

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT AND  
GENERAL SUPPORT MAINTENANCE MANUAL

COMPRESSOR, RECIPROCATING;  
POWER-DRIVEN AIR 3500 PSI, TYPE II,  
CLASS 1, 15 CFM  
(NSN 4310-01-070-5615)



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INSTRUCTIONS

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PMCS

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MAINTENANCE

END ITEM  
MAINTENANCE

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PMCS

ORGANIZATIONAL  
MAINTENANCE

DIRECT SUPPORT,  
GENERAL SUPPORT  
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ALPHABETICAL INDEX

HEADQUARTERS, DEPARTMENT OF THE ARMY

1 MAY 1981

**WARNING****DEATH**

Severe injury, illness to personnel, or damage to property may result if personnel fail to observe WARNINGS and CAUTIONS contained in this manual.

Unit lifting device must be capable of lifting minimum of 2 tons (1.82 metric tons). Use spreader bars on lifting cables or chains as necessary to prevent damage to unit.

To prevent serious burns when filling battery, take precaution against spilling electrolyte on clothing or allowing to come in contact with skin or eyes. Use rubber gloves and apron. If chemical get on your skin, clothes, or equipment, wash immediately with water. If chemical get in your eyes, wash them with plenty of water and get medical help immediately.

Never attempt to remove dehydrator caps until air pressure has been relieved. High pressure air is extremely dangerous to personnel. Unit should be shut down and DEHYDRATOR BLEED valve should be open.

Do not operate the air compressor in an enclosed area unless exhaust gases are piped outside. Inhalation of exhaust fumes may result in serious illness or death.

Do not operate unit a position more than 15 degrees of level.

Compressed air is extremely dangerous. Ensure that hose being used is serviceable and all connections are secure.

Maximum towing speed is 25 MPH (40.23 kms/hr) over smooth, paved surfaces or 10 MPH (16.09 kms/hr) over rough terrain.

If ignition in winterization air heater does not take place within 3 minutes after turning control switch to either ON-LO or ON-HI, place switch in OFF and notify maintenance personnel.

Check hoses for evidence of cracks or other damage prior to starting unit.

Dry cleaning solvent, Federal Specification P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near an open flame or excessive heat. Flash point of solvent is 100°F - 130°F (38°C - 59°C).

When cleaning electrical components with trichloroethane, provide adequate ventilation; avoid prolonged breathing of vapors and minimize contact with skin.

When cleaning with compressed air, nozzle pressure shall not exceed 30psi (2.11 kgs/cm<sup>2</sup>).

Provide metal-to-metal contact between filling container (nozzle) and fuel tank filler neck when filling fuel tank to prevent a spark from being generated as gasoline flows over metal surfaces. Do not allow smoking or open flame near unit when servicing fuel tank.

Suitable blocking and lifting device shall be used to remove and install air receiver. The receiver tank weighs approximately 145 pounds (65.77 kgs).

CHANGE  
NO. 3

HEADQUARTERS  
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WASHINGTON, D.C., 15 October 1990

Operator, Organizational, Direct Support and  
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for  
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Operator, Operational, Direct Support and  
General Support Maintenance Manual  
for  
**COMPRESSOR, RECIPROCATING;  
POWER-DRIVEN AIR 3500 PSI, TYPE II,  
CLASS 1, 15 CFM  
(NSN 4310-01-070-5615)**

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DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 10 January 1984

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT  
AND GENERAL SUPPORT MAINTENANCE MANUAL  
FOR  
COMPRESSOR, RECIPROCATING; POWER-DRIVEN,  
AIR, 3500 PSI, TYPE II, CLASS 1, 15 CFM  
NSN 4310-01-070-5616

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Chapter 3	3-13 and 3-14 3-15 and 3-16	3-13 thru 3-14A/3-14B 3-15 and 3-16
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Index	Index 1 thru Index 4 Index 7 and Index 8 Index 11 and Index 12	Index 1 thru Index 4 Index 7 and Index 8 Index 11 and Index 12

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OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT  
AND GENERAL SUPPORT MAINTENANCE MANUAL  
FOR  
**COMPRESSOR, RECIPROCATING; POWER-DRIVEN,  
AIR 3500 PSI, TYPE II, CLASS 1, 15 CFM  
(DAVEY MODEL 1MCAA)  
NSN 4310-01-070-5615**

**REPORTING OF ERRORS**

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of the manual directly to Commander, U.S. Army Troop Support and Aviation Materiel Readiness Command, ATTN: DRSTS-MTT, 4300 Goodfellow Boulevard, St. Louis, Missouri 63120. A reply will be furnished to you.

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CHAPTER 1  
INTRODUCTION

Section I. GENERAL INFORMATION

**1-1. Scope.** This manual is for your use in operating and maintaining the Davey Compressor Company Model 1MCAA, Reciprocating Air Compressor. These air compressors are intended to provide clean, dry, high-pressure air for missiles and flame throwers.

