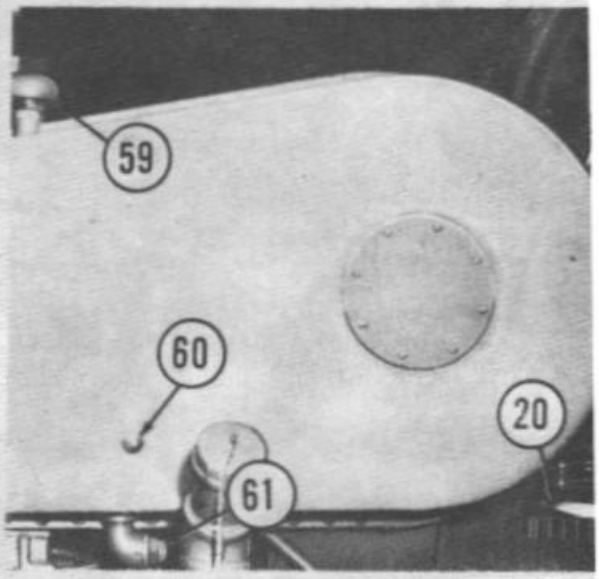
REF 8. SWING LOCK CONTROL SHAFT.
REF 10. SWING SHAFT BEARING
REF 21. INTERMEDIATE SWING SHAFT.



REF 11. MAGNETORQUE HUB BEARING.
REF 12. MAGNETORQUE OIL SEAL.
REF 51. BEVEL GEARCASE FILL CAP.
REF 52. BEVEL PINION GEARCASE LEVEL PLUG.
REF 53. BEVEL PINION GEARCASE DRAIN PLUG.



REF 9. INTERMEDIATE HOIST SHAFT BEARING.
REF 16. JACKSHAFT BEARING.
REF 18. PROPEL GEAR BUSHING.
REF 19. PROPELLING JACKSHAFT BEARING.



REF 20. SWING GEAR BUSHING.
REF 59. CHAIN CASE FILL AND LEVEL CAP.
REF 60. CHAIN CASE LEVEL PLUG.
REF 61. CHAIN CASE DRAIN PLUG.

MEC 3810-231-12/13 (8)

Figure 13. - Continued.

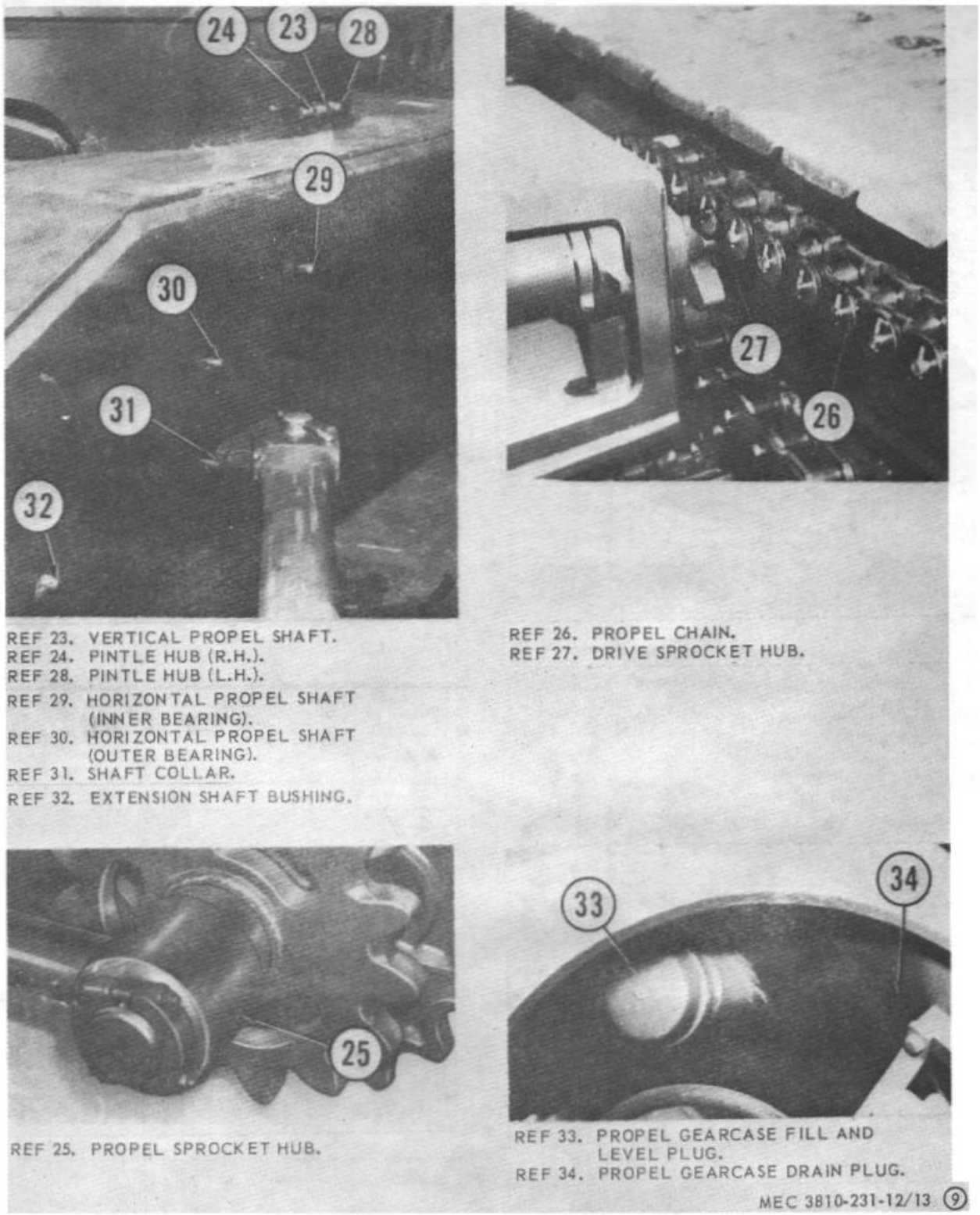


Figure 13. - Continued.

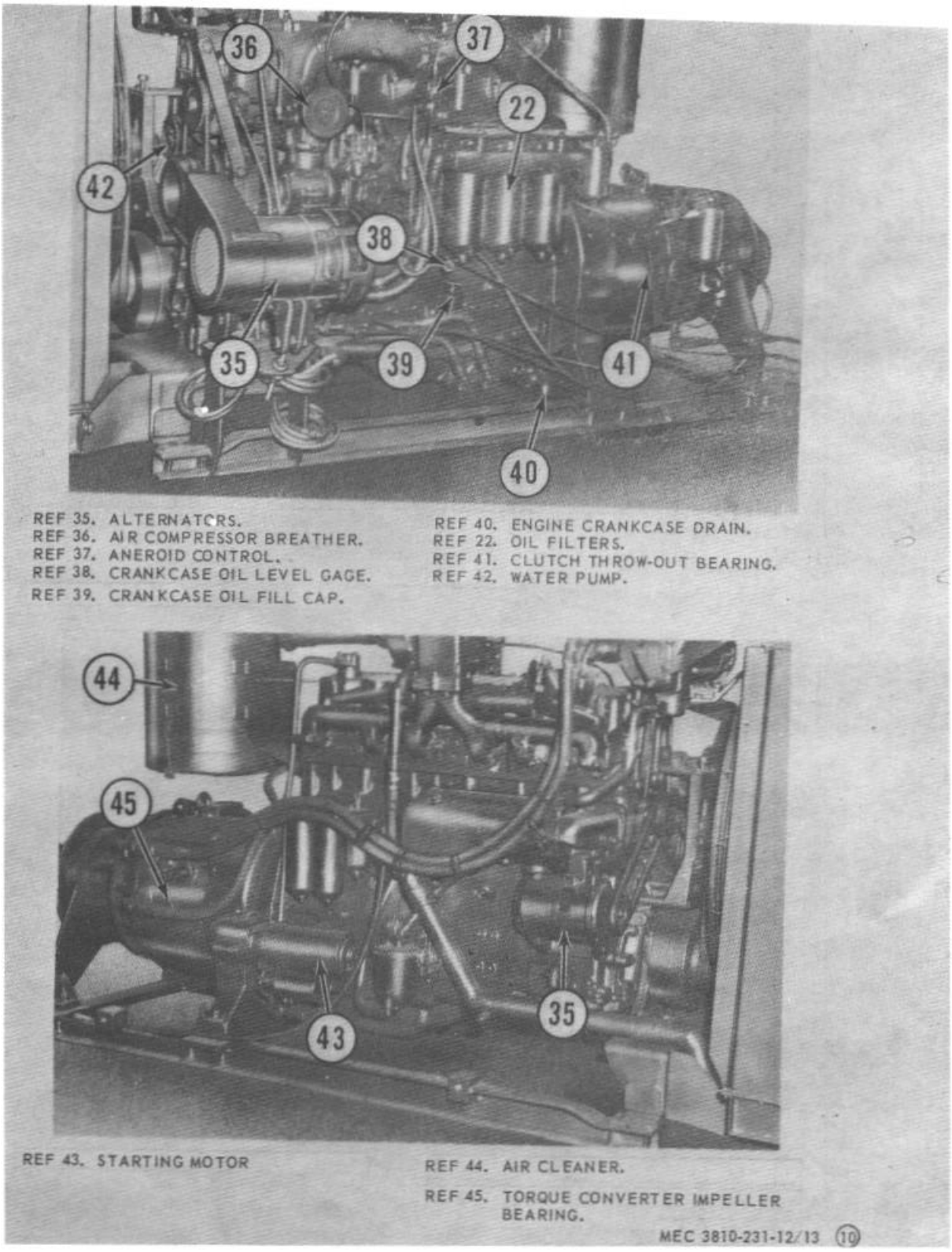


Figure 13. - Continued.

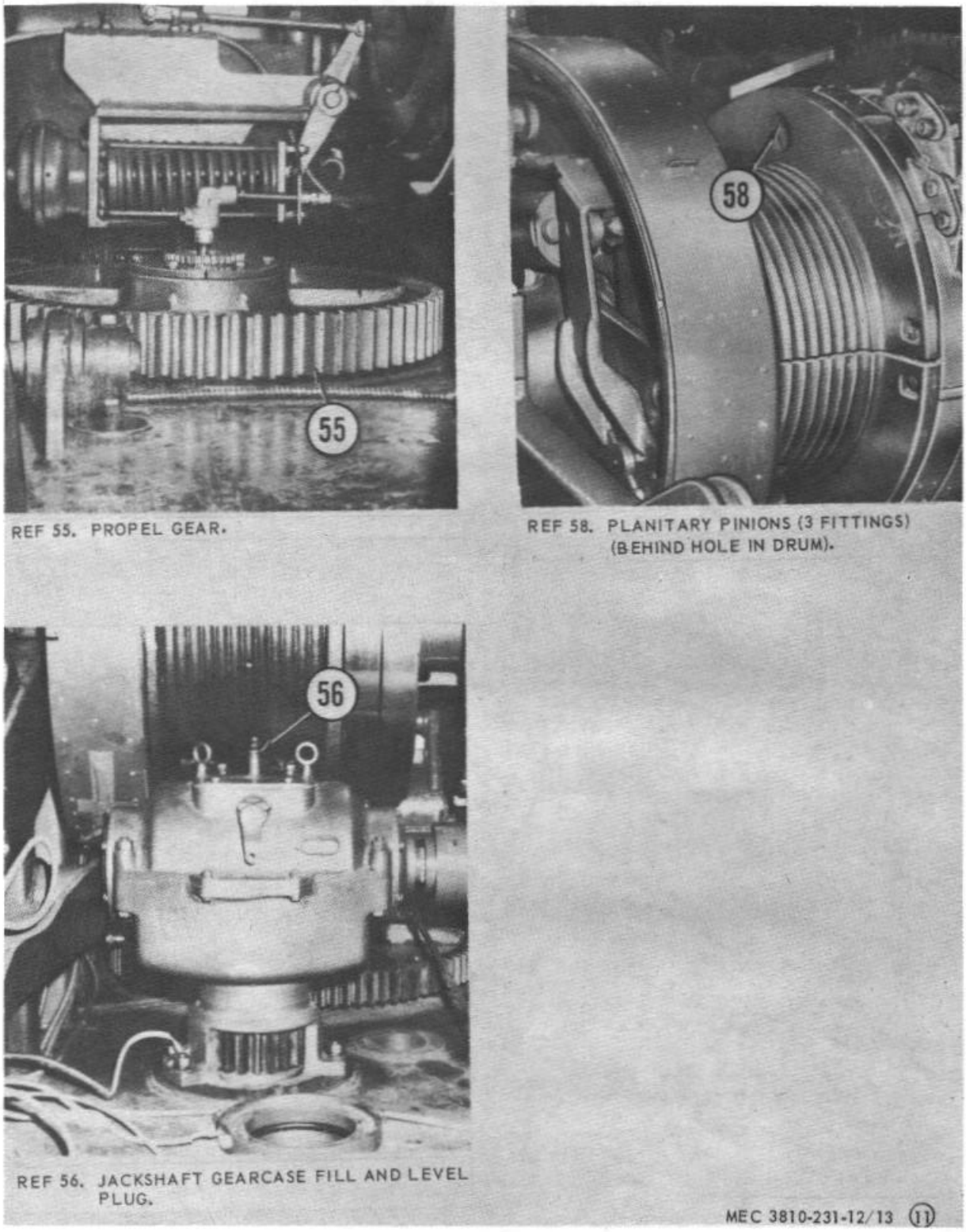
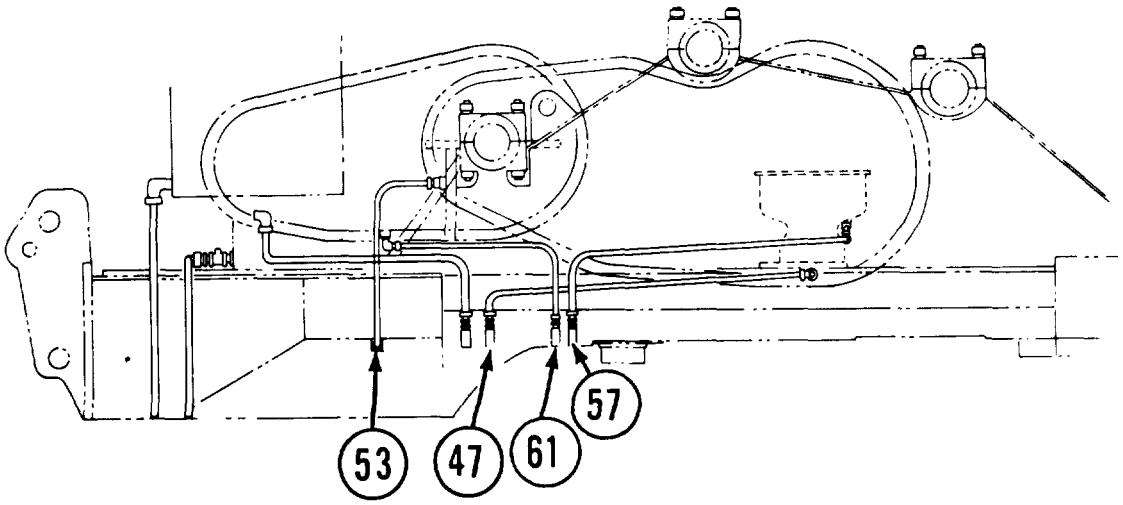


Figure 13. - Continued.



DRAIN LOCATION REFERENCE POINTS

NO 53. BEVEL PINION GEARCASE DRAIN.

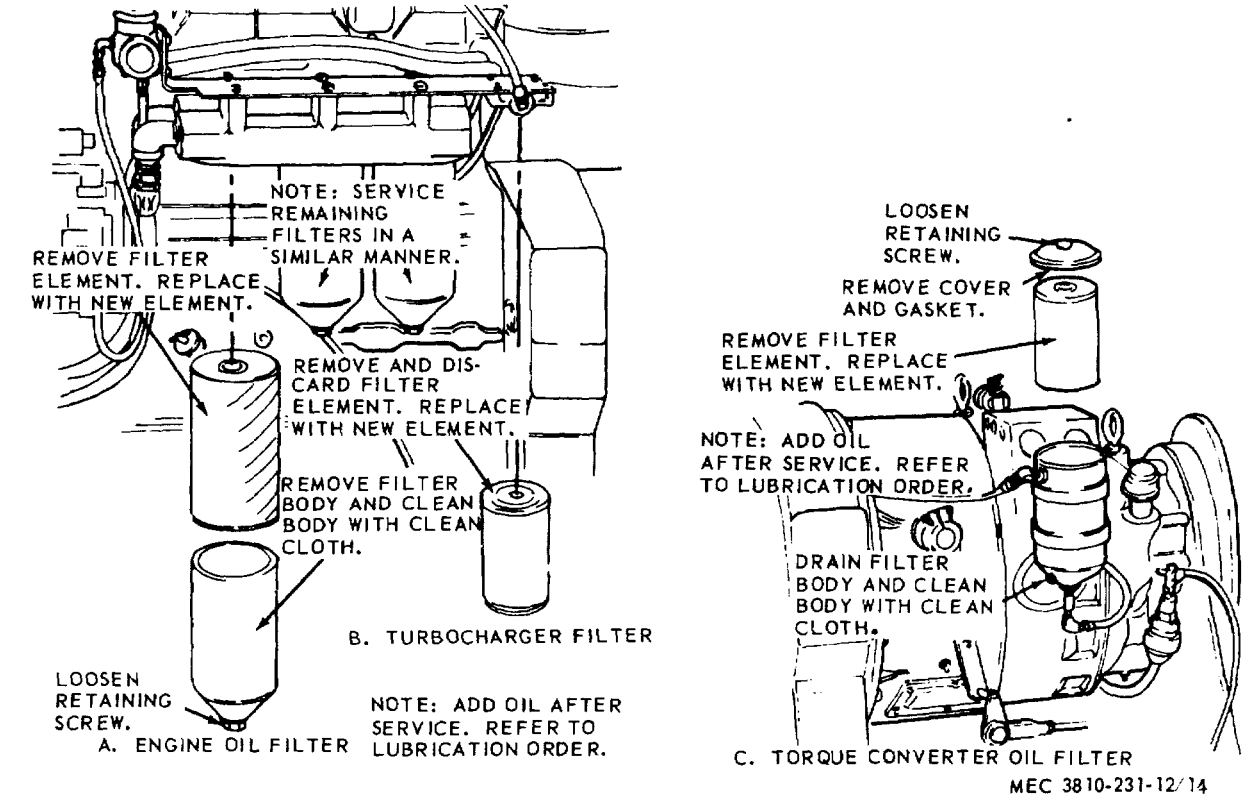
NO 47. GEARCASE DRAIN.

NO 61. CHAIN CASE DRAIN.

NO 57. PROPELLING JACKSHAFT GEARCASE DRAIN.

MEC 3810-231-12/13 (12)

Figure 13. - Continued.



A—Engine oil filter

B—Turbocharger oil filter

C—Torque converter oil filter

Figure 14. Oil filter service.

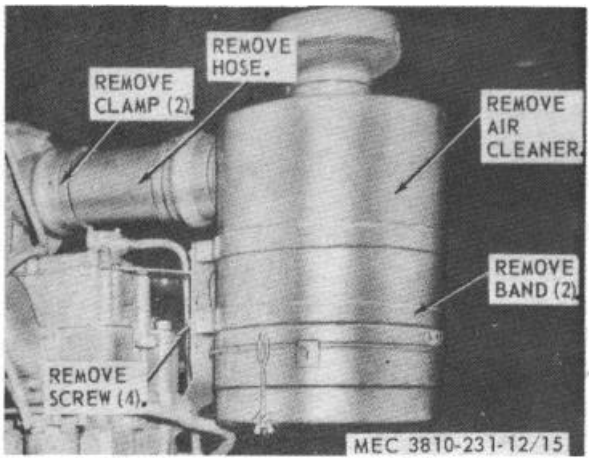


Figure 15. Engine air cleaner service.

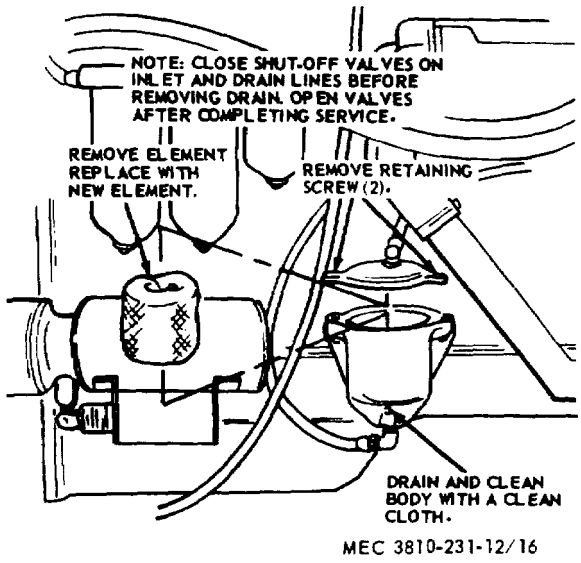


Figure 16. Engine water corrosion resistor service.

Section III. PREVENTIVE MAINTENANCE SERVICES

34. General

To insure that the Model 1125, 60 Ton Crawler Crane is ready for operation at all times, it must be inspected systematically, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary Preventive Maintenance Services to be performed are listed and described in paragraph 35 and 36. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered 'during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed during operation which would damage the equipment if operation were continued. All deficiencies and short comings will be recorded together with the corrective action taken on DA Form 2404 at the earliest possible opportunity.

35. Daily Preventive Maintenance Services

This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by the operator. The item numbers are listed consecutively and indicate the sequence of the minimum requirements. Refer to figure 17 for the Daily Preventive Maintenance Services.

36. Quarterly Preventive Maintenance Services

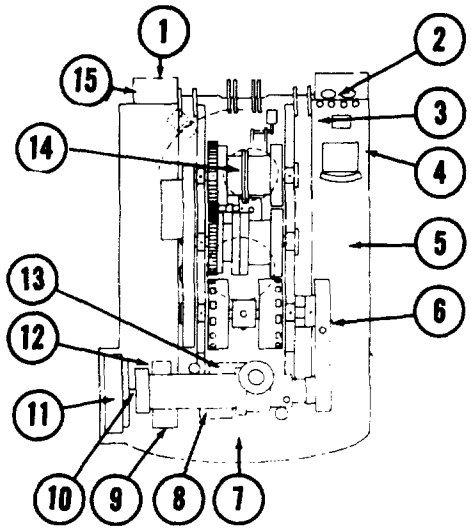
a. This paragraph contains as illustrated tabulated listing of preventive maintenance services which must be performed by Organizational Maintenance personnel at quarterly intervals. A quarterly interval is equal to 3 calendar months, or 250 hours of operation, whichever occurs first.

b. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 18 for the Quarterly Preventive Maintenance Services.

PREVENTIVE MAINTENANCE SERVICES

DAILY

TM 5-3810-231-12	**HARNISCHFEGER MODEL**	**CRANE**
	1125	



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		**PAR REF**
1	LIGHTS. Inspect for burned out lamps.	40
2	CONTROL PEDALS AND LEVERS.. Inspect for improper operation and adjustment.	117-112
3	CONTROLS AND INSTRUMENTS.. Inspect for damage and loose mounting. With the unit operating, check for proper operation. Normal operating readings for instruments are as follows: Ammeter — Slight reading on charge side Converter oil pressure — 45 to 65 psi Converter oil temperature — 160°F to 220°F Engine oil pressure — 15 to 45 psi Engine voltmeter — Normal reading in green Engine temperature gage — 165°F to 185°F Engine Hourmeter — Total Hours of operation Fuel Pressure Gage — 0 to 60 psi Tachometer — 2100 rpm Warning Lights — out with engine running	

MEC 3810-231-12/17 (1)

Figure 17.

ITEM		PAR REF
4	FIRE EXTINGUISHER. Inspect for broken seal.	26
5	BATTERIES. Tighten loose cables and mountings. Remove corrosion. Inspect for cracks and leaks. Fill to 3/8 inch above the plates. Clean vent hole in filler cop before installing. In freezing weather run engine a minimum of 1 hour after adding water. (Weekly).	89
6	DRIVE CHAINS. Inspect for wear and improper adjustment.	
7	FUEL TANK. Add fuel as required.	64
8	OIL LEVEL GAGE. Add oil as indicated by level gage. Reference Current L.O.	
9	AIR COMPRESSOR. Clean intake filter, drain condensate (Weekly).	
10	FAN V-BELTS. Proper adjustment is a deflection of 3/4 inch midway between pulleys. (Weekly).	39
11	RADIATOR. Proper coolant level is 2 inches below filler neck.	
12	GENERATOR V-BELTS. Proper adjustment is a deflection of 1/2 inch midway between pulleys. (Weekly).	39
13	FUEL FILTERS. Drain water and sediment, inspect for leaks. (Weekly).	
14	CABLES. Inspect for damage.	42
15	CRAWLER TRACK AND SUPPORT ROLLERS. Inspect for wear and damage.	
	NOTE OPERATIONAL TEST. During operation observe for any unusual noise or vibration.	

MEC 3810-231-12/17 (2)

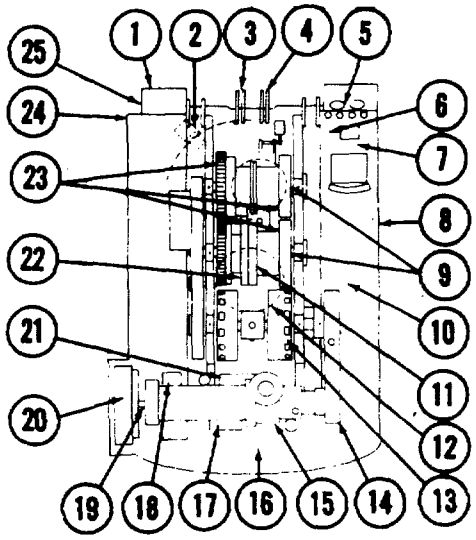
Figure 17 - Continued.

PREVENTIVE MAINTENANCE SERVICES

QUARTERLY

TM 5-3810-231-12 **HARNISCHFEGER MODEL** **CRANE**

1125



LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER

ITEM		PAR REF
1	LIGHTS. Inspect for burned out lamp, and insecure mounting. Inspect wiring for damage and loose electrical connections.	40
2	HOOK ROLLERS. Inspect for wear and proper operation, adjust as necessary, correct clearance between hook rollers and lower side of roller path is a maximum of 1/16 inch.	108
3	HOISTING CABLES. Inspect for worn, frayed or damaged cables, replace a defective cable.	42
4	BOOM ASSEMBLY. Inspect boom assembly for damage. Inspect sheaves for cracks. Replace a damaged sheave or boom.	142
5	CONTROL PEDALS AND LEVERS. Tighten loose mounting hardware. Check for proper operation and adjustment.	117-122

MEC 3810-231-12/18 (1)

Figure 18.

ITEM		PAR REF
6	CONTROLS AND INSTRUMENTS. Inspect for damage and loose mounting. With the unit operating, check for proper operation. Normal operating readings are as follows: Ammeter — Slight reading on charge side Converter oil pressure — 45 to 65 psi Converter oil temperature — 160°F to 220°F Engine oil pressure — 15 to 45 psi Engine voltmeter — Normal reading in green Engine temperature gage — 165°F to 185°F Engine hourmeter — Total hours of operation Fuel oil pressure gage — 0 to 60 psi Tachometer — 2100 rpm Warning lights — out when engine running	90
7	FIRE EXTINGUISHER. Inspect for full charge, loose mounting, and broken seal.	26
8	OPERATOR'S CAB. Inspect for broken glass and damaged doors. Replace cracked glass, repair or replace damaged door.	135-138
9	MAIN AND SECONDARY HOIST BRAKE. Inspect for proper operation and adjustment. Replace a defective brake.	89
10	BATTERIES. Tighten loose cables and mounting. Remove corrosion. Fill to 3/8 inch above plates. Clean vent hole in filler cap before installing. In freezing weather run engine a minimum of I hour after adding water. Repair or replace a cracked or leaking battery.	112
11	BOOM HOIST CLUTCH. Inspect for proper operation and correct adjustment. Adjust, repair or replace a defective clutch.	
12	SWING BRAKE. Inspect for proper operation and adjustment replace a defective brake.	114
13	MAGNETIC CLUTCHES. Inspect for proper operation. Repair or replace a defective magnetic clutch.	116
14	MAIN DRIVE CHAIN. Inspect for wear and proper tension. Adjust chain tension. Replace a defective chain.	

MEC 3810-231-12/18 (2)

Figure 18 - Continued.

ITEM		PAR REF
15	ENGINE CLUTCH. Inspect for proper operation. Adjust as necessary.	103
16	FUEL TANK. Add fuel as required. Tighten loose mounting. Replace a leaking fuel tank. Replace a defective cap gasket.	64
17	OIL LEVEL GAGE. Add oil as indicated by level gage. Reference current L.O.	
18	GENERATOR V-BELTS. Proper adjustment is a deflection of 1/2 inch midway between pulleys. Replace a worn or frayed belt.	94
19	FAN V-BELTS. Proper adjustment is a deflection of 3/4 inch midway between pulleys. Replace a worn or frayed belt.	94
20	RADIATOR. Proper coolant level is 2 inches below filler neck. Replace cracked or frayed hose. Replace defective radiator. Remove obstructions in the air passages. Tighten all mountings, and leaking connections.	
21	FUEL FILTER. Drain condensate. Replace filter element every 500 hours.	38
22	BOOM HOIST BRAKE. Inspect for proper operation. Adjust or replace a defective brake.	113
23	PLANATARY, MAIN AND SECONDARY CLUTCHES. Inspect for proper operation. Adjust or replace a defective clutch.	
24	PROPEL DRIVE CHAIN. Inspect for wear and proper tension. Adjust as necessary. Replace a defective chain.	107
25	CRAWLER TRACK AND SUPPORT ROLLERS. Replace excessively worn or damaged track shoes, rollers or shafts, proper adjustment is I 1/2 inch minimum sag at ends of track rails.	108
	NOTE 1. OPERATIONAL TEST. During operation check for unusual noises and proper operation.	
	NOTE 2. ADJUSTMENTS. Make all necessary adjustments during operational test.	

MEC 3810-231-12/18 (3)

Figure 18 - Continued.

Section IV. OPERATOR'S MAINTENANCE

37. General

The instructions in this section are published for the information and guidance of the operator to maintain the Model 1125, 60 ton Crawler Crate.

38. Fuel Filter Service

Service the fuel filter as illustrated in figure 19.

39. V-Belt Adjustments

Adjust the V-belts as illustrated in figure 20.

40. Light or Lamp Replacement

Remove and install light or lamp as illustrated in figure 21.

41. Counterweight, Removal, and Installation

a. Removal. Position machine with the front of the upper over the front of the lower (propel chains are in the rear of the lower) so that' the counterweight will clear the crawler tracks when lowered.

(1) Lower gantry assembly (para 18).

(2) Raise spreader bar and block up. Reeve wire rope (3/4 inch x 110 feet) as illustrated in figure 22.)

(3) Take up tension on cable and remove pins holding counterweight and lower counterweight to the ground be sure to keep it level so the sheaves on gantry and counterweight will operate properly.

b. Installation. Reverse the procedure described for removal.

42. Boom Assembly, Removal and Installation

a. General. All crane booms and jibs are adjusted for length by use of inserts between the point section and base section (fig. 23). The lengths of these inserts vary depending upon the length of the boom or jib desired. The allowable boom length and jib length to be used is specified on the Rating Plate furnished with the machine. Always consult the Rating Plate when using a long boom or making a heavy sift. Information on this Rating Plate is listed by the boom length and operating radius is measured from the center of rotation of the machine to the center of the hook. Lifting capacity is also affected by the number of parts of line used to reeve the main hoist block. Lifting capacities for each reeving of the hook block are shown on the Rating Plate.

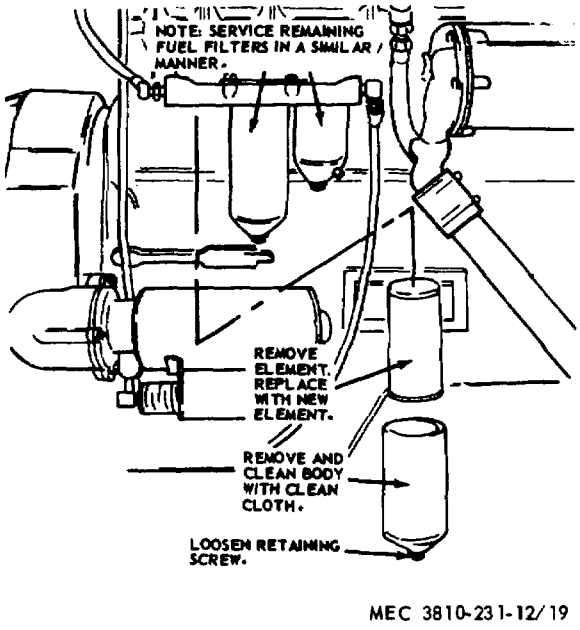


Figure 19. Fuel filter service.

b. Crane Boom Installation.

(1) Using suitable lifting device, lift the boom into position, aligning the holes of the boom base section, with the holes in the rotating upper section and install boom foot pins as shown in figure 24.

(2) Install boom backstop to boom and gantry (fig. 23).

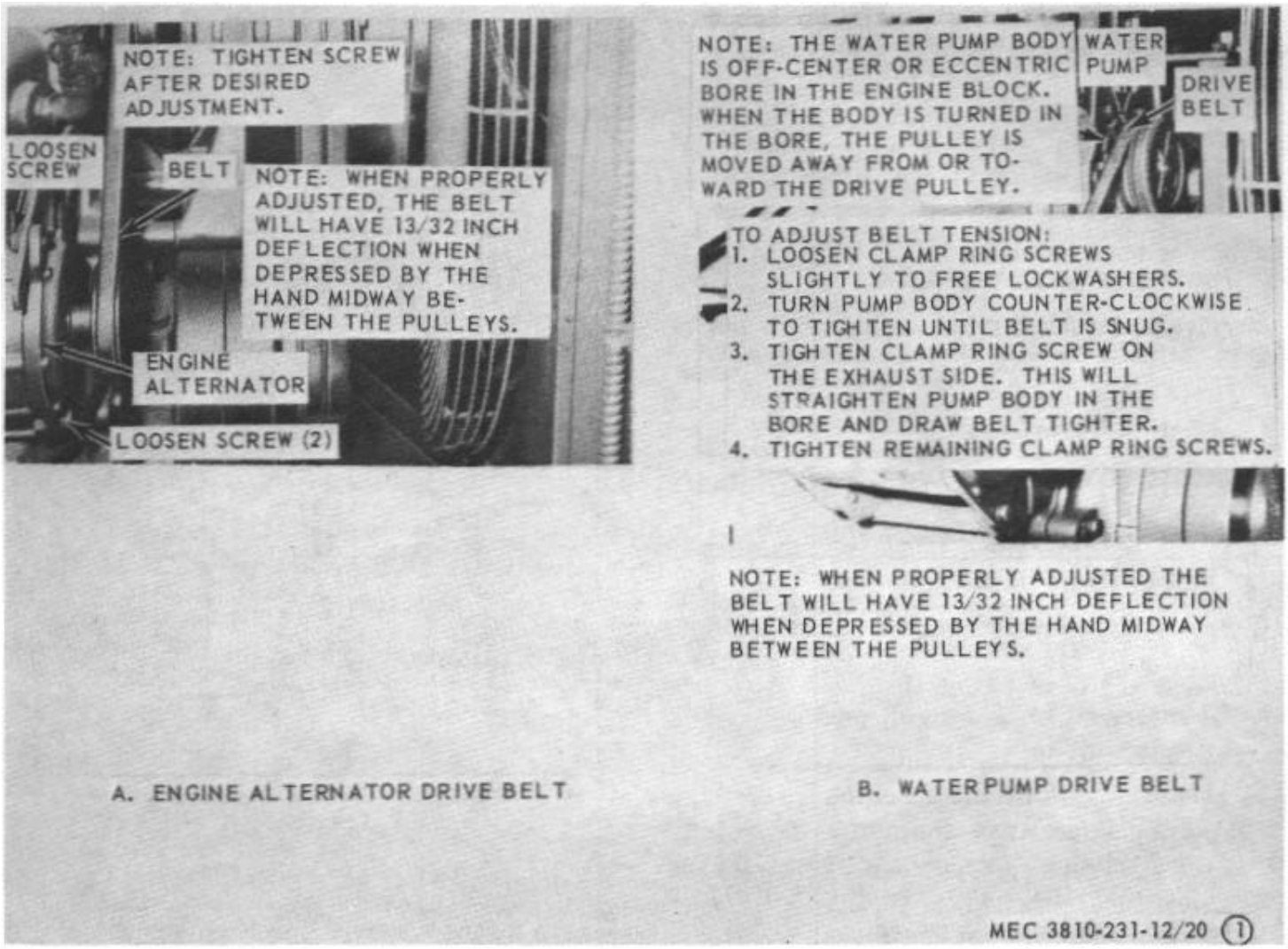


Figure 20. V-belt adjustments.

(3) Install pendant line, equalizer assembly and boom spread assembly (fig. 23).

c. Crane Boom Removal. Reverse procedure instructions for installation above.

d. Cable Reeving.

(1) Remove cable in proper manner.

(2) Refer to figure 23, pass the cable over the gantry guide sheave and forward of the boom hoist drum so that it will wrap around the drum from front to the rear. The planetary system inside the boom hoist drum makes this opposite reeving necessary since the planetary causes the boom hoist drum to rotate in the opposite direction from the secondary hoist drum.

(3) The number of parts of the line used to reeve the hoist line will determine the load which may be lifted by the machine. Consult the Rating Plate mounted in the machine for the maximum loads which may be lifted with two, four, six, seven or eight parts of line reeved on the bottom block.

e. Crane Boom Jib.

(1) When installing the jib on the crane boom, the jib strut (fig. 23) supports jib suspension cables. The length of the jib suspension cables should be adjusted so that the jib, when loaded, does not deflect more than 15 degrees after the load is applied.

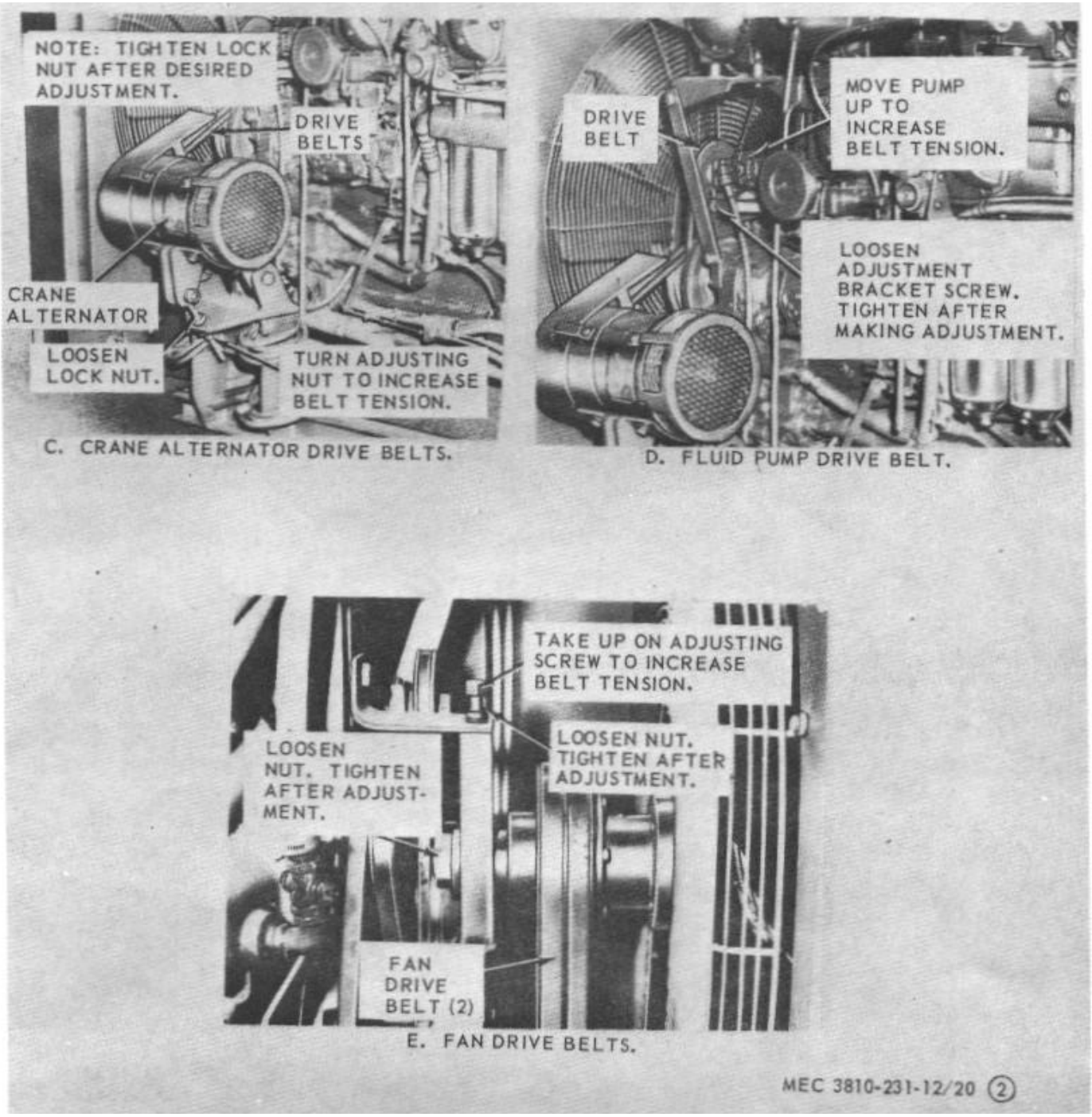


Figure 20 - Continued.

(2) Adjust the length of the jib suspension cables so that the jib strut forms equal angles (fig. 23) with the crane boom and the jib. It may be necessary to shorten the jib suspension cables from the jib strut to the base of the crane boom a slight amount to prevent the jib strut from leaning forward when a load is applied to the jib.

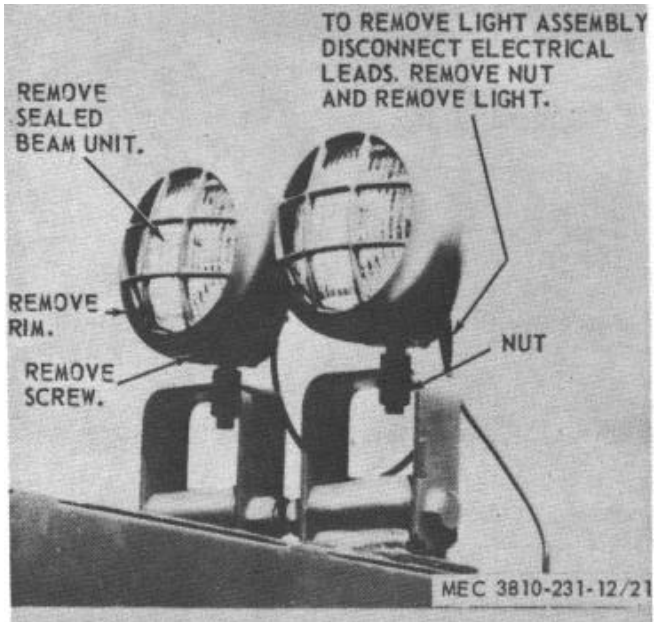
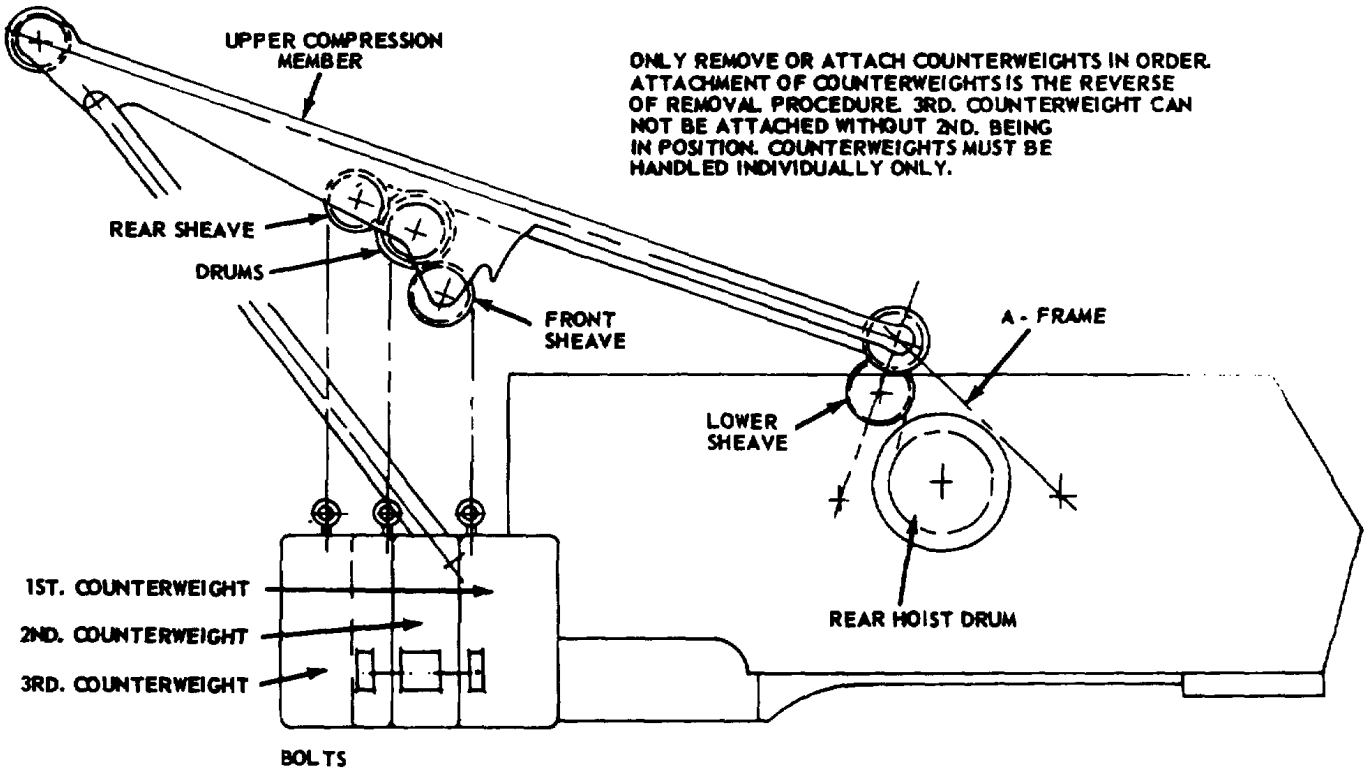


Figure 21. Light or lamp, removal and installation



COUNTERWEIGHT REMOVAL PROCEDURE

1. WITH GANTRY IN INTERMEDIATE POSITION AND MACHINE LEVEL, REEVE CABLE FROM REAR HOIST DRUM OVER LOWER SHEAVE AT A-FRAME TO CENTER. DRUM MOUNTED ON UPPER COMPRESSION MEMBER OF GANTRY.
2. REEVE CABLE FROM L.H. AND R.H. DRUMS ON COMPRESSION MEMBER OVER FRONT SHEAVE OR REAR SHEAVE OR DIRECTLY FROM DRUM TO COUNTERWEIGHT. POSITION OF CABLE IS DETERMINED BY WHICH COUNTERWEIGHT IS TO BE REMOVED.
3. REMOVE BOLTS ATTACHING COUNTERWEIGHT TO NEXT COUNTERWEIGHT.
4. ACTIVATE REAR HOIST DRUM UNTIL COUNTERWEIGHT IS SUPPORTED BY CABLE. REMOVE PINS ATTACHING COUNTERWEIGHT TO REVOLVING FRAME.
5. LOWER COUNTERWEIGHT TO GROUND OR TRUCK.

MEC 3810-231-12/22

Figure 22. Counterweight reeving.

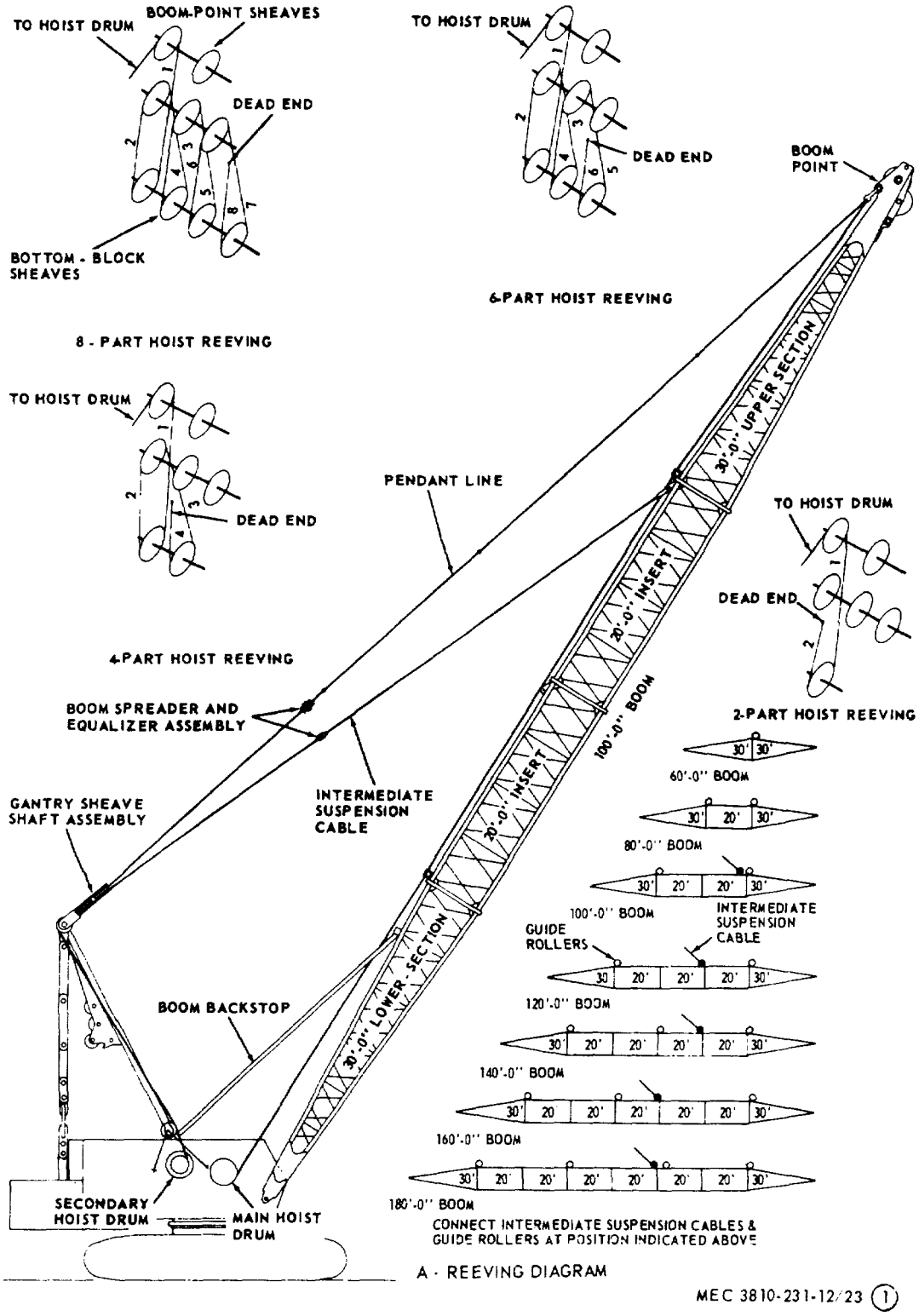


Figure 23. Reeving diagram, crane boom and jib removal and installation, and load rating tables.

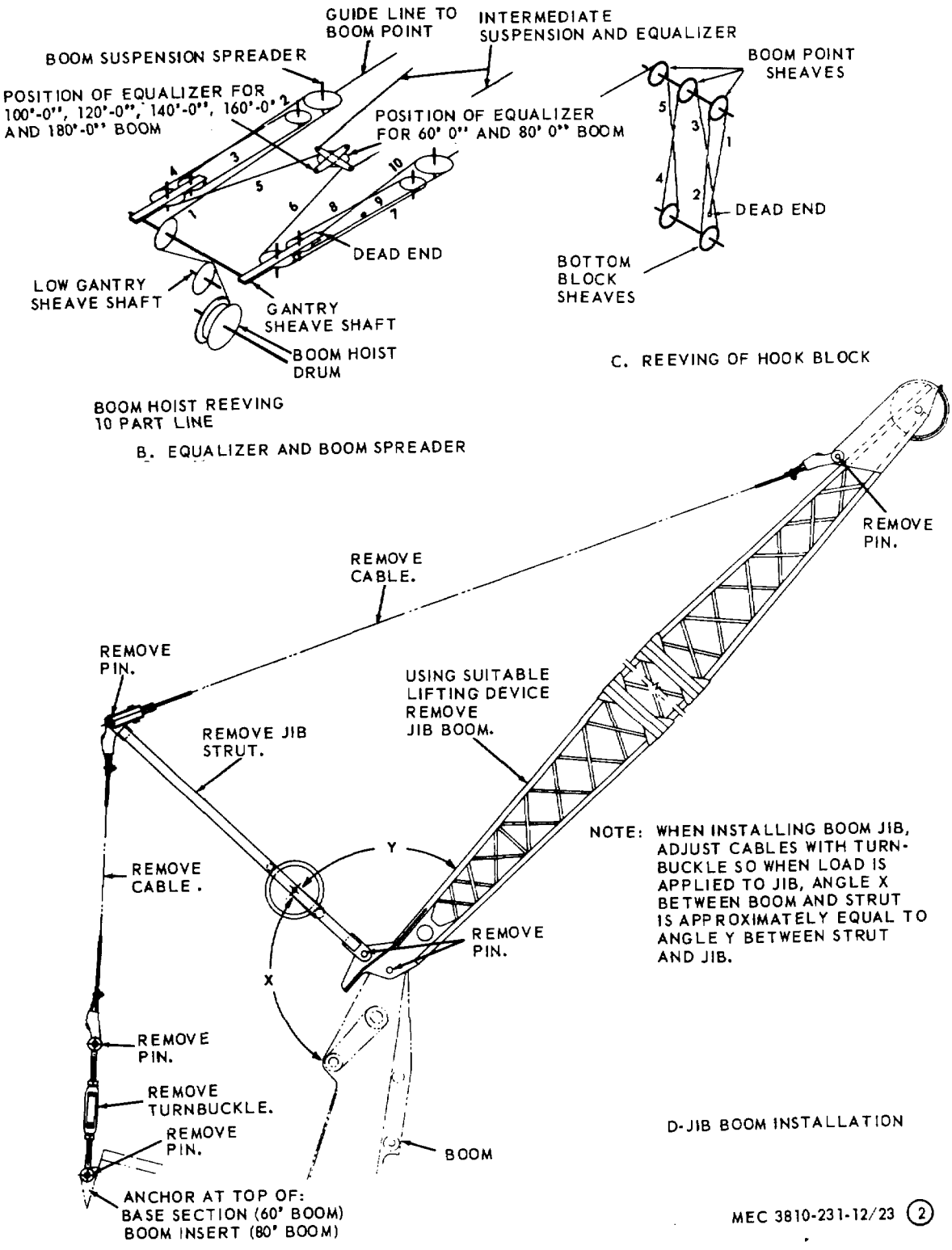


Figure 23 - Continued.

RATED CRANE LOADS IN LBS. MAIN BOOM

OPER RAD. FT.	ANGLE	60 FT. BOOM BOOM PT. EL.	60 FT. BOOM RATING LBS.	ANGLE	80 FT. BOOM BOOM PT. EL.	80 FT. BOOM RATING LBS.	ANGLE	100 FT. BOOM BOOM PT. EL.	100 FT. BOOM RATING LBS.	ANGLE	120 FT. BOOM BOOM PT. EL.	120 FT. BOOM RATING LBS.	ANGLE	140 FT. BOOM BOOM PT. EL.	140 FT. BOOM RATING LBS.	ANGLE	160 FT. BOOM BOOM PT. EL.	160 FT. BOOM RATING LBS.	ANGLE	180 FT. BOOM BOOM PT. EL.	180 FT. BOOM RATING LBS.	OPER. RAD. FT.
15	80	69.3	220000																			15
20	76	68.3	160000	79	88.7	159250																20
25	71	66.8	120500	76	87.6	119750	78	108.1	119000													25
30	65	64.8	92000	72	86.2	91250	76	107.0	90500	78	127.5	89750										30
35	60	62.1	73700	68	84.4	72950	73	105.6	72200	76	126.4	71450										35
40	54	58.8	61100	64	82.2	60350	70	103.9	59600	73	125.0	58850	76	145.7	58100							40
45	48	54.6	52100	60	79.5	51350	66	101.9	50600	71	123.4	49850	73	144.4	49100	76	165.1	48350				45
50	41	49.3	45200	56	76.3	44450	63	99.5	43700	68	121.5	42950	71	142.8	42200	74	163.8	41450	76	184.5	40700	50
55	33	42.4	39700	51	72.5	38950	60	96.8	38200	65	119.3	37450	69	141.0	36700	72	162.2	35950	74	183.1	35200	55
60	22	32.2	35200	46	68.0	34450	57	93.7	33700	63	116.9	32950	67	139.0	32200	70	160.5	31450	72	181.6	30700	60
65				41	62.6	30950	53	90.1	30200	60	114.1	29450	65	136.7	28700	68	158.6	27950	71	179.9	27200	65
70				35	56.0	27850	49	86.0	27100	57	111.0	26350	62	134.2	25600	66	156.4	24850	69	178.1	24100	70
75				28	47.6	25350	45	81.3	24600	54	107.6	23850	60	131.4	23100	64	154.1	22350	67	176.1	21600	75
80				19	35.6	23050	41	75.8	22300	51	103.7	21550	58	128.4	20800	62	151.6	20050	65	173.9	19300	80
85							37	69.4	20400	48	99.4	19650	55	125.0	18900	60	148.8	18150	64	171.5	17400	85
90							31	61.8	18600	45	94.5	17850	53	121.3	17100	58	145.7	16350	62	168.9	15600	90
95							25	52.1	17200	41	89.0	16450	50	117.2	15700	56	142.4	14950	60	166.1	14200	95
100							17	38.6	15800	37	82.8	15050	47	112.7	14300	54	138.8	13550	58	163.1	12800	100
105										33	75.5	13850	44	107.8	13100	51	134.9	12350	56	159.8	11600	105
110										29	66.9	12750	41	102.3	12000	49	130.7	11250	54	156.3	10500	110
115										23	56.2	11750	38	96.1	11000	46	126.1	10250	52	152.5	9500	115
120										16	41.3	10850	35	89.1	10100	44	121.0	9350	50	148.5	8600	120
125													31	81.1	9300	41	115.5	8550	48	144.1	7800	125
130													26	71.7	8500	38	109.4	7750	46	139.4	7000	130
135													21	60.0	7800	35	102.6	7050	44	134.3	6300	135
140													14	43.8	7200	32	95.0	6450	41	128.7	5700	140
145																29	86.3	5850	39	122.7	5100	145
150																25	76.1	5250	36	116.1	4500	150
155																20	63.5	4750	33	108.7	4000	155
160																13	46.2	4250	30	100.5	3500	160
165																			27	91.1	3000	165
170																			23	80.2	2600	170
175																			19	66.8	2200	175
180																			13	48.3	1800	180

OPERATING RADIUS IS HORIZONTAL DISTANCE FROM THE CENTERLINE OF ROTATION TO A VERTICAL LINE THROUGH THE GRAVITY CENTER OF THE LOAD. CAPACITIES SHOWN ARE NOT MORE THAN 75% OF THE TIPPING LOADS WITH MACHINE STANDING ON A FIRM, LEVEL, UNIFORMLY SUPPORTING SURFACE. THE CRANE RATINGS INCLUDE THE WEIGHT OF SLINGS AND ALL OTHER LOAD HANDLING ACCESSORIES, BUT DO NOT INCLUDE THE WEIGHT OF THE MAIN BOTTOM BLOCK.

FOR ALL LIFTING OPERATIONS THE GANTRY MUST BE IN THE FULLY RAISED POSITION. NO BOOM OF ANY LENGTH MAY BE TRANSPORTED OR CRAWLED WITH GANTRY IN LOWERED POSITION. WHEN GANTRY IS IN INTERMEDIATE POSITION MAXIMUM BOOM LENGTH TO BE CARRIED IS 120' 0" IN HORIZONTAL POSITION. CENTER HITCH REQUIRED FOR BOOM LENGTHS 100 FT. AND OVER.

NOTE: OPERATION OF THIS EQUIPMENT IN EXCESS OF RATED LOADS AND DISREGARD OF INSTRUCTIONS VOIDS THE WARRANTY.

E. LOAD RATING PLATE.

MEC 3810-231-12/23 (3)

Figure 23 - Continued.

DRAGLINE RATING				
OPER. RAD..	BOOM LENGTH			
FT.	60 FT.	80 FT.	100 FT.	120 FT.
50	20000			
55	20000			
60	20000			
65		20000		
70		18000		
75		16030		
80			4850	
85			13600	
90			12400	
95			11450	10900
100				10000
105				9250
110				8500

OPER. RAD..				
FT.	60 FT.	80 FT.	100 FT.	120 FT.
35	20000			
40	20000			
45	20000			
50	20000	20000		
55	20000	20000	20000	
60		20000	20000	
65		20000	20000	20000
70		20000	18640	18070
75			17060	16490
80			15490	14920
85			14320	13760
90			13150	12600
95				11660
100				10720

CLAMSHELL RATINGS SHOWN ALSO APPLY TO MAGNET, GRAPPLE, AND ALL OTHER MATERIAL HANDLING BUCKETS EXCEPT DRAGLINE, WHICH IS RATED SEPARATELY. FOR CLAMSHELL, DRAGLINE AND MAGNET OPERATIONS THE WEIGHT OF BUCKET OR MAGNET IS CONSIDERED A PART OF THE LOAD AND THE TOTAL WEIGHT OF BUCKET PLUS CONTENTS OR MAGNET PLUS LOAD MUST NOT EXCEED THE CORRESPONDING RATINGS SHOWN. MAXIMUM ALLOWABLE SIZE OF DRAGLINE OR CLAMSHELL BUCKET, CUBIC YARDS.

NUMBER OF PARTS OF MAIN HOIST REEVING	1	2	3	4	5	6	7	8
MAXIMUM LOAD - LBS	27500	55000	92500	110000	137500	165000	192500	2000

OFFSET ANGLE JIB TO BOOM UNDER FULL LOAD	MAXIMUM JIB RATING LBS.	
	20 FT. JIB	30 FT. JIB
5^{o}	14000	13000
10^{o}	13500	12500
15^{o} MAX.	13000	12000

WEIGHT OF LOAD HANDLING ACCESSORIES	
SINGLE SHEAVE HOOK BLOCK	LBS.
FOUR SHEAVE HOOK BLOCK	LBS.
SLINGS	200 LBS. APPROX.
CLAMSHELL OR DRAGLINE BUCKET	DEPENDS ON SIZE AND MAKE

JIB CRANE RATING AT ANY RADIUS FROM CENTER OF ROTATION IS THE SAME AS CRANE RATING SHOWN IN TABLE FOR MAIN BOOM, WHEN OPERATED AT THAT RADIUS BUT NOT TO EXCEED MAXIMUM JIB RATINGS SHOWN. MAXIMUM JIB OPERATING RADIUS NOT TO EXCEED LENGTH OF MAIN BOOM ON WHICH IT IS BEING USED.

WHEN BOOM IS EQUIPPED WITH JIB MAIN HOOK RATINGS SHOULD BE REDUCED BY:

1500 LBS FOR 20 FT. JIB
2000 LBS. FOR 30 FT. JIB

BACKSTOPS RECOMMENDED FOR ALL BOOM LENGTHS AT RADII AND BOOM LENGTHS. WHERE NO RATING ARE SHOWN ON PLACE, OPERATION IS NOT INTENDED OR APPROVED. RATINGS ARE BASED UPON FREELY SUSPENDED LOADS AND MACHINE STANDING ON FIRM LEVEL UNIFORMLY SUPPORTING SURFACE. SAFE LOADS DEPEND UPON GROUND CONDITIONS, BOOM LENGTH, RADIUS OF OPERATION, AND PROPER HANDLING, ALL OF WHICH MUST BE TAKEN INTO ACCOUNT BY THE USER. RATING ARE CONTINGENT UPON MACHINE BEING EQUIPPED WITH PROPER BOOM.

F. LOAD RATING PLATE

MEC 3810-231-12/23 (4)

Figure 23 - Continued.

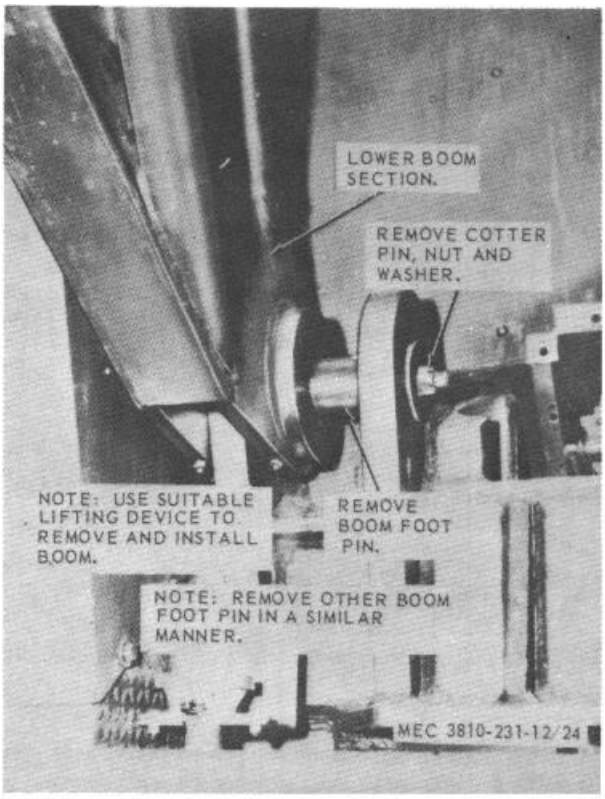


Figure 24. Boom foot pin, removal and installation

Section V. TROUBLESHOOTING

43. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the Model 1125, 60 ton Crawler Crane and its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable cause. Any trouble beyond the scope of organizational maintenance shall be reported to direct support maintenance.

44. Engine Overheats

Probable cause	Possible remedy
Radiator coolant level low	Inspect coolant level and refill if necessary.
V-belt loose, broken or slipping	Adjust or replace V-belt (para. 95).
Worn water pump	Replace water pump (para. 83).

45. Engine Lacks Power

Probable cause	Possible remedy
Dirty fuel filter	Clean and replace fuel filter (para. 38).
Restricted air intake	Inspect and service air cleaner (para 33).
Poor quality fuel	Reference to Maintenance and Operating Supplies.
Long idle periods	Do not allow engine to idle for long periods. If machine is not being used, shut engine down.

46. Engine Hard to Start or Fails to Start

Probable cause	Possible remedy
Restricted air intake	Inspect and service air cleaner (para. 33).
Out of fuel or fuel shut-off closed	Inspect and service fuel tank.
Restricted fuel lines or dirty fuel filter	Inspect and service fuel filter (para. 38).
Loose injector inlet or drain connection	Inspect and tighten as necessary (para. 65).
Long idle periods	Do not allow engine to idle for long periods. When not in use shut engine down.

47. Excessive Fuel Consumption

Probable cause	Possible remedy
Restricted air intake	Inspect and service air cleaner (para 33).
External or internal fuel leaks	Inspect, tighten and replace fuel lines as necessary (para. 64).
Engine overloaded	Reduce load.

48. Excessive Oil Consumption or Dilution

Probable cause	Possible remedy
External or internal fuel leaks	Inspect, tighten and replace fuel lines as necessary (para. 64).
Loose injector inlet or drain connection	Inspect and tighten as necessary (para. 65).
External and internal oil leaks	Tighten external oil lines (para. 73). Report to proper authority.
Wrong grade oil for weather conditions	Reference current lubrication order.

49. Starter Fails to crank Engine

Probable cause	Possible remedy
Poor electrical connection	Clean and tighten battery cables and other electrical connections. Replace if necessary (para. 89).
Starter switch defective	Replace switch (para. 87, 90).
Faulty starter	Replace starter (para. 88).
Faulty batteries	Replace batteries (para. 89).
Starter brushes worn	Replace brushes (para. 88).
Internal engine seizure	Report to proper authority.

50. Battery-Charging Alternator Not Charging

Probable cause	Possible remedy
Faulty alternator	Replace or repair alternator (para. 85).
V-belt loose, broken or slipping	Adjust or replace V-belt (para. 39 and 96).
Alternator brushes worn	Replace brushes (para. 85).
Loose wiring	Inspect and tighten (para. 92).

51. Engine Clutch Slips or Will Not Engage Properly

Probable cause	Possible remedy
Incorrect clutch adjustment	Adjust clutch (para. 103).
Control linkage loose or out of adjustment	Tighten or adjust control linkage (para. 104).

52. Main Drive Chain Excessively Noisy

Probable cause	Possible remedy
Defective chain	Replace chain. Report to direct support maintenance.
Worn sprockets	Replace sprocket. Report to direct support maintenance.
Improper adjustment	Adjust and align drive chain. Report to direct support maintenance.

53. Hoist Shaft Gears Noisy

Probable cause	Possible remedy
Worn gear teeth	Report to direct support maintenance.
Worn or scored bearing	Report to direct support maintenance.
Bent shaft	Report to direct support maintenance.

54. Crane Boom or Hoist Operation Rough

Probable cause	Possible remedy
Broken shaft	Report to direct support maintenance.
Worn or defective shaft bearings	Report to direct support maintenance.
Defective clutches	Replace or repair clutch (para. 115).

55. Cables Tend to Flatten

Probable cause	Possible remedy
Sheave channel clearance too great	Replace sheaves (para. 142-146).
Defective cables	Replace cables (para. 42).
Incorrect cable size	Install correct cable (para. 4).

56. Revolving Frame Teeters or Will Not Swing

Probable cause	Possible remedy
Hook rollers out of adjustment	Adjust rollers (para. 110).
Worn rollers	Replace hook rollers. Report to direct support maintenance.
Swing clutch out of adjustment	Adjust swing clutch (para. 116).
Worn roller shaft	Replace roller shaft. Report to direct support maintenance.
Worn or loose roller bushing	Replace bushings. Report to direct support maintenance.

56A. Machine Fails to Swing in Either Direction

Probable cause	Possible remedy
Circuit breaker tripped	Remove cover from control cabinet and reset circuit breaker (para. 150).
	With engine "off" check for open circuit In regulator coil circuit. Remove all leads from terminal "C" (fig. 3) on the regulator. At terminal "C" to "D" on regulator reading with ohmmeter should be about 37 to 45 ohms. If not replace voltage regulator plug-in unit (para. 150).
	Remove leads from terminal "A" (fig. 3) on voltage regulator chassis. Reading measure from terminal "A" to "B" should be 40 ohms. If not replace regulator plug-in unit (para. 150).
Alternator field open or shorted	Check continuity of alternator field with an ohmmeter. disconnect the leads at the alternator field terminals. Reading should be 23 to 25 ohms.
	If not replace brushes and clean slip-rings (para. 116). If trouble persists repair or replace the crane alternator (para. 148).
Crane alternator belts loose or broken	Adjust or replace belts (para. 39 and 96).

56B. Machine Fails To Swing in One Direction But is Normal in Other Direction

Probable cause	Possible remedy
Moveable contacts in the controller "R" or "L" (fig. 3) not making contact with the stationary contact	Replace badly burned or worn contacts (para. 149).

Probable cause	Possible remedy
Brushes do not make good contact with the slip-rings on the magnetic clutch shaft unit	Replace the magnetic clutch slip-ring brushes and clean the slip-ring (para. 116).

56C. Machine Swings Violently and Lacks Control

Probable cause	Possible remedy
Voltage regulator not functioning properly	Check voltage from "A" to "B" (fig. 3) should be 45 to 105, if zero, replace voltage regulator plug-in unit (para. 150).
Movable graphite brush contact on circuit board of controller fails to contact segments	Replace brush and clean circuit board (para. 149).

56D. Machine Swings Too Slowly in Either Direction

Probable cause	Possible remedy
Crane alternator belts loose	Adjust belt tension (para. 39).
Voltage regulator contact fingers badly worn or oxidized ...	Remove voltage regulator plug-in unit and visually inspect finger contacts. If faulty replace voltage regulator plug-in unit (para. 150).

Section VI. RADIO INTERFERENCE SUPPRESSION

57. Definitions

a. Interference. The term "interference" as used herein, applies to electrical disturbances in the radio frequency range which are generated by the Model 1125, 60 ton Crawler Crane and which may interfere with the proper operation of radio receivers or other electronic equipment.

b. Interference suppression. The term "interference suppression" as used herein, applies to the methods used to eliminate or effectively reduce radio interference generated by the Model 1125, 60 ton Crawler Crane.

58. General Methods Used to Attain Proper Suppression

Essentially, suppression is obtained by providing a low resistance path to ground for stray currents. The methods used include shielding the ignition and high frequency wires, grounding the frame with bonding straps, and using capacitors and resistors.

59. Interference Suppression Components

a. Primary Suppression Components. The primary suppression components are those whose primary function is to suppress radio interference. These components are described and located in figure 25.

NOTE

Do not pull on the cable or twist the braided shielding. Gently work the cable from side to side and free the rubber seal. Do not use sharp metal tools to install the rubber seals.

b. Secondary Suppression Components. These components have radio interference suppression - functions which are incidental and/or secondary to their primary function.

60. Replacement of Suppression Components

Refer to figure 25 and replace the radio interference suppression components.

61. Testing Radio Interference Suppression Components

Test the capacitors for leaks and shorts on a capacitor tester; replace defective capacitors. If test equipment is not available and interference is indicated, isolate the cause of interference by the trail-and-error method of replacing each capacitor in turn until the cause of interference is located and eliminated.

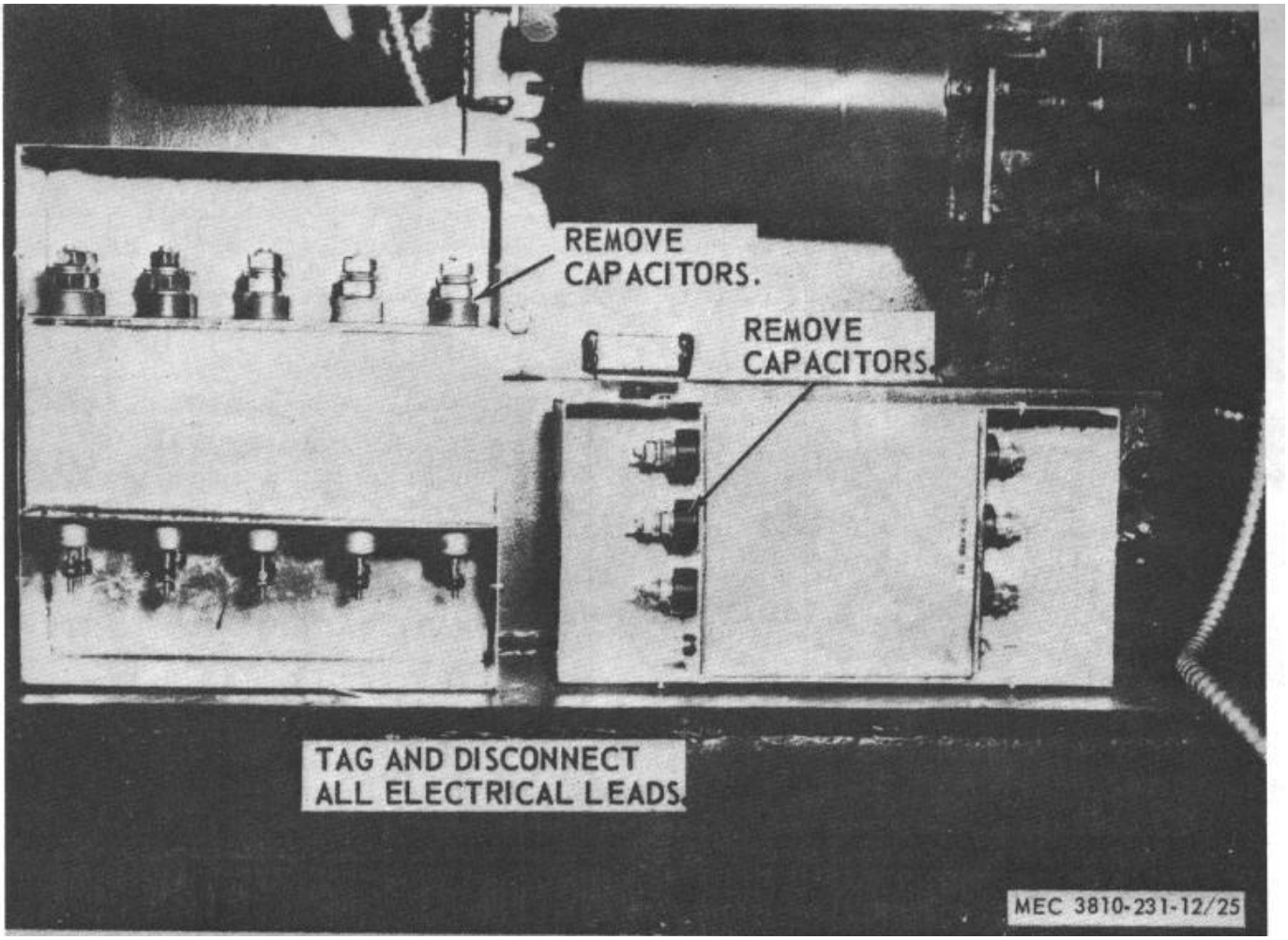


Figure 25. Interference suppression components, location, removal and installation.

Section VII. ENGINE FUEL SYSTEM

62. General

The engine fuel system consists of the fuel tank, fuel filters, fuel pump, supply and drain lines and the injectors (fig. 26). The fuel pump draws fuel from the fuel tank through the fuel filter and delivers it to the injectors under controlled pressure. The injectors receive the low-pressure fuel from the pump and deliver it into the individual combustion chambers at the right time, and in equal quantity and proper condition to burn.

63. Fuel Filter

a. Removal. Remove engine fuel filters as shown in figure 27.

b. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, or other damage. Replace all defective parts.

c. Installation. Install engine fuel filters as shown in figure 27.

64. Fuel Tanks, Lines, and Fittings

a. Removal. Remove engine fuel tanks, lines and fittings as instructed in figure 28.

b. Cleaning, Inspection and Repair.

(1) Clean with approved solvents, being sure to remove all sludge, deposits and water.

(2) Inspect for damage and leaks.

(3) Replace if inspection reveals faults.

c. Installation. Install engine fuel tanks, lines and fittings as instructed in figure 28.

65. Fuel Injectors

a. General. The fuel injectors meter an d injects fuel into the combustion chambers. They should be cleaned and adjusted regularly to prevent restriction of fuel and proper delivery to the combustion chamber.

b. Removal.

(1) Remove rocker cover from rocker housing (fig. 29).

(2) Remove injectors as shown in figure 29.

c. Cleaning, Inspection and Repair.

(1) Remove circlip and clean screen (fig. 29).

(2) Clean all parts in an approved cleaning solvent and dry thoroughly.

(3) Inspect for cracks, breaks, or other damage. Replace all damaged parts.

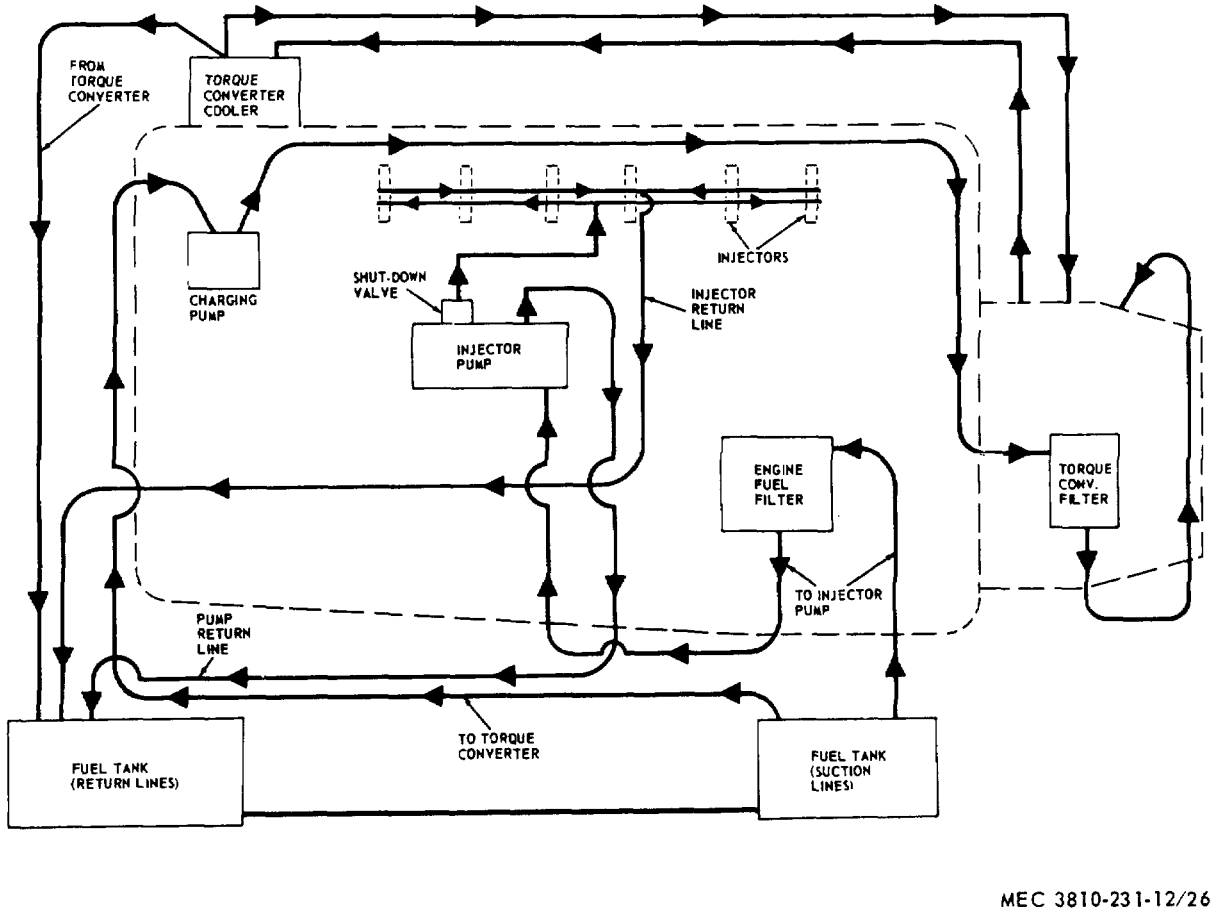


Figure 26. Engine fuel flow schematic.

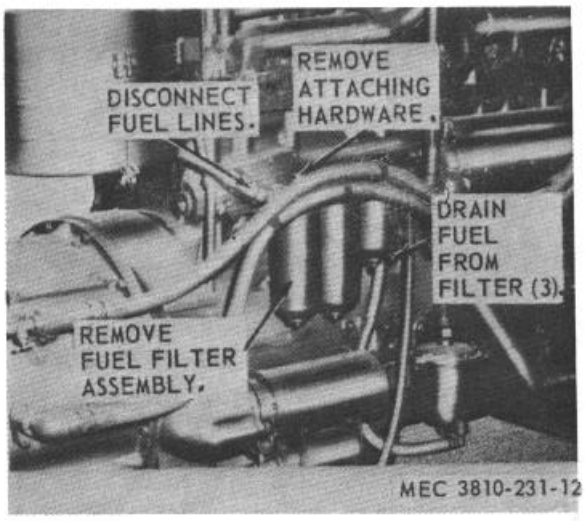


Figure 27. Fuel filter, removal and installation.

Caution:

Do not use drills, wires or other instruments when cleaning cups.

(4) Replace a defective or damaged injector.

(5) Replace screen and circlip.

Caution:

Screen overlap should not be over inlet orifice.

d. Installation.

(1) Install injectors as shown in figure 29.

(2) Replace rocker cover (fig. 29).

e. Adjustment.

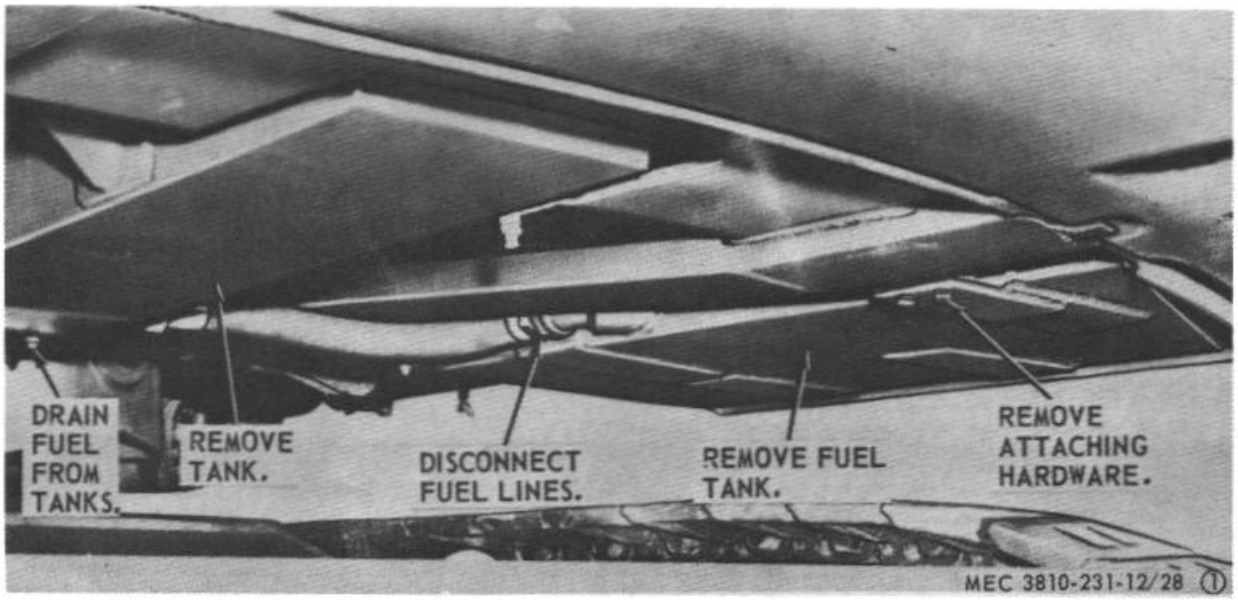
Note.

Injectors should be adjusted before adjusting valves (para. 66).

(1) Bar engine in direction of rotation until "1-6VS" mark on fan drive pulley (fig. 29) is in line with timing mark on gear case cover. In this position both intake and exhaust valves will be closed for No. 1 cylinder.

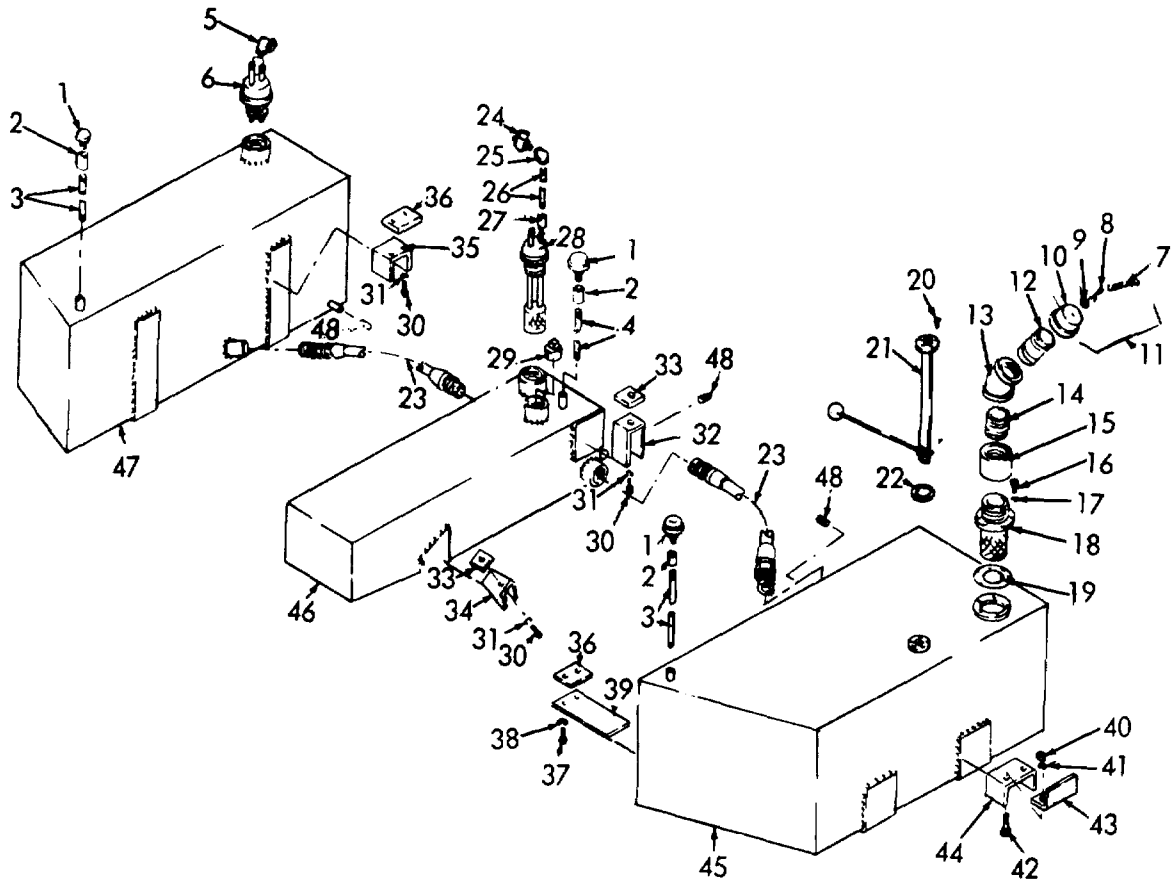
(2) Turn adjusting screw down until plunger contacts cup and advance an additional 15 degrees to squeeze oil from cup.

(3) Loosen adjusting screw one turn; then, using a torque wrench calibrated in inch-pounds and a screw driver adapter, tighten adjusting screw to 48 in./lbs. (cold or warm setting) or 60 in./lbs. (hot setting) and tighten lock nut to 70/80 foot-pounds with torque-wrench.



A-Fuel tank removal and installation

Figure 28. Fuel tanks, lines, and fittings, removal and installation.



MEC 3810-231-12/28 ②

1	Air breather	17	Lockwasher	33	Bracket
2	Pipe coupling	18	Filter	34	Bracket
3	Pipe nipple	19	Gasket	35	Bracket
4	Pipe nipple	20	Screw	36	Bracket
5	Elbow	21	Fuel level sender	37	Capscrew
6	Double return pipe assembly	22	Gasket	38	Lockwasher
7	Sash chain	23	Hose assembly	39	Bracket
8	Cotter	24	Check valve	40	Nut
9	Plain washer	25	Street elbow	41	Lockwasher
10	Pipe cap	26	Pipe nipple	42	Capscrew
11	Pipe cap	27	Pipe coupling	43	Bracket
12	Pipe nipple	28	Double suction pipe assembly	44	Bracket
13	Pipe elbow	29	Pipe plug	45	Fuel tank R.H.
14	Close nipple	30	Capscrew	46	Fuel tank-center
15	Pipe coupling	31	Lockwasher	47	Fuel tank L.H.
16	Capscrew	32	Bracket	48	Drain plug

B—Fuel tank, lines, and fittings, exploded view.

Figure 28 - Continued.

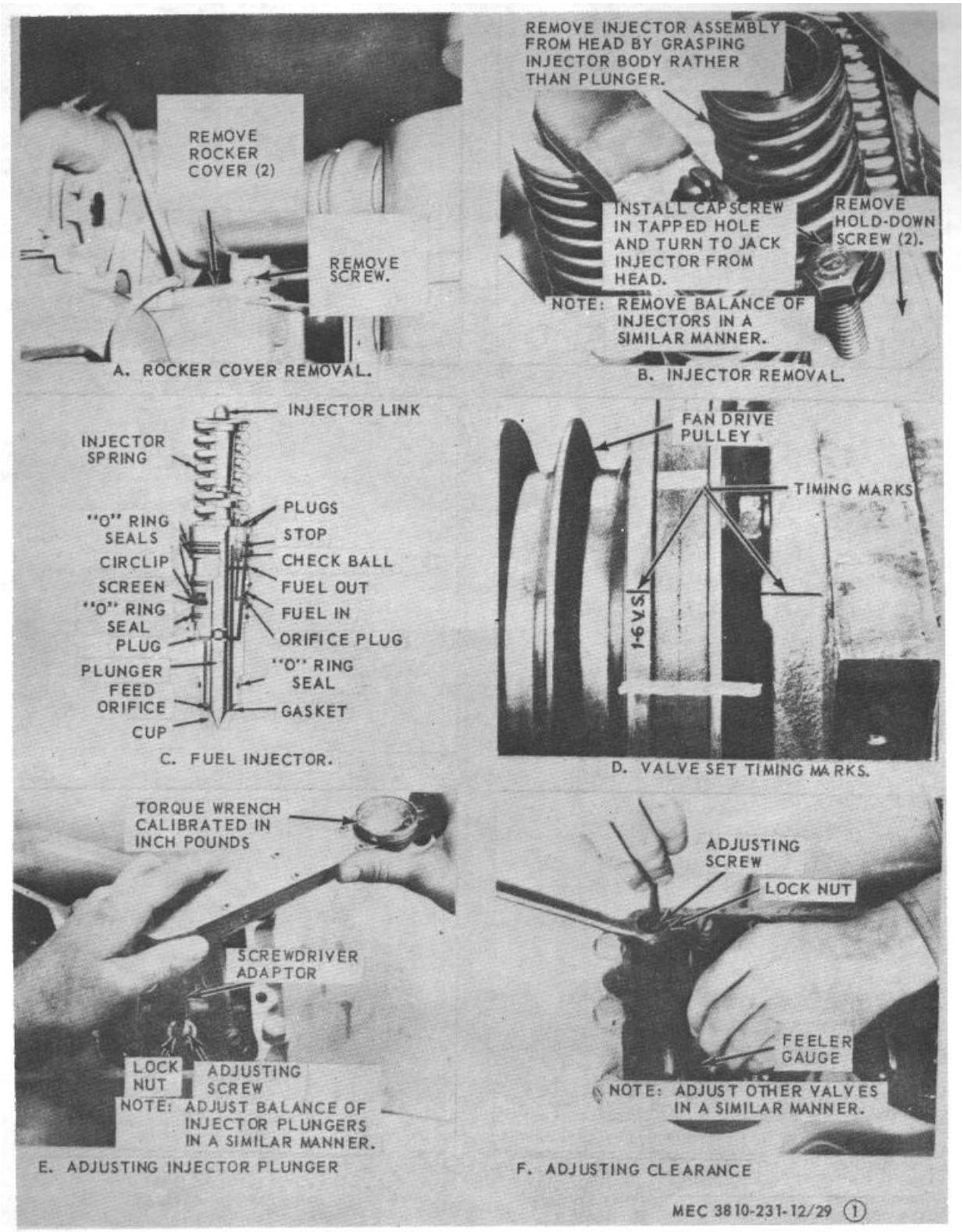


Figure 29. Fuel injectors, removal, cleaning, adjustment, and installation.

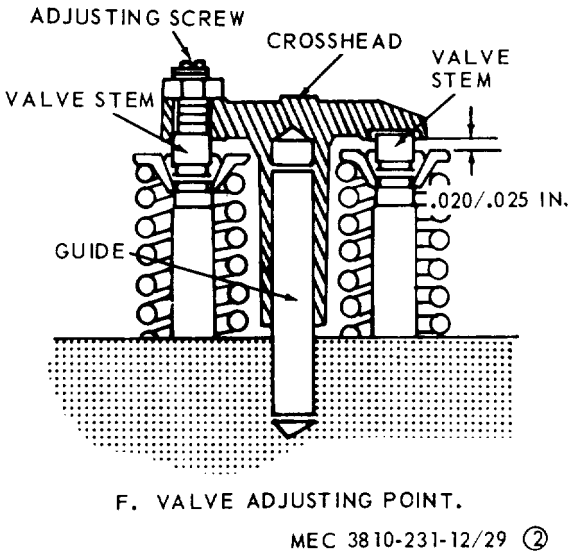


Figure 29 - Continued.

(4) Turn crankshaft in direction of rotation to next "VS" mark corresponding to firing order (1-5-3-6-2-4) of engine "25VS" and No. 5 cylinder will be ready for adjustment.

(5) Continue turning the crankshaft in direction of rotation and making adjustments until all injectors and valves (para 66), have been correctly adjusted.

Note.

Two complete revolutions of the crankshaft are needed to set all injector plungers and valves. Injector and valves can be adjusted for only one cylinder at any one "VS" setting.

66. Valve Adjustment

a. Crosshead Adjustment. Make crosshead adjustment before making valve adjustment b below.

(1) Loosen valve crosshead adjusting screw locknut and back off screw one turn (fig. 29).

(2) Use light finger pressure at the rocker lever contact surface to hold crosshead in contact with valve stem nearest the push rod.

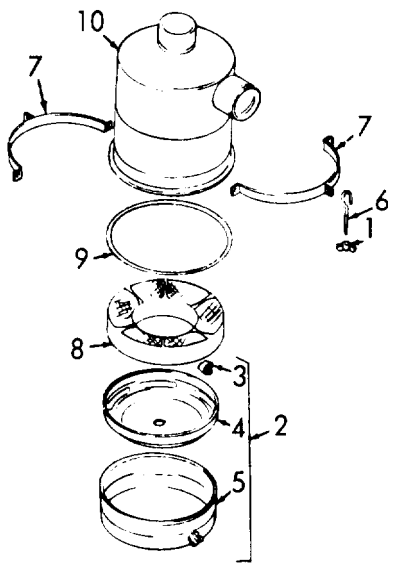


Figure 30. Air cleaner, disassembly and reassembly.

(3) Turn adjusting screw down until it contacts its mating valve stem.

(4) For new crossheads and guides, advance adjusting screw one third of one hex (20 degrees) to straighten stem in its guide and to compensate for slack in threads. With worn crossheads and guides, it may be necessary to advance screw a s much as 30 degrees in order to straighten stem in its guide.

(5) Hold adjusting screw in this position and tighten locknut to 25/30 footpounds torque.

(6) Check clearance between crosshead and valve spring retainer with a wire gauge (fig. 29) for minimum clearance.

b. Valve Adjustment. The same position used in setting injectors (para 65) is used for setting intake and exhaust valves.

(1) Loosen locknut and back off the adjusting screw (fig. 29). Insert feeler gauge between rocker lever and

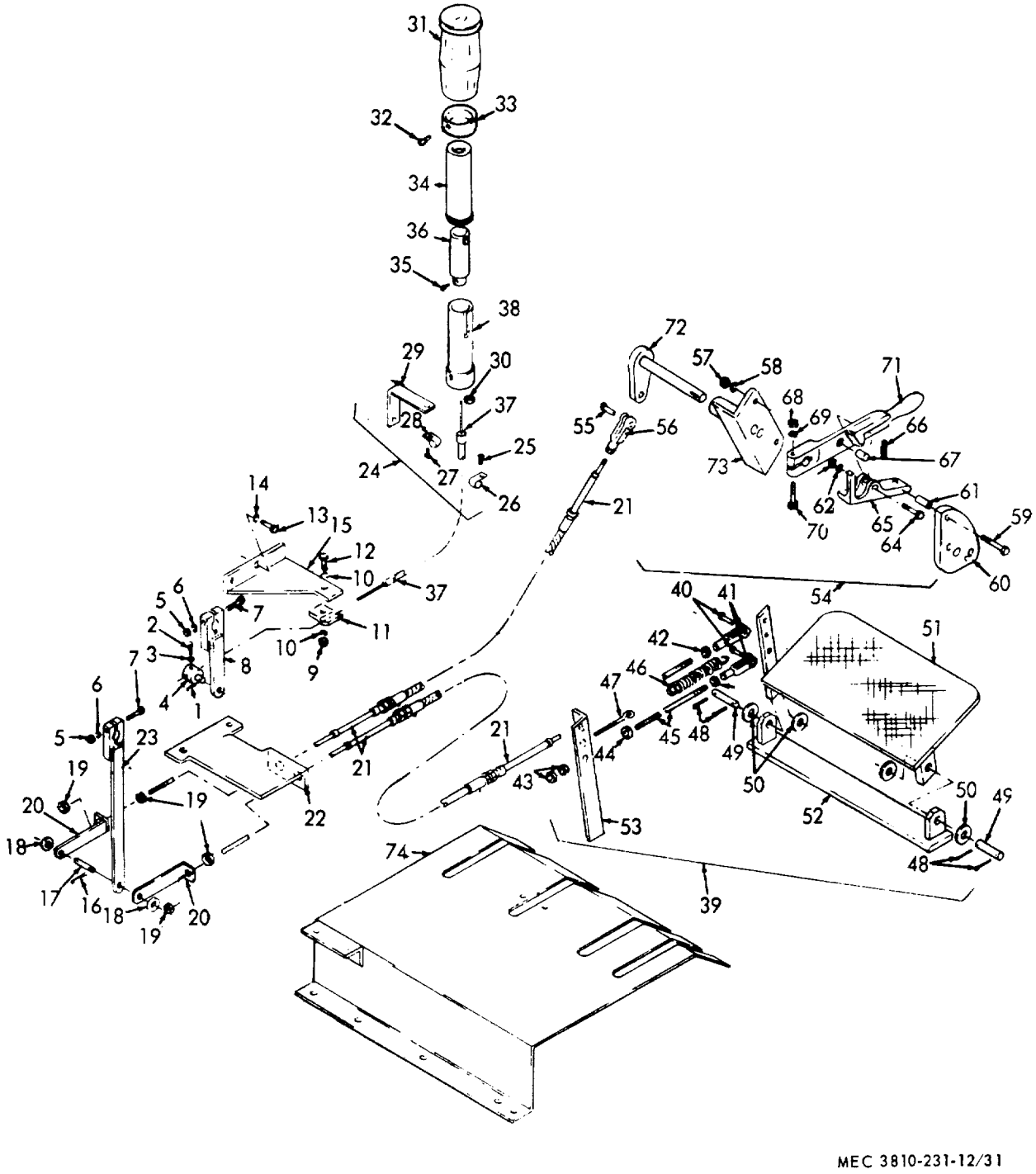


Figure 31. Throttle and governor controls, removal and installation.

1 Cotter pin
2 Machine screw
3 Nut
4 Trunnion
5 Nut
6 Lockwasher
7 Capscrew
8 Throttle lever
9 Nut
10 Lockwasher
11 Governor control clamp
12 Capscrew
13 Capscrew
14 Lockwasher
15 Bracket
16 Cotter pin
17 Pin
18 Plain washer
19 Hex nut
20 Bracket
21 Control cable
22 Bracket
23 Throttle lever
24 Governor control lever assembly
25 Screw with nut
26 Wire cleat
27 Machine screw nut
28 Clip
29 Bracket
30 Jam nut
31 Handlebar grip
32 Machine screw
33 Handlebar grip retainer
34 Sleeve assembly
35 Machine screw
36 Plunger assembly
37 Control cable
38 Throttle body adapter
39 Foot throttle assembly
40 Yoke pin assembly
41 Adjusting yoke end
42 Hex nut
43 Hex nut
44 Plain washer
45 Accelerator rod
46 Spring
47 Eye bolt
48 Cotter pin
49 Pin
50 Plain washer
51 Foot throttle pedal
52 Mounting bracket
53 Bracket
54 Hand throttle assembly
55 Yoke pin
56 Adjusting yoke end
57 Nut
58 Lockwasher
59 Capscrew
60 Quadrant
61 Spacer
02 Nut
63 Lockwasher
64 Capscrew
65 Lever
66 Compression spring
67 Roller
68 Nut
69 Lockwasher
70 Capscrew
71 Handle
72 Lever shaft
73 Bracket
74 Cover plate

Figure 31 - Continued.

top of valve stem or crosshead, and turn screw down until lever touches gauge. Lock adjusting screw in this position with jam nut. Tighten nut to 70/80 foot pounds with torque wrench.

(2) Always make valve adjustment after injectors are adjusted. Valve clearances are as follows: Intake valves, Cold or Warm, .016"-Hot, .014"; Exhaust Valves, Cold or Warm, .029"-Hot, .027".

67. Air Cleaner

a. Removal and Disassembly. Remove and disassemble air cleaner as instructed in figure 30.

b. Cleaning, Inspection and Repair.

(1) Clean - all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for wear or damage, especially the gaskets.

(3) Repair or replace damaged or defective parts.

c. Reassembly and Installation. Reassemble and install air cleaner as instructed in figure 30.

68. Throttle and Governor Controls

a. Removal. Remove throttle and governor controls as instructed in figure 31.

b. Cleaning, Inspection and Repair.

(1) Clean all parts with a n approved cleaning solvent, and dry thoroughly.

(2) Inspect for cracks, breaks or other damage.

(3) Repair or replace damaged or defective parts.

c. Installation. Install throttle and governor controls as instructed in figure 31.

Section VIII. LUBRICATION SYSTEM

69. General

The lubrication oil system components maintain the proper oil pressure required at the various operating units, filter the oil, maintain the oil at proper operating temperature, and provide facilities for draining, replenishing, and measuring lubricating oil in the crankcase.

70. Lubricating Oil Filter

a. Removal. Remove oil filter as instructed in figure 32.

b. Cleaning, Inspection and Repair.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks or other damage

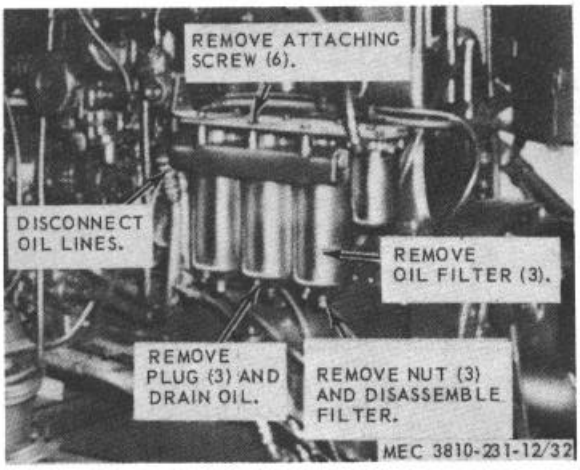


Figure 32. Oil filter, removal and installation.

(3) Repair or replace damaged or defective parts.

c. Installation. Install oil filter as instructed in figure 32.

71. Oil Cooler

a. Removal and Disassembly. Remove and disassemble oil cooler as shown in figure 33.

Caution:
Be careful not to damage copper tubes.

b. Cleaning, Inspection and Repair.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

Caution:
Do not use solvent that will harm copper. Do not use a mechanical cleaning method such as scraping.

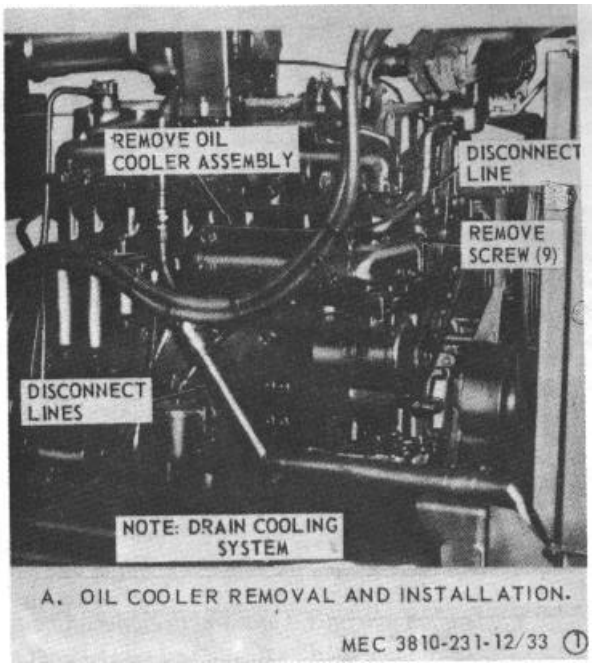
(2) Inspect all parts for cracks, breaks, and other damage.

(3) Repair or replace damaged or defective parts.

c. Reassembly and Installation.

(1) Always replace new O-ring and gaskets when reassembling.

(2) Reassemble and install oil cooler as shown in figure 33.



1	Capscrew	17	Lockwasher
2	Lockwasher	18	Support
3	Connection	19	Capscrew
4	Gasket	20	Lockwasher
5	Capscrew	,21	Capscrew
6	Lockwasher	22	Lockwasher
7	Plug, pipe	23	Capscrew
8	Cover, cooler	24	Lockwasher
9	Gasket	25	Support
10	Ring, element retainer	26	Gasket
11	O-ring	27	Gasket
12	Hose	28	Ring, element retainer
13	Clamp	29	0-ring
14	Tube	30	Element, cooler
15	O-ring	31	Plug, pipe
16	Capscrew	32	Housing cooler

Figure 33. Oil cooler.

72. Crankcase Breather

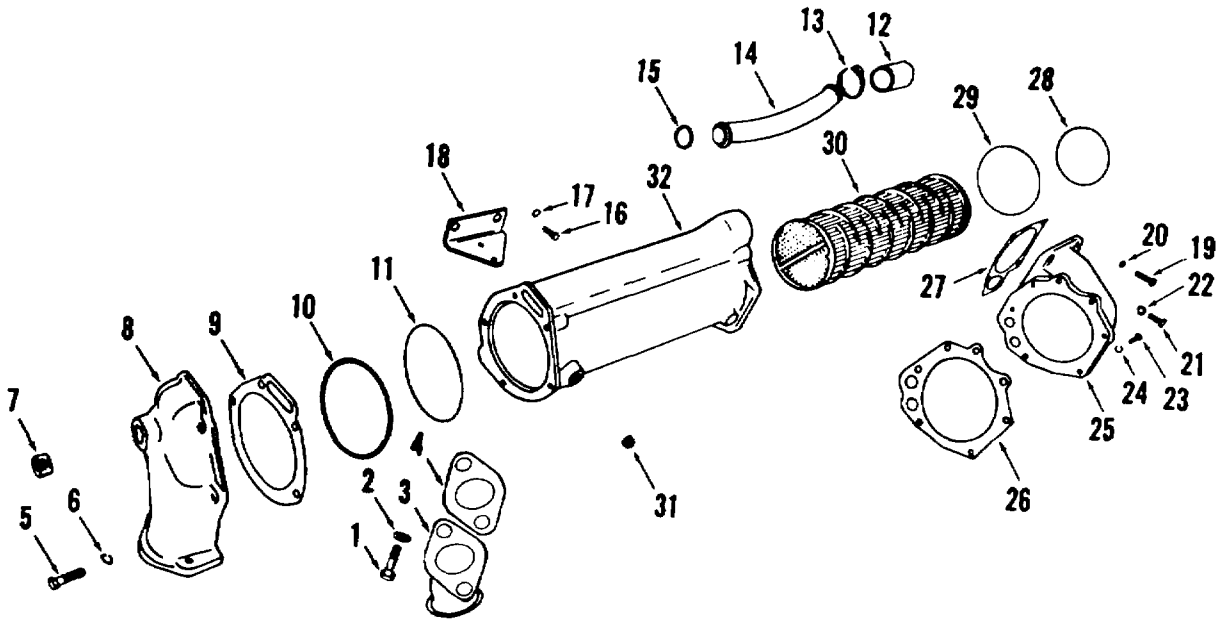
a. Removal and disassembly. Remove and disassemble breather as shown in figure 34.

b. Cleaning, Inspection and Repair.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Clean vent tube, screens and baffle. Inspect for cracks, breaks, or other damage.

(3) Repair or replace damaged parts as necessary.



B. OIL COOLER, DISASSEMBLY AND REASSEMBLY.

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Figure 33 - Continued.

c. Reassembly and Installation. Reassemble and install crankcase breather as shown in figure 34.

73. Oil Lines and Fittings

a. Removal. Remove oil lines and fittings as shown in figure 35.

b. Cleaning, Inspection and Repair.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, and other damage.

(3) Replace damaged or defective parts as necessary.

c. Install oil lines and fitting as shown in figure 35.

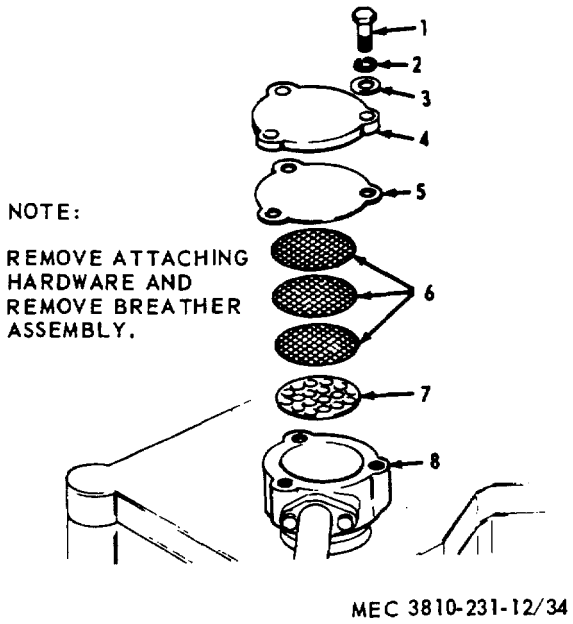


Figure 34. Crankcase breather assembly.

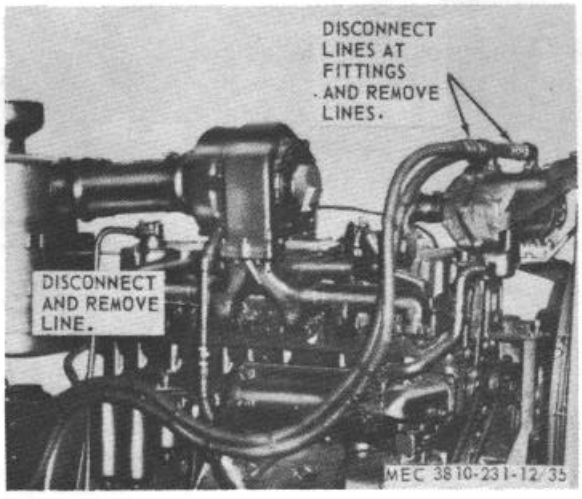


Figure 35. Oil lines and fittings, removal and installation.

Section IX. AIR INDUCTION AND EXHAUST SYSTEM

74. General

The turbocharger forces additional air into the combustion chambers so the engine can burn more fuel and develop more horsepower. The turbocharger is driven by exhaust gases. The exhaust stack carries the exhaust gases out of the engine compartment.

75. Exhaust Stack and Rain Cap

a. Removal. Remove exhaust stack and rain cap as shown in figure 36.

b. Clean, Inspect and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, or other damage.

(3) Repair or replace damaged or defective parts.

c. Installation. Install exhaust stack and rain cap as shown in figure 36.

76. Turbocharger

a. Removal. Remove turbocharger as shown in figure 36.

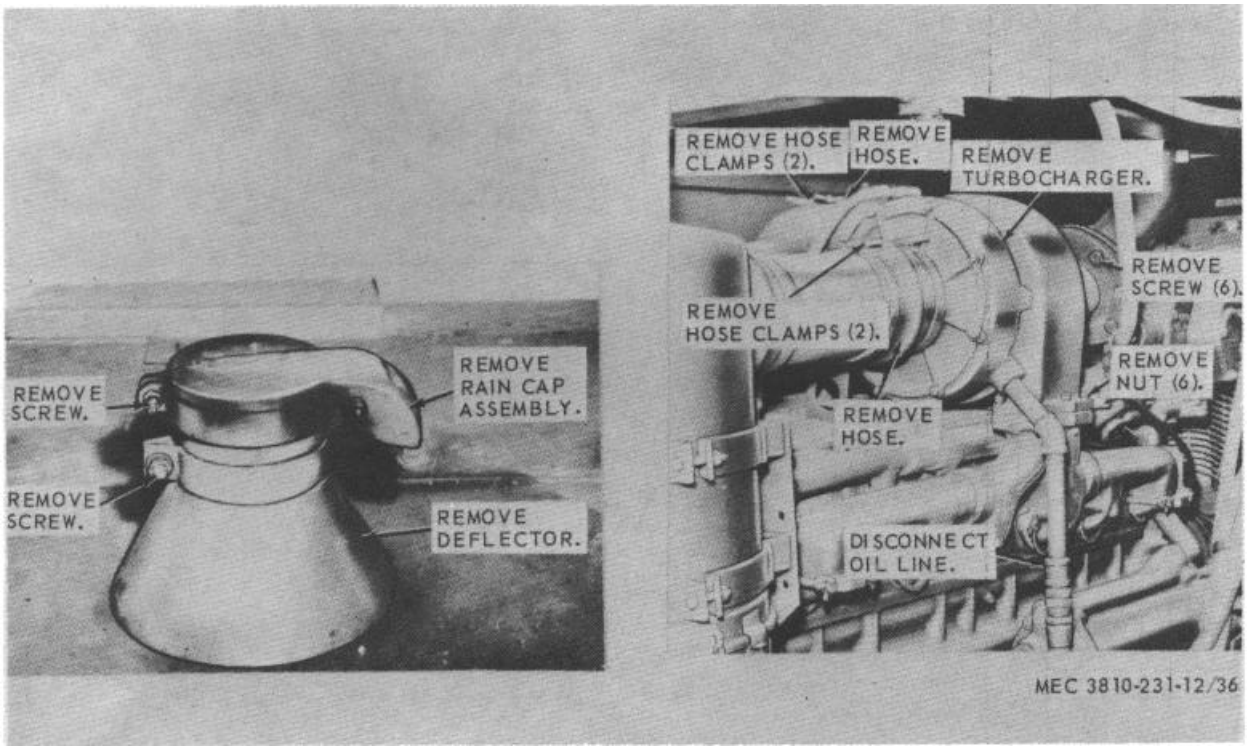
b. Clean, Inspect and Repair.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks or other damage.

(3) Replace a damaged or defective turbocharger.

c. Installation. Install turbocharger as shown in figure 36.



A-Rain cap and exhaust stack **B-Turbocharger**

Figure 36. Turbocharger, exhaust stack and rain cap, removal and installation.

77. Exhaust Manifold

a. Removal. Remove and install exhaust manifold as shown in figure 37.

b. Cleaning, Inspection and Repair.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, or other damage.

(3) Repair- or replace damaged parts as necessary.

c. Installation. Install exhaust manifold as shown in figure 37.

78. Intake Manifold

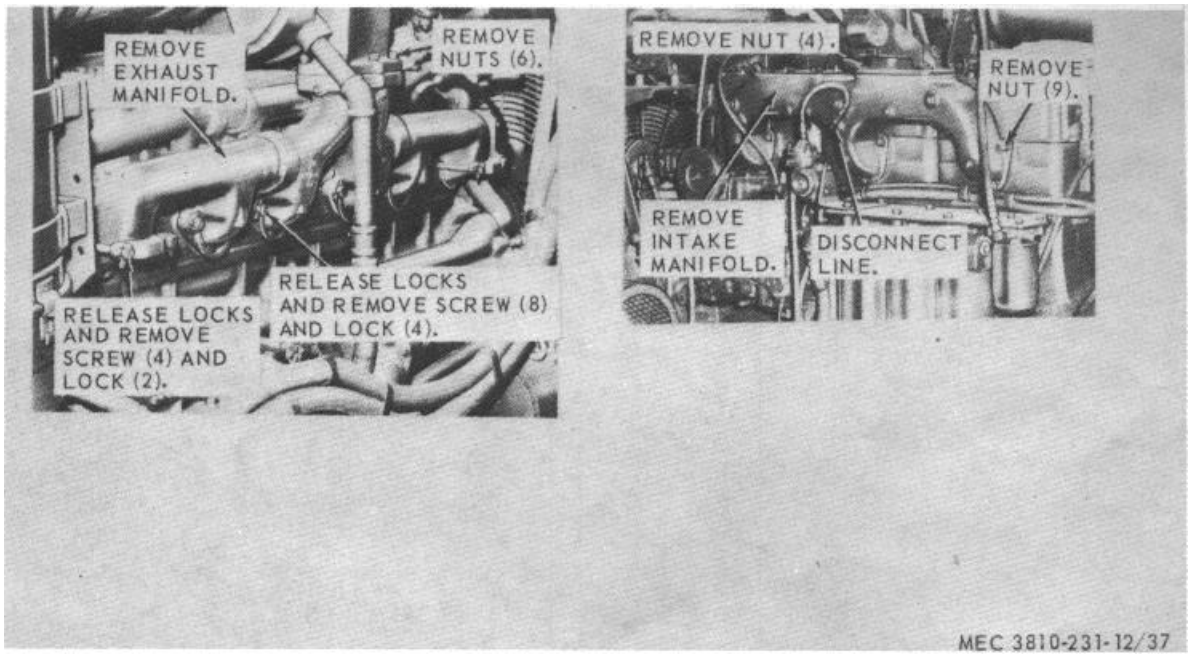
a. Removal. Remove intake manifold a s shown in figure 37.

b. Cleaning, Inspection and Repair.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, and other damage. Replace damaged or defective parts as necessary.

c. Installation. Install intake manifold as shown in figure 37.



A - Exhaust manifold **B - Intake manifold**

Figure 37. Manifolds, removal and installation.

Section X. ENGINE COOLING SYSTEM

79. General

The cooling system consists of a radiator, water pump, oil coolers, thermostats, fan, fan guard and necessary lines and fittings to connect these components. The flow control thermostat regulates the flow of coolant pumped through the engine block and oil coolers to cool the engine.

80. Hoses, Clamps Lines and Fittings

a. Removal. Remove cooling system hoses, lines and fittings as shown in figure 38.

b. Cleaning. Inspection and Repair.

(1) Inspect all parts for cracks or breaks.

(2) Test the thermostat (para 81).

(3) Clean deposits of rust from inside of all parts.

(4) Replace all gaskets and damaged or defective parts as necessary.

c. Installation. Install cooling system hoses, lines and fittings as shown in figure 38.

81. Thermostat Housing and Thermostat

a. Removal. Remove thermostat housing and thermostat shown in figure 39.

b. Thermostat Testing. Test the thermostat for proper operation by suspending i t and a thermometer in a container of water. Heat the water. When the thermometer indicates 170° F., the thermostat should start to open and should be fully open when t h e temperature reaches 1850 F. Remove the thermostat from the water. The cooler surrounding air should cause a pronounced closing action and the thermostat should be completely closed within a short time. Replace a defective thermostat.

c. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Clean gasket material from the thermostat housing and the cylinder head.

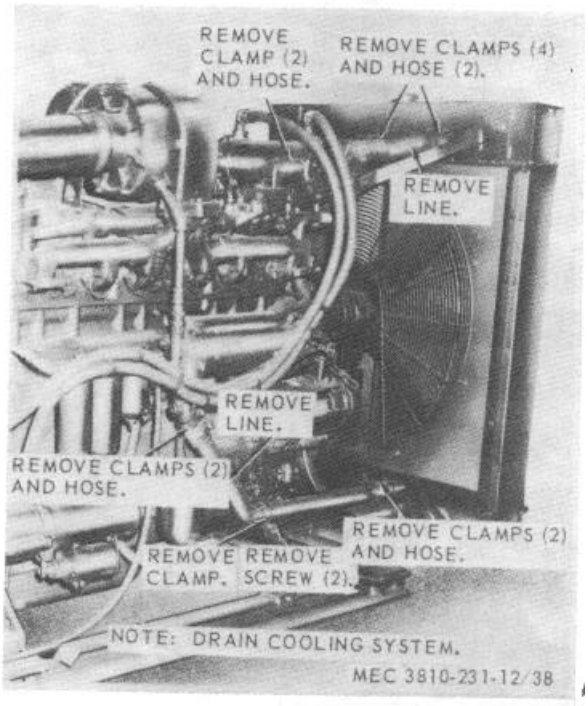


Figure 38. Cooling system hose, lines and fittings, removal and installation.

(3) Inspect for cracks, breaks, or other damage. Replace all damaged parts.

d. Installation. Refer to figure 39 and install the thermostat and thermostat housing.

82. Fan Guard and Fan

a. Removal. Remove the fan guard and fan as instructed in figure 40.

b. Cleaning, Inspection and Repair.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, and other damage.

(3) Replace damaged or defective parts as necessary.

c. Installation. Install the fan and fan guard as instructed in figure 40.

83. Water Pump

a. Removal.

(1) Drain the cooling system.

(2) Remove fan guard and fan (para 82).

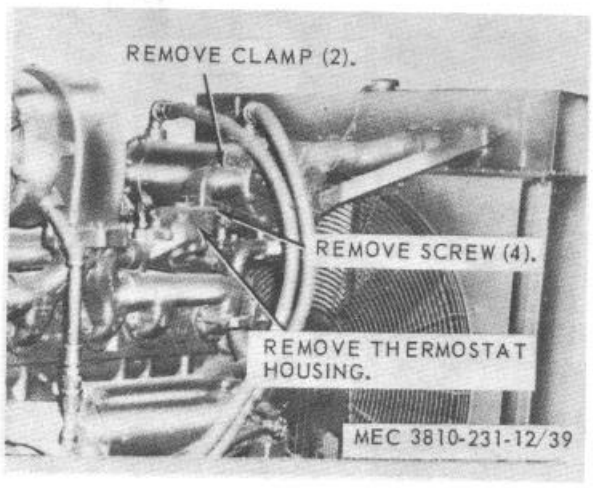


Figure 39. Thermostat housing and thermostat, removal and installation.

(3) Remove the water pump assembly as instructed in figure 41.

b. Cleaning, Inspection and Repair.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

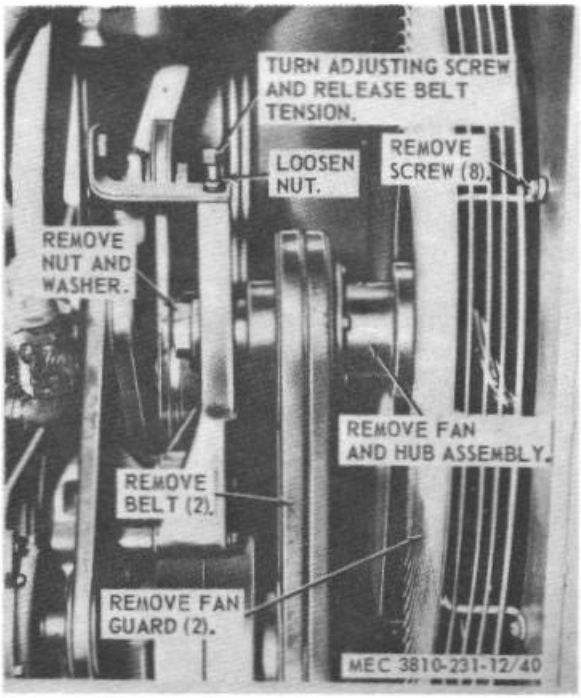


Figure 40. Fan guard and fan, removal and installation

(2) Inspect for cracks, breaks, and other damage.
(3) Replace a damaged or defective: water pump.

c. Installation.

(1) Install the water pump as instructed on figure 41.
(2) Install the fan and fan guard (para 82).
(3) Refill cooling system.

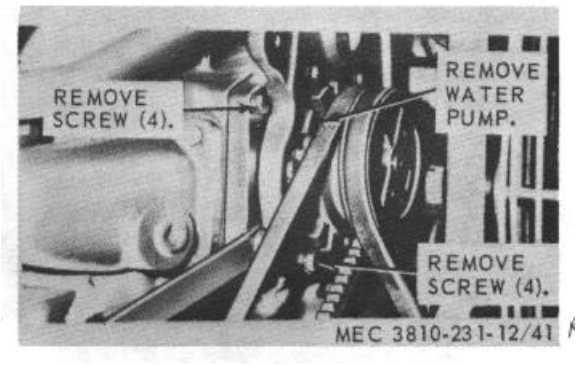


Figure 41. Water pump assembly, removal and installation.

Section XI. ENGINE ELECTRICAL SYSTEM, CONTROL AND INSTRUMENTS

84. General

The basic 24-volt engine electrical system is composed of two batteries, alternator, alternator regulator, starter, and wiring to all components of the system. Refer to figure 3 wiring diagram.

85. Alternator

a. Removal. Remove alternator, assembly as instructed in figure 42.

b. Cleaning, Inspection and Repair.

(1) Clean the exterior with a cloth dampened in an approved cleaning solvent and dry thoroughly.
(2) Inspect for cracks, breaks or other damage.
(3) Replace a defective or damaged alternator.

c. Installation.

(1) Install alternator assembly as instructed in figure 42.
(2) Adjust V-belt drive tension (par. 39).

d. Test.

(1) Attach voltmeter to alternator regulator ground and to regulator battery terminal lead.
(2) Start engine and slowly build up rpm to operating speed. Using DC 74 scale observe voltmeter. The minimum voltage is 27.5 volts.

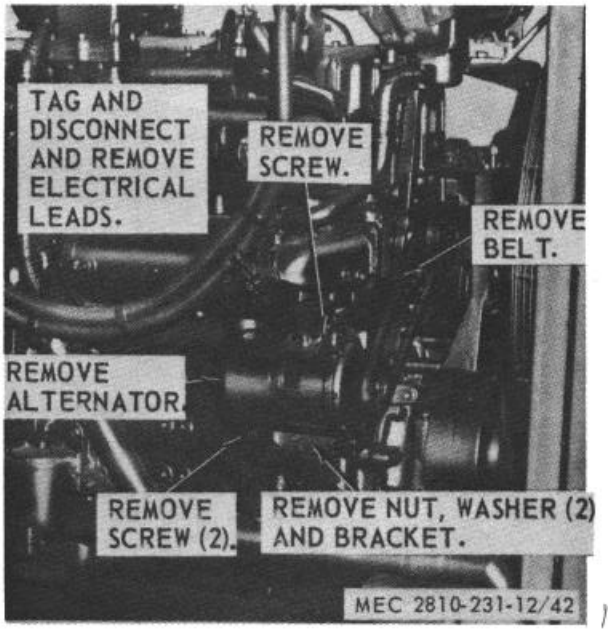


Figure 42. Engine alternator, removal and installation.

(3) If voltage is not built up to the required value. Check alternator brushes for general condition and

proper contact. See that cut-out relay is not open. If still no voltage build up, replace alternator.

e. Brush Replacement. Replace alternator brushes as instructed in figure 43.

86. Aneroid Control and Overspeed Governor

a. Aneroid Control Adjustment.

(1) The aneroid control (fig. 44A) may be field adjusted by observing acceleration smoke density if pressure gauges are not available.

(2) Turn fuel screw in 2 to 2 1/2 turns after contact with lever.

(3) If density of acceleration smoke is too dark, back out fuel screw until smoke density becomes acceptable.

Caution:

Do not back screw away from contact with lever. If screw is backed out too far, engine acceleration will be slow.

b. Removal. Remove the aneroid control as shown on figure 44A.

c. Cleaning and Inspection.

(1) Clean the aneroid control using a cloth dampened with an approved cleaning solvent.

(2) Inspect for cracks, breaks, and other damage.

(3) Replace a damaged or defective aneroid control.

d. Installation. Install the aneroid control as shown on figure 44A.

e. Overspeed Governor Reset. The overspeed governor (fig. 44-B) has a reset button. Should overspeed occur the governor will stop the engine and it cannot be started until the reset button on the end of t h e governor is pushed to reset it.

f. Governor Removal. Remove the overspeed governor as shown in figure 44-B.

g. Cleaning and Inspection.

(1) Clean the overspeed governor using a cloth dampened with an approved cleaning solvent.

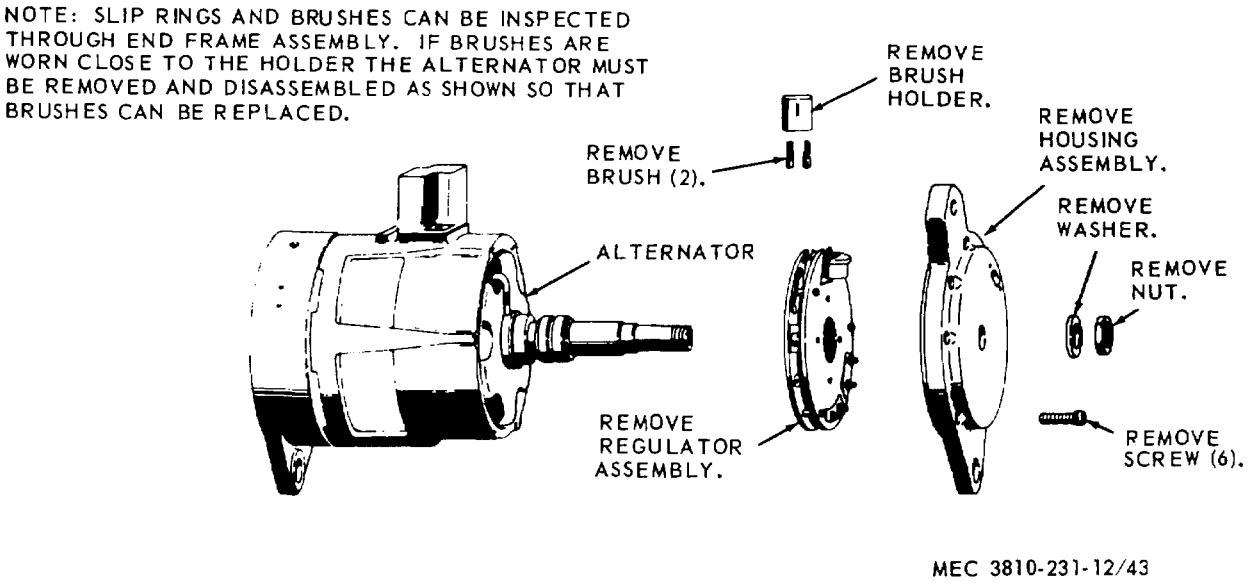


Figure 43. Alternator brush replacement.

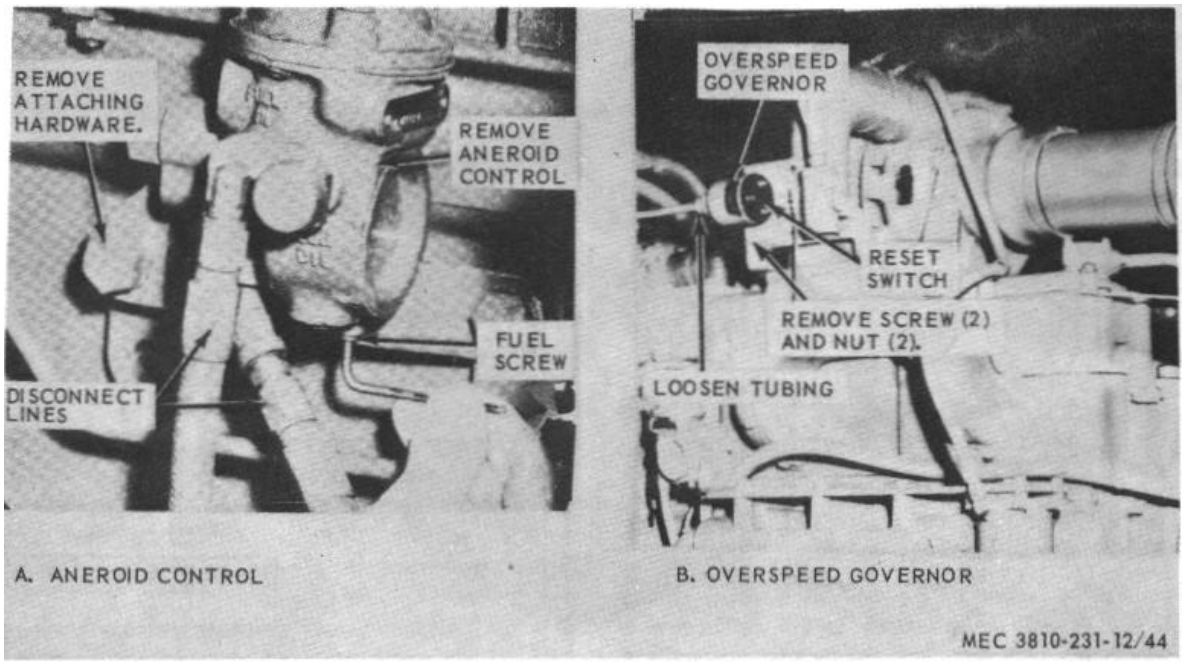


Figure 44. Aneroid control and overspeed governor, adjustment, renewal and installation.

(2) Inspect for cracks, breaks, and other damage.

(3) Replace a damaged or defective governor.

h. Governor Installation. Install the overspeed governor as shown on figure 44-B.

87. Starter Solenoid Switch

a. Test. Test the solenoid and starter assembly as instructed on figure 45.

b. Removal.

(1) Disconnect battery cables (para 89).

(2) Remove the starter solenoid switch assembly as instructed on figure 46.

c. Cleaning and Inspection.

(1) Clean the starter solenoid switch with a cloth dampened with an approved cleaning solvent.

(2) Inspect the solenoid for proper operation, and other damage. Replace a defective solenoid switch.

(3) Inspect the wiring for frayed, broken, or worn conditions. Replace wiring as necessary.

d. Installation.

(1) Install the starter solenoid switch as illustrated on figure 46.

(2) Connect battery cables (para 89).

88. Starter Assembly

a. Removal.

(1) Remove starter solenoid switch (para 87).

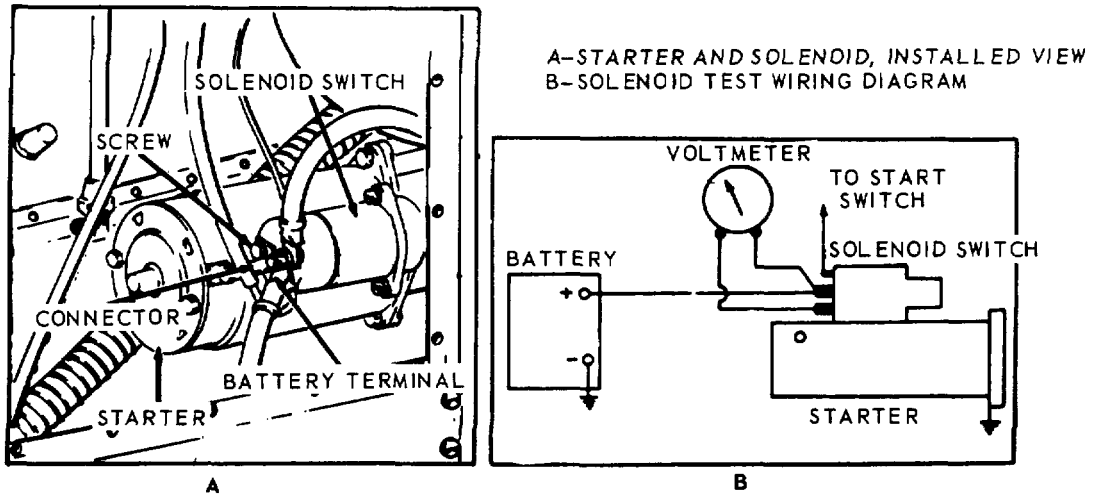
(2) Remove the starter as instructed on figure 46.

b. Cleaning and Inspection.

(1) Clean the starter assembly with a cloth dampened with an approved cleaning solvent.

(2) Rotate the drive pinion to see that the armature turns freely and does not bind.

(3) Remove the cover band and inspect the brushes. If the brushes are worn to less than 1/2 inch of the original length, replace brushes.



STEP 1. DETERMINE THAT BATTERY IS FULLY CHARGED AND THAT ALL BATTERY AND STARTER CABLES ARE SERVICEABLE AND PROPERLY INSTALLED.

STEP 2. MOMENTARILY ENGAGE STARTER SOLENOID. VOLTMETER READING SHOULD DROP TO ZERO AND STARTER SHOULD CRANK ENGINE. IF VOLTMETER READING DOES NOT DROP TO ZERO, SOLENOID SWITCH IS DEFECTIVE AND MUST BE REPLACED. IF VOLTMETER DROPS TO ZERO BUT STARTER FAILS TO CRANK ENGINE, STARTER IS DEFECTIVE AND MUST BE REPLACED.

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Figure 45. Starter and solenoid test wiring diagram

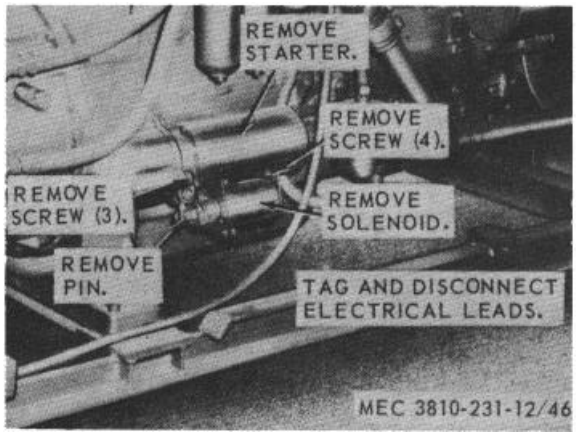


Figure 46. Solenoid and starter, removal and installation

(4) Inspect the starter assembly for proper operation, wear, and other damage. Replace a defective starter.

(5) Inspect the commutator for pits, burns, and other damage, if commutator is defective replace the starter.

c. Installation. Install the starter assembly as illustrated on figure 46.

d. Brush Replacement.

(1) Removal.

(a) Remove the starter as instructed on figure 46.

(b) Remove the cover band.

(c) Remove the brushes as instructed on figure 47.

(2) Installation.

(a) Install the brushes as illustrated on figure 47. Fit brushes to commutator. Place new brush in position with a piece of medium grade sandpaper under the brush with the back (smooth side) of the sandpaper held closely in contact

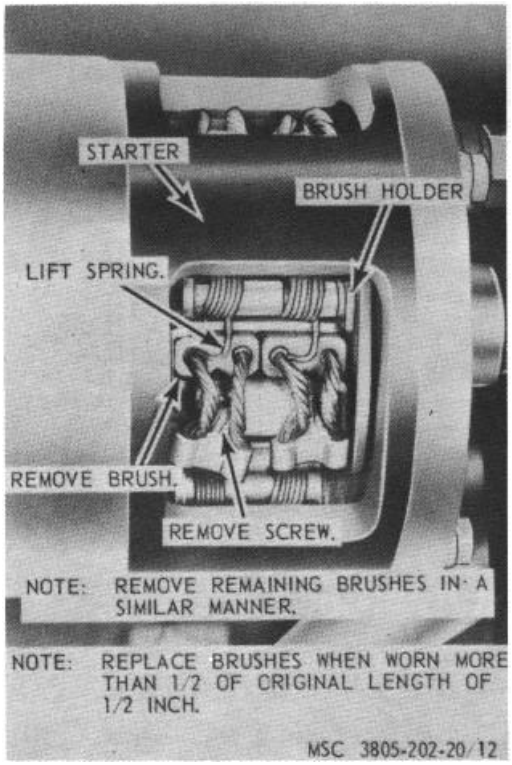


Figure 47. Starter brush, replacement.

with the curve of the commutator. Hold brush in its normal position and draw sandpaper back and forth under brush. This will sand the brush down to the curve of the commutator.

(b) Install the cover band.

(c) Install the starter as illustrated on figure 46.

89. Batteries, Cables, and Battery Box

a. Test. Test the batteries with a hydrometer. If the specific gravity reads below 1.225, recharge the batteries. Test the batteries after recharging. A fully charged battery should read between 1.280 and 1.300. Replace a battery that will not take or hold a charge.

b. Removal and Installation. Remove and install the batteries, cables and battery box as instructed in figure 48.

c. Cleaning, Inspection and Repair.

(1) Clean the batteries, cables, and battery box with an approved cleaning solvent and dry thoroughly.

(2) Clean battery terminals and cable lugs of all corrosion and grease lightly with GAA.

(3) Inspect the batteries for cracks, leaks or other damage. Replace a defective battery.

(4) Inspect the cables for frayed insulation, broken wires, bent or broken lugs, and other damage. Replace or repair damaged cables as necessary.

(5) Inspect the battery box for cracks, breaks or other damage. Repair or replace a damaged battery box.

90. Instrument Panel Components

a. Removal. Remove the instrument panel components as instructed on figure 49.

b. Cleaning and Inspection. Clean and inspect. Replace damaged or defective instrument panel components.

c. Installation. Install the instrument panel components as instructed on figure 49.

91. Sending Units, Safety Switch and Pressure Switch

a. Removal. Remove sending units and switch units as instructed on figure 49.

b. Cleaning and Inspection.

(1) Clean all switch units and sending units with a cloth dampened with an approved cleaning solvent and dry thoroughly.

(2) Inspect the switch units and sending units for general condition and damage. Replace a damaged or defective unit.

c. Installation. Install the switch units and sending units as illustrated on figure 49.

92. Wiring Harness Repair

a. Inspection. Inspect the wiring for oilsoaked, cracked, or frayed insulation, for 'broken wires, and for loose or corroded connections.

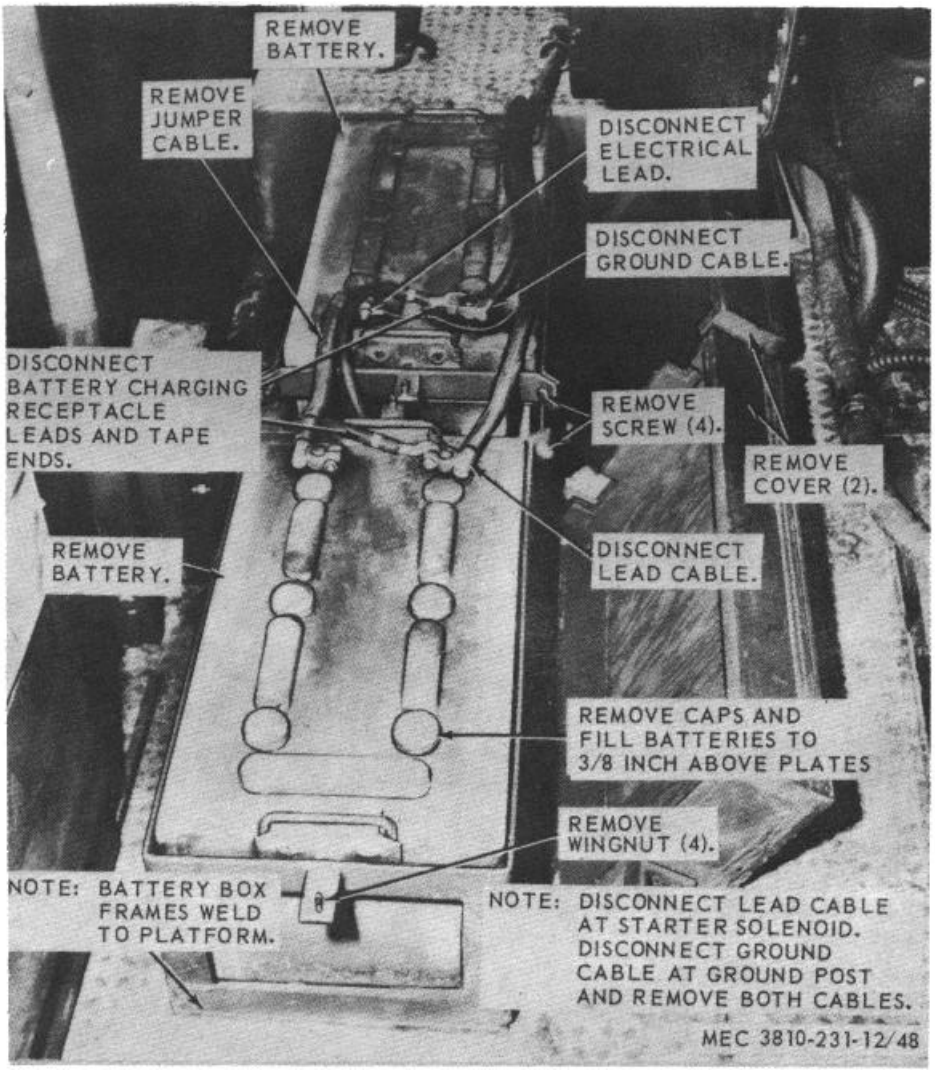


Figure 48. Batteries, cables, and battery box, removal and installation.

b. Repair. Repair a broken wire by cutting a length of wire and taping it along the harness. Install two clips at either end and remove the broken wire of the harness. Secure the end of the new wire to the connection.

93. Battery Charging Receptacle

a. Removal. Refer to figure 50 and remove battery charging receptacle. Tape lead ends to prevent battery discharge.

b. Cleaning and Inspection.

(1) Clean battery charging receptacle with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, or other damage. Replace a damaged or defective receptacle.

c. Installation. Refer to figure 50 and install battery charging receptacle.

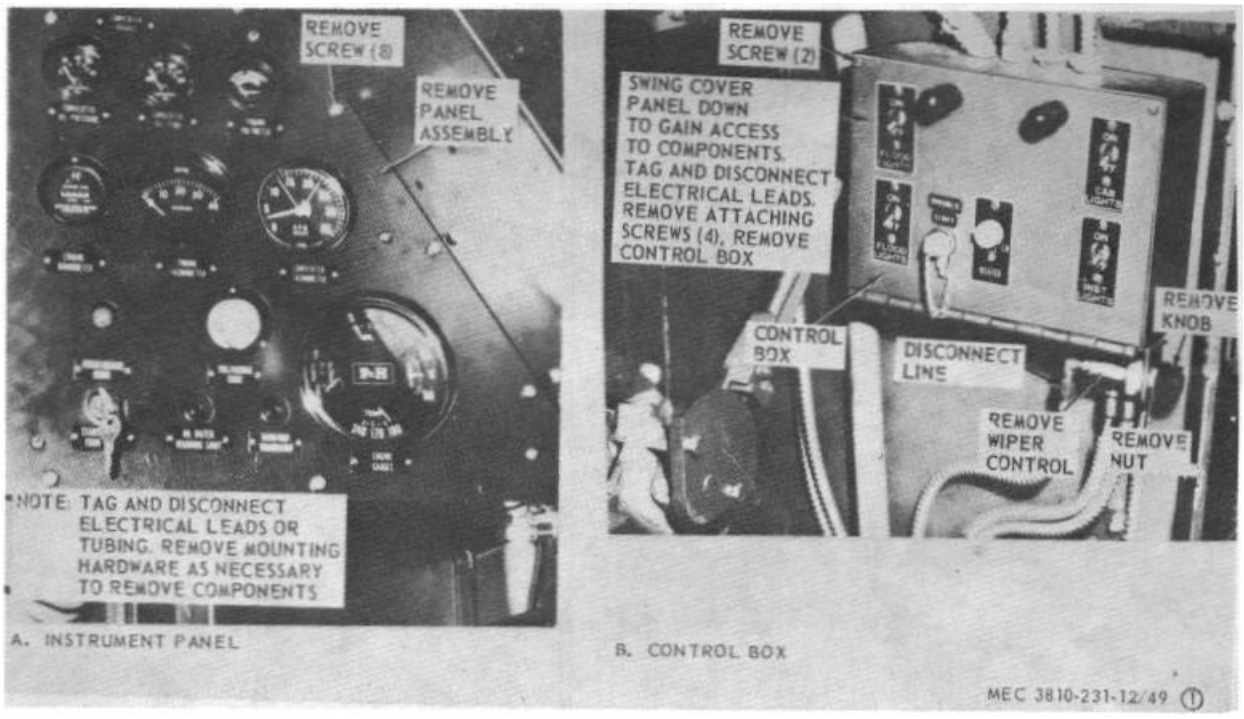
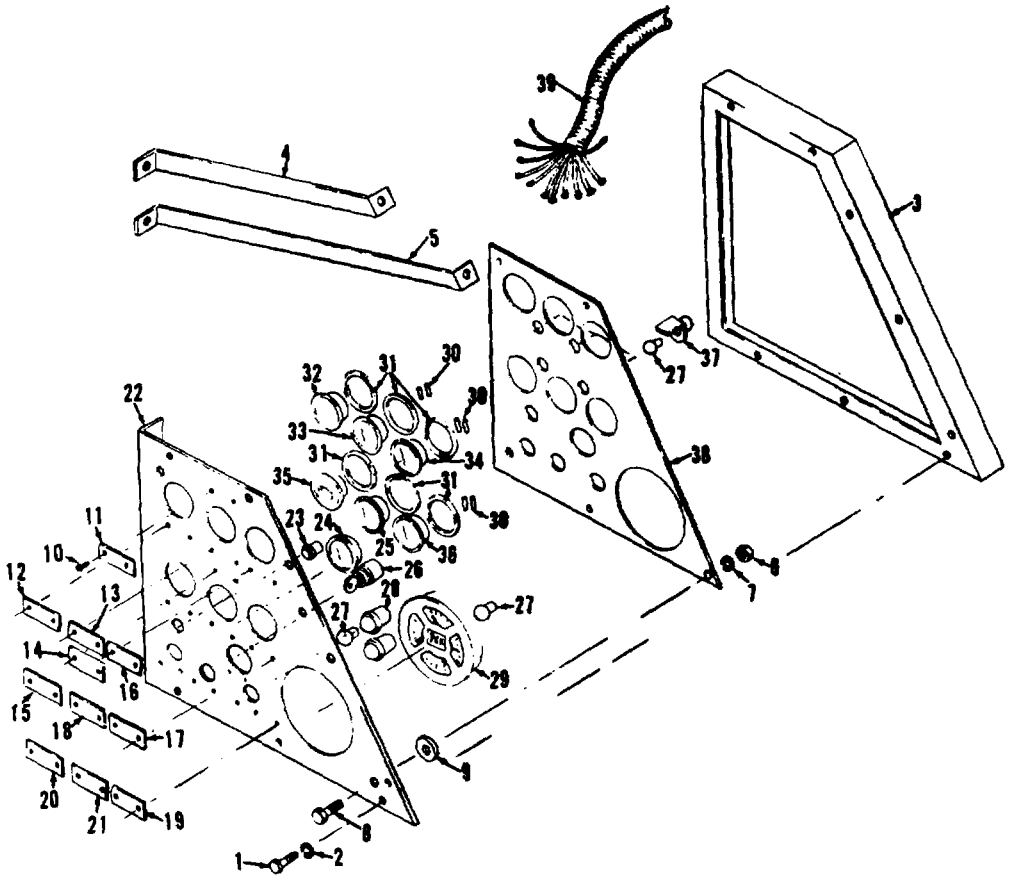


Figure 49. Instrument panel gages, controls, and sending units, removal and installation



C. INSTRUMENT PANEL ASSEMBLY, EXPLODED VIEW.

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Figure 49 - Continued.

1 Capscrew
2 Lockwasher
3 Bracket
4 Brace
5 Brace
6 Nut
7 Lockwasher
8 Bolt
9 Washer
10 Drive screw
11 Name plate
12 Name plate
13 Name plate
14 Name plate
15 Name plate
16 Name plate
17 Name plate
18 Name plate
19 Name plate
20 Name plate
21 Name plate
22 Cover
23 Reset button
24 Gage
25 Tachometer (Engine)
26 Key switch
27 Light bulb
28 Pilot light
29 Gage cluster
30 Resistors
31 Shock mounts
32 Tachometer (Converter)
33 Gage
34 Gage
35 Hourmeter
36 Battery indicator
37 Socket
38 Panel
39 Harness assembly

Figure 49- Continued

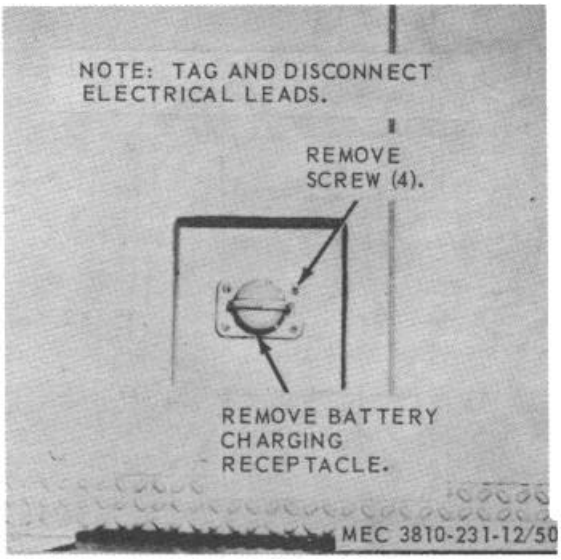


Figure 50. Battery charging receptacle, removal and installation.

Section XII. ENGINE V-BELT DRIVES

94. General

All new belts will loosen after running for an hour or more and must be adjusted. If a belt can be pushed down 1/8 inch more than recommended, adjust as described in paragraph 39. Belts often slip or squeak be cause of glaze which forms due to dirt or steam cleaning. Clean belts as directed in paragraph 95b. (1) below.

95. Fan Drive Belts

a. Removal.
- (1) Remove fan guard and fan (para 82).
- (2) Remove fan drive belts as shown in figure 51.

b. Cleaning and Inspection.
- (1) Clean the drive belts with a cloth dampened with an approved cleaning solvent.
- (2) Inspect the drive belts for cracks, breaks, and frayed or stretched condition. Replace defective belts as a complete set of 3. Never replace one belt individually.

c. Installation.
- (1) Install the fan drive belts as shown in figure 51.
- (2) Adjust belt tension (para 39).
- (3) Replace fan and fan guard (para 82).

96. Crane Alternator Drive Belts

a. Removal. Remove crane alternator drive belts as instructed on figure 51.

b. Cleaning and Inspection.
- (1) Clean the drive belts with a cloth dampened with an approved cleaning solvent.
- (2) Inspect the drive belts for cracks, breaks, and frayed or stretched condition. Replace defective belts as a complete set of 2. Never replace a belt individually.

c. Installation. Install crane alternator drive belts as instructed on figure 51.

97. Fluid Pump Drive Belt

a. Removal.
- (1) Remove crane alternator drive belts (para 96).

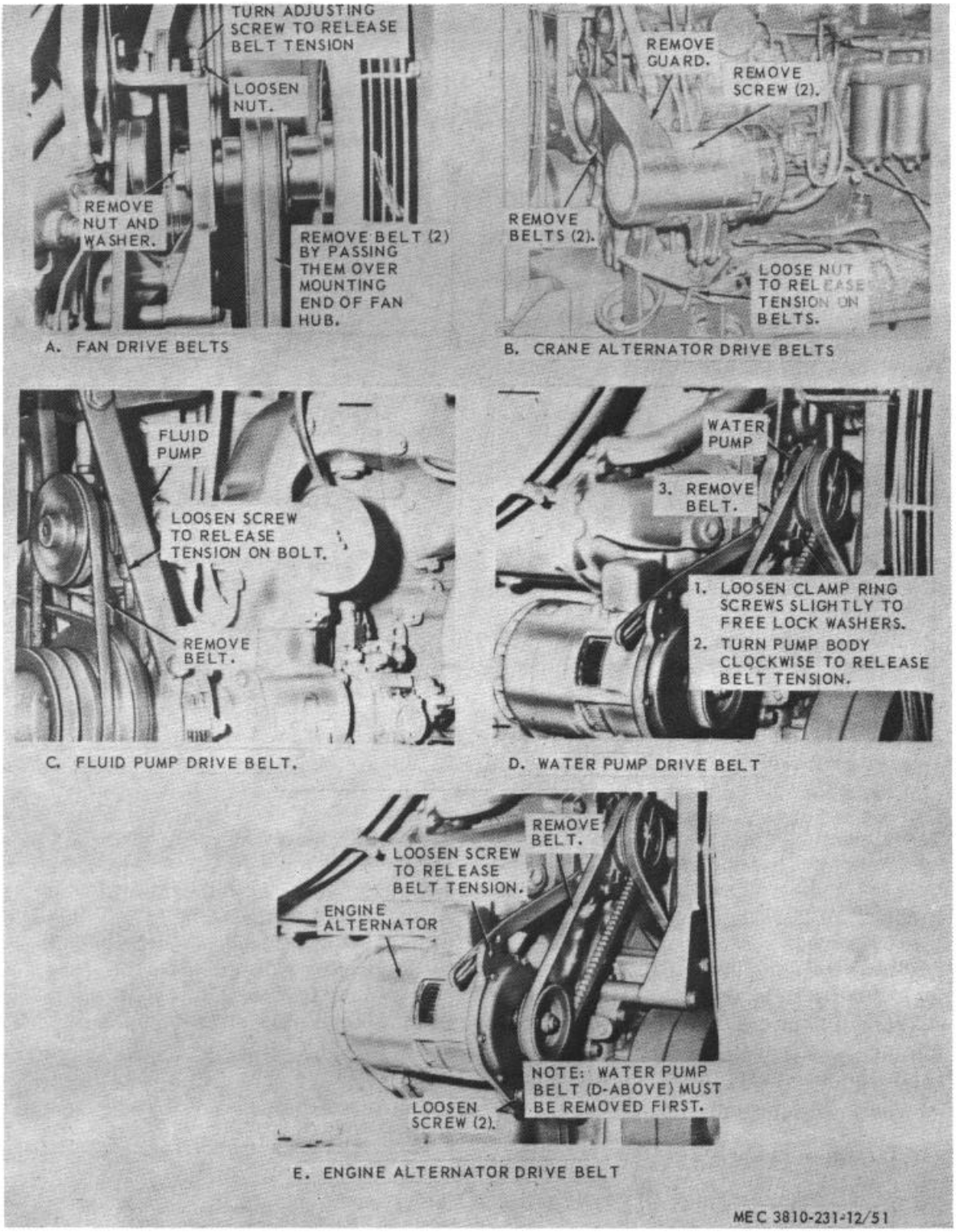


Figure 51. V-belt drives, removal and installation.

(2) Remove fluid pump drive belt as instructed on figure 51.

b. Cleaning and Inspection.

(1) Clean the drive belt with a cloth dampened with an approved cleaning solvent.

(2) Inspect the belt for cracks, breaks, and frayed or stretched condition. Replace a defective belt.

c. Installation.

(1) Install fluid pump drive belt as instructed on figure 51.

(2) Install crane alternator drive belts (para 96).

98. Water Pump Drive Belt

a. Removal.

(1) Remove fluid pump drive belt (para 97).

(2) Remove water pump drive belt as shown in figure 51.

b. Cleaning and Inspection.

(1) Clean the drive belt with a cloth dampened with an approved cleaning solvent.

(2) Inspect the drive belt for cracks, breaks, and frayed or stretched condition. Replace a defective belt.

c. Installation.

(1) Install water pump drive belt as shown in figure 51.

(2) Adjust drive belt tension (para 39).

(3) Install fluid pump drive belt (para 97).

99. Engine Alternator

a. Removal.

(1) Remove water pump drive belt (para 98).

(2) Remove alternator drive belt as shown in figure 51.

b. Cleaning and Inspection.

(1) Clean drive belt with a cloth dampened with an approved cleaning solvent.

(2) Inspect the drive belt for cracks, breaks, and frayed or stretched condition. Replace a defective belt.

c. Installation.

(1) Install alternator drive belt as shown in figure 51, and adjust tension (para 39).

(2) Install water pump drive belt (para 98).

Section XIII. ENGINE FLUID PUMP

100. General

The engine fluid pump is used to circulate the fuel oil from the fuel tanks through the aftercooler and torque converter to cool the torque converter.

101. Fluid Pump

a. Removal. Remove the engine fluid pump as instructed in figure 52.

b. Cleaning and Inspection.

(1) Clean the pump with a cloth dampened in an approved cleaning solvent.

(2) Inspect for cracks, breaks or other damage.

(3) Replace a damaged or defective fluid pump.

c. Installation. Install the engine fluid pump as instructed on figure 52.

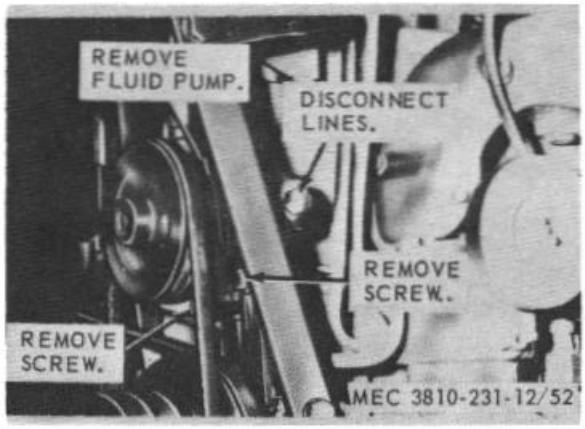


Figure 52. Engine fluid pump, removal and installation

Section XIV. ENGINE CLUTCH ASSEMBLY

102. General

The engine clutch is single plate, dry disc, adjustable pull type, multiple lever design. The clutch is operated by mechanical linkage from the operator's cab.

103. Engine Clutch Adjustment

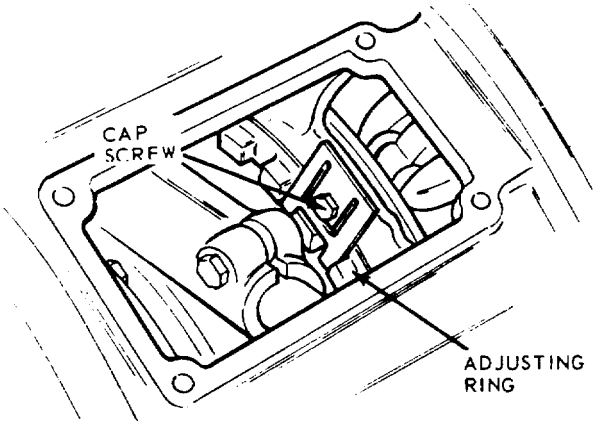
Adjust the engine clutch as shown in figure 53.

104. Engine Clutch Lever and Swing Lock Lever

a. Removal and Disassembly. Remove and disassemble in numerical sequence as shown in figure 54.

b. Cleaning, Inspection and Repair.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.



STEPS:
1. REMOVE CLUTCH INSPECTION COVER.
2. DISENGAGE CLUTCH. ROTATE ENGINE FLYWHEEL WITH PRY BAR UNTIL ADJUSTING RING LOCK CAN BE REACHED THROUGH INSPECTION HOLE.
3. LOOSEN, BUT DO NOT REMOVE, HEX-HEAD CAPSCREW.
4. TURN ADJUSTING RING CLOCKWISE TO TAKE UP OR TIGHTEN CLUTCH.
5. PLACE ADJUSTING RING LOCK IN ADJUSTING RING SLOT, THEN TIGHTEN CAP SCREW.

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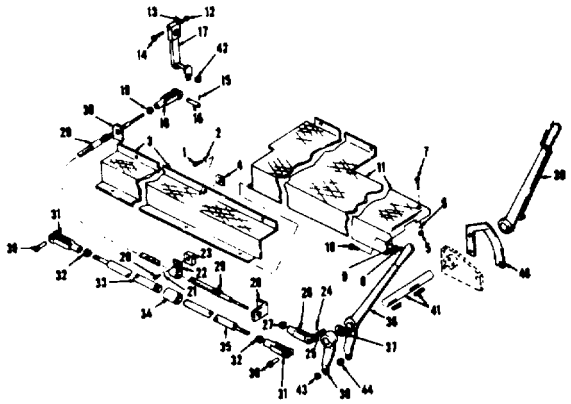
Figure 53. Engine clutch adjustment.

(2) Inspect all parts for breaks, bends, excessive wear and other damage. Repair or release defective parts as necessary.

c. Reassembly and Installation. Reassemble and install in reverse order of numerical sequence shown in figure 54.



MEC 3810-231-12/54

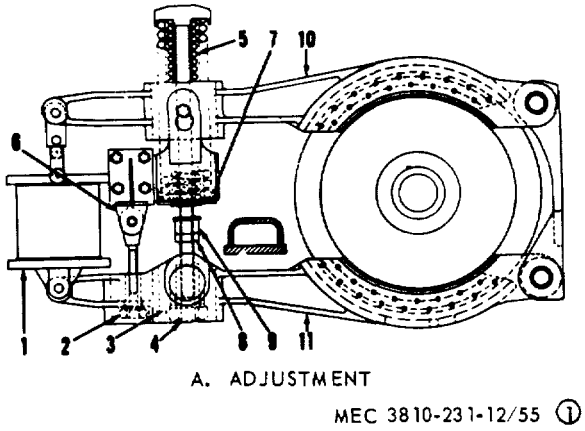
1. Capscrew
2. Lockwasher
3. Cover
4. Mounting plate
5. Nut
6. Lockwasher
7. Capscrew
8. Nut
9. Lockwasher
10. Capscrew
11. Cover
12. Capscrew
13. Nut
14. Lockwasher
15. Cotter pin
16. Pin
17. Lever
18. Clevis
19. Hex nut
20. Machine bolt
21. Lockwasher
22. Clamp
23. Support
24. Cotter pin
25. Pin
26. Clevis
27. Hex nut
28. Bracket
29. Control cable
30. Yoke end pin assembly
31. Adjusting yoke end
32. Hex nut
33. Tie rod
34. Pipe coupling
35. Tie rod
36. Lever
37. Washer
38. Lever
39. Lever
40. Quadrant
41. Shaft
42. Bushing
43. Bushing
44. Bushing

Figure 54. Engine clutch lever and swing lock lever assemblies.

Section XV. CRANE LOWER CRAWLER SECTION

105. General

The lower crawler section is the foundation of the machine and must be kept in perfect operating condition. All parts are designed to withstand hard wear but careful inspection and periodic adjustments are required for good operation. When the machine is traveled through, or worked in mud or water, flush out the gear case underneath the propel gear. Refer to Lubrication Order (para 32).



A. ADJUSTMENT

MEC 3810-231-12/55 ①

1. Air cylinder
2. Adjusting nut
3. Lock plate
4. Adjusting nut
5. Spring
6. Support rod
7. Spring retainer
8. Jam nut
9. Special nut
10. Upper brake arm
11. Lower brake arm

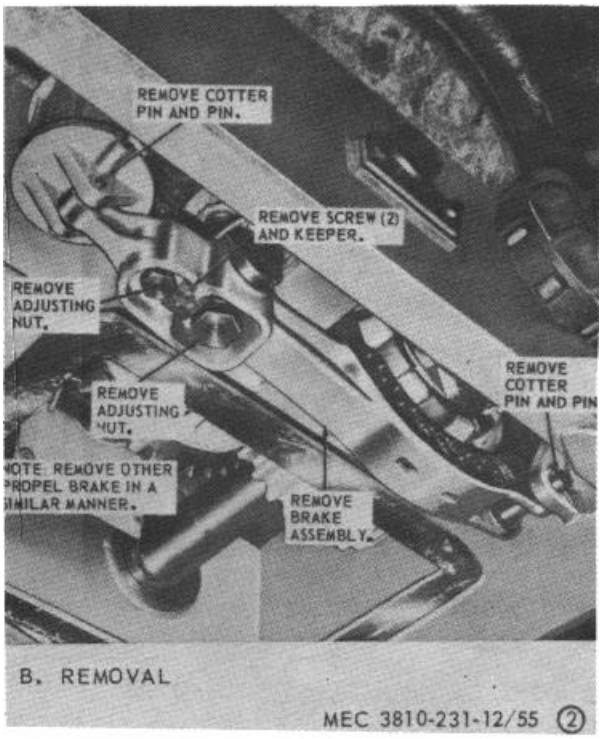
A—ADJUSTMENT

Figure 55. Propel brake.

106. Propel Brake

a. Adjustment.

When checking the propel brake adjustment, first check to make sure the cylinder does not bottom or close completely when the brake is in a set position. Remove the lock plate (3, fig. 55A) and apply pressure to the cylinder to release the brake. Turn nut (2) to obtain a clearance of one quarter inch between the lining and the clutch drum, in the center of the bottom shoe. Replacement of the lock plate completes normal band adjustment.



B-REMOVAL

Figure 55 Continued.

If the lining is worn to the point where the cylinder completely retracts and the brake does not hold, move the pin on the cylinder to the second hole. To do this, first load the spring by tightening nut (9) until pressure is relieved from nut (4). Insert the pin, then back off on nut (9) to obtain a clearance of one inch between the nut and spring seat. Tighten the jam nut, then readjust the brake as just described.

If the spring is not under enough tension to hold the brake, tighten nut (4) until the spring is tight enough to hold the brake with the cylinder in a retracted position.

b. Removal. Remove propel brake as shown in figure 55B.

c. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, loose rivets and worn linings. Replace a defective or worn brake band and parts as necessary.

(3) If brake linings become glazed, remove the glazed spots with a steel brush. If oil or grease soaked, replace.

d. Installation. Install propel brake as shown in figure 55B.

107. Propel Chain

a. Adjustment.

(1) Propel the machine in a backward direction for at least the length of the crawler frame. This will place all of the slack in the propel chain on top (fig. 56). The hand holes provided in the idler roller must be opposite the adjusting nut.

(2) Remove the retainer pin (fig. 57) and remove several of the shims, securing the idler roller assembly, to relieve the crawler belt tension.

(3) Insert a hydraulic jack into the hole in the crawler frame in front of the drive shaft assembly. Increase the tension on the propel chain until the slack of the chain can be raised approximately 1 1/2 inches minimum to 3 inches maximum.

(4) Add shims (fig. 56) on bearing bolt until the drive shaft is parallel t o the axle. Install the keeper bar to lock the shims in place.

(5) Adjust crawler track tension (para 108).

b. Removal and Installation. Remove and install propel chain as instructed in figure 56.

c. Cleaning and Inspection.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

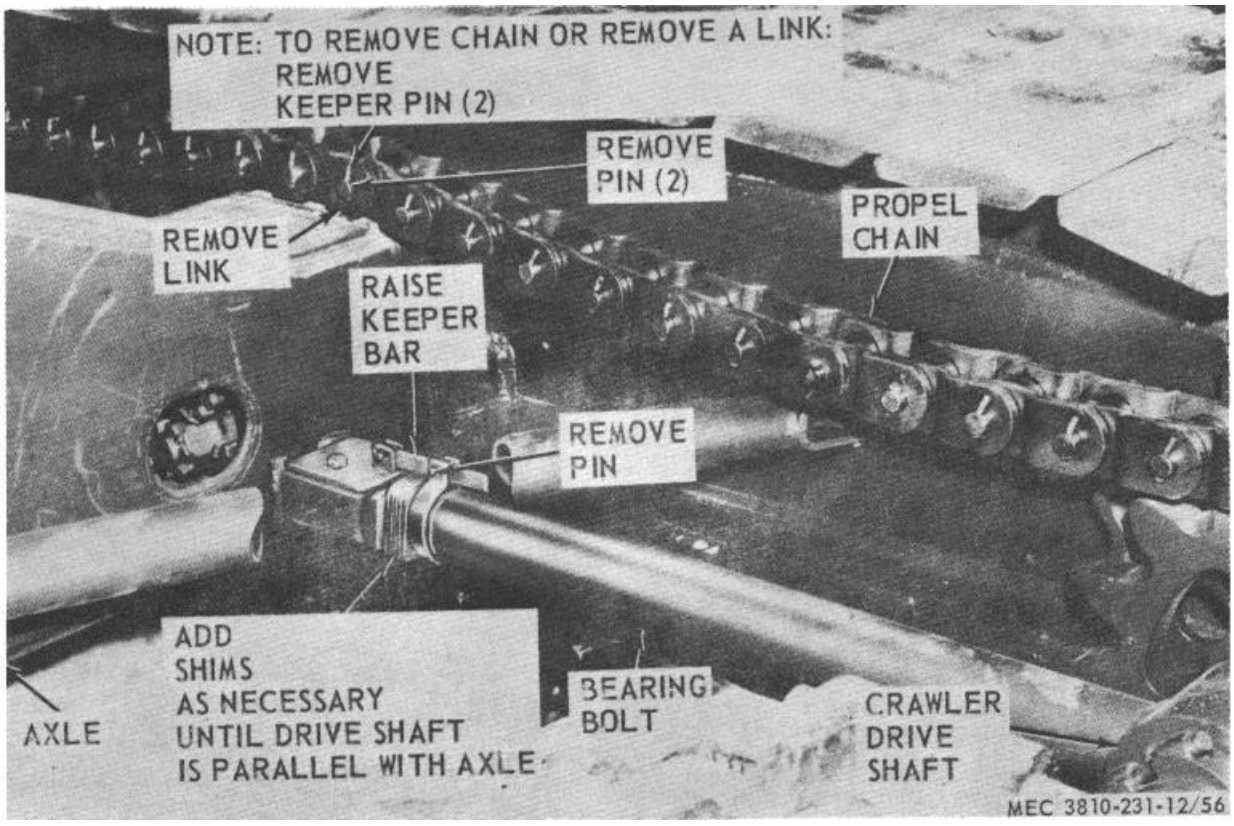


Figure 56. Propel chain adjustment, removal and installation.

(2) Inspect for cracks, breaks, worn rollers or pins. Replace a defective or damaged chain.

108. Crawler Track Tension

a. Adjustment (fig. 57).
   (1) Propel the machine in a forward direction at least the length of t he crawler frame. This will place a II of the slack on top of the crawler belt.
   (2) Insert a hydraulic jack in the hole of the frame.
   (3) Apply tension to the crawler belt until the link pins are resting firmly against the idler roller and a dip in the crawler belt of approximately 1 1/2 inches is maintained at t he ends of the track rail.
   (4) Secure the adjustment by inserting shims as necessary.
   (5) Secure shims with retainer pin and remove hydraulic jack.

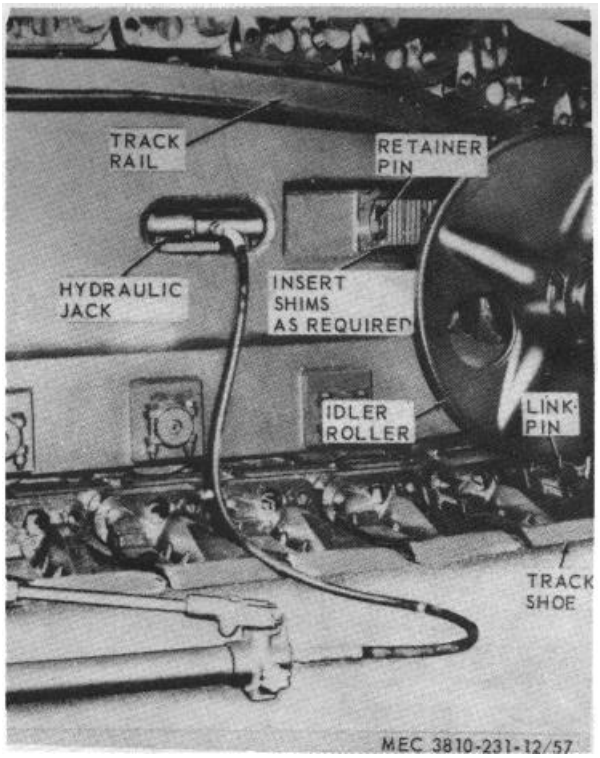


Figure 57. Crawler track ten-in adjustment.

Section XVI. HOOK ROLLER ASSEMBLIES

109. General

The hook roller assemblies hold the revolving frame to the live roller circle when the machine rotates. They are provided with eccentric type adjustment to compensate for wear.

110. Hook Roller

a. Adjustment.
   (1) When there is more than 1/16 inch gap between the lower side of the roller path and the hook roller, the hook rollers (fig. 58) must be adjusted.
   (2) Lower the boom to approximately the horizontal position and adjust the front hook rollers.
   (3) Remove the cap screws and rotate the eccentric pin in either direction until the roller is snug against the bottom of the roller path. A maximum of 1/16 inch clearance is allowed between the roller path and the hook rollers.
   (4) Install the cap screws after the adjustment is complete.
   (5) Check the hook roller bracket for tightness every time the hook rollers are adjusted. If the machine is operated with loose hook roller bolts, severe damage to the entire machine may result.

b. Removal. Remove hook roller assemblies as illustrated on figure 59.

c. Cleaning, Inspection and Repair.
   (1) Clean all parts with an approved cleaning solvent and dry thoroughly.
   (2) Inspect for cracks, breaks, and excessive wear. Repair or replace defective parts.

d. Installation. Install hook roller assemblies as illustrated on figure 59.

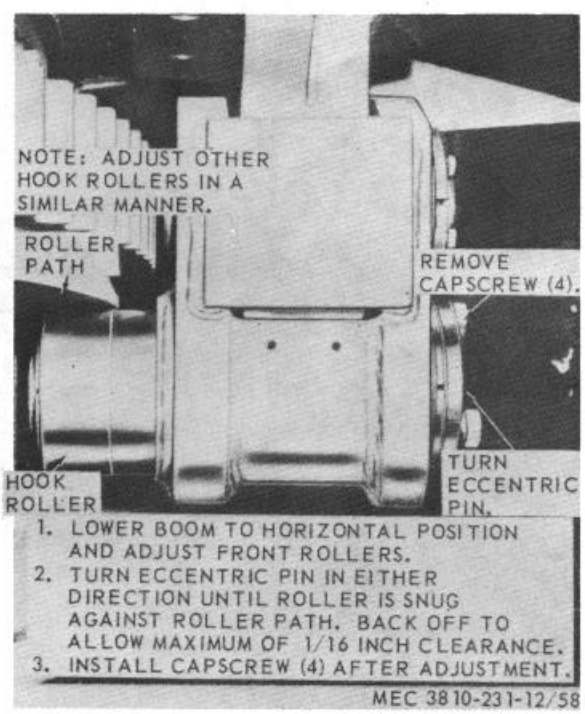


Figure 58. Hook roller adjustment.

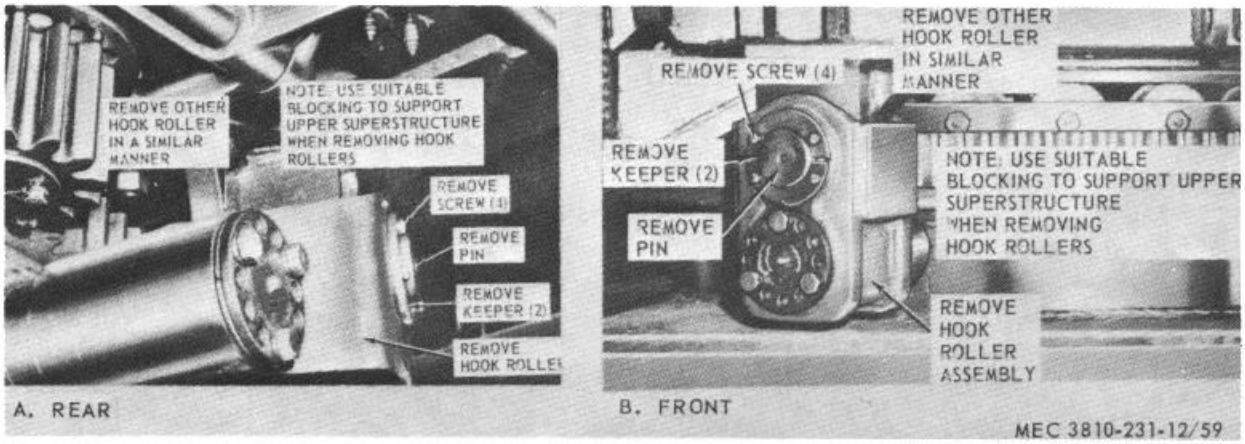


Figure 59. Hook roller assembly, removal and installation.

Section XVII. CRANE BRAKE AND CLUTCH ASSEMBLIES

111. General

The location of the various brakes and clutches are shown in figure 60. Brakes and clutches should be kept in proper adjustment as a safety measure, and for proper operation. Hydraulic cylinder operating mechanisms are used to actuate the various brakes and clutches. These assemblies differ in size of the hydraulic cylinder used and number or size of the release springs used. Adjustments for all of the unit are the same.

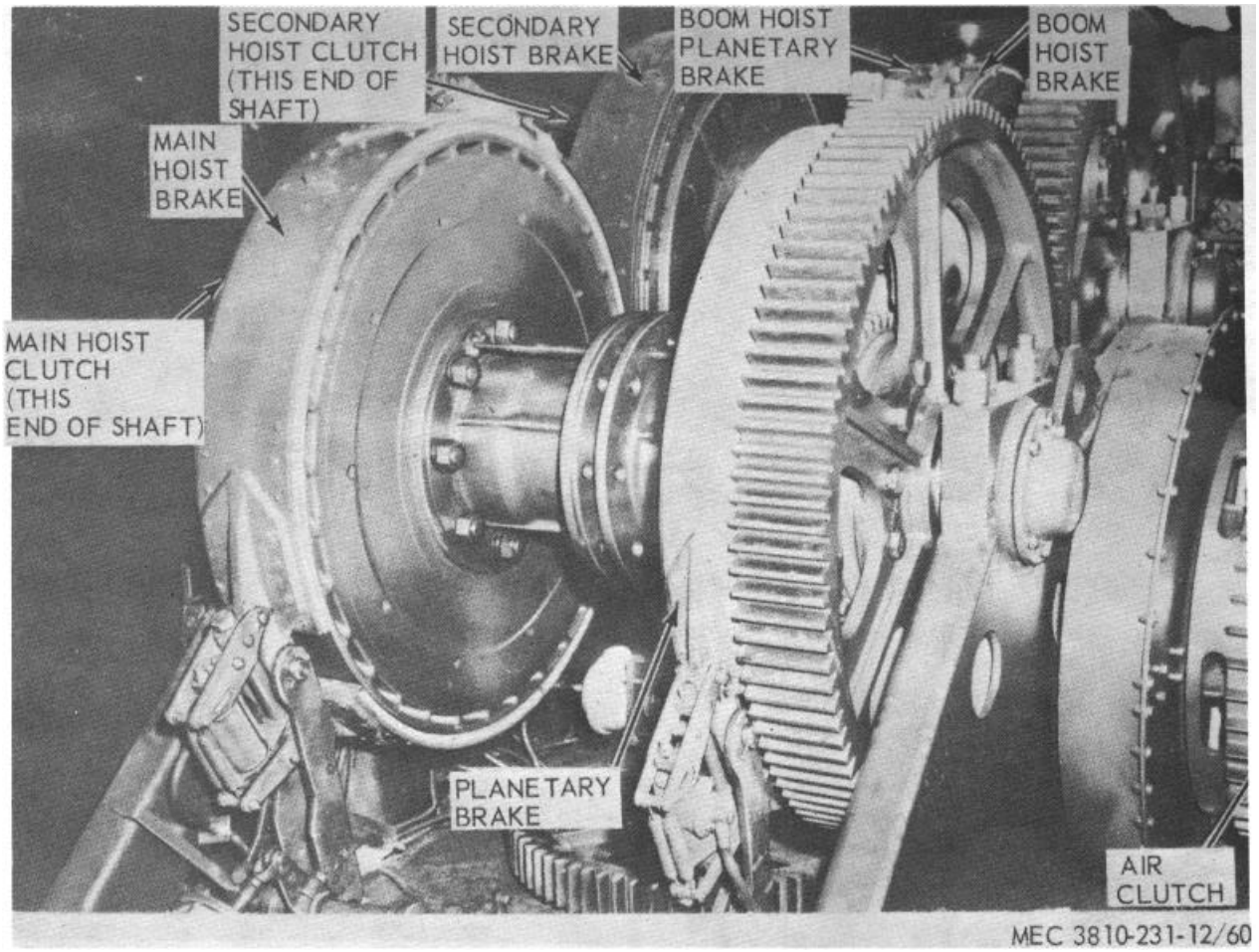


Figure 60. Location of brakes and clutches.

112. Main Hoist Brake and Secondary Hoist Brake

a. Adjustment. Adjustment may be made to the hoist brake bands to compensate for wear as shown in figure 61.

b. Removal. Remove the brake band as shown in figure 61.

c. Cleaning and Inspection.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect the lining for excessive wear, glazing and other damage. Replace a brake band having defective lining.

d. Installation. Install the brake band as illustrated on figure 61.

113. Boom Hoist Brake

a. General.

(1) This brake (fig. 62, should be just tight enough so that it will support the boom and the load which the machine is handling. This is a spring loaded brake. When the boom is raised, the boom hoist drum turns against the dragging brake. It is best, therefore, to have the brake no tighter than is required for the operating condition.

(2) Before making any adjustments, be sure that the boom hoist pawl is engaged in the boom hoist drum ratchet. If the boom hoist brake is not tight enough to support the

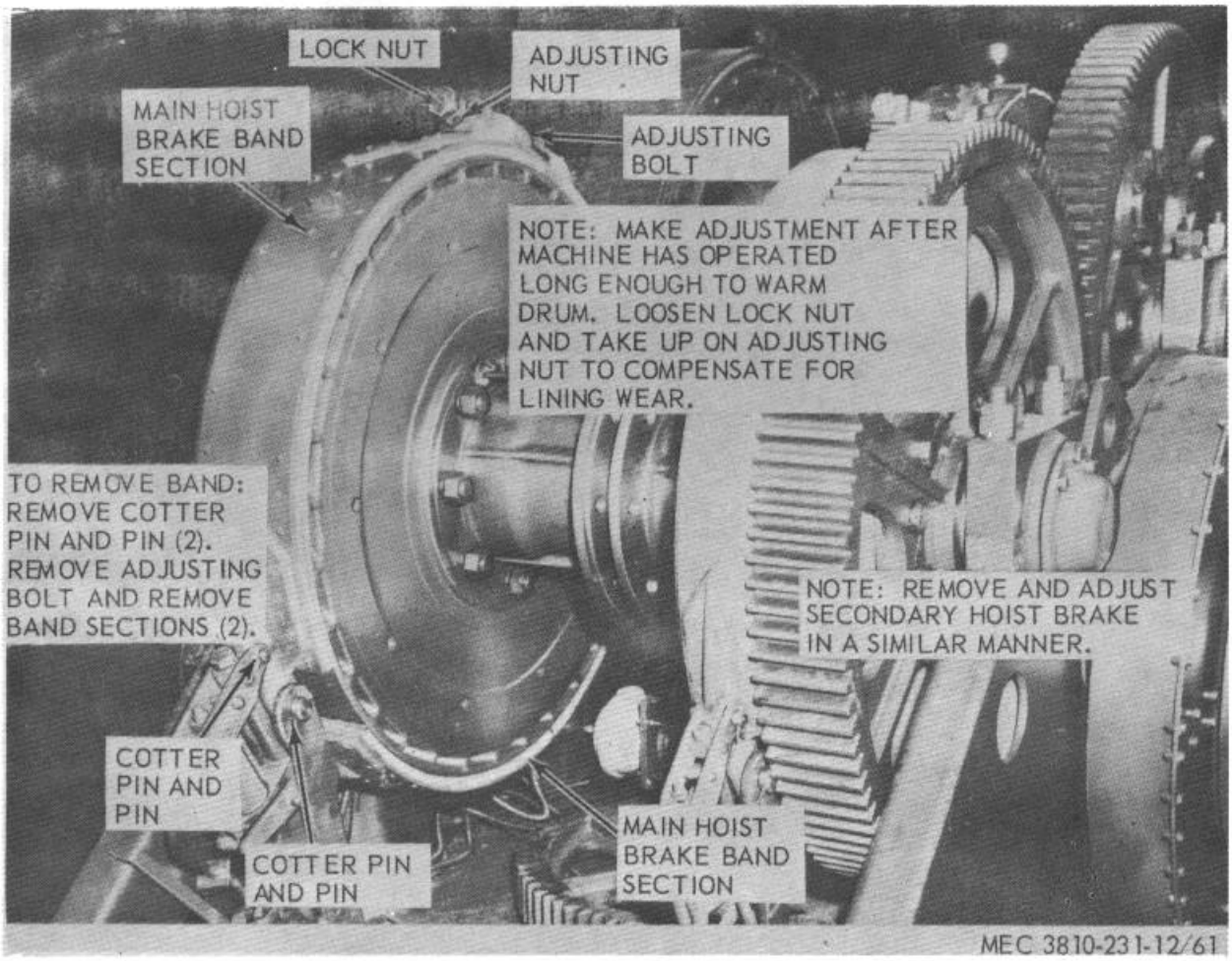


Figure 61. Main hoist brake and Secondary hoist brake adjustment, removal and installation.

boom and loads being handled, proceed as follows:

b. Adjustment.

(1) Pull the boom hoist lever toward the operator to compress the spring in the boom hoist brake. Loosen the lock nut on the lower end of t h e adjusting bolt (2, fig. 62B) and turn the adjusting bolt clockwise. After making several turns on the adjusting bolt, tighten the spring adjustment bolt (3).

(2) When spring adjusting bolt (3) is tightened as much as possible, tighten adjusting bolt (2) a few more turns. Proceed with the tightening in this fashion using the adjusting bolt (2) to compress the spring slightly, then take up the slack with the spring adjusting bolt (3). As a final adjustment, back off on adjusting bolt (2) until there is at least 1/16 inch space between the thimble (4) and the end plate (5). This space must be allowed between the end plate and either the upper thimble or the lower thimble. This space assures that the spring pressure is applied against the boot hoist drum and not against the hydraulic cylinder. If there is no space between the thimble and end plate, the brake will slip.

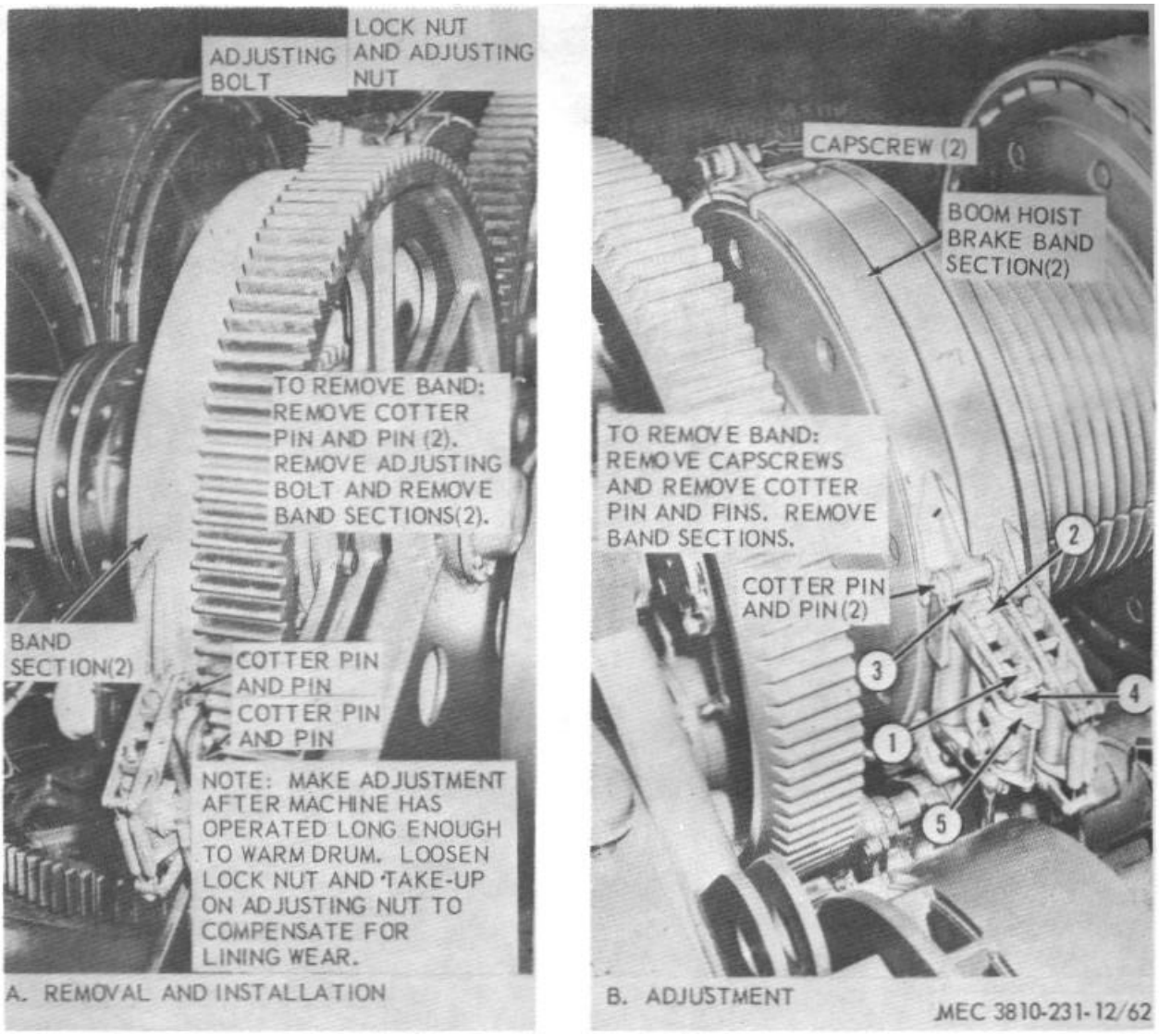


Figure 62. Boom hoist brake adjustment, removal and installation.

c. Removal. Remove the boom hoist brake band as shown in figure 62.

d. Cleaning and Inspection.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect the lining for excessive wear, glazing and other damage. Replace a brake band having a defective lining.

e. Installation. Install the boom hoist brake as shown on figure 62.

114. Swing Brake Band

a. Adjustment. Adjust swing brake band as instructed on figure 63.

b. Removal. Remove swing brake band as instructed on figure 63.

c. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the lining for excessive wear, glazing and other damage. Replace a

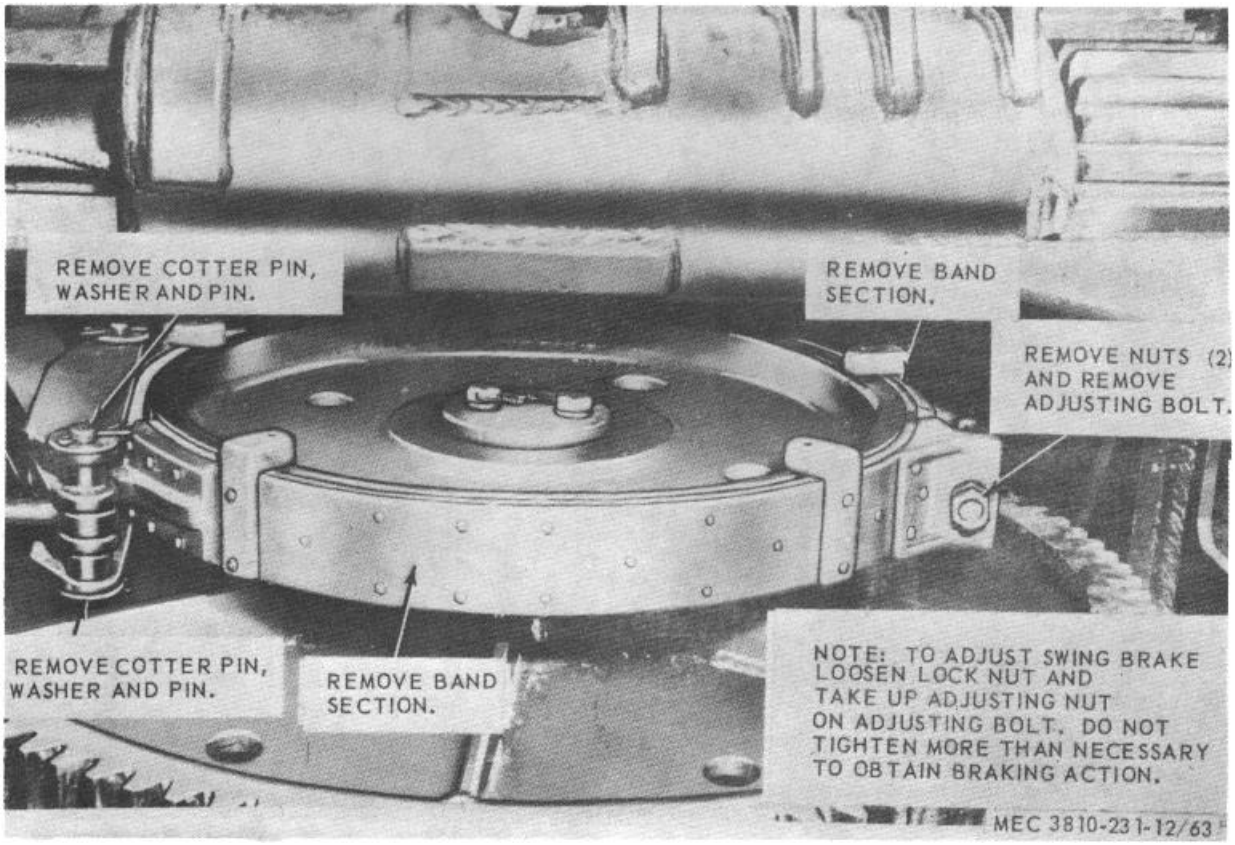


Figure 63. Swing brake adjustment, removal and installation.

brake band having a defective lining.

d. Installation. Install the swing brake band as instructed on figure 63.

115. Main Hoist Clutch and Secondary Hoist Clutch

a. Adjustment.

(1) To compensate for lining wear on the main hoist and secondary hoist clutches, loosen jam nuts (fig. 64) and turn adjusting nut so band will not drag on drum when clutch is hot. A clearance of 1/16 inch between clutch lining and drum at the lower part of the clutch should be maintained.

(2) The eccentric rollers mounted on the eccentric bolts should be rotated to provide uniform clearance between clutch band and drum when the clutch is in the released position. Tighten jam nuts after completing the adjustment.

(3) Jam nuts must be tightend after the adjustment is complete.

(4) It is good practice, before the clutch linings are worn out, to interchange the dead shoe with the live shoe. Most of the lining wear will be concentrated on the dead shoe.

b. Removal of Clutch Shoes.

(1) Remove the keeper plates from the clutch spider. Remove the cap screws which secure washers which

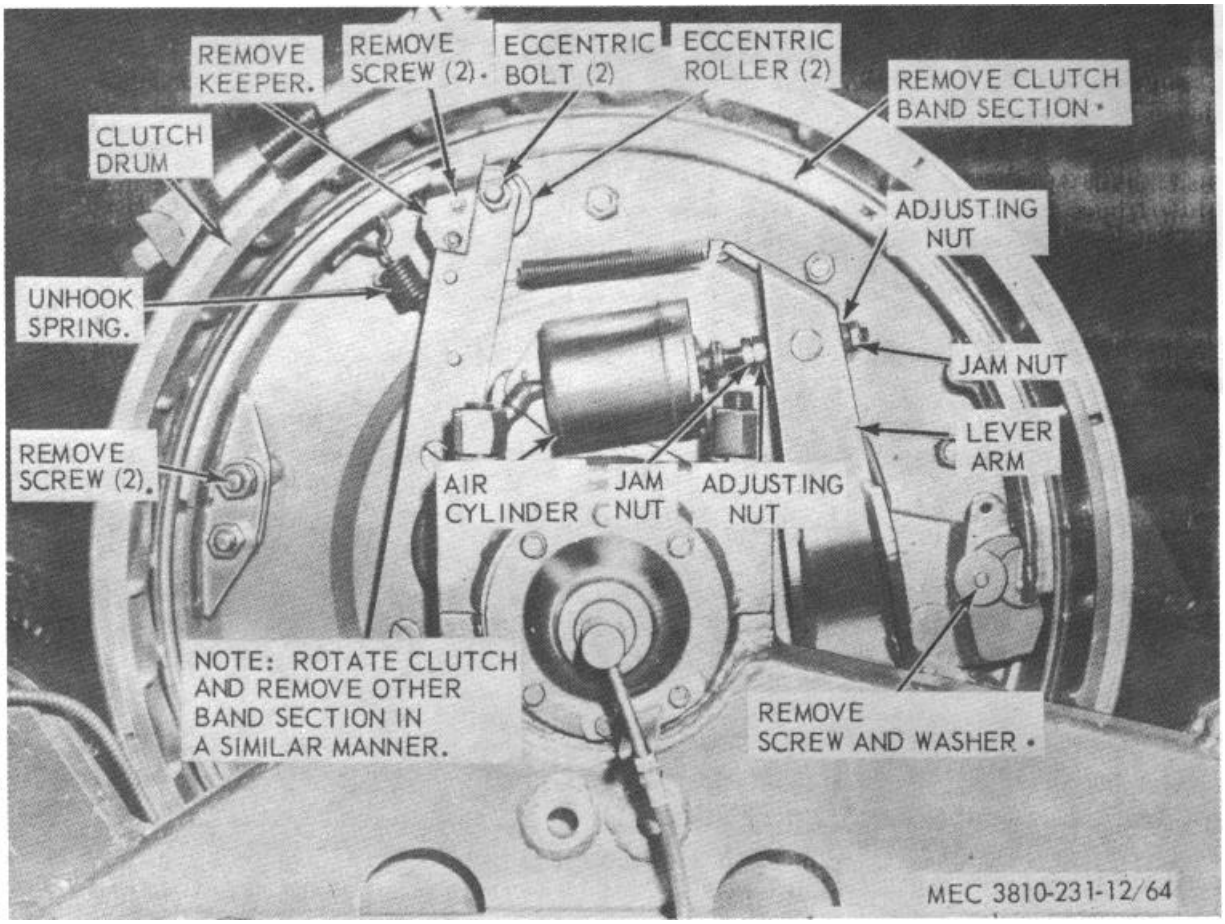


Figure 64. Main hoist and secondary hoist clutch, adjustment, removal and installation.

secure the two bands together. Rotate the drumshaft until the band section with the lug toward the outside is uppermost ill the drum. Remove this section of band first.

(2) Rotate the drumshaft until the other band is uppermost, then remove this band.

c. Cleaning and Inspection.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect linings for excessive wear, glazing and other damage. Replace a clutch band having a defective lining.

(3) Inspect all other parts for breaks, excessive wear, and other damage.

d. Installation. Install clutch band assemblies in reverse order of the procedure described for removal.

116. Magnetic Clutches

a. General.

(1) Two magnetic clutch units a r e mounted on the jackshaft and straddle the intermediate swing shaft. These clutches are similar and maintenance is identical for both. Field coils are imbedded in the outer (or "driving") member which is keyed to the jackshaft (fig. 65). Each inner (or "driven") member is keyed

to a bevel gear which is meshed with the intermediate swing shaft bevel gear. When electrical power is applied to one of the outer (driving) members, the inner (driven) member is caused to turn by magnetic force generated in the outer member. There is no direct physical contact between these inner and outer members. The driven member always rotates in the same direction to one or the other of the magnetic clutch units, the intermediate swing shaft is rotated either clockwise or counterclockwise. This will cause the machine to swing in either direction depending on direction selected.

(2) The wiring diagram for the complete magnetic clutch system is shown in figure 66. This is a schematic diagram and the units which make up the system are not necessarily shown in the same relationship that they are found on the machines.

b. Brush Replacement and Adjustment.

(1) The brushes (fig. 67) which contact the magnetic clutch sliprings should be checked occasionally to be certain that they are free in the brushholders. If the brushes do not move freely, there will be poor electrical contact between the brushes and the magnetic clutch sliprings and the sliprings may be worn excessively. Replace the brushes when they are worn so that the top of the brush is approximately even with the top

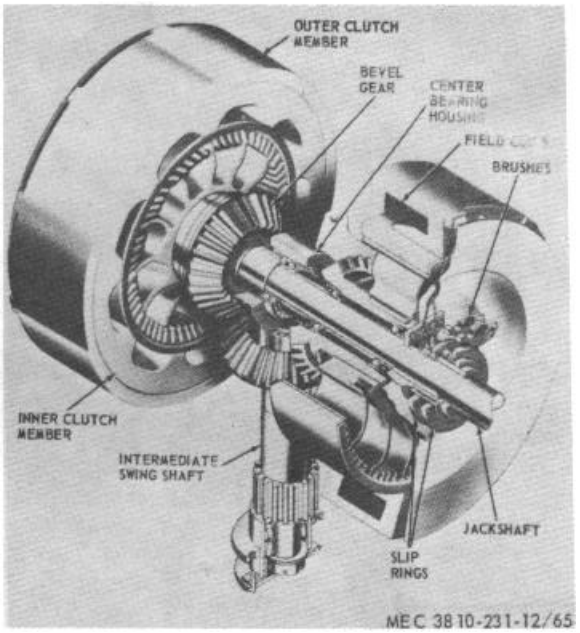
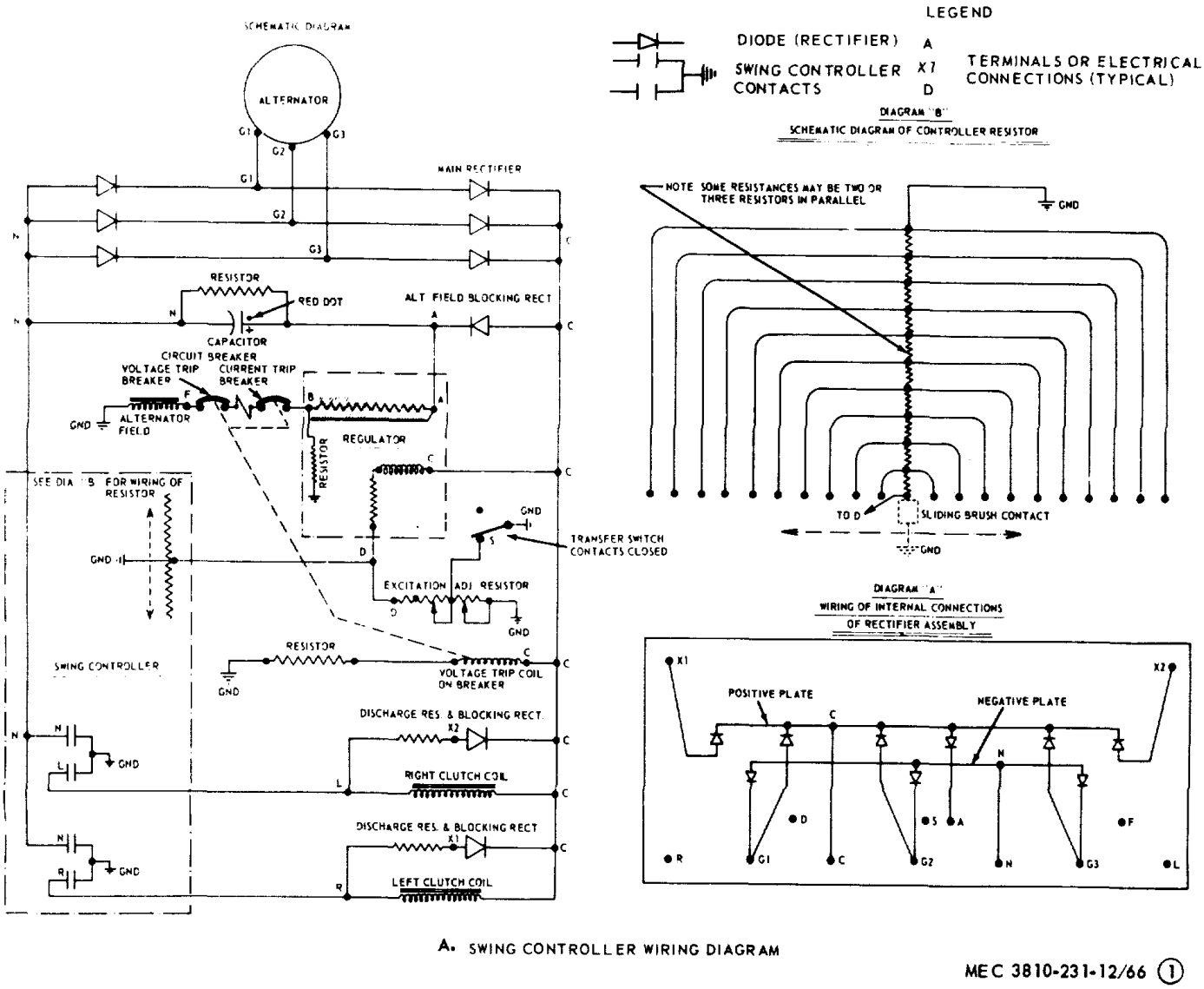


Figure 65. Magnetic clutch jack shaft assembly.

of the brush holder. This insures that the brush pressure spring is applying pressure against the brush and not against the brush holder.

(2) The pressure springs (fig. 67) which hold the brush against the sliprings are adjustable. Set for approximately 1-1/4 to 1-1/2 pounds, as measured with a spring scale.

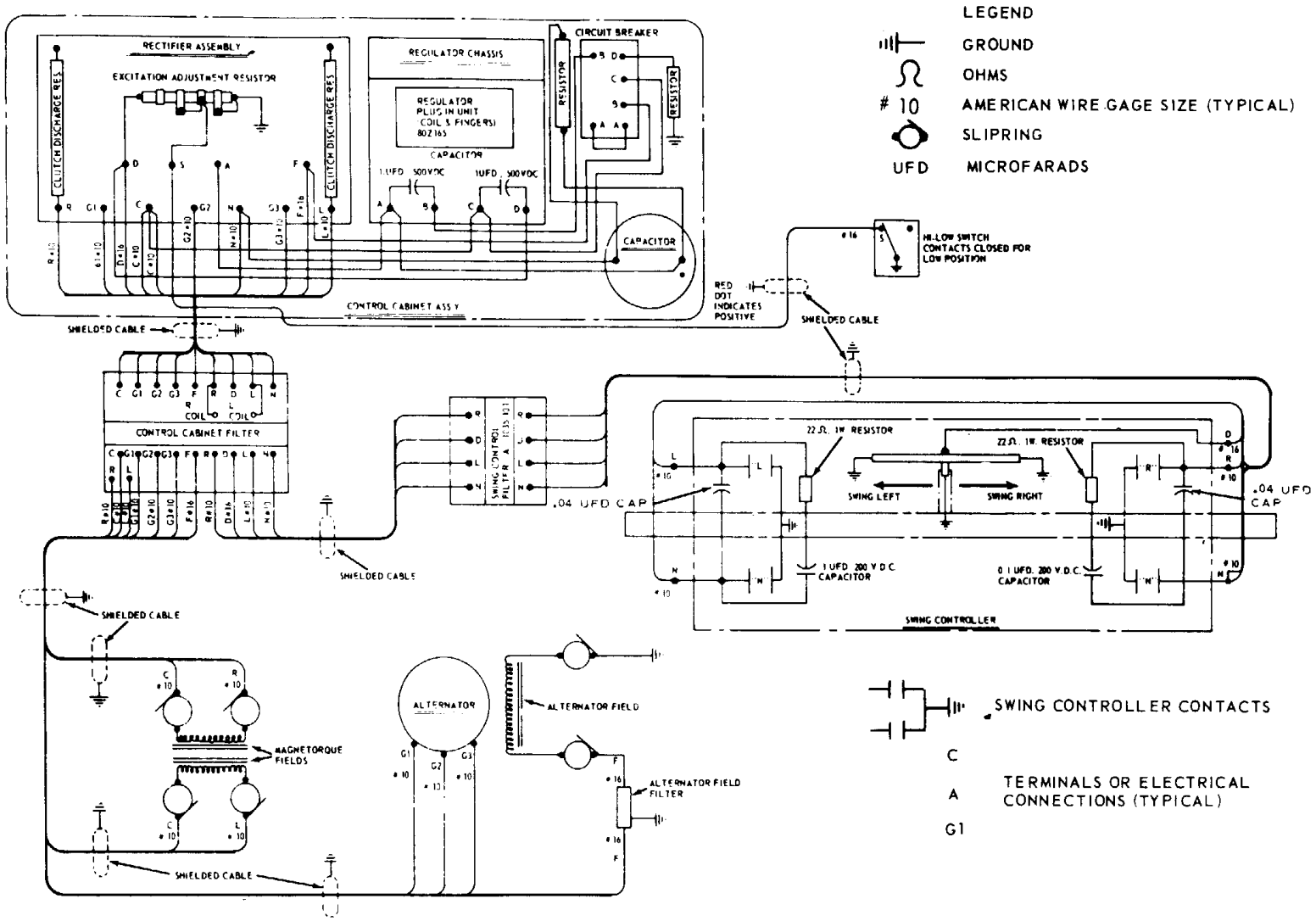
c. Cleaning Sliprings. If sliprings become badly discolored clean by holding 00 sandpaper against the slipring.



A. SWING CONTROLLER WIRING DIAGRAM

MEC 3810-231-12/66 (1)

Figure 66. Schematic wiring diagram.



B. CONTROLS WIRING DIAGRAM

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Figure 66 - Continued.

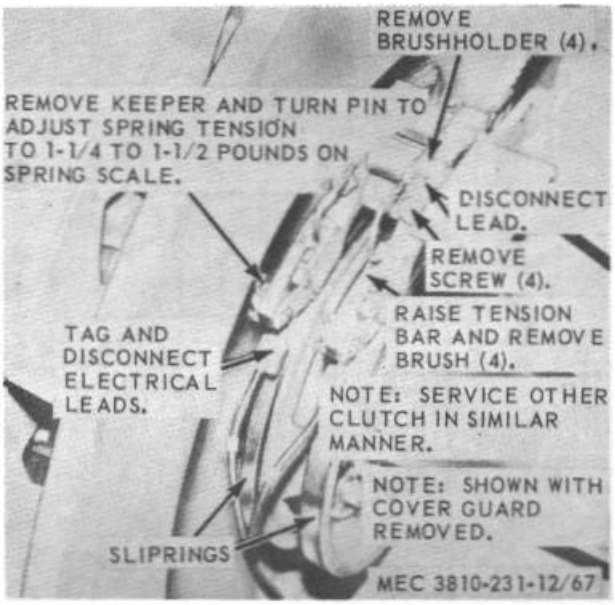

Figure 67. Magnetic clutch brushholders and brushes, adjustment, removal and installation.

Section XVIII. HYDRAULIC SYSTEM

117. General

a. Movement of the control stand levers or pedals connected to the hydraulic compensators causes the compensator to move. Movement of this piston forces hydraulic brake fluid through the tubes connecting the compensators with the various brakes and clutches. The pressure of the hydraulic fluid in the connecting tubes moves the piston in the brake or clutch cylinder. This movement of the piston causes the clutch or brake to engage the drum and the force applied to the brake or clutch varies with the force applied to the lever or pedal. Springs in the compensators and cylinders return the pistons to their normal positions as soon as the control stand lever or pedal is released. The fluid reservoir makes allowance for the expansion and contraction of the fluid and insures that the system is filled at all times.

b. Smooth, uniform operation is a characteristic of the hydraulic system. Always check the adjustment of the brake or clutch first, then check the adjustment of the control stand linkage, if operation of the controls appears faulty. Poor adjustment of the brakes or clutches is usually the difficulty, rather than the hydraulic system.

c. On the hoist brake and the digging brake air/hydraulic (usually spoken of as "Air Over Hydraulic") is used for additional ease of control. The use of compressed air as a booster in the hydraulic system for these two brakes provides these advantages.

(1) It enables the operator to apply more pressure to the brake than would be possible with the hydraulic control alone. (2) brake band travel is increased, making for easier and less critical adjustment.

118. Bleeding Air From the System

a. Fill the supply tank or reservoir with clean hydraulic brake fluid and check the level frequently during the bleeding operation to prevent air from entering the supply line. Open the valve below the tank, than bleed the air from the bleeder cap on each compensator in the control stand (fig. 68). Start with the lower compensators and work

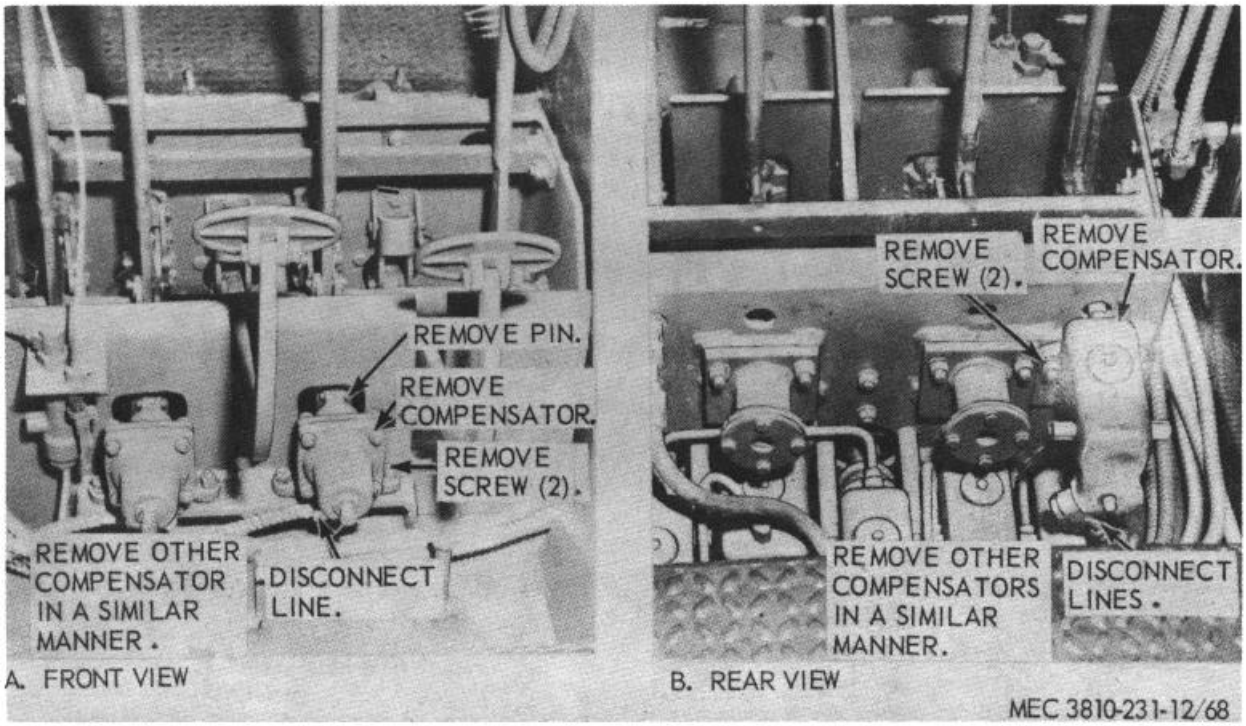

Figure 68. Control stand hydraulic compensators, removal and installation.

upward toward the top row of compensators. When bleeding air from the system, always start with the lowest unit and work upward.

b. Attach the bleeder hose (fig. 69) to the bleed valve and use a clean jar or can t o catch the hydraulic fluid. Bleed the air from each of the hydraulic cylinders on the machine, beginning with the lowest cylinders first and working toward the cylinders mounted at the highest point. Keep the end of the bleeder hose at the bottom of the can or jar used to collect the hydraulic fluid removed from the bleeder valves. This will prevent air from entering the bleeder hose and re-entering the system. Manual operation of the controls will be required to expel the air from the system.

c. Work each of the controls slowly and note the action on the machine. If any of the controls still feel spongy, it may be necessary to remove the hydraulic cylinder from the hydraulic cylinder assembly (fig. 70). Hold the hydraulic cylinder in the position shown, then rock the cylinder back and forth to insure that all trapped air is allowed to escape. Slight pressure may be applied to the operating lever or pedal during this operation. Be sure to open the bleed valve after the pressure is applied and close the valve before the lever reaches the end of travel or is released. If this caution is not observed, air will the sucked into the system through the bleed valve.

d. Check the level of the hydraulic fluid in the reservoir and keep the reservoir filled at all times. This will prevent air from entering the supply line at the bottom of reservoir.

119. Hydraulic Compensators

a. Removal. Remove the compensator as shown in figure 68.

b. Cleaning and Inspection.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, leaks and other damage.

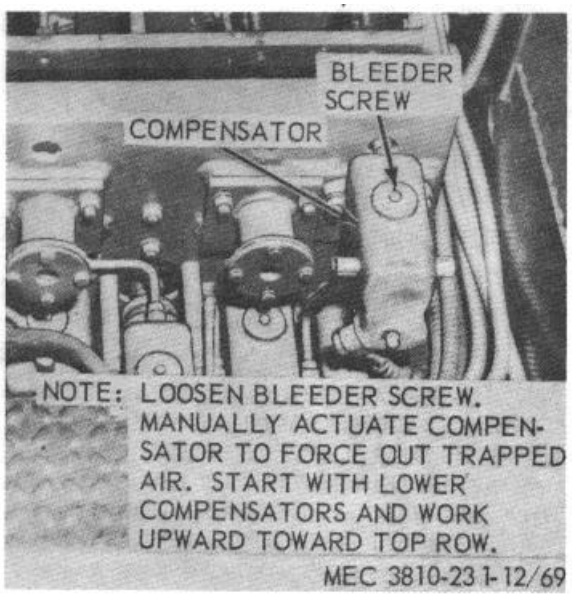

Figure 69. Bleeding compensator.

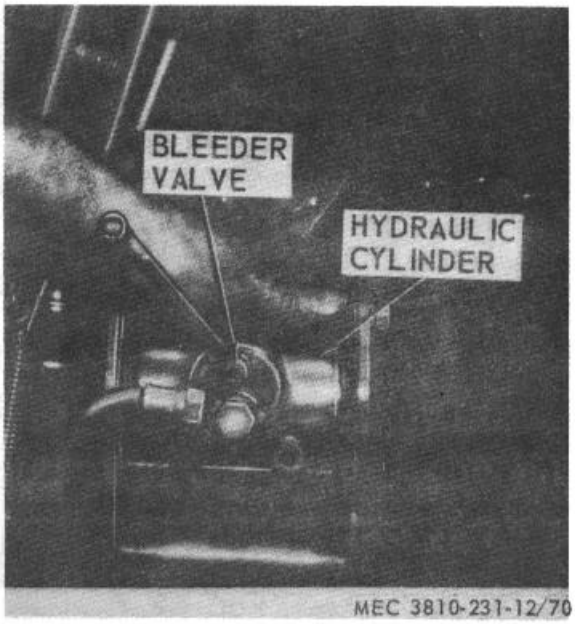

Figure 70. Hydraulic cylinder removed from assembly to bleed air.

(3) Replace a damaged or defective compensator.

c. Installation. Install the compensator as shown on figure 68.

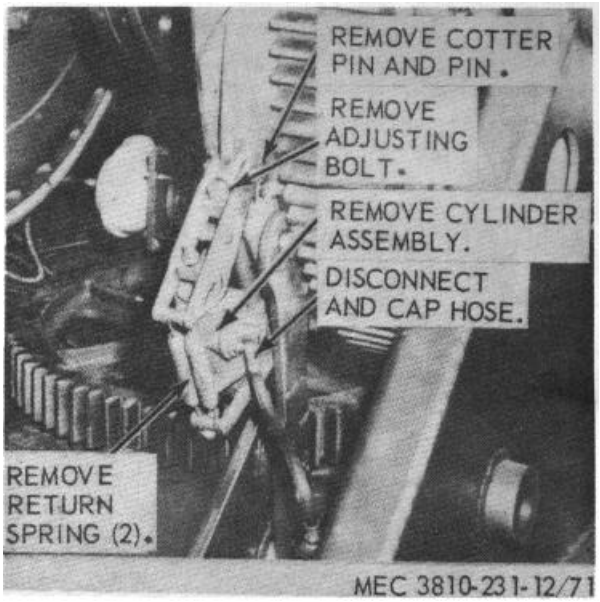

Figure 71. Hydraulic cylinder, removal and installation

120. Hydraulic Cylinder

a. Removal. Remove hydraulic cylinders as shown in figure 71.

b. Cleaning and Inspection.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, leaks and other damage.

(3) Replace a damaged or defective hydraulic cylinder.

c. Installation. Install hydraulic cylinder as shown in figure 71.

121. Brake or Clutch Operating Mechanism

a. Adjustment (fig. 72).

(1) To adjust for lining wear of a brake or clutch, loosen lock nut and tighten adjusting bolt. Do not tighten adjusting bolt more than necessary for good operation of the brake or clutch. If adjustment is too tight, the operating levers work hard and linings wear too fast.

(2) Tighten lock nut after adjustment is complete. A few drops of light oil

on each end of trunnions, (A and B, fig. 72), when adjusting, will keep the assembly working freely.

b. Removal. Remove operating mechanism as illustrated on figure 71.

c. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, and other damage. Repair or replace defective parts.

d. Installation.

(1) Install operating mechanism as shown on figure 72.

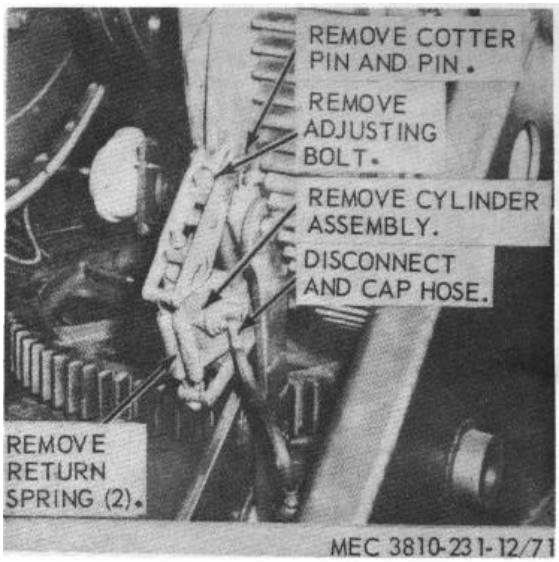

Figure 72. Brake or clutch operating mechanism assembly.

(2) Adjust operating mechanism as in *a* above.

122. Hydraulic Fluid Reservoir

a. Removal. Remove the hydraulic reservoir as shown on figure 73.

b. Cleaning, Inspection and Repair.

(1) Clean and flush with an approved cleaning solvent and dry thoroughly.

(2) Inspect for leaks, cracks, breaks or other damage. Repair or replace a defective reservoir.

c. Installation. Install the hydraulic reservoir as shown in figure 73.

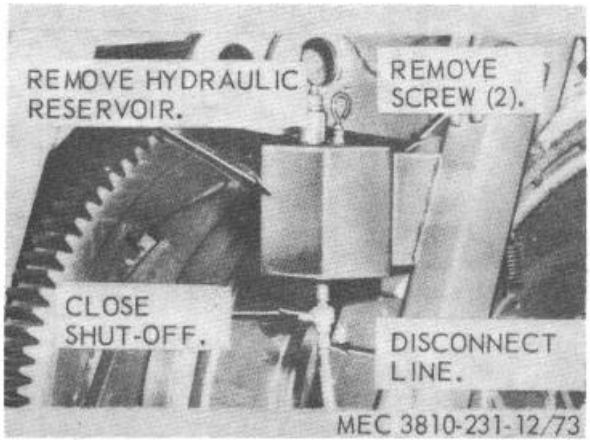

Figure 73. Hydraulic fluid reservoir, removal and installation.

Section XIX. CRANE AIR SYSTEM

123. General

The crane air system provides air assist to operating controls of clutch, brakes, steering and operating controls.

124. Pressure Gages

a. Removal. Remove the pressure gages as instructed on figure 74.

b. Cleaning and Inspection.

(1) Clean gages with a cloth dampened with an approved cleaning solvent.

(2) Inspect gages for cracked glass, stripped threads and other damage. Replace a damaged or defective gage.

c. Installation. Install the pressure gages as instructed on figure 74.

125. Pressure Regulating Valve

a. Removal. Remove the pressure regulating valve as instructed on figure 74.

b. Cleaning, Inspection and Repair.

(1) Clean regulating valve with a cloth dampened with an approved cleaning solvent.

(2) Inspect regulating valve for cracks, breaks, stripped threads and other damage. Replace a damaged or defective regulating valve.

c. Installation. Install the pressure regulating valve as instructed on figure 74.

126. Air Pac Assemblies

a. Removal. Remove air-pac assemblies as instructed on figure 74.

b. Cleaning, Inspection and Repair.

(1) Clean exterior with a cloth dampened with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, stripped threads and other damage. Replace a defective air-pac.

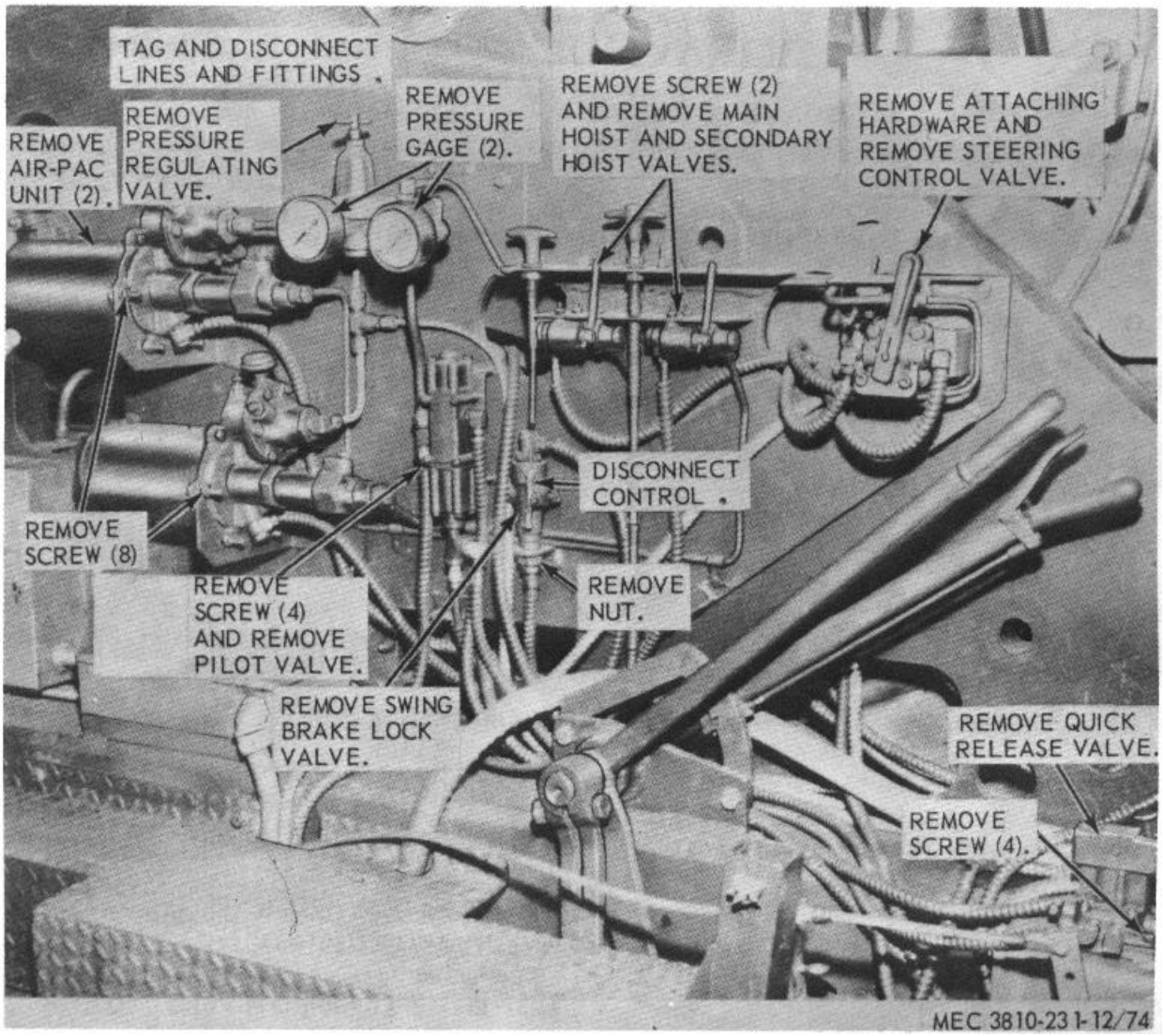

Figure 74. Air system controls, valves and gages, removal and installation.

c. Installation. Install air-pac assemblies as instructed on figure 74.

127. Pilot Valve

a. Removal. Remove the pilot valve a s instructed on figure 74.

b. Cleaning and Inspection.

(1) Clean exterior with a cloth dampened with an approved cleaning solvent and dry thoroughly.
(2) Inspect for cracks, breaks and other damage. Replace a damaged or defective pilot valve.

c. Installation. Install the pilot valve as instructed on figure 74.

128. Swing Brake Lock Valve

a. Removal. Remove the swing brake lock valve as instructed on figure 74.

b. Cleaning and Inspection.

(1) Clean exterior with a cloth dampened with an approved cleaning solvent and dry thoroughly.
(2) Inspect for cracks, breaks, and other damage. Replace a defective or damaged valve.

c. Installation. Install the swing brake lock valve as instructed on figure 74.

129. Main Hoist Broke and Secondary Hoist Broke Valves

a. Removal. Remove the hoist brake valves as instructed on figure 74.

b. Cleaning and Inspection.

(1) Clean exterior with a cloth dampened with an approved cleaning solvent and dry thoroughly.
(2) Inspect for cracks, breaks and other damage. Replace a damaged or defective valve.

c. Installation. Install hoist brake valves as instructed on figure 74.

130. Steering Control Valve

a. Removal. Remove the steering control valve as instructed on figure 74.

b. Cleaning and Inspection.

(1) Clean exterior with a cloth dampened with an approved cleaning solvent and dry thoroughly.
(2) Inspect for cracks, breaks, and other damage. Replace a damaged or defective valve.

c. Installation. Install the steering control valve as instructed on figure 74.

131. Quick Release Valve

a. Removal. Remove quick release valve as instructed on figure 74.

b. Cleaning and Inspection

(1) Clean exterior with a cloth dampened with an approved cleaning solvent and dry thoroughly.

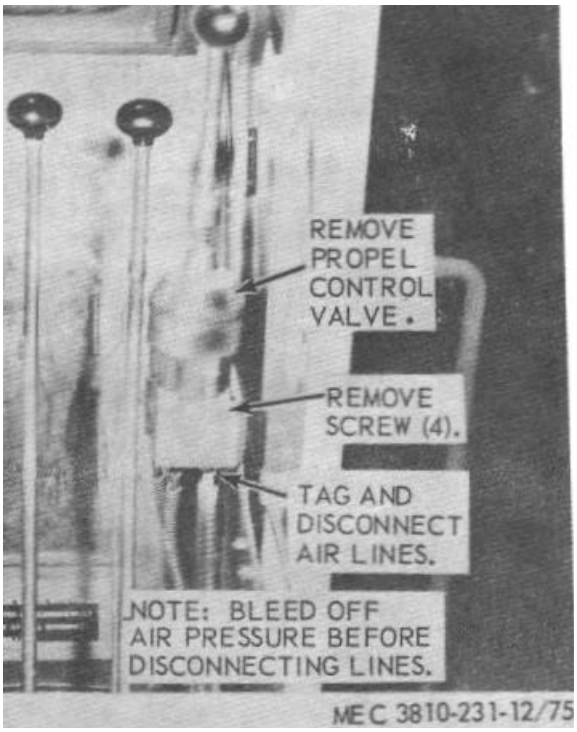

Figure 75. Propel control valve, removal and installation.

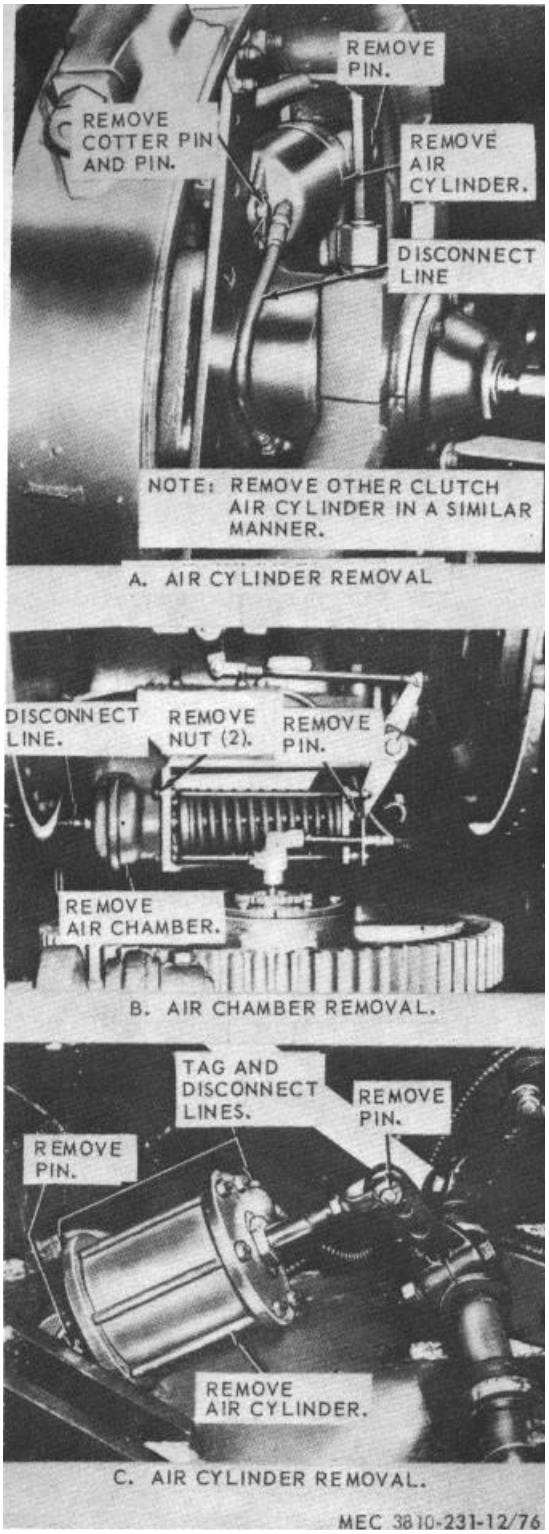

Figure 76. Air cylinder and air chamber assemblies, removal and installation.

(2) Inspect for cracks, breaks, and other damage. Replace a damaged or defective valve.

c. Installation. Install the quick release valve as instructed on figure 74.

132. Propel Control Valve

a. Removal. Remove the propel control valve as instructed on figure 75.

b. Cleaning and Inspection.

(1) Clean exterior with a cloth dampened with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, and other damage. Replace a damaged or defective valve.

c. Installation. Install the propel control valve as instructed on figure 75.

133. Air Cylinder Assembly

a. Removal. Remove the air cylinder assembly as instructed-on figure 76.

b. Cleaning and Inspection.

(1) Clean exterior with a cloth dampened with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, and other damage. Replace a damaged or defective air cylinder.

c. Installation. Install air cylinder as instructed on figure 76.

134. Air Chamber Assembly

a. Removal. Remove air chamber assembly as instructed on figure 76.

b. Cleaning and Inspection.

(1) Clean exterior with a cloth dampened with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, and other damage. Replace a damaged or defective air chamber.

c. Installation. Install the air chamber assembly as instructed on figure 76.

Section XX. CRANE CAB AND COMPONENTS

135. General

The crane cab is mounted on the revolving frame and encloses the revolving frame, shaft assemblies, engine accessories and all levers, pedals, and linkage controls. It is constructed of sheet-steel welded panels and doors, has glass windows and is fastened to the floor of the revolving frame with capscrews.

136. Operator's Door and Access Panels

a. Removal. Remove operator's door and access panels by removing mounting hardware as shown in figure 77.

b. Cleaning and Inspection.

(1) Clean the doors and panels with an approved cleaning solvent.

(2) Inspect doors and panels for bends, breaks, broken glass and other damage.

(3) Repair as necessary and replace broken glass.

c. Installation. Install operators door and access panels by reversing procedure for removal (fig. 77).

137. Door and Window Glass

a. Removal.

(1) Insert a suitable tool (fig. 78) in the rubber channel seal strip at the seam and slide tool around the channel to break the seal.

(2) After seal has been broken, insert a suitable tool between the rubber channel and the glass and move it slowly around the rubber channel to break the seal.

(3) Press glass gently while breaking the seal and glass will slide out of the panel as soon as the seal is completely broken.

b. Cleaning, Inspection and Repair.

(1) Clean the edges of the window panel with an approved cleaning solvent.

(2) Inspect the rubber channel for weather cracks and other damage. Replace defective rubber channel.

(3) Inspect the panels for dents, bends, and other damage. Repair or replace as necessary.

(4) Replace all cracked or broken glass.

c. Installation.

(1) Start the rubber channel (fig. 78) along the side of the window opening.

(2) Fit the narrow edge of the rubber channel over the edge of the do or panel and continue the strip around the window opening and back to the starting point with a 1/2-inch overlap.

(3) Place the ends of the rubber channel together and press into place to obtain a tight, smooth joint.

(4) Start the door glass in one of the lower corners of the rubber channel. Use the straight end of a suitable tool to lift the channel, allowing the glass panel to slip into position.

(5) Insert a suitable tool in the rubber channel and force the locking strip into place.

Note

Do not begin the locking operation at the strip joint. Start around the corners to avoid buckling or crimping the rubber channel.

138. Operator's Seat

a. Removal and Disassembly. Remove and disassemble operator's seat in numerical sequence as shown in figure 79.

b. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved, cleaning solvent and dry thoroughly.

(2) Inspect the seat and backrest f or torn, bent or worn condition. Replace damaged seat or backrest.

(3) Inspect all other parts for breaks, bends, and or damage. Repair or replace as necessary.

c. Reassembly and Installation. Reassemble and install operator's seat in reverse order of numerical sequence shown in figure 79.

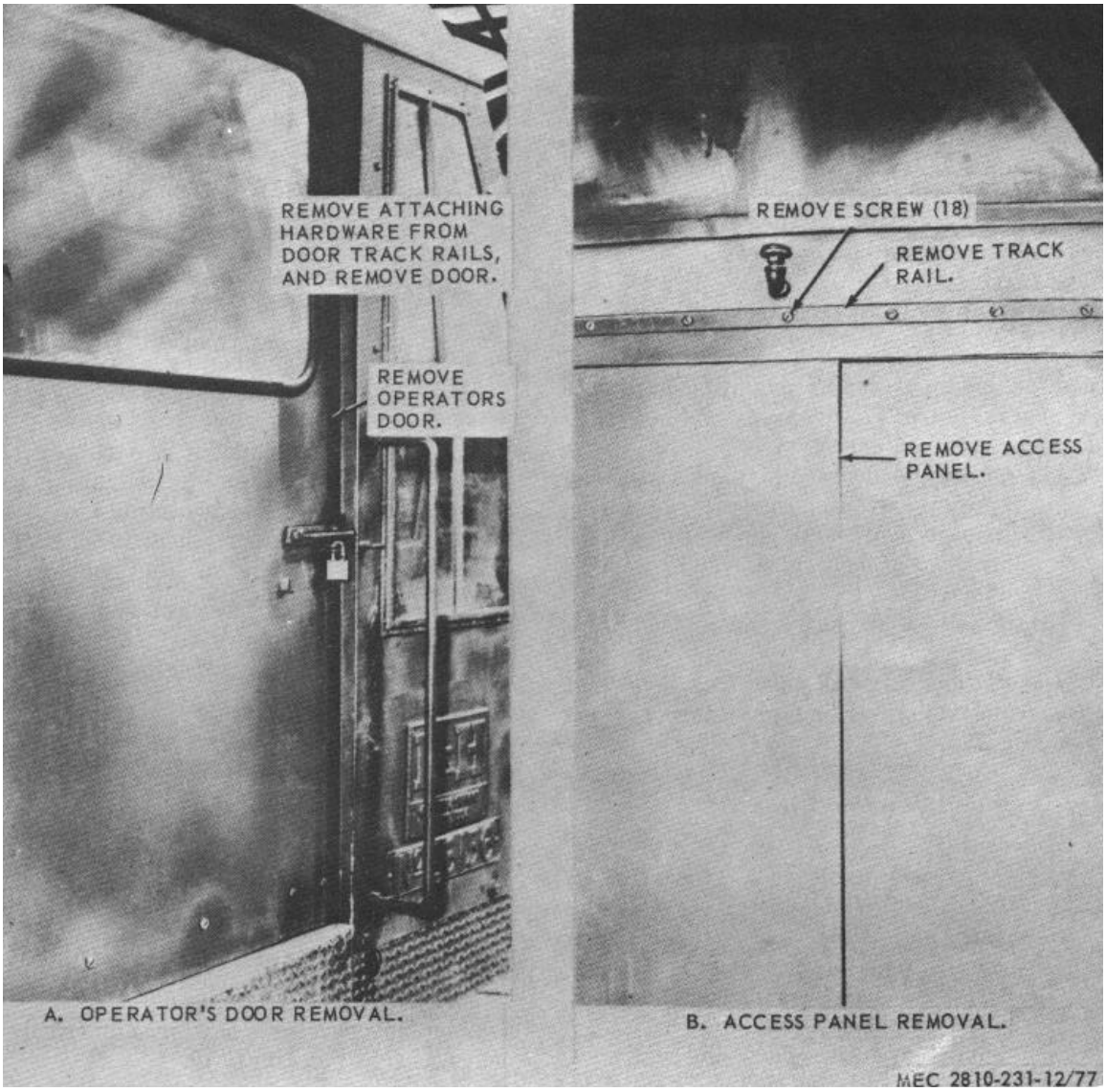

Figure 77. Crane cab assembly.

139. Windshield Wiper Arm and Blade

a. Inspection. Inspect the windshield arm and blade for cracks, bends, deterioration, or cuts. Replace a defective wiper arm or blade as necessary.

b. Removal and Installation. Remove and install the windshield wiper arm and blade as illustrated in figure 80.

140. Windshield Wiper Motor

a. Removal. Remove wiper motor as instructed on figure 80.

b. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect the windshield wiper motor for breaks, bends, or other damage. Repair or replace damaged hardware.

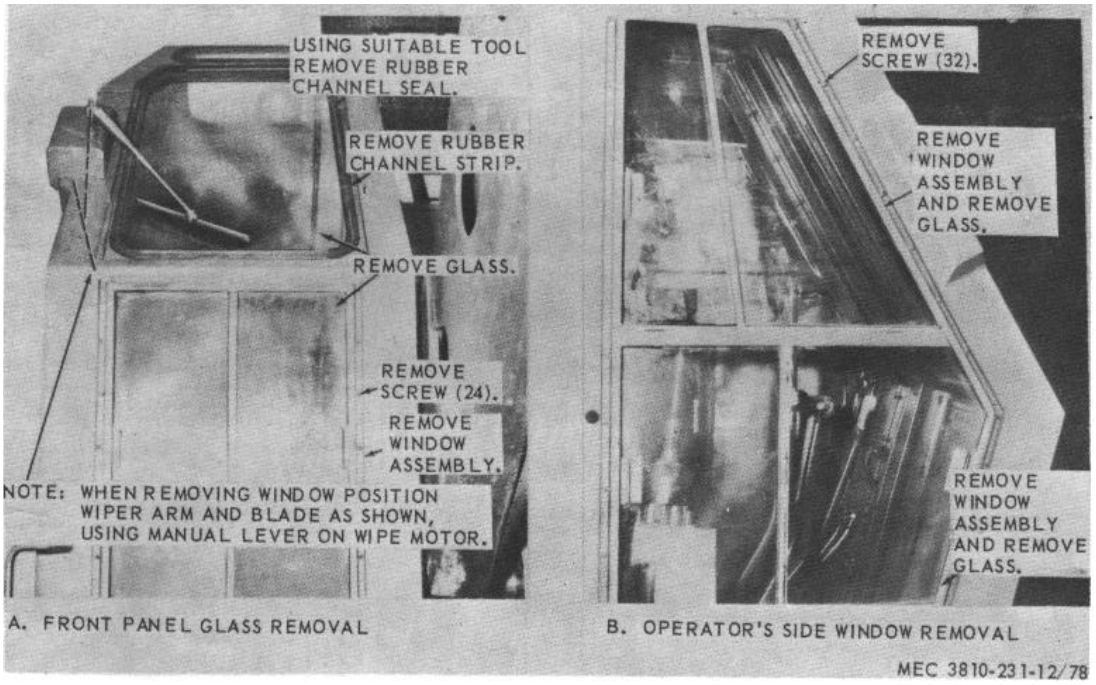

Figure 78. Door and window glass, replacement.

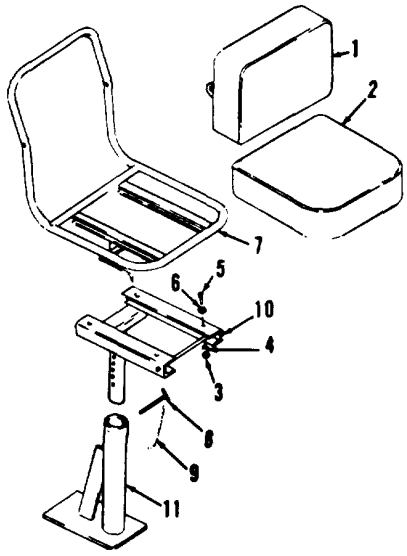

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Figure 79. Operator's seat assembly, disassembly and reassembly.

1	Back rest
2	Cushion
3	Hex nut (5/16" - 18 UNC)
4	Lockwasher (5/16")
5	Bolt, Mach. (5/16" -18 UNC x 1")
6	Flat washer (5/16")
7	Frame
8	Adjusting pin
9	Transom chain
10	Seat frame
11	Seat base

Figure 79. Continued.

(3) Inspect the motor for proper operation. Replace a defective motor.

c. Installation. Install wiper motor as instructed on figure 80.

141. Heater and Defroster

a. Removal. Remove the cab heater and defrosters as instructed on figure 81.

b. Cleaning and Inspection.

(1) Clean the heater, defrosters and mounting hardware with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks and other damage.

(3) Inspect for proper operation. Replace a defective heater.

(4) Replace a repair defroster ducts and mounting hardware as necessary.

c. Installation. Install the cab heater and defroster as illustrated on figure 81.

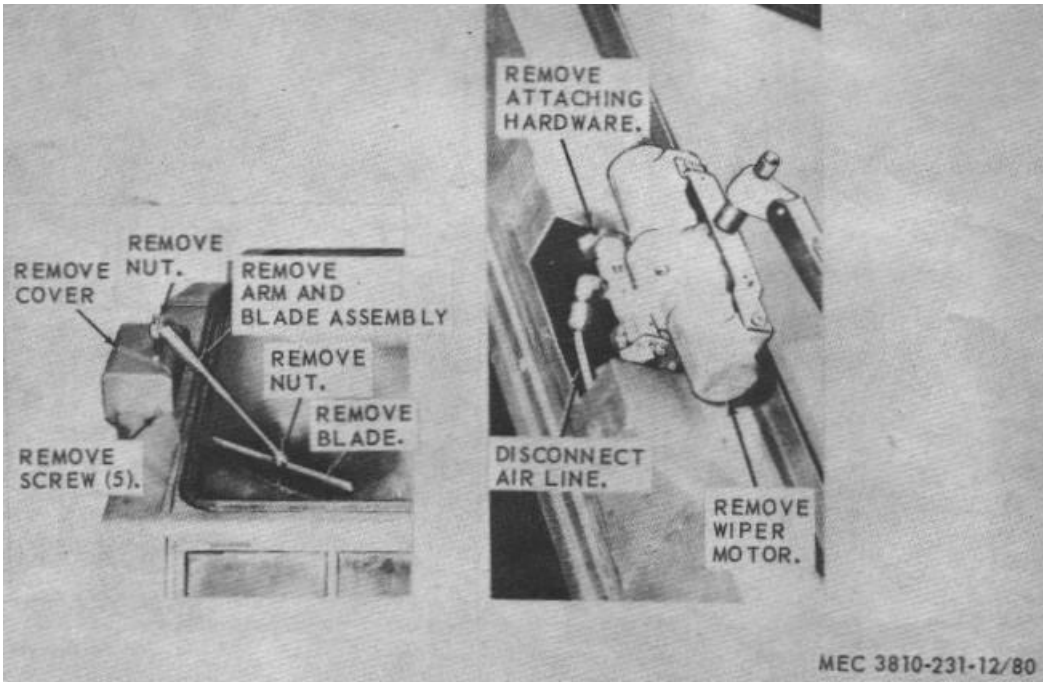


Figure 80. Windshield wiper motor, arm and blade, removal and installation.

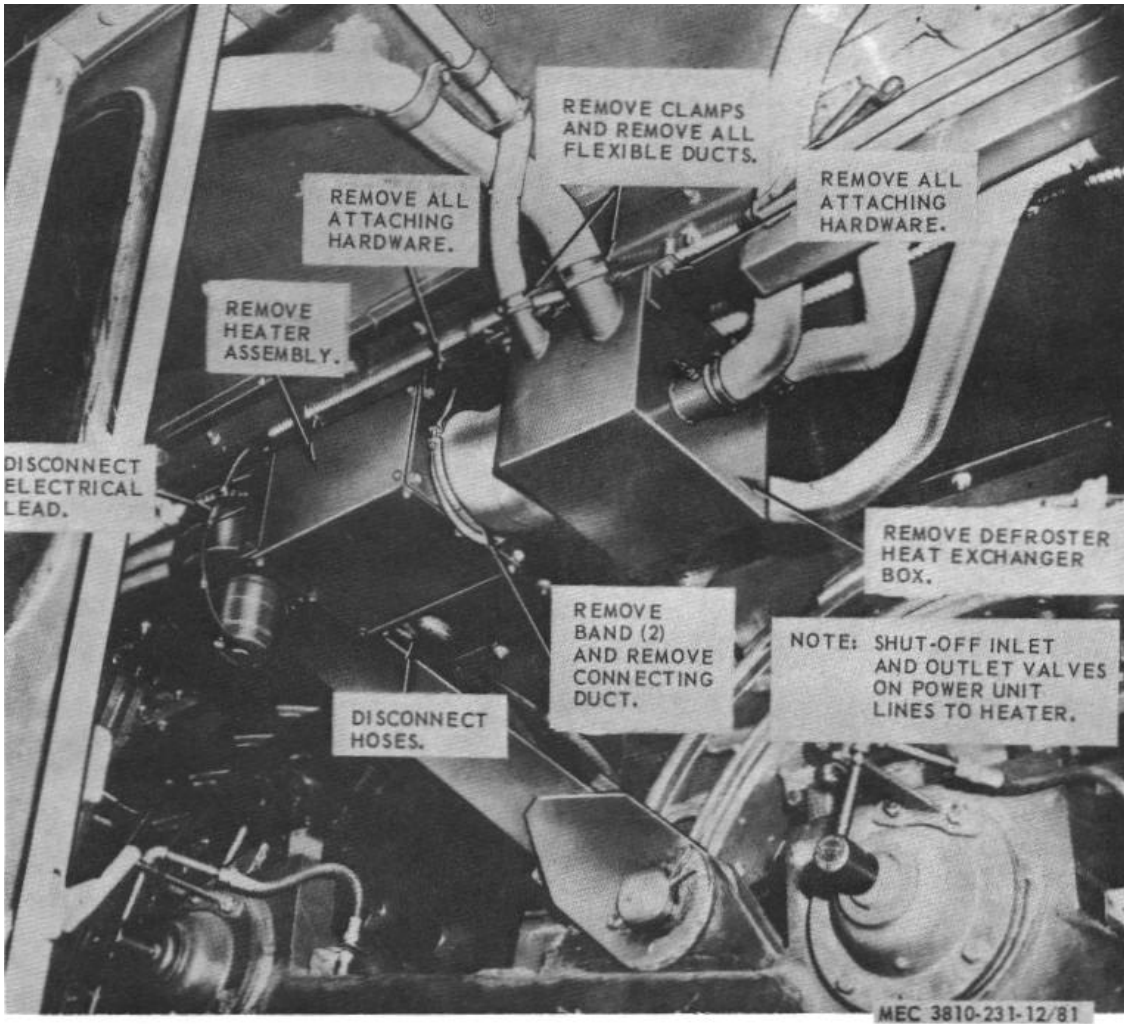


Figure 81. Heater and defroster, removal and in8tallation.

Section XXI. BOOM ASSEMBLY AND COMPONENTS

142. Boom Assembly and Backstop

a. General. The boom assembly consists of two sections. The lower base section is connected to the revolving frame. The upper point section carries the boom point sheave assembly. A 20 foot boom insert section is provided to be inserted between the base and point sections to extend the boom. All sections are of welded construction.

b. Removal.

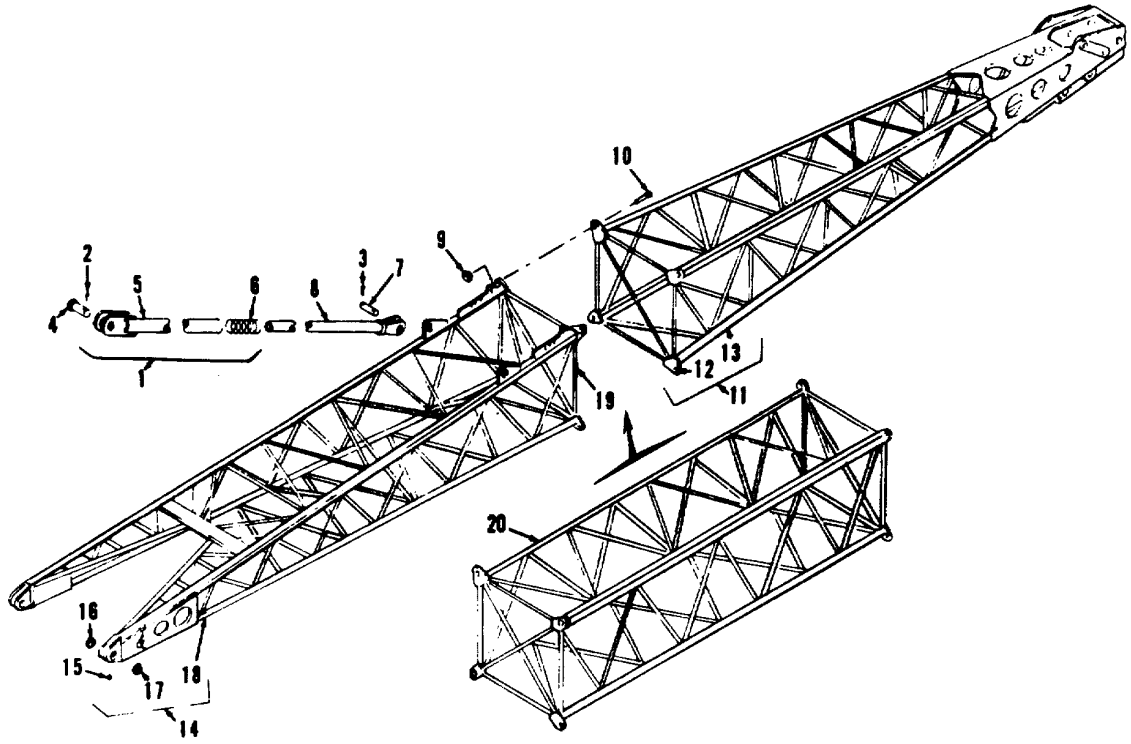
(1) Remove all reeving from the crane boom (fig. 23).

(2) Remove boom assembly from the revolving frame (para 42).

c. Disassembly. Refer to figure 82 and disassemble boom and components.

d. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.



1	Boom backstops	11	Boom upper section assembly
2	Cotter pin	12	Splice section
3	Cotter pin	13	Boom upper
4	Pin	14	Boom lower section assembly
5	Backstop female	15	Grease fitting
6	Compression spring	16	Bushing
7	Pin	17	Bushing
8	Backstop male	18	Boom lower
9	Nut	19	Splice section
10	Bolt	20	Boom center section

Figure 82. Boom assembly and components.

(2) Inspect crane boom and components for broken welds, bends, and other damage. Repair or. replace the defective or damaged parts as necessary.

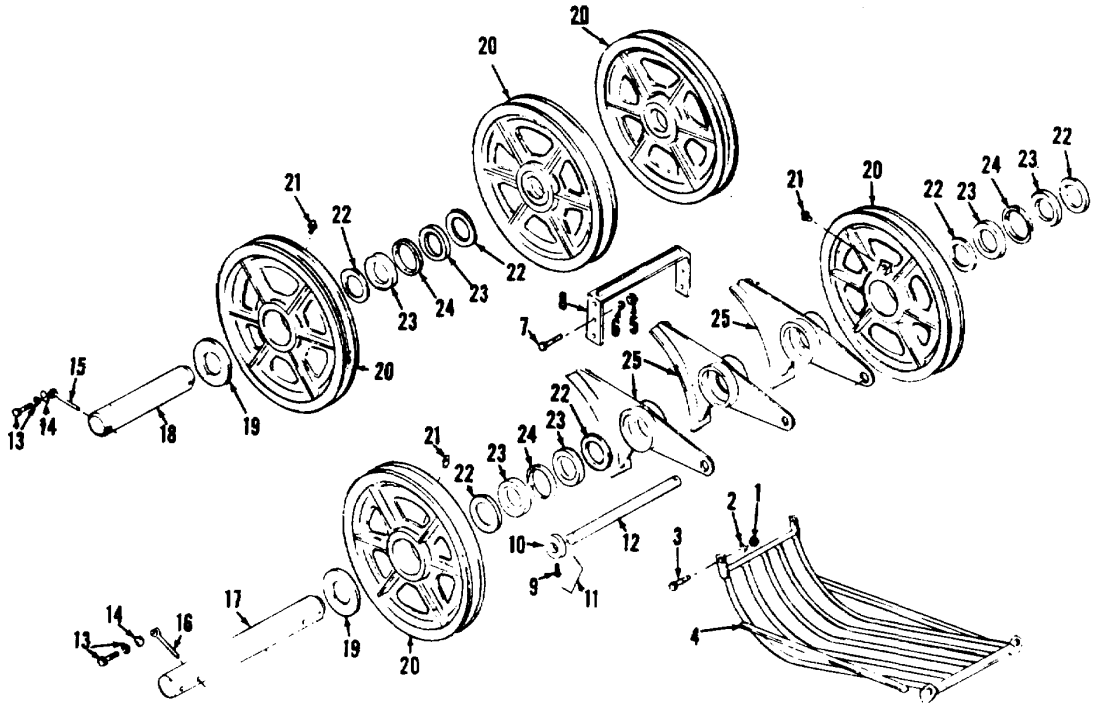
(3) Inspect boom point sheaves, pulleys and all other parts for breaks, excessive wear and other damage. Repair or replace all defective parts as necessary.

e. Reassembly. Refer to figure 82 and reassemble boom and components.

f. Installation.

(1) Install boom assembly to revolving frame (para 42).

(2) Install all reeving to crane boom (fig. 23).



1	Hex nut (¾" - 10 UNC)	13A	Lockwasher (¾")
2	Lockwasher (¾")	14	Plain washer (¾")
3	Capscrew (¾" - 10 UNC x 1¾")	15	Rod end
4	Rope guard	16	Rod end
5	Hex nut (5/8" - 11 UNC)	17	Pin
6	Lockwasher (5/8")	18	Pin
7	Capscrew (5/8" - 11 UNC x 1")	19	Washer
8	Rope guard	20	Sheave
9	Setscrew (½" x ¾")	21	Grease fitting
10	Collar	22	Bearing retainer
11	Set collar assembly	23	Bearing
12	Pin	24	Spacer
13	Capscrew (¾" - 10UNC x 2¼")	25	Rope guard & spacer

B - BOOM POINT SHEAVES

Figure 82. Continued.

143. Boom Jib Assembly

a. Removal.

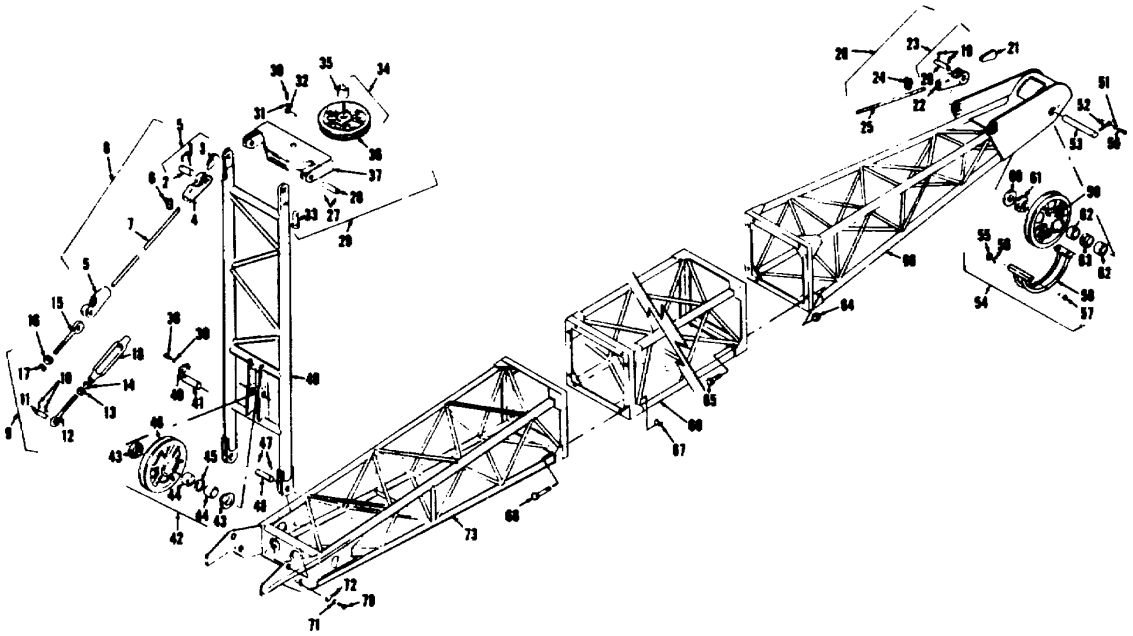
(1) Remove cable reeving (fig. 23).

(2) Remove boom jib assembly (para 42).

b. Disassembly. Refer to figure 83 and disassemble the boom jib assembly.

c. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.



1	Cotter pin	26	Jib guyline	51	Plain washer (½")
2	Pin	27	Cotter pin	52	Rod end
3	Wedge (¾")	28	Pin	53	Pin
4	Socket (¾")	29	Jib suspension equalizer stay	54	Jib point assembly
5	Rope socket	30	Capscrew (½"-13 UNC x 1")	55	Hex nut (½"-13 INC)
6	Rope clamp	31	Lockwasher (½")	56	Lockwasher (½")
7	¾" dia. cable	32	Rod end	57	Capscrew (½"-13 UNC x 1½")
8	Jib backstay guyline	33	Pin	58	Sheave guard
9	Turnbuckle assembly	34	Sheave	59	Sheave assembly
10	Cotter pin	35	Bushing	60	Washer
11	Pin	36	Sheave	61	Bearing retainer
12	Clevis	37	Jib suspension equalizer frame	62	Bearing
13	Hex nut (1½"-6 UNC)	38	Capscrew (5/8"-11 UNC x 1")	63	Spacer
14	Lockwasher (1½")	39	Lockwasher (5/8")	64	Special nut (7/8")
15	Rod end	40	Keeper plate	65	Special bolt (7/8")
16	Hex nut (1½"-6 UNC) L. H.	41	Pin	66	Jib upper section
17	Lockwasher (1½")	42	Jib sturt sheave ay.	67	Special nut (7/8")
18	Turnbuckle	43	Bearing retainer	68	Special bolt "7/8")
19	Cotter pin	44	Bearing	69	Jib insert
20	Pin	45	Spacer	70	Capscrew (½"-13 UNC x 1½")
21	Wedge (¾")	46	Sheave	71	Plain washer (½")
22	Socket (¾")	47	Cotter pin	72	Rod end
23	Rope socket	48	Pin	73	Jib base section
24	Rope clamp	49	Jib sturt		
25	¾" dia. cable	50	Capscrew (½"-13 UNC x 1½")		

Figure 83. Boom jib and components, disassembly and reassembly.

(2) Inspect jib boom and all parts for broken welds, cracks, bends, or other damage.

(3) Repair or replace damaged or defective parts as necessary.

d. Reassembly. Refer to figure 83 and reassemble the boom jib assembly.

e. Installation.

(1) Install boom jib assembly (para 42).

(2) Install cable reeving (fig. 23).

144. Hook Block Assembly

a. Removal and Disassembly. Refer to figure 84 and remove and disassemble hook block.

b. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for cracks, breaks, or other damage. Repair or replace damaged or defective parts as necessary.

c. Reassembly and Installation. Refer to figure 84 and reassemble and install hook block.

145. Boom Equalizer and Spreader Assembly

a. Removal and Disassembly.

(1) Remove cable reeving (fig. 23).

(2) Refer to figure 85 and remove and disassemble equalizer and spreader assembly.

b. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for cracks, breaks and other damage. Inspect bushings and bearings for excessive wear or other damage. Repair or replace damaged or defective parts as necessary.

c. Reassembly and Installation.

(1) Refer to figure 85 and reassemble and install equalizer and spreader assemblies.

(2) Install cable reeving (fig. 23).

146. Gantry Spreader Assembly and Gantry Sheaves

a. Removal and Disassembly.

(1) Remove cable reeving (fig. 23).

(2) Refer to figure 86 and remove and disassemble gantry spreader assembly and gantry sheaves.

b. Cleaning, Inspection and Repair.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

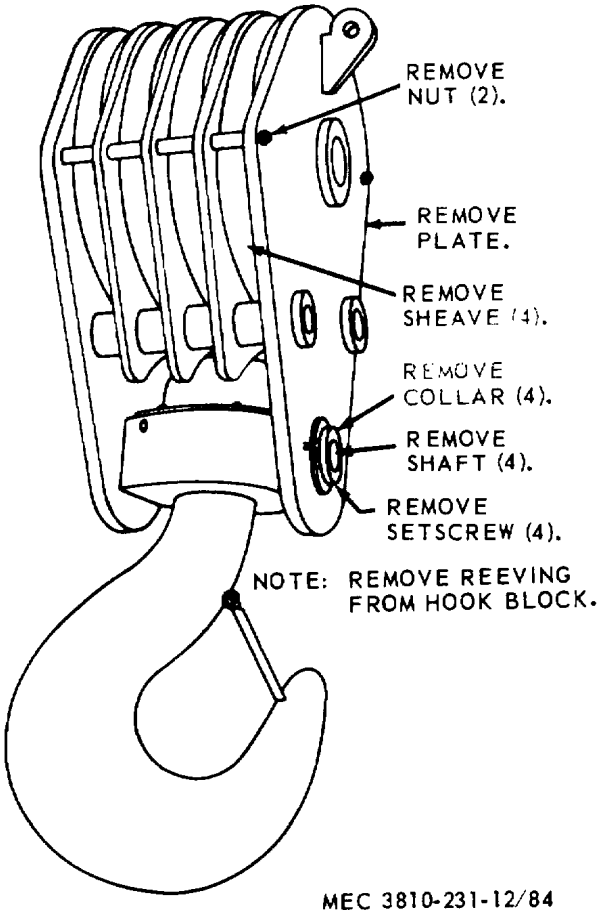


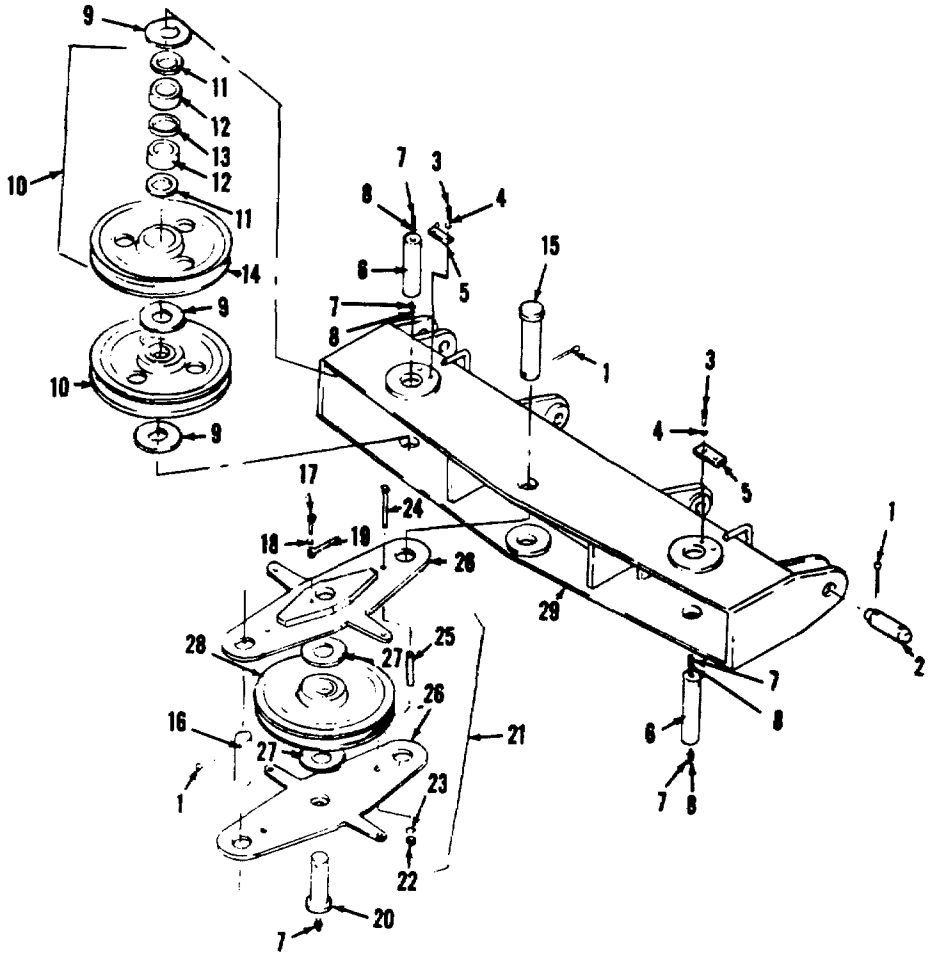
Figure 84. Hook block assembly, removal, disassembly, reassembly and installation.

(2) Inspect all parts for cracks, breaks and other damage. Inspect bushings and bearings for excessive wear or other damage. Repair or replace damaged or defective parts as necessary.

c. Reassembly and Installation.

(1) Refer to figure 86 and reassemble and install gantry spreader assembly and gantry sheaves.

(2) Install cable reeving (fig. 23).



1	Cotter pin	11	Retaining ring	21	Equalizer frame assembly
2	Pin	12	Bearing	22	Nut
3	Capscrew	13	Spacer	23	Lockwasher
4	Lockwasher	14	Sheave	24	Capscrew
5	Keeper plate	15	Pin	25	Spacer
6	Pin	16	Pin	26	Equalizer frame
7	Grease fitting	17	Capscrew	27	Thrust washer
8	Bushing	18	Lockwasher	28	Sheave assembly
9	Thrust washer	19	Rod end	29	Upper spreader frame
10	Sheave assembly	20	Pin		

Figure 85. Boom equalizer and spreader assembly, exploded view.

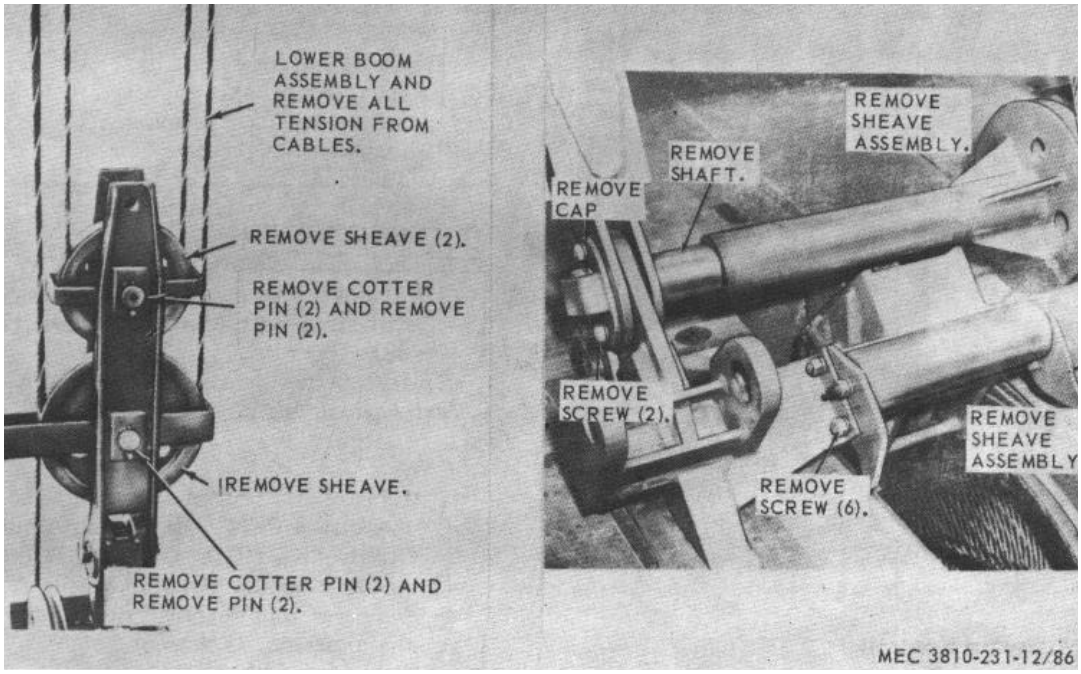


Figure 86. Gantry spreader assembly and gantry sheaves.

Section XXII. CRANE ELECTRICAL CONTROL SYSTEM

147. General

The crane electrical control system consists of a controller, control cabinet, alternator and the magnetic clutches (par. 116). These components function together to permit the operator to swing the machine to left or right.

148. Crane Alternator

a. Removal. Remove the alternator as instructed on figure 87.

b. Cleaning and Inspection.

(1) Clean the exterior with a cloth dampened with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks and other damage.

(3) Replace a defective or damaged alternator.

c. Installation.

(1) Install alternator assembly as instructed on figure 87.

(2) Adjust V-belt drive tension (para 39).

d. Test.

(1) Disconnect leads at the alternator field terminals and attach ohmmeter. Reading should be approximately 23 to 25 ohms.

(2) If reading is not up to required valve check alternator brushes for general condition and proper contact. If trouble persists replace the alternator.

e. Brush Replacement. Replace alternator brushes in same manner as engine alternator brushes (par. 85).

Figure 87. Crane alternator, removal and installation.

149. Swing Controller

a. Inspection and Adjustment.

(1) Remove the cover from the controller and visually inspect main contacts (fig. 88) and graphite brush.

(2) The main contacts will show pitting on one face and build up on the mating face. Both the arc on interruption and the contact erosion are normal.

Caution

Do not file or dress the main contracts because of build up of material.

(3) The contact material is approximately 1/8 inch thick and only when pitting is well into the backing is it necessary to replace the main contacts.

(4) The graphite brush will leave a track of graphite on the circuit board. To clean, use a lint-free rag dampened with an approved cleaning solvent and remove the carbon deposits.

(5) The graphite brush must be replaced when worn to 1/2 inch in length.

b. Removal. Remove the controller as instructed on figure 89.

c. Cleaning and Inspection.

(1) Clean exterior with a cloth dampened with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, breaks, and other damage, refer to par. *a* above. Repair or replace a defective controller.

d. Brush Replacement.

(1) Remove wax seal and screw type cap from rear of brush holder (fig. 88).

(2) Install new brush and replace cap.

e. Installation. Install the controller as instructed on figure 89.

f. Testing.

(1) Control in neutral position should measure 4 to 14 volts across terminal "C" to "N" (Refer to figure 66), depending upon alternator speed. This indicates that the residual voltage of the alternator is present.

(2) Controller full-on (main engine clutch disengaged) measure full-on voltage from terminal "C" to terminal "N". If "C" to "N" voltage at full-on controller, and engine at high idle is 7080, this indicates that the rectifier and the wiring between alternator and rectifier are all right.

(3) Controller full-on (main engine clutch disengaged) measure the ac voltage at alternator output terminals G-G2, G2-G3-G31. This voltage will be slightly less than the "C" to "N" voltage. These should be nearly equal, indicating that the alternator and main rectifier are functioning properly. The above checks will be of assistance in localizing the trouble.

150. Control Cabinet

a. General. The control cabinet (fig. 90) has a circuit breaker that protects the system against overload. Remove cover to reset circuit breaker. The replaceable plug-in voltage regulator unit can be checked by removing leads from terminal (A, fig. 66) on voltage regulator chassis.

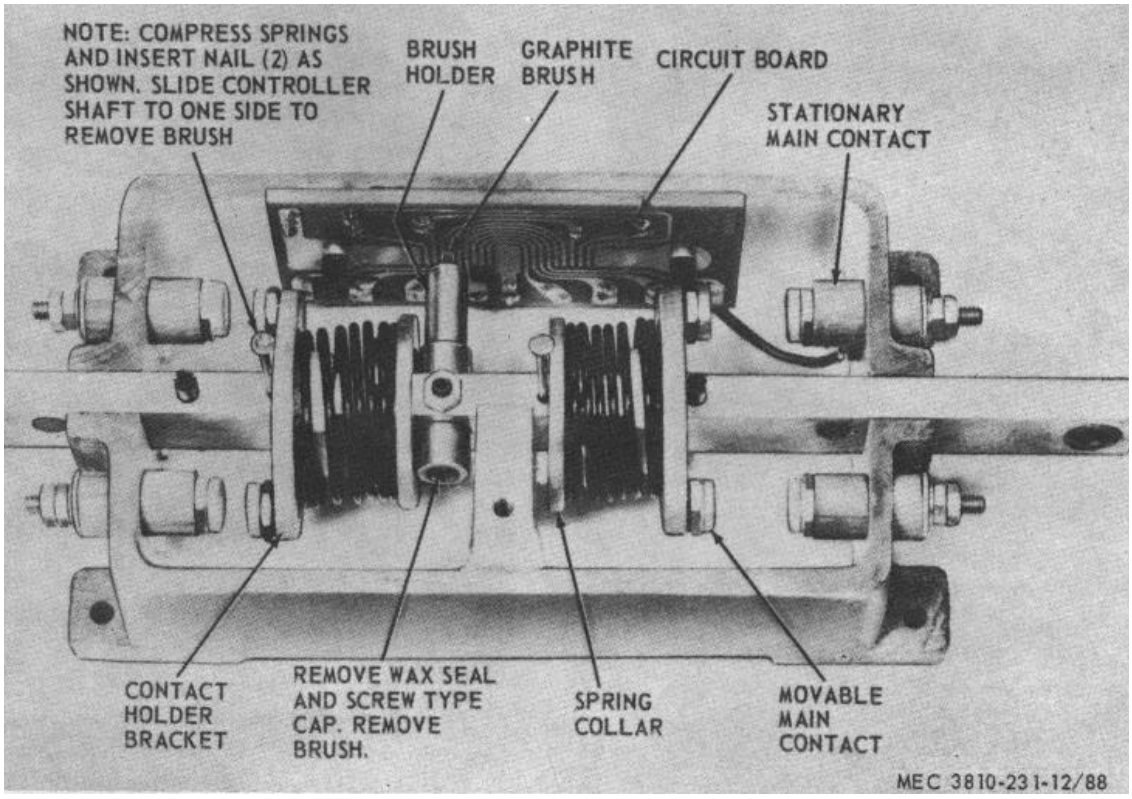


Figure 88. Swing controller assembly shown with cover removed.

Measure ohms from terminal A to B with an ohmmeter. The reading should register 40 ohms. If not, replace plug-in voltage regulator unit.

b. Removal. Remove the control cabinet assembly as instructed in figure 90.

c. Cleaning and Inspection.

(1) Clean the exterior with a cloth dampened with an approved cleaning solvent.

(2) Inspect for cracks, breaks, or other damage. Repair or replace a defective control cabinet.

d. Installation. Install the control cabinet as instructed on figure 90.

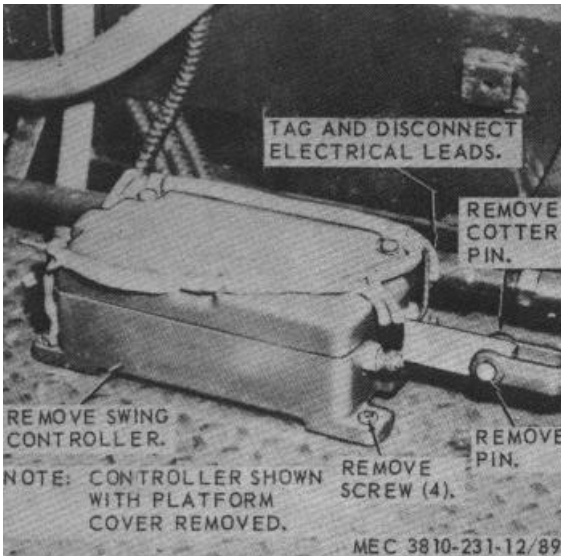


Figure 89. Swing controller, removal and installation.

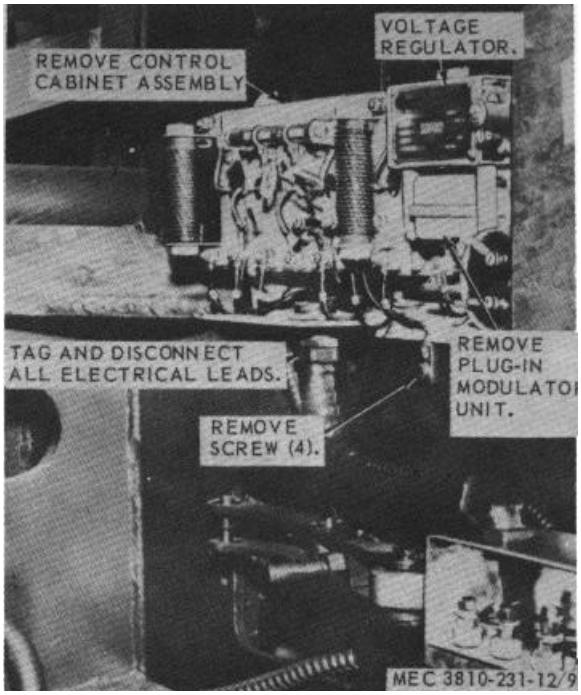


Figure 90. Control cabinet assembly, shown with cover removed.

CHAPTER 4.

WINTERIZATION EQUIPMENT

Section I. OPERATING INSTRUCTIONS

151. General

a. The winterization equipment installed on Harnischfeger Model 1125 Crane is designed to permit operation at low ambient temperatures, by directing heated air to cab and components, and circulation of heated engine coolant thru engine lubrication oil by means of a special coil inserted in oil pan.

b. Heated air for cab and components i s supplied by two fuel fired fresh air heaters, (each rated at 60,000 Btu (British thermal units), and all necessary ductwork for distribution.

c. Heat for engine coolant and lubricating oil is furnished by a 60,000 BTU fuel fired coolant heater, circulating pump, fittings, hose, and lines necessary to circulate the engine coolant liquid.

152. Cab and Component Heaters

a. The two cab and component heaters are installed on right hand side of crane upper section (fig. 91). Heater installed near center of cab right side is used primarily for cab heating and defrosting. Heater installed at rear of cab right side provides heat for propel clutch, engine clutch housing, torque converter, and battery box.

b. Before starting heaters, check heater fuel pumps (para 158) and assure that fuel line valves are open.

(1) Depress lens of indicator lamp (fig. 92) to test for power availability. If lamp fails to light when depressed, operate reset switch and repeat the test. Replace a burned out l a m p (para 160).

(2) Move control switch to either ON position. When ON-LO is u s e d, heat output is considerably less than at ON-HI position.

(3) Preheating of combustion chamber lasts for approximately one minute before ignition cycle begins. Approximately one minute after ignition, the indicator lamp will glow an d heater will operate.

c. Battery box heating is a controlled procedure as outlined below.

(1) When engine is stopped and batteries are to be preheated, No. 1 thermostat in battery box must be bypassed. This is necessary because heating system was designed to raise electrolyte temperature 50° F. in one hour, and keep battery temperature between 40° F. and 1000 F. during engine operation. To accomplish this requires that battery box be exposed to heated air for periods up to one hour. Without bypassing No. 1 thermostat (which is set at 60° F. to 80° F.) exposure for one hour would interrupt the preheat cycle.

(2) To bypass No. 1 thermostat, an oil pressure switch is provided. This switch is ON when engine is stopped, and disconnects No. 1 thermostat from circuit. When engine is started, the oil pressure switch breaks circuit, throwing No. 2 thermostat out, and No. 1 thermostat controls the heater.

(3) With engine stopped, and preheating cycle on too long, No. 2 thermostat (set at 250° F.), will shut

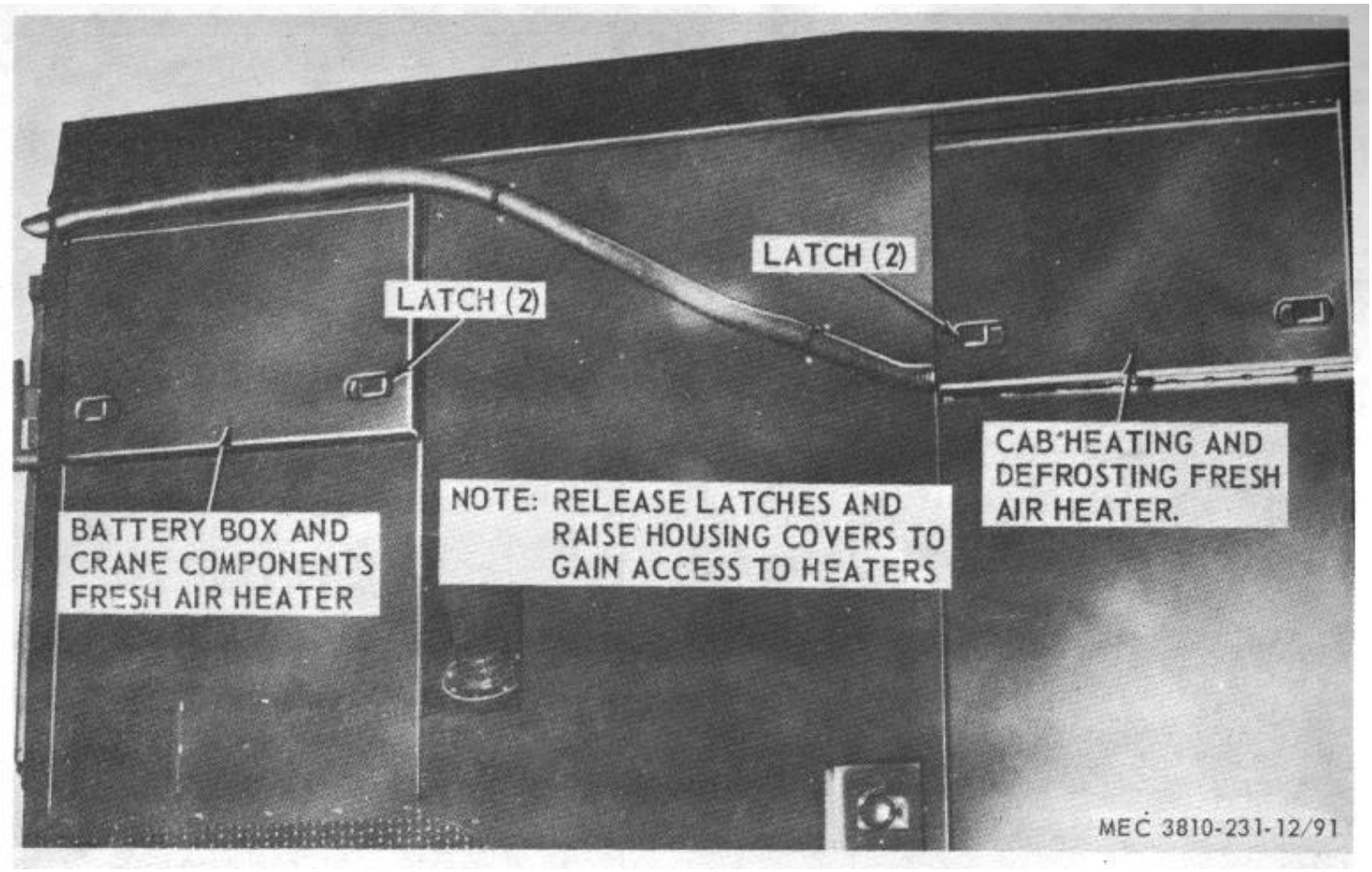


Figure 91. Cab or component fresh air heaters

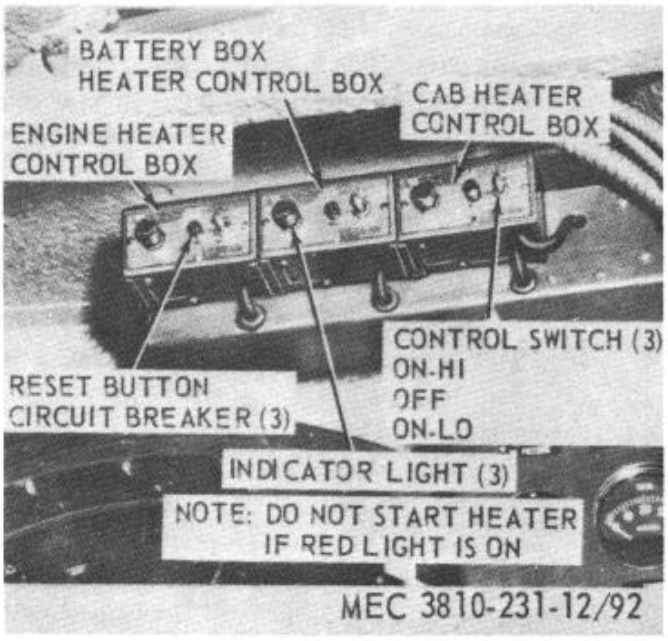


Figure 92. Heater control panel.

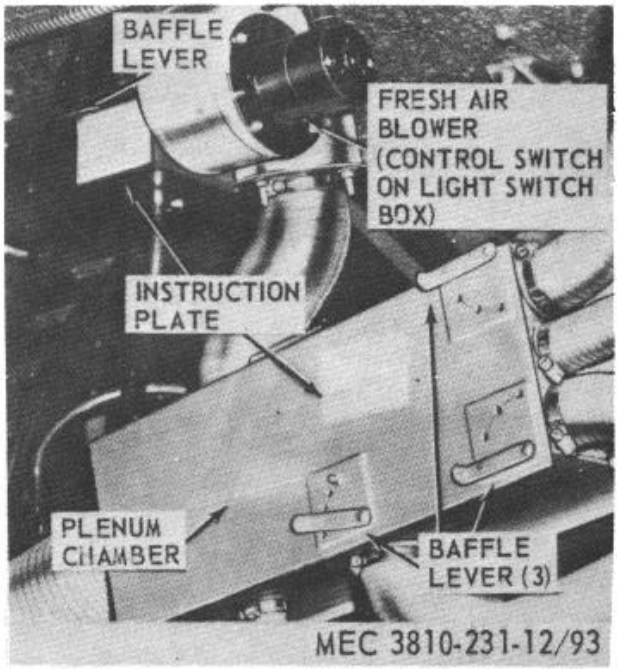


Figure 93. Plenum chamber and fresh air blower.

off heater before damaging temperature is reached.

Caution

Do not turn off oil pressure switch manually. If this precaution is not observed, switch will not continue to operate automatically.

b. Cab heating and defrosting functions are accomplished by manipulation of baffle levers on large plenum chamber (fig. 93).

Caution

Before starting defrost operation at low ambient temperature, open lower baffle of plenum chamber (control for foot warmer) and heat cab for approximately 15 minutes. This precaution must be observed to prevent glass breakage, which could occur when directing hot air at extremely cold glass.

(1) Direct heated air to cab ducts by use of baffle levers on plenum chamber as directed by instruction plate. Begin defrost function after cab has become noticably warmer.

(2) A blower is provided to produce an increase in volume of air sent through system. An automatic control will operate blower in accordance with preset temperatures. The blower switch is located on light switch box. Movement of baffle lever behind blower (fig. 93) will select warmed inside air, or introduce fresh out side air to the system. Choose position indicated on instruction plate.

153. Engine Coolant Heater

a. The engine coolant heater is located in a housing on left side of crane upper section (fig. 94). This heater maintains proper operating temperature of engine coolant and lubricating oil in engine oil pan. A pump circulates a continuous flow of heated coolant throughout system, including a tubular coil inserted in engine oil pan.

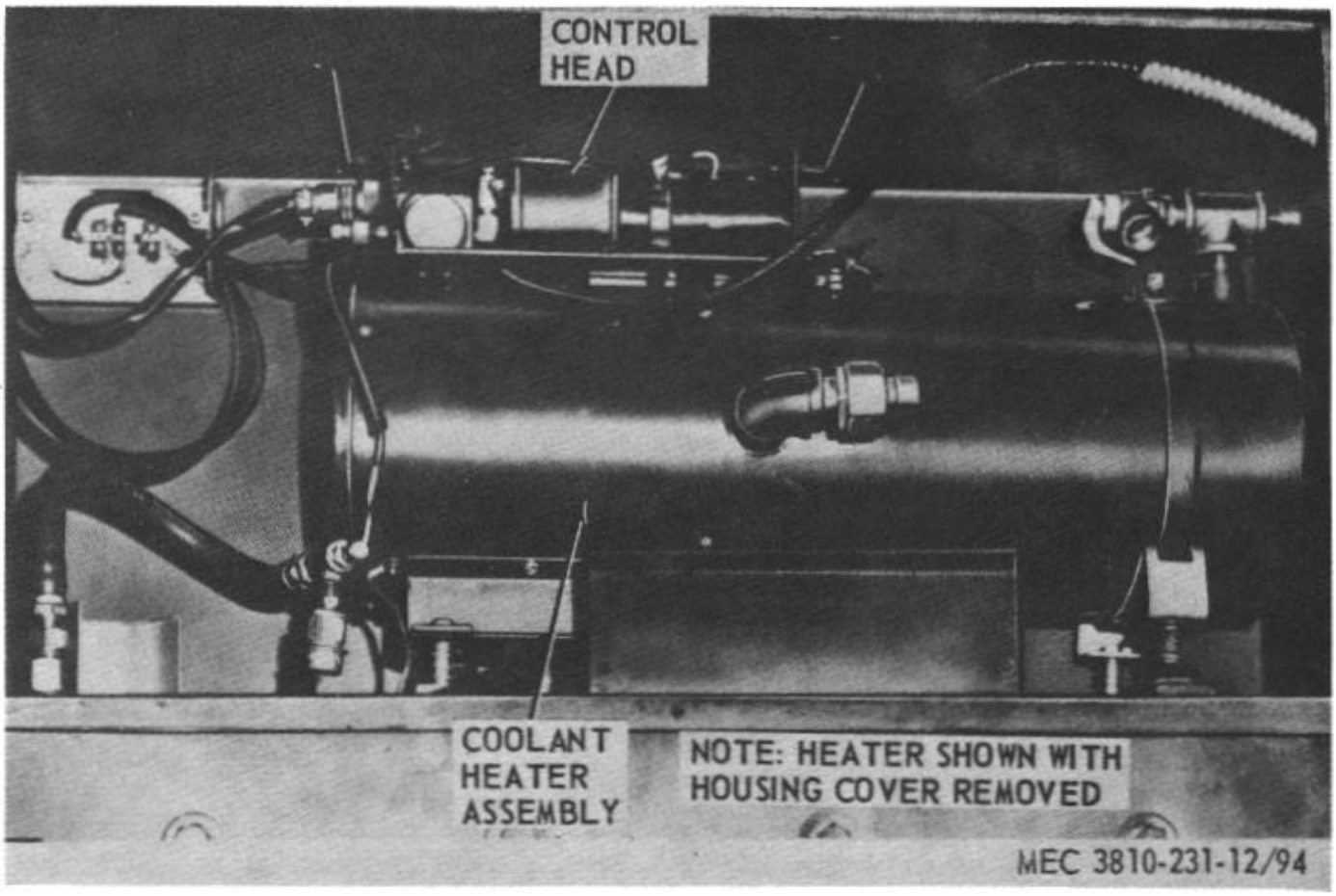


Figure 94. Engine coolant heater.

b. Before starting heater, refer to paragraph 158 and assure that fuel line valve is open.

c. Start engine coolant heater in similar manner as fresh air heaters (para 152). Operation of heater is automatically controlled by a thermostat with a range from 170° F. to 185° F. The coolant pump begins circulation when light on heater control glows. This glow indicates full operation of coolant heater.

154. Radiator Winter Front Shutter

a. The radiator winter front shutter is designed to control flow of air through crane engine radiator by positioning of shutters.

b. The shutter control lever is mounted on winter front, and has three operating positions: open, half open, and closed.

c. Refer to figure 95 for operating instructions of winter front.

155. Heater Control boxes

The three heater control boxes are identical in operation, and have three controls described below.

a. *Indicator Light.* The indicator light (fig. 92) has two functions. By depressing lens, operator may determine power availability (para 152b(1)). Indicator light glows constantly when heater is operating in either LO or HI, and will continue to glow f or approximately two minutes after heater i s turned OFF (while cooling).

Caution

Never attempt restart of heater while light is glowing. Wait until light goes out, and avoid fire hazard.

b. *Circuit Breaker Reset Button.* The circuit breaker (fig. 92) is a safety device installed in system to remove fire hazard of current overloads. To reset after tripping, press in on rest button.

Caution

Pulling out on circuit breaker button breaks all electrical circuits to heater. Do not stop heater operation with circuit breaker, for this will prevent heater from purging itself of fuel at end of operating cycle.

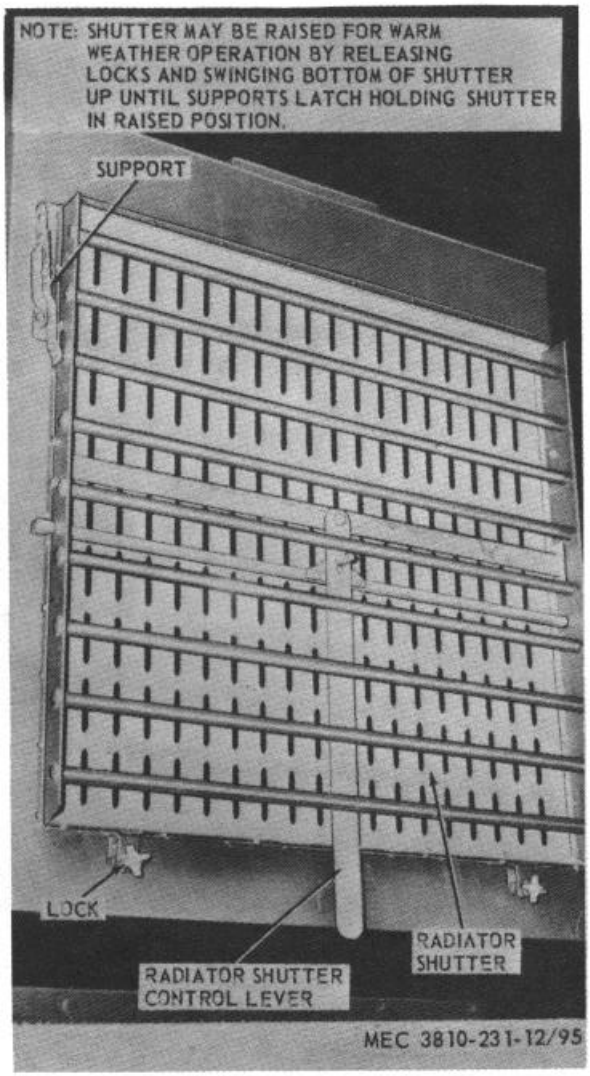


Figure 95. Radiator winter front .

c. *Control Switch*. The control switch (fig. 92) is a three-position toggle switch with ON-HI (up), OFF (center), and ON-LO (down) used to select required heater range.

156. Baffle Levers of Plenum Chambers

Each plenum chamber has a series of baffle levers to control amount and direction of heat to various connecting ducts. Instructions for movement of these baffle levers is provided by an instruction plate mounted on each plenum chamber. A typical chamber is illustrated in figure 93.

157. Lagging Seals

Lagging seals to prevent entry of snow into drum brake and clutch housings are provided. These seals are made of strips of belting riveted to a steel plate which in turn is mounted to cab frame.

Caution

Do not operate cable drums in normal ambient temperatures without opening lagging seals. Failure to observe this precaution will cause drum brakes to overheat and ruin seals.

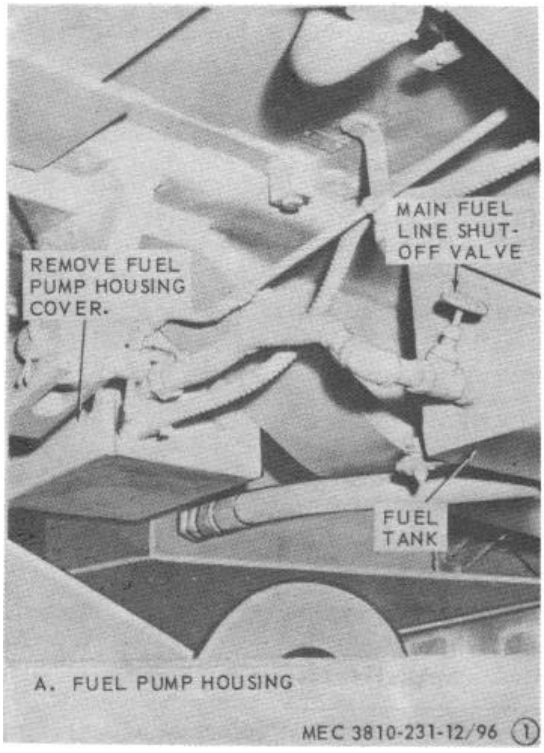
Section II. OPERATOR'S SERVICE

158. Heater Fuel Pumps, Filters, and Shut-off Valves

The fuel pumps, filters, and shut-off valves for all heaters are identical, and are located in fuel pump housing just in front of fuel tanks underneath crane deck (fig. 96A). Before starting heaters, operator must be sure that main shut-off valve and individual heater shut-off valves are open.

159. Heater Fuel Pump Service

a. Screen. Refer to figure 97 for service to fuel pump screen.



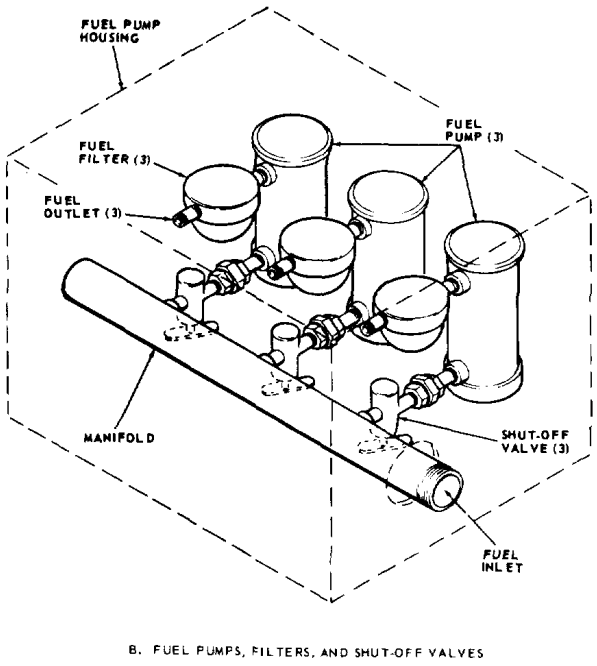
A-Fuel pump housing

Figure 96. Fuel pump housing, pumps, filters and shut-off valves.

b. Filter. Remove ceramic filter element from filter body as directed on figure 97. Clean with an approved cleaning solvent and air dry with low pressure compressed air, or wipe dry with a lint-free cloth. Handle element carefully to avoid breakage.

160. Indicator Light

Service to indicator light consists of lamp replacement. Remove lens, remove and replace unserviceable lamp, then replace lens.

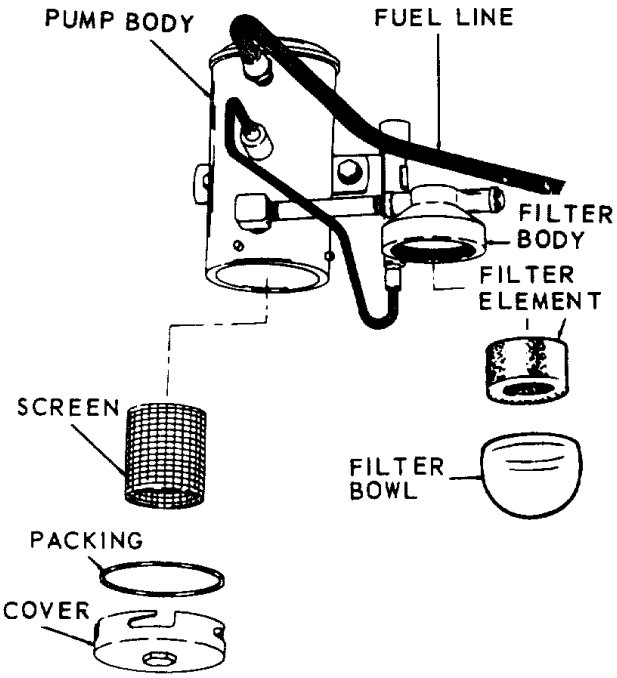


B-Fuel pumps, filters, and shutoff valves

Figure 96 - Continued.

NOTE: ALL HEATER FUEL PUMPS ARE SERVICED IN SIMILAR MANNER.

STEP 1. CLOSE SHUT-OFF VALVES (FIG. 96).
STEP 2. REMOVE COVER, PACKING AND SCREEN.
STEP 3. CLEAN BODY, COVER, SCREEN AND PACKING IN AN APPROVED CLEANING SOLVENT AND WIPE DRY WITH LINT-FREE CLOTH.
STEP 4. REPLACE SCREEN BY REVERSING STEP 2 ABOVE.



STEP 5. REMOVE BOWL AND FILTER ELEMENT.
STEP 6. CLEAN BODY, ELEMENT, AND BOWL IN AN APPROVED CLEANING SOLVENT AND WIPE DRY WITH LINT-FREE CLOTH.
STEP 7. REPLACE FILTER ELEMENT BY REVERSING STEP 5 ABOVE.
STEP 8. OPEN ALL SHUT-OFF VALVES (FIG. 96).

MEC 3810-231-12/97

Figure 97. Heater fuel pump screen and filter service.

Section III. ORGANIZATIONAL MAINTENANCE

161. General

This section describes, locates, illustrates, and furnishes organizational maintenance personnel with sufficient information to perform authorized maintenance on winterization equipment installed on Harnischfeger Model 1125, Crawler Mounted 60 Ton Crane.

162. Heater Fuel Pumps

a. *Removal*. Refer to figure 96B and remove heater fuel pumps.

b. *Cleaning and Inspection*.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect all mounting hardware for distortion, worn threads, or other damage. Replace all damage mounting hardware.

(3) Inspect fuel pumps for cracks, leaks, or other damage. Replace defective fuel pumps.

c. *Installation*. Refer to figure 96B and install heater fuel pumps on crane.

163. Fuel Filters

a. *Removal*. Refer to figure 96 and remove fuel filters.

b. *Cleaning and Inspection*.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for distortion, excessive wear, or other damage. Replace all damaged or defective parts.

c. *Installation*. Refer to figure 96 and install fuel filters.

164. Engine Coolant Heater

a. *Removal*. Refer to figure 98 and remove engine coolant heater.

b. *Cleaning and Inspection.*

(1) Clean heater and mounting hardware with an approved cleaning solvent and dry thoroughly.

(2) Inspect heater and mounting hardware for distortion, cracks, breaks, or other damage. Replace all damaged or defective parts.

c. *Installation*. Refer to figure 98 and install engine coolant heater on crane.

165. Engine Coolant Heater Pump

a. *Removal*. Refer to figure 99 and remove engine coolant heater pump.

b. *Cleaning and Inspection*.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly

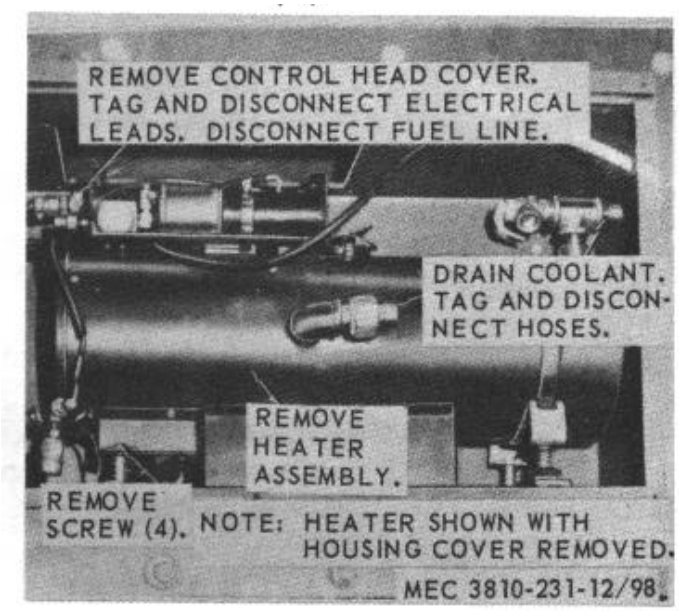


Figure 98. Engine coolant heater, removal and installation.

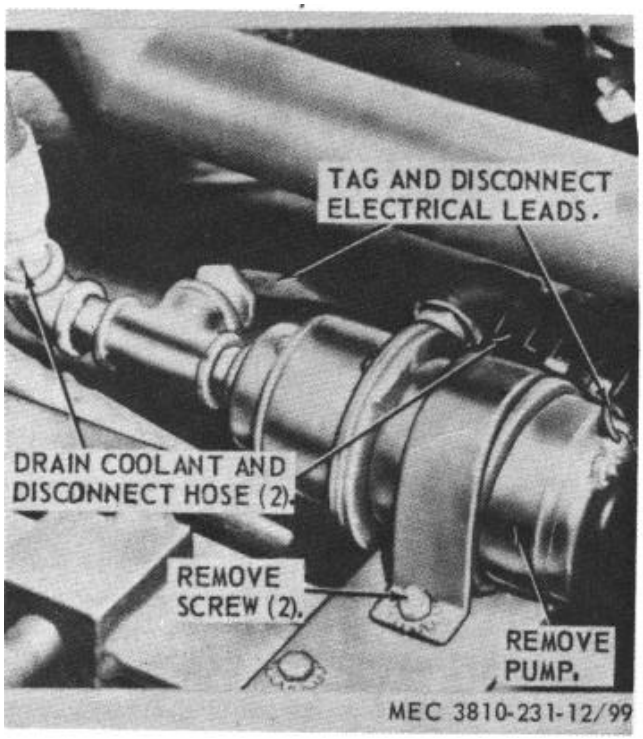


Figure 99. Engine coolant heater pump, removal and installation.

(2) Inspect heater pump and mounting hardware for distortion, wear, or other damage. Replace all damaged or defective parts.

c. *Installation*. Refer to figure 99 and install engine coolant heater pump.

166. Engine Coolant Heater Lines, Hoses, and Fittings

a. *Removal*. Refer to figures 98 and 99 and remove all coolant lines, fittings, and hoses, of engine coolant heater system.

b. *Cleaning and Inspection*.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for d a m a g e d threads, distortion, signs of leakage, wear, or other damage. Replace all damaged or defective parts.

c. *Installation*. Refer to figure 98 and 99 and install coolant lines, fittings, and hoses of engine coolant heater system.

167. Cab or Component Fresh Air Heater

a. *Removal*. Refer to figure 100 and remove cab or component fresh air heater.

b. *Cleaning and Inspection*.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for distortion, wear, or other damage. Replace a defective heater or mounting hardware.

c. *Installation*. Refer to figure 100 and install cab or component fresh air heater.

168. Heater Fuel Lines, Fittings, and Valves

a. *Removal*. Refer to figure 101 and remove heater fuel lines, fittings, and valves.

b. *Cleaning and Inspection*.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for distortion, damaged threads, cracks, leaks, or other damage. Replace a damaged or defective part.

c. *Installation*. Refer to figure 101 and install heater fuel lines, fittings, and valves.

169. Radiator Winter Front Shutters

a. *Removal*. Refer to figure 102 and remove radiator window front shutters.

b. *Cleaning, Inspection, and Repair*.

(1) Clean all parts in an approved cleaning solvent and dry thoroughly.

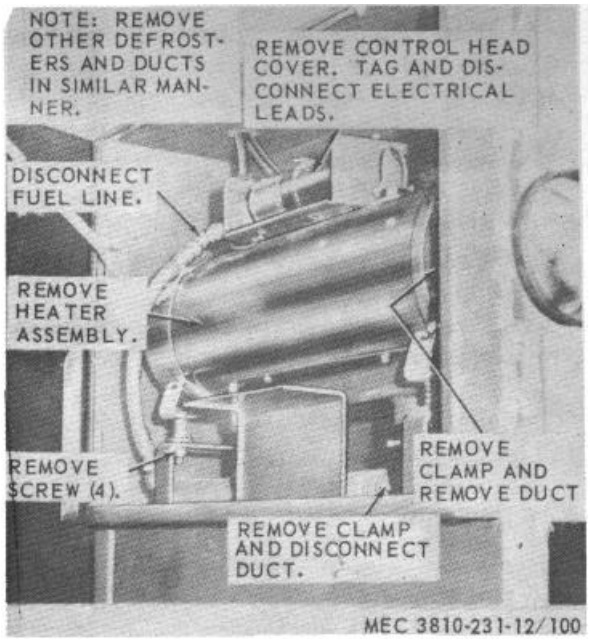


Figure 100. Cab or component fresh air heater, removal and installation.

(2) Inspect shutters for distortion, breaks, bends, or other damage.

(3) Straighten all bends and weld all cracks. Replace a shutter damaged beyond repair.

c. *Installation.* Refer to figure 102 and install radiator winter front shutter.

170. Wiring

a. *General.* Wiring of winterized model differs from nonwinterized model, as illustrated on figure 103.

b. *Test*. Refer to figures 3 and 103 and test continuity of leads with a multimeter set on RX1 ohms scale.

c. *Inspection and Repair*.

(1) Inspect all leads for loose connections, cracked or bare insulation, loose terminals, or broken wire.

(2) Repair by replacing loose terminals, tightening connections, or covering worn insulation with both rubber and friction tape. Report major damage of wiring system to direct support maintenance.

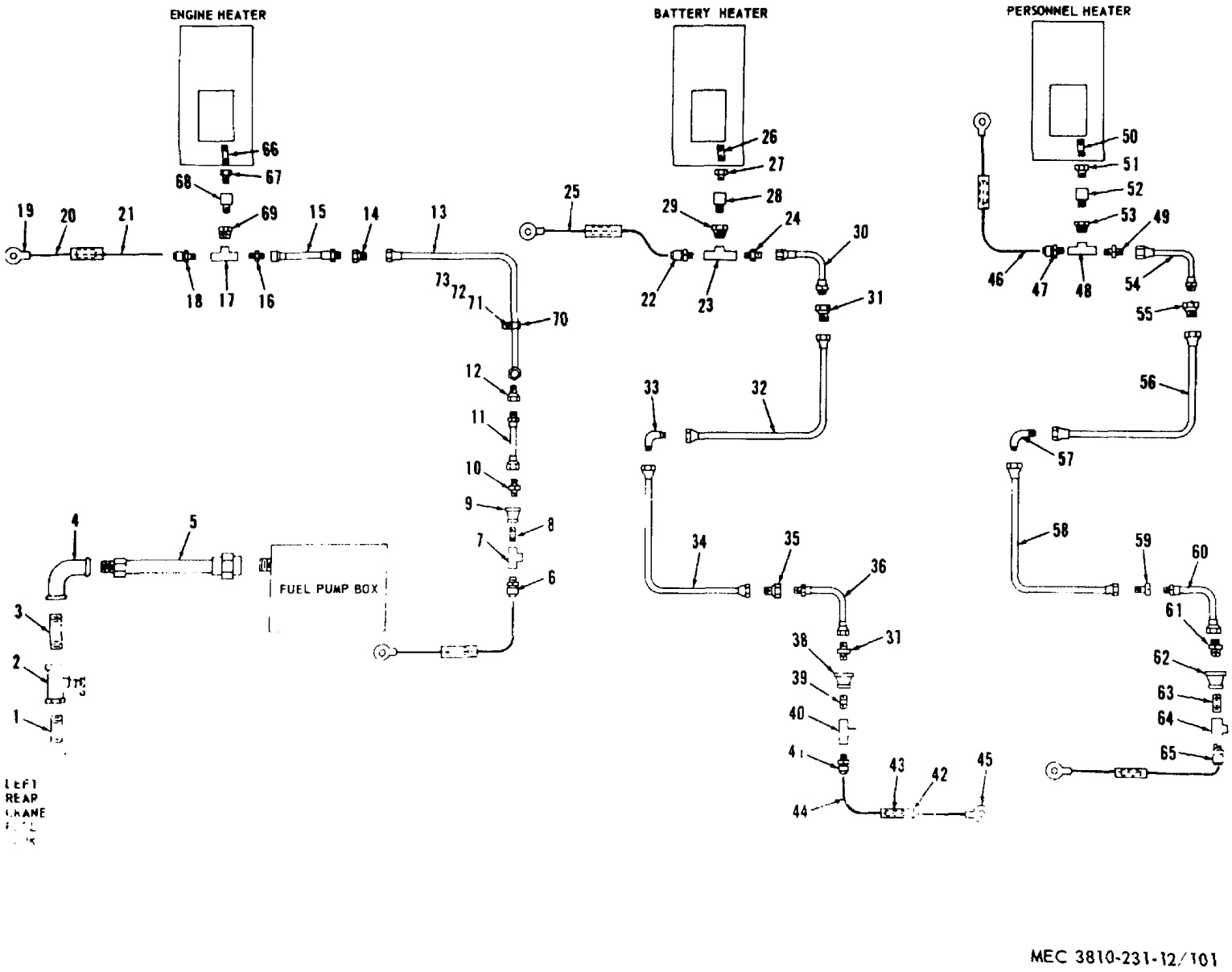


Figure 101. Heater fuel lines, fitting, and valves, removal and installation

1 Nipple, close
2 Valve, shut off
3 Nipple
4 Elbow
5 Hose ay., flex.
6 Fitting, wire
7 Tee
8 Nipple, close
9 Coupling
10 Adapter
11 Hose assembly
12 Fitting
13 Fuel line ay. (Eng. Htr.)
14 Fitting
15 Hose assembly
16 Adapter
17 Tee
18 Fitting, wire
19 Terminal, ring
20 Wire
21 Wire
21 Fitting, wire
23 Tee
24 Adapter
25 Wire
26 Nipple
27 Quick disconnect (plain nipple)
28 Quick disconnect (valve coup.)
29 Reducer
30 Hose assembly
31 Fitting
32 Fuel line ay. (up. batt. htr.)
33 Elbow
34 Fuel line ay. (low. batt. htr.)
35 Fitting
36 Hose assembly
37 Adapter
38 Coupling
39 Nipple, close
40 Tee
41 Fitting, wire
42 Tubing amaulation
43 Connector parallel
44 Wire
45 Terminal, ring
46 Wire
47 Fitting, wire
48 Tee
49 Adapter
50 Nipple
51 Quick disconnect (plain nipple)
52 Quick disconnect (valve coup.)
53 Reducer
54 Hose assembly
55 Fitting
56 Fuel Ine ay. (up. personnel htr.)
57 Elbow
58 Fuel line ay. (low. personnel htr.)
59 Fitting
60 Hose assembly
61 Adapter
62 Coupling
63 Nipple, close
64 Tee
65 Fitting, wire
66 Nipple
67 Quick disconnect (Plain nipple)
68 Quick disconnect (valve coup.)
69 Reducer
70 Clamp
71 Bolt
72 Washer, int. ext.
73 Nut

Figure 101 - Continued.

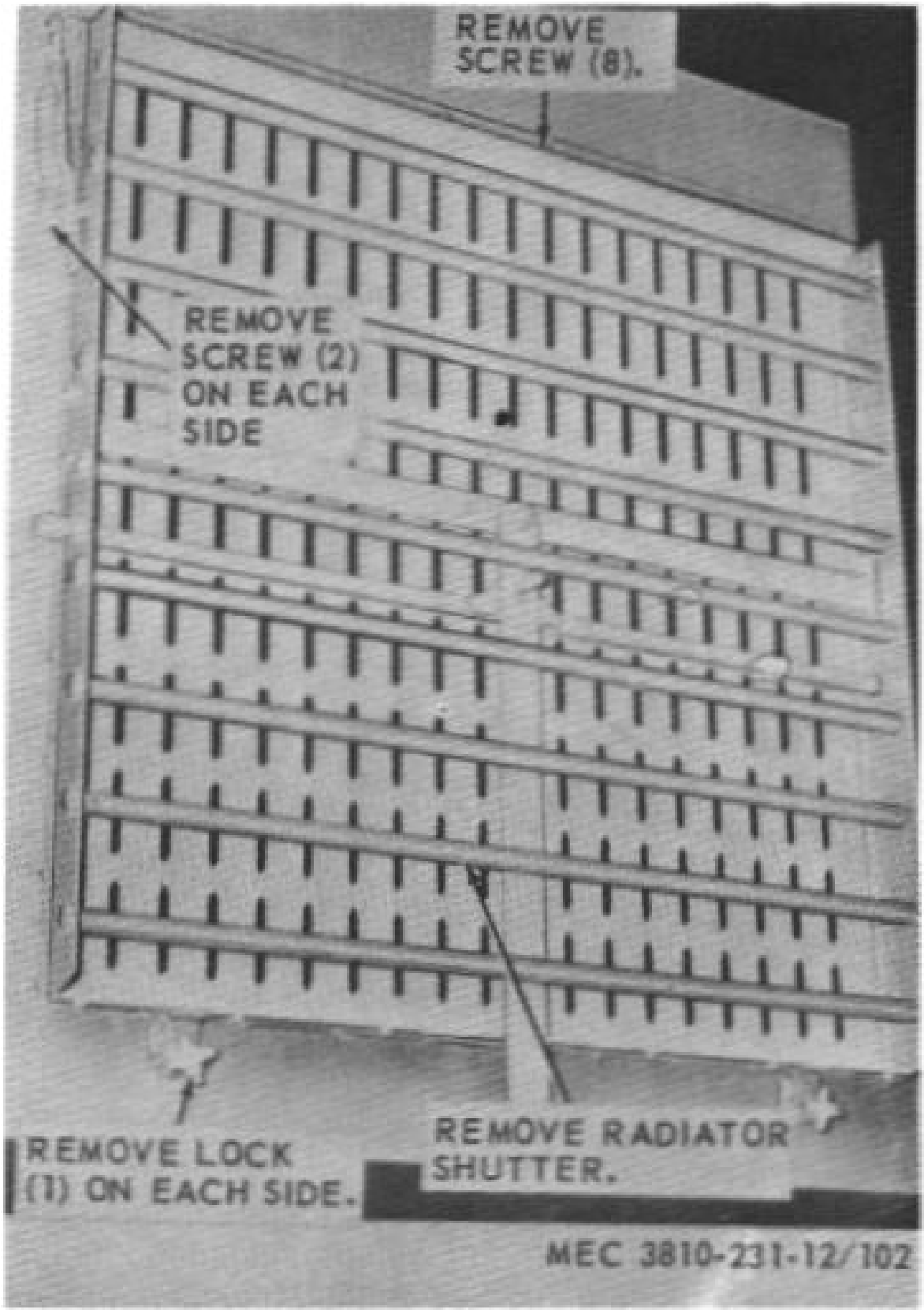


Figure 102. Radiator winter front shutters, removal and installation

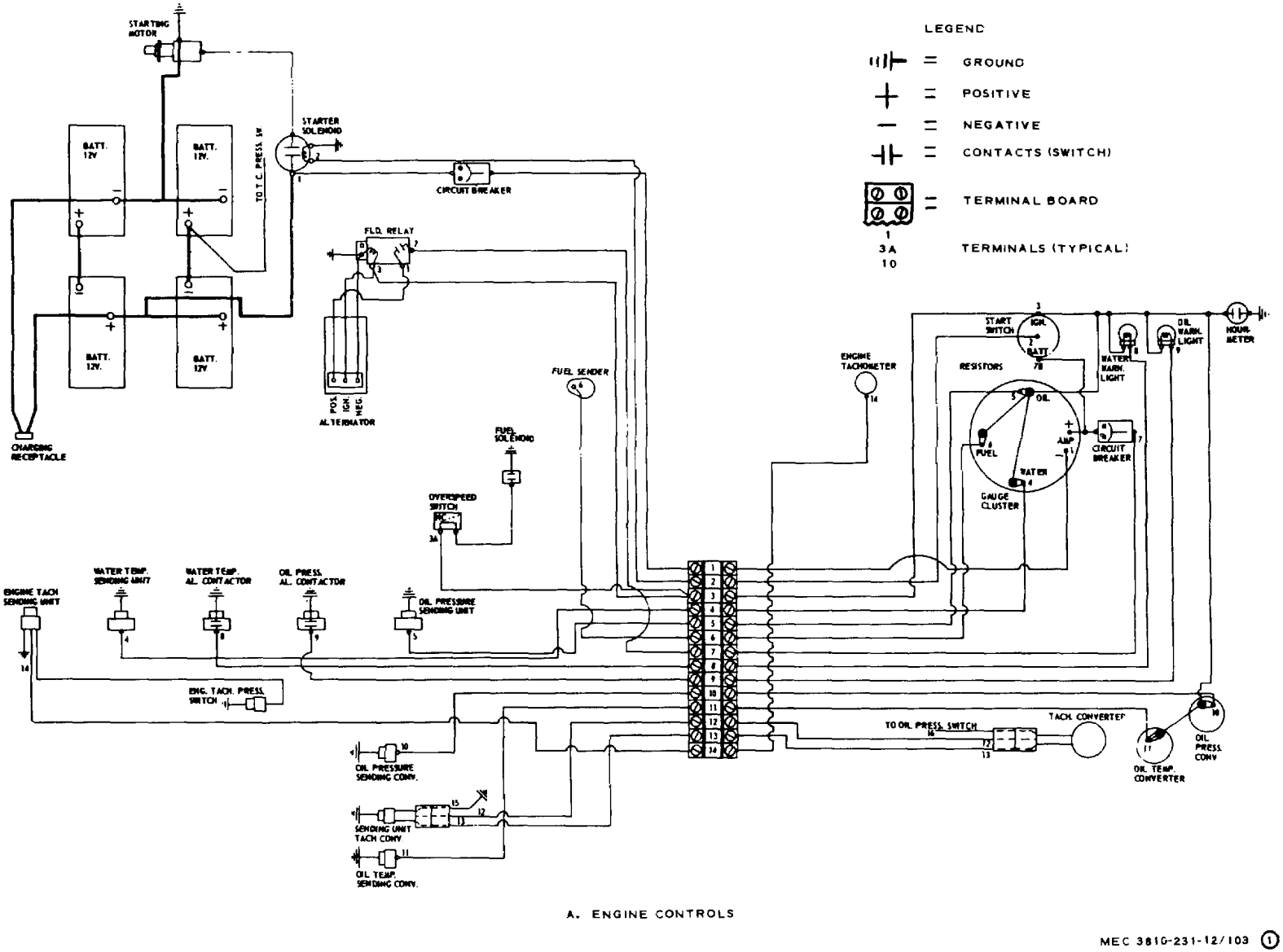


Figure 103. Winterized wiring diagram.

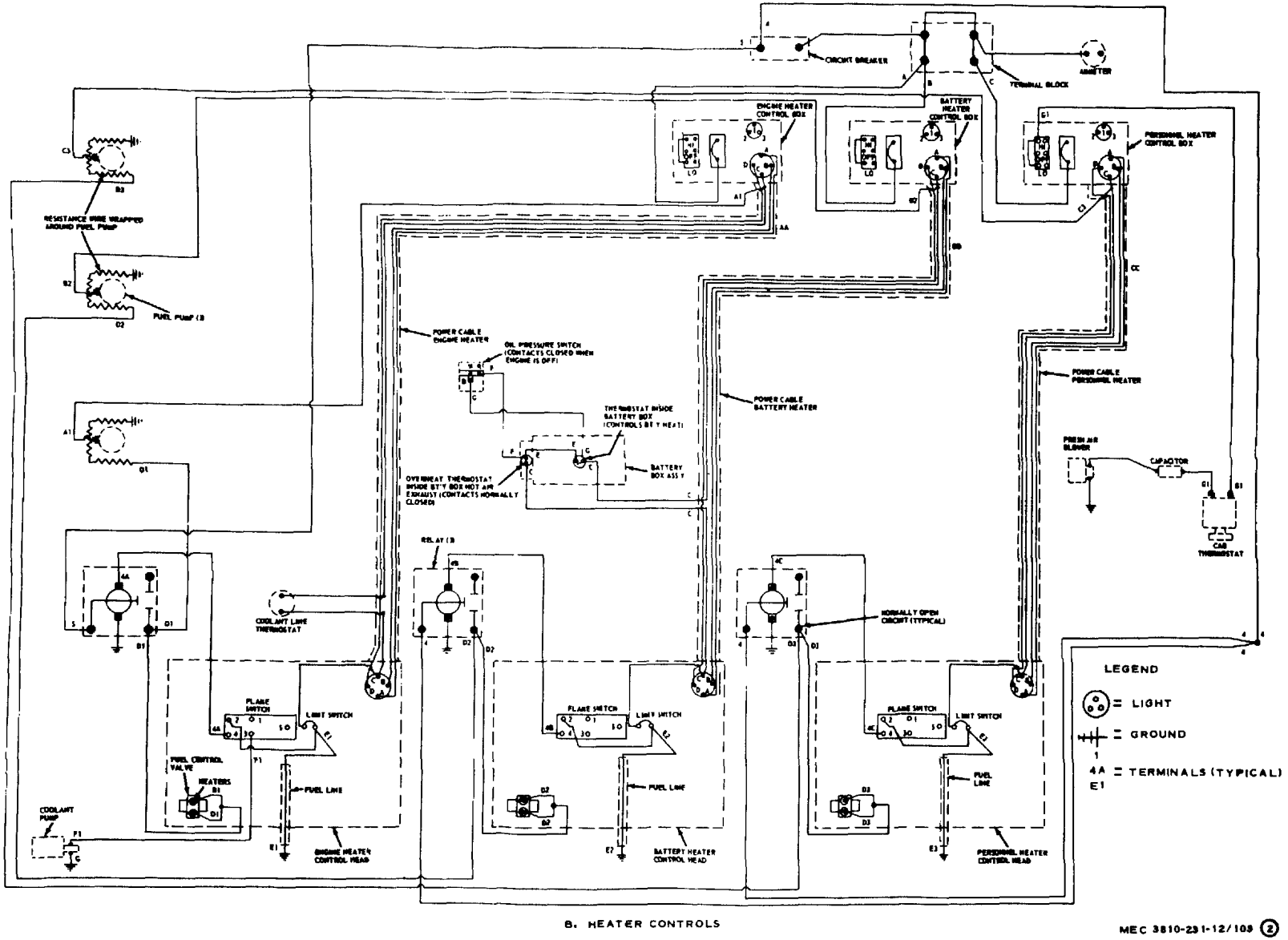


Figure 103 - Continued.

APPENDIX I

REFERENCES

1. Fire Protection

TB 5-4200-200-10	Hand Portable Fire Extinguishers Approved for Army Users.
TM 5-687	Repair and Utilities. Fire Protection Equipment and Appliances: Inspections, Operations, and Preventive Maintenance.

2. Lubrication

LO 5-3810-231-12-1	Crane, Crawler Mounted, 60 Ton Diesel Driven (Harnischfeger Model 1125) W/Engine Cummins Model NT-380-1 Winterized and Non-Winterized.

3. Painting

TM 9-213	Painting Instructions for Field Use.

4. Preventive Maintenance

TB ENG 347	Winterization Techniques for Engineer Equipment.
TM 5-764	Electric Motor and Generator Repair.
TM 9-207	Operation and Maintenance of Army Materiel in Extreme Cold Weather (0° to-65° F.).
TM 9-6140-200-15	Operation and Organizational, Field and Depot Maintenance: Storage Batteries, Lead-Acid Type.
TM 38-750	Army Equipment Record Procedures.

5. Radio Interference Suppression

TM 11-483	Radio Interference Suppression.

6. Shipment and Limited Storage

TM 38-230	Preservation, Packaging, and Packing of Military Supplies and Equipment.

7. Supply Publications

C-9100IL	Petroleum, Petroleum-Base Products and Related Material.
TM 5-3810-231-20P	Organizational Maintenance Repair Parts and Special Tool List, Crane, Crawler Mounted, 60 Ton, Diesel Driven, (Harnischfeger Model 1125) FSN 38107289945 (Winterized) FSN 3810-701-7324 (Non-Winterized).

APPENDIX II
BASIC ISSUE ITEMS AND MAINTENANCE AND OPERATING SUPPLIES

Section I. INTRODUCTION

1. General

Section II lists the accessories, tools, and publications required for maintenance and operation by the operator, initially issued with, or authorized for the crane. Section III lists the maintenance and operating supplies required for initial operation.

2. Explanation of Columns Contained in Section II

a. Source Codes. The information provided in each column is as follows:

(1) *Materiel.* This column is left blank. For identification of agencies assigned supply responsibility for parts, refer to appropriate Federal and Department of Army Supply Catalogs.

(2) *Source*. The selection status and source of supply for each part are indicated by one of the following code symbols:

(a) P-applied to high-mortality repair parts which are stocked in or supplied from the army supply system, and authorized for use at indicated maintenance categories.

(b) X2-applied to repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain them through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.

(3) *Maintenance*. The lowest maintenance level authorized to use, stock, install, or manufacture the part is indicated by the following code symbol:

O - Organizational Maintenance

Note

When no code is shown in the recoverability column the part is considered expendable.

(4) Federal Stock Number. When a Federal stock number is available for a part, it will be shown in this column, and will be used for requisitioning purposes.

(a) Description.

1 The item name and brief description of the part are shown.

2 A five-digit Federal supply code for manufacturers and/or other supply services is shown in parentheses followed by the manufacturer's part number. This number shall be used for requisitioning purposes when no Federal stock number is indicated in the Federal stock number column. Example: (08645) 86453

(b) Unit of Issue. If no abbreviation is shown in this column, the unit of issue is "each".

(c) Quantity Authorized. This column lists the quantities of repair parts, accessories, tools, or publications

authorized for issue to the equip- ment operator or crew as required.

(d) Quantity Issued with Equipment.

This column lists the quantities of repair parts, accessories, tools, or publications that are initially issued with each item of equipment. These indicated by an asterisk are to be requisitioned through normal supply channels as required.

3. Explanation of Columns Contained in Section III

a. Item. This column contains numerical sequenced item numbers, assigned to each component application, to facilitate reference.

*b. Component Application. T*his column identifies the component application of each maintenance or operating supply item.

c. Source of Supply. This column is left blank. For identification of agencies assigned supply responsibility for parts, refer to appropriate Federal and Department of Army Supply Catalogs.

d. Federal Stock Number. The Federal stock number will be shown in this column and will be used for requisitioning purposes.

e. Description. The item and a brief description are shown.

f. Quantity Required for Initial Operation. This column lists the quantity of each maintenance or operating supply item required for initial operation of the equipment.

g. Quantity Required for 8 Hours Operation. Quantities listed represent the estimated requirements for an average eight hours of operation.

h. Notes. This column contains informative notes keyed to data appearing in the preceding column.

Section II. BASIC ISSUE ITEMS LIST

Source codes				Federal stock No.	Description	Unit of Issue	Qty author-ized	Qty issued with equip-ment	Illustration	
Material-	Source	Mainte-nance	Recover-ability						Fig.	Item.
					GROUP 31. BASIC ISSUE ITEMS, MANUFACTURER INSTALLED					
					3100. BASIC ISSUE ITEMS, MANUFACTURER OR DEPOT INSTALLED					
	P	0		6140-126-1548	BATTERY: storage, 12 volt 6 cell (repair parts manual group 0612).		2	2		
	P	0		7510-889-3494	BINDER, LOOSE-LEAF: U.S. Army Equip-ment Log Book.		1	1		
					NOTE. Initial issue and replacement will be made in accordance with TM U-760.					
	P	0		5220-559-9618	CASE: maintenance and operational manuals, cotton duck, water repellent, mildew resistant, MTL-B-11743 B.		1	1		
					DEPARTMENT OF THE ARMY LUBRICATION ORDER LO 5-3810-231-12.		1	1		
					DEPARTMENT OF THE ARMY OPERATORS AND ORGANIZATIONAL MAINTENANCE MANUAL TM 5-3810-231-12.					
					DEPARTMENT OF THE ARMY DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE MANUAL TM 5-3810-231-35.		2	2		

Source codes				Federal stock No.	Description	Unit of Issue	Qty author-ized	Qty issued with equip-ment	Illustration	
Material-	Source	Mainte-nance	Recover-ability						Fig.	Item.
					3100. BASIC ISSUE ITEMS, MANUFACTURER OR DEPOT INSTALLED- Continued.					
					DEPARTMENT OF THE ARMY ORGANIZATIONAL MAINTENANCE REPAIR PARTS AND SPECIAL TOOL LIST TM 5-3810-231-20P.		2	2		
					DEPARTMENT OF THE ARMY DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE REPAIR AND SPECIAL TOOL LIST TM 5-3810-231-35P.		2	2		
	P	0		6240-019-0677	LAMP, INCANDESCENT: 24 volts 0.23 amp (GE).		1	1		
	P	0		6240-044-6914	LAMP, INCANDESCENT: 24 volts 1.2 amp (GE).		1	1		
	P	0		6240-155-8714	LAMP, INCANDESCENT: 28 volts 0.17 amp (GE).		1	1		
	P	0		5340-291-3462	PADLOCK		5	5		
	P	0		6810-264-9063	SULFURIC ACID: Electrolyte (Repair Parts Manual Group 0612).	GAL	8	8		
					GROUP 32. BASIC ISSUE ITEMS, TROOP INSTALLED					
					3200 BASIC ISSUE ITEMS, TROOP INSTALLED OR AUTHORIZED					
	P	0		5120-224-1372	BAR, PINCH: bent chisel and taper, 3/4 in. dia. 26 in. lg.		1	*		
	P	0		8020-260-1304	BRUSH: 2 in. w, 9/16 in. thick		1	*		
	P	0		5110-234-1944	CHISEL, COLD, HAND: 1 in., 8 in. lg.		1	*		
	P	0		5110-242-8807	CUTTER, ROPE WIRE: hammer impact 1 in. capacity.		1	*		
	X2	0		5420-176-7933	CHAIN ASSEMBLY, SINGLE LEG		2	*		
	P	0		5120-227-8074	EXTENSION: socket wrench 1/2 in. drive, 10 in. lg.		1	*		
	P	0		5120-221-1999	GAGE, THICKNESS: 26 leaves, 0.0015 to 0.0250.		1	*		
	P	0		4930-360-2801	GREASE GUN, HAND: lever operated 16 oz. capacity.		1	*		
	P	0		5120-224-4128	HAMMER, HAND: blacksmith's sledge 8 lb head.		1	*		
	P	0		5120-243-2963	HAMMER, HAND: machinists ballpeen 1 1/2 lb head.		1	*		
	P	0		5120-230-6385	HANDLE, SOCKET WRENCH: ratchet in. square drive.		1	*		
	P	0		4930-141-8311	HOSE ASSEMBLY, GREASE GUN:		1	*		
	P	0		6240-155-7790	LAMP, INCANDESCENT: 28 volts 21 c. p. G-2W.		1	*		
	P	0		6230-268-9437	LIGHT, EXTENSION: 2 conductor water resistant, 16 awg. 50 ft. lg.		1	*		
	P	0		4930-262-8868	OILER, HAND: pump force fed, 16 oz. capacity.		1	*		

Source codes				Federal stock No.	Description	Unit of Issue	Qty author-ized	Qty issued with equip-ment	Illustration	
Material-	Source	Mainte-nance	Recover-ability						Fig.	Item.
					3200 BASIC ISSUE ITEMS, TROOP INSTALLER OR AUTHORIZED- Continued					
	P	0		5120-223-7397	PLIERS, SLIP JOINT: stgh nose, comb/w cutter, 8 in. lg.		1	*		
	P	0		4930-224-4859	PUMP, BUCKET LUBRICATION: hand operated 10 foot hose.		1	*		
	P	0		5120-197-9488	PUNCH, CENTER, SOLID: 3/8 in. dia 4 1/2 in. lg.		1	*		
	P	0		5120-242-0763	PUNCH, DRIFT: 1/4 in. diameter point, 1/2 in. stock 10 in. lg.		1	*		
	P	0		5120-227-7349	SCREWDRIVER, FLAT TIP: 3/8 in. w. tip 11 1/4 in. lg.		1	*		
	P	0		5120-189-7914	SOCKET, SOCKET WRENCH: 1/2 in. sq. dr. 1 1/8 in. opening.		1	*		
	P	0		5120-189-7985	SOCKET, SOCKET WRENCH: 1/2 in. sq. dr. 8/4 in. opening.		1	*		
	P	0		5120-189-7932	SOCKET, SOCKET WRENCH: 1/2 in. sq. dr. 9/16 in. opening.		1	*		
	P	0		5120-184-8642	WRENCH, BOX AND OPEN END COMBI-NATION: 15 degree, 9/16 opening.		1	*		
	P	0		5120-228-9505	WRENCH, BOX AND OPEN END COMBI-NATION: 15 degree, 7/16 in. opening.		1	*		
	P	0		5120-228-9504	WRENCH, BOX AND OPEN END COMBI-NATION: 15 degree, 3/8 in. opening.		1	*		
	P	0		5120-228-9510	WRENCH, BOX AND OPEN END COMBI-NATION: 15 degree, 3/4 in. opening.		1	*		
	P	0		5120-228-9513	WRENCH, BOX AND OPEN END COMBI-NATION: 15 degree, 15/16 opening.		1	*		
	P	0		5120-228-9514	WRENCH, BOX AND OPEN END COMBI-NATION: 15 degree 1 in. opening.		1	*		
	P	0		5120-184-8643	WRENCH, BOX AND OPEN END COMBI-NATION: 15 degree, 5/8 in. opening.		1	*		
	P	0		5120-264-3796	WRENCH, OPEN END, ADJUSTABLE: sgle. hd, 12 in. lg.		2	*		
	P	0		5120-449-8084	WRENCH, OPEN END, ADJUSTABLE: oto 2 7/16 in. opening 24 in. lg.		1	*		
	P	0		5120-277-6470	WRENCH, OPEN END, ADJUSTABLE: pin. jaws, 2 15/16 to 4 3/4 in opening 36 in. lg.		1	*		
	P	0		5120-240-5328	WRENCH, OPEN END, ADJUSTABLE: sgle hd. 8 in. lg.		1	*		
	P	0		4120-293-1346	WRENCH, OPEN END, FIXED: 2 3/4 in opening, 25 in. lg.		1	*		
	P	0		5120-288-9287	WRENCH, OPEN END, FIXED: 3 in. opening, 28 in. lg.		1	*		
	P	0		5120-449-8155	WRENCH, OPEN END, FIXED: 15 degree 1 7/8 in. opening.		1	*		
	P	0		5120-227-9818	WRENCH, OPEN END, FIXED: 1 3/4 in. and 1 1/2 in. opening.		1	*		

Section III. Maintenance and Operating Supplies

Item	Component application	Source of supply	Federal stock No.	Description	Quantity required for Initial operation	Quantity required for 8 hours operation	Notes
1	0101 CRANKCASE (1)			OIL LUBRICATING: 5 gal pails as follows:			(1) Includes quantity of oil to fill engine oil system as follows:
			9160-265-9435(2)	OE-30	48 qt	(3)	48 qt. crankcase
			9150-265-9428(2)	OE-10	48 qt	(3)	10 qt. air cleaner
			9150-242-7603(2)	OES	48 qt	(3)	(2) See C9100-IL for additional
2	0304 AIR CLEANER			OIL LUBRICATING: (4)	10 qt	(3)	data and requisitioning procedure.
3	0306 FUEL			FUEL OIL, DIESEL: bulk as follows:			(3) See current L.O. for grade application and replenishment intervals.
			9140-286-5294(2)	DF-2 Regular Grade	270 gal(5)	88 gal (6)	(4) Use oil as prescribed in item 1.
			9140-286-5286(2)	DF-1 Winter Grade	270 gal(5)	88 gal (6)	(5) Tank capacity.
			9140-286-5283(2)	DF-A Arctic Grade	270 gal(5)	88 gal (6)	(6) Average fuel consumption
4	0311 PRIMING SYSTEM		2910-565-9424	TANK	1 (7)		is 11 gal per hour.
5	0501 RADIATOR			WATER ANTI-FREEZE: 55 gal drum as follows:	88 qt		(7) Quantity indicated is the minimum required for one each start when temperature is below 40° F.
			6850-893-8636	ANTIFREEZE: ethylene glycol			(8) Quantity of hydraulic fluid to fill reservoir.
			6850-174-1806	ANTIFREEZE: compound arctic	88 qt		(9) Use lubricating oil gear as prescribed in item 9.
6	4305 HYDRAULIC CONTROLS		9150-252-6375	HYDRAULIC FLUID: 1 gal can as follows: HBA	1 qt (8)	(3)	
7	7416 EXPOSED GEARS			LUBRICATING OIL CHAIN-WIRE ROPE EXPOSED GEAR: 5 lb as follows:			
			9150-234-5199(2)	CW-11 A	5 lb	(3)	
			9150-234-5199(2)	CW-11 B	5 lb	(3)	
8	7420 CHAIN CASE			OIL, LUBRICATING: 5 gal pail as follows:			
			9150-265-9435(2)	OE-30	16 qt	(3)	
			9150-265-9428(2)	OE-10	16 qt	(3)	
			9150-242-7603(2)	OES	16 qt	(3)	

Maintenance and Operating Supplies - Continued

Item	Component application	Source of supply	Federal stock No.	Description	Quantity required for initial operation	Quantity required for 8 hours operation	Notes
9	7420 JACKSHAFT GEAR CASE			LUBRICATING OIL GEAR: 55 gal as follows:,			
			9150-577-5848(2)	GO-140	12 qt	(3)	
			9150-577-5845(2)	GO-90	12 qt	(3)	
			9150-257-5442(2)	GOS	12 qt	(8)	
10	7420 MAIN GEAR CASE			LUBRICATING OIL GEAR(9)	20 qt	(3)	
11	7420 PROPEL GEAR CASE			LUBRICATING OIL GEAR (9)	16 qt	(3)	
12	7420 BEVEL PINION GEAR CASE			LUBRICATING OIL GEAR. (9)	12 qt	(3)	
				GREASE, AUTOMOTIVE AND ARTILLERY 35-lb PAIL AS FOLLOWS:		(3)	
			9150-190-0907(2)	GAA	35 lb		

APPENDIX III
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

1. General

a. Section I provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance operations on the identified end item or component. The implementation of the maintenance tasks upon the end item or component will be consistent with the assigned maintenance operations.

c. Section III lists the special tools and test equipment required for each maintenance operation as referenced from Section II.

d. Section IV contains supplemental instructions, explanatory notes and/or illustrations required for a particular maintenance function.

2. Explanation of Columns in Section II

a. Functional Group Number. The functional group is a numerical group set up on a functional basis. The applicable functional grouping indexes (obtained from TB 750-931 Functional Grouping Codes) are listed on the MAC in the appropriate numerical sequence. These indexes are normally set up in accordance with their function and proximity to each other.

b. Component Assembly Nomenclature. This column contains a brief description of the components of each functional group.

c. Maintenance Operations and Maintenance Levels. This column lists the various maintenance operations ("A" through "J") and indicates the lowest maintenance level authorized to perform these operations.

The symbol designations for the various maintenance levels are as follows:

O/C-Operator or crew
0 -Organizational maintenance
F -Direct support maintenance
H -General support maintenance
D -Depot maintenance

The Maintenance Operations are defined as follows:

A- SERVICE: Operations required periodically to keep the item in proper operating condition, i.e., to clean, preserve, drain, paint, and replenish fuel, lubricants, hydraulic, and deicing fluids, or compressed air supplies.

B-ADJUST: Regulate periodically to prevent malfunction. Adjustments will be made commensurate with adjustment procedures, and associated equipment specifications.

C-ALINE: Adjust two or more components of an electrical or mechanical system so that their functions are properly synchronized or adjusted.

D-CALIBRATE: Determine, check, or rectify the graduation of an instrument, weapon, or weapons system or components of a weapons system.

E-INSPECT: Verify serviceability and detect incipient electrical or mechanical failure by close visual examination.

F- TEST: Verify serviceability and detect incipient electrical or mechanical failure by measuring the mechanical or electrical characteristics of the item and comparing those characteristics with authorized standards. Tests will be made commensurate with test procedures and with calibrated tools and/or test equipment referenced in the MAC.

G- REPLACE: Substitute serviceable components, assemblies and subassemblies for unserviceable counterparts or remove and install the same item when required for the performance of other maintenance operations.

H- REPAIR: Restore to a serviceable condition by replacing unserviceable parts or by any other action required using available tools, equipment and skills- to include welding, grinding, riveting, straightening, adjusting and facing.

I- OVERHAUL: Restore an item to a completely serviceable condition (as prescribed by serviceability standards developed and published by the commodity commands) by employing techniques of "Inspect and Repair Only as Necessary" (IROAN). Maximum use of diagnostic and test equipment is combined with minimum disassembly during overhaul. "Overhaul" m a y be assigned to any level of maintenance except organizational, provided the time, tools, equipment, repair parts authorization, and technical skills are available at that level. Normally, overhaul as applied to end items, is limited to depot maintenance level.

J- REBUILD: Restore to a condition comparable to new by disassembling to determine the condition of each component part and reassembling using serviceable, rebuilt, or new assemblies, subassemblies, and parts.

e. Reference Note. This column, subdivided into columns "K" and "L", is provided for referencing the SPECIAL TOOL A ND TEST EQUIPMENT REQUIREMENTS (Section III) and REMARKS (sec. IV) that may be associated with maintenance operations (sec. II).

3. Explanation of Columns in Section III

a. Reference Code. This column consists of a number and a letter separated by a dash. The number references the T & TE requirements column on the MAC.

The letter represents the specific maintenance operation the item is to be used with. The letter is representative of columns "A" through "J" on the MAC.

b. Maintenance Level. This column shows the lowest level of maintenance authorized to use the special tool or test equipment.

c. Nomenclature. This column lists t he name or identification of the tool or test equipment.

d. Tool Number. This column lists the manufacturer's code and part number, or Federal Stock-Number, of tools and test equipment.

4. Explanation of Columns in Section IV

a. Reference Code. This column consists of two letters separated by a dash, both of which are references to section II. The first letter references column L and the second letter references a maintenance operation, column "A" through "J".

b. Remarks. This column lists information pertinent to the Maintenance Operation being performed, as indicated on the MAC, section II.

Section II. MAINTENANCE ALLOCATION CHART

Date

Functional Group No.	Component Assembly Nomenclature	Maintenance operations / Maintenance levels: A Service	B Adjust	C Aline	D Calibrate	E Inspect	F Test	G Replace	H Repair	I Overhaul	J Rebuild	Note ref: K T&TE rqmt	L Remarks
01	ENGINE												
0100	Engine assembly:												
	Engine assembly	O/C				O/C	F	F	O	H			A
0101	Block, cylinder head:												
	Block, cylinder							H	H				
	Head, cylinder							F	F				
	Liner, cylinder							H					
0102	Crankshaft:												
	Bearings, seals, covers							H					
	Crankshaft assembly							H			D		B
	Damper and pulley							F					
0103	Flywheel assembly							H	H				C
0104	Pistons, connecting rods							H	H				
0105	Valves, camshafts and timing systems:												
	Arm assembly, rocker		0					F	F				
	Bushings, camshaft, gears, covers							H					
	Cover, valve							O					
	Push rods							F					
	Springs, guides, locks							H					
	Valves, seats							H	H				D
0106	Engine lubrication system:												
	Breather, crankcase	O						O					
	Cooler assembly							O	O				
	Filter assemblies	O/C						O	O				E
	Gage and drain plug							O/C					
	Hose and fittings							O					
	Pump assembly, valve, by pass							F	F				F
	Pan, oil							F	F				
0108	Manifolds							O					
0109	Accessory drive mechanism							F					
20	CLUTCH												
0200	Clutch assembly:	O/C	O					F	F				
	Hose and fittings							O					
	-Plates and lining							F					
0202	Clutch Release mechanism:												
	Linkage and levers							O	O				
	Shaft, bearings, yoke							F					
0203	Torque converter:												
	Adapter, tachometer							O					
	Torque converter assembly		O			O		F	F	H			G
	Gage, level							O/C					
0204	Clutch cooling:												
	Hose and fittings							O					
03	FUEL SYSTEM												
0301	Fuel injector						0	0	F				
0302	Fuel pumps:	F					H	F	F	H			H
	Controls	0	0										

Section II. MAINTENANCE ALLOCATION CHART

Date

Functional Group No.	Component Assembly Nomenclature	Maintenance operations / Maintenance levels: A Service	B Adjust	C Aline	D Calibrate	E Inspect	F Test	G Replace	H Repair	I Overhaul	J Rebuild	Note ref: K T&TE rqmt	L Remarks
0304	Air cleaner	O/C						O	O				
0305	Turbocharger:							F	F				
	Anevoid control, air filter	O/C						O					I
0306	Tanks, lines, fittings:												
	Breather, cap, cock, hose, Fittings, valves							O					
	Screen	O						O					
	Tank, fuel	O/C						F					
0309	Fuel filters	O/C						O					J
0311	Engine starting aids	O/C						O					K
0312	Throttle control							O	O				
04	EXHAUST SYSTEM												
0401	Muffler and pipes								O				
06	COOLING SYSTEM												
0501	Radiator:												
	Cap, radiator						0	0					L
	Radiator assembly	O/C				O/C	F	F	F				
0503	Water Manifolds, headers, thermostats, housing gaskets: Couplings, hose, clamps, cocks, housing							O					
	Manifold, water							F					
	Thermostat							O	O				
0504	Water pump:							O	F				M
	Belt, drive		O					O					N
	Pulley								O				
0506	Fan assembly:							O	F				
	Belt, drive		O					O					
	Guard, fan							O					
0508	Water filter	O						O					P
	Hose, fittings, valve							O					
06	ELECTRICAL SYSTEM												
0601	Alternator:	O/C					O	O	F				Q
	Belt, drive		O					O					
	Brushes							O					
0603	Starting motor:	O					O	O	F				R
	Brushes, cables							O					
	Solenoid, starter						O	O					
0606	Engine safety controls												
	Governor, overspeed, solenoid, fuel							O	F				
	Switches							O					
0607	Instrument or engine control panel:												
	Ammeter, hourmeter, tachometer Circuit breaker, voltmeter,												
	Gages, lights, switches							O					
	Lamps							O/C					
	Panel, control, wiring harness							F					

Section II. MAINTENANCE ALLOCATION CHART

Date

Functional Group No.	Component Assembly Nomenclature	Maintenance operations / Maintenance levels: A Service	B Adjust	C Aline	D Calibrate	E Inspect	F Test	G Replace	H Repair	I Overhaul	J Rebuild	Note ref: K T&TE rqmt	L Remarks
0608	Miscellaneous items							O					
0609	Lights:							O					
	Lamps							O/C					
0610	Sending units, warning, switches							O					
0611	Horn, siren							O					
0612	Batteries, storage	O/C					O	O					
	Box, battery							O					
	Cables							O	O				
0613	Chassis wiring harness							F	O				
0615	Radio interference suppression:												
	Capacitor						O	O					
	Strap, ground							O					
08	TRANSFER ASSEMBLY												
1801	Power transfer assembly	O/C				O/C		H	H				
	Breather	O/C						O					
	Bearings, seals, gears, shafts							H					
	Cover, plates							O					
13	TRACKS												
1301	Suspension system							F	H				
1302	Track support rollers:												
	Roller assembly, lower	O/C						F	F				
	Roller assembly, upper	O/C						O	F				
1303	Track idlers and brackets:												
	Link assembly, adjusting	O/C						F					
	Shaft assembly, idler	O/C						F	F				
1304	Track drive sprockets:												
	Shaft assembly, drive	O/C						F	F				
	Chains	O/C						O	O				
1305	Track assembly:												
	Link												
	Track assembly		O/C					O					
15	FRAME							O	H				
1501	Frame assembly:												
	Guards, mud							O					
1502	Counterweights							O					
18	BODY, CAB, HOOD AND HULL												
1801	Body, cab, hood, hull assemblies:												
	Cab assembly							H	F				
	Doors, panels, guards							O	O				
	Glass							O					
1806	Seats							O					
22	BODY, CHASSIS OR HULL AND ACCESSORY ITEMS												
2202	Accessory items:												
	Arm and blade wiper							O/C					
	Box, control, burner assembly							F	F				
	Defrosters, ducts, hoses							F					

Section II. MAINTENANCE ALLOCATION CHART

Date

Functional Group No.	Component Assembly Nomenclature	Maintenance operations / Maintenance levels: A Service	B Adjust	C Aline	D Calibrate	E Inspect	F Test	G Replace	H Repair	I Overhaul	J Rebuild	Note ref: K T&TE rqmt	L Remarks
	Filter, fuel	O/C						O					
	Heater assembly, personnel	O/C					H	O	F	H			S
	Lines, fittings							F					
	Panel, control; pipe, exhaust							F	F				
	Pump, fuel	O/C						O					
	Regulators, switches, valves							F					
	Wiper assembly							O					
	Wiring							F	O				
2207	Winterization system:												
	Box, battery							F					
	Control assemblies							F	F				
	Cock, drains; ducts; clamps							F					
	Coil, oil pan							F					
	Heater assembly	O/C					H	O	F	H			T
	Filter, fuel	O/C						O					
	Lines, coolant							H					U
	Lines, coolant and fuel							O					V
	Pump, coolant							O					
	Pump, fuel	O/C						O					
	Pipe, exhaust							O					
	Panels; regulator; fuel							F	F				
	Shutter, radiator		O/C					O					
	Switches; thermostats							F					
	Valves							F	F				
	Wiring							F	O				
2210	Data plates:							F					
	Plates, instruction							O					
40	ELECTRIC GENERATORS												
4000	Alternator assembly:												
	Alternator assemblies	O/C						O	F				
	Belt, drive							O					
	Brushes, alternator							O					
4001	Rotor assemblies						F	F					
4002	Stator assemblies						F	F					
4003	Brush holders:												
	Brushes							O					
	Holder assembly, brush							O	O				
4004	Ventilating system							F					
4005	Frame support and housing							F					
4007	Drive components							O					
4010	Master or auxiliary control assembly:												
	Cabinet assembly, control							O	F				
	Circuit breaker and rectifier							F					
	Regulator voltage		F					F	F				W
	Controller assembly, swing							F	F				
	Brushes, contact, springs							F	F				
43	HYDRAULIC SYSTEM												
4300	Hydraulic system	O/C				O/C							

Section II. MAINTENANCE ALLOCATION CHART

Date

Functional Group No.	Component Assembly Nomenclature	Maintenance operations / Maintenance levels										Note ref	
		A	B	C	D	E	F	G	H	I	J	K	L
		Service	Adjust	Aline	Calibrate	Inspect	Test	Replace	Repair	Overhaul	Rebuild	T&TE rqmt	Remarks
4301	Strainers, filters, hose, pipe												
	Fittings, tubing							O	O				
4302	Pump and pump drives:												
	Belt, drive		O					O					X
	Pump assembly							O	F				
	Pulley, drive							O					
4305	Manual and/or control valves:												
	Compensators; valves, control							O	F				
4307	Hydraulic cylinders							O	F				
4308	Reservoir	O/C						O					
4309	Hydraulic controls and/or manual controls:												
	Control assembly, hydraulic												
	Check valve, hydraulic							O	F				
	Levers; linkage							O					
	Control, push-pull							F					
4316	Hose, fitting, lines, breathers							F					
4318	Air cylinders							F	F				
47	GAGES												
4701	Instruments							O					
4702	Gages							O					
50	PNEUMATIC EQUIPMENT												
5000	Air compressor							F	F	F			
6001	Crankcase, cylinder head:							F	F				
	Cock, Drain							O					
5002	Crankshaft							F					
5004	Pistons, Connecting Rods							F					
5005	Valves							F					
5008	Air Intake	O/C						O					Y
5009	Unloader System Components:												
	Governor Assembly	O						F	F				Z
5014	Air Receiver	O/C						F					
5015	Air Discharge System:												
	Breathers; Valves, Hose,												
	Tubes and Fittings							O					
	Evaporator moisture	O/C						O					
74	CRANES, SHOVELS AND EARTH MOVING EQUIPMENT COMPONENTS												
7411	Boom attachments:												
	Boom assemblies	O/C						O	O				
	Boom backstops							O	O				
	Cables							O/C					
	Indicator angle switch, limit							O					
	Sheaves	O/C						O					
7413	Pile driver attachments	O/C						O/C					

Section II. MAINTENANCE ALLOCATION CHART **Date**

Functional Group No.	Component Assembly Nomenclature	Maintenance operations / Maintenance levels										Note ref	
		A	B	C	D	E	F	G	H	I	J	K	L
		Service	Adjust	Aline	Calibrate	Inspect	Test	Replace	Repair	Overhaul	Rebuild	T&TE rqmt	Remarks
7414	Base deck:												
	Frame assembly, crane	O/C						H	H				
	Plates, platforms							F					
7415	Clutch:												
	Clutch assembly, magnetic							H	F				
	Clutch assembly, hoist							F	O				
	Sprocket, clutch							O					
7416	Shafts:												
	Shaft assemblies	O/C						H	H				
	Bands		O/C					O	F				
	Case assembly, chain, sprockets	O/C						O					
	Gears, brackets: bearings							H					
	Guards; shields							O	O				
7417	Hoists:												
	Bands, clutch and brake		O/C					O	F				
	Hoist drum shaft	O/C						H	H				
	Guards; shields, lagging, drums							O					
7419	Turntable:												
	Band, swing brake	O/C						O	O				
	Drum							H					
	Linkage							O					
	Rollers							O	F				
	Swing lock assembly	O/C						O	O				
7420	Machinery gear case or frame:												
	Breathers	O/C						O/C					
	Covers, guards							O					
	Pan assembly, oil							O	O				
7422	Machinery mechanism controls:												
	Brake assembly, controls	O/C						O	O				
	Lever assemblies							O	O				
7423	Gantry:							O	O				
	Spreader bar assemblies, sheaves	O/C						O	F				
7424	Crawler bed, frame and ring gear:							O					
	Frame and axle assembly	O/C						H	F				
	Gear, ring; bearings							H					
7425	Propel and steering mechanism:												
	Band assemblies	O/C						O	F				
	Clutches; bearings, gears;												
	Shafts, sprockets							H					
	Linkage; levers							O					
	Shaft assemblies, steering	O/C						F	H				
7499	Cables and ropes							O/C					

Section III. SPECIAL TOOL AND SPECIAL TEST EQUIPMENT REQUIREMENTS

Reference code	Maintenance level	Nomenclature	Tool No.
		No special tools or test required to perform maintenance on the crane.	

Section IV. REMARKS

Maintenance Allocation Chart

Reference code	Remarks
A-F	Test includes engine operation and compression
B-J	Metalize, grind, resize
C-H	Replace ring gear
D-H	Repair of valves and seats includes refacing and grinding
E-A	Replace filter element
F-H	Install repair kit
G-A	Replace filter element
H-A	Clean filter screen
H-F	Test includes bench test
I-A	Replace filter element
J-A	Clear or replace element
K-A	Service includes replacing accumulator
L-F	Correct cap pressure is 6 1/2 to 8 lbs

Maintenance Allocation Chart-Continued

Reference code	Remarks
M-H	Install repair kit
N-B	Adjust drive belt deflection to 3/4 inch
O-B	Adjust drive belt deflection to 1/2 inch
P-A	Replace element
Q-H	Repair includes installing repair kit
R-H	Repair includes installing repair kit
S-F	Bench test
T-F	Bench test
U-G	Internal lines
V-G	External lines
W-H	Replace module
X-B	Adjust drive belt deflection to 5/8 inch
Y-A	Clean filter
Z-A	Replace filter element

INDEX

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

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- Army Dep (2) except
  - Tobyhanna (3)
- USA Tml Comd (2)
- Army Tml (1)
- Div Engr (2)
- Engr Dist (2)
- USAMEC (46)
- USAECFB (5)
- USAREUR Eng Proc Cen (2)
- USAREUR Engr Sup Cen Agcy (10)
- Engr Fld Maint Shops (2)
- Ft Knox Fld Maint Shops (10)
- Fld Comd, DASA (8)
- AMS (3)
- USAREURCOMZ (2)
- MAAG (1)
- Units org under fol TOE:
  - 5-8 (2)
  - 5-237 (5)
  - 5-262 (5)
  - 5-267 (1)
  - 5-278 (5)
  - 5-279 (2)

NG: State AG (8).
USAR: Same as Active Army except allowance is one copy to each unit.
For explanation of abbreviations used, see AR 820-0.

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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 = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.365	metric tons	short tons	1.102
pound-inches	newton-meters	.11375			

Temperature (Exact)

^{o}F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	^{o}C