**1-2. Maintenance Forms and Records.** Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, the Army Maintenance Management System (TAMMS).

**1-2.1. Hand Receipt Manual.** Hand receipts for the End Item/Components of End Item (COEI), Basic Issue Items (BI), and Additional Authorization List (AAL) items are published in a Hand Receipt Manual. The Hand Receipt Manual numerical designation is the same as the related Technical Manual with letters HR added to the number. These manuals are published to aid in property accountability and are available through: Commander, US Army Adjutant General Publications Center, 2800 Eastern Boulevard, Baltimore, MD.

**1-3. Reporting Equipment Improvement Recommendations (EIR's).** EIR's can and must be submitted by anyone who is aware of an unsatisfactory condition with the equipment design or use. It is not necessary to show a new design or list a better way to perform a procedure, just simply tell why the design is unfavorable or why a procedure is difficult. EIR's may be submitted on DA Form SF368. Mail directly to: Commander, U.S. Army Troop Support and Aviation Materiel Readiness Command, ATTN: DRSTS-MEM, 4300 Goodfellow Boulevard, St. Louis, Missouri 63120. A reply will be furnished to you.

**1-4. Warranty Information.** The Model 1MCAA air compressors are warranted by Davey Compressor Company for 12 months or 1000 hours, whichever comes first. Report all defects in material or workmanship to your supervisor, who will take appropriate action through your organizational maintenance shop.

**1-5. Nomenclature Cross-Reference.** This listing includes the nomenclature cross-reference, list of abbreviations, and explanation of terms (glossary) used in this manual.

a. *Nomenclature Cross-Reference.*

Common Name    Official Nomenclature

Air Compressor	Compressor, Reciprocating; Power-Driven, Air 3500 PSI, Type II, Class 1, 15 CFM
Engine	Engine, Gasoline, Air Cooled, Wisconsin Model VH4D, Specification No. 414926

b. *List of Abbreviations*

AMP, amp	Amperes
ASSY, assy	Assembly(ies)
ATTN	Attention
BAT	Battery
°C	Degrees Centigrade
CC, cc	Cubic centimeters
CFM, cfm	Cubic feet per minute
CU IN., cu in.	Cubic inch(es)
DA	Department of the Army
DC	Direct current
ECM	Electronic counter-measures
EIR's	Equipment Improvement Recommendations
EMI	Electromagnetic Interference
°F	Degrees Fahrenheit
FED SPEC	Federal Specification
GAL, gal	Gallons
HP, hp	Horsepower
IDENT, ident	Identification
IN., in.	Inch(es)
KGS/CM <sup>2</sup> , kgs/cm <sup>2</sup>	Kilograms per square centimeter
KMS/HR, kms/hr	Kilometers per hour
kPa	Kilopascals
LH, lh	Left-hand
LO	Lubrication Order
MAC	Maintenance Allocation Chart
MAX, max	Maximum
MIN, min	Minimum
MM, mm	Millimeter(s)
MPH, mph	Miles per hour
MS	Military Standard
MTOE	Modified Table of Organizations and Equipment
NSN	National Stock Number
ON-HI	On-high
ON-LO	On-low
PMCS	Preventive Maintenance Checks and Services

RPM, rpm	Revolutions per minute
SAE	Society of Automotive Engineers
SMR	Source, Maintenance and Recoverability
TM	Technical Manual
TMDE	Test, Measurement, and Diagnostic Equipment
TS	Troop Support
V	Volt(s)
VDC, vdc	Volts direct current
PSI, psi	Pounds per square inch
QA/QC	Quality assurance/quality control
RCMS	Reliability Centered Maintenance Strategy
RH, rh	Right-hand

c. *Glossary.*

Front	Towing end of unit
Rear	Operating control end of unit, opposite towing end
Right side	Right-hand side of unit facing control panel
Left side	Left-hand side of unit facing control panel
Unit	Compressor, Air, Reciprocating; Gasoline Engine, Power Driven, 3500 PSI, Type II, Class 1, 15 CFM, Davey Model 1MCAA
Manufacturer	Davey Compressor Company, Cincinnati, Ohio 45242

**Section II. EQUIPMENT DESCRIPTION**

**1-6. Equipment Purpose, Capabilities, and Features.**

**a. Equipment Purpose.** The air compressors are intended to provide clean, dry, high-pressure air for charging air systems on missiles and flame throwers.

**b. Capabilities and Features.**

- (1) 15 Cubic feet of air per minute (CFM) (0.425 m<sup>3</sup>/min)

- (2) 3500 pounds per square inch (PSI) (246.05 kgs/cm<sup>2</sup>)
- (3) Four-wheel mounted, steerable
- (4) Air-cooled gasoline engine driven
- (5) Reciprocating air compressor, four stages
- (6) Winterization system
- (7) Moisture separation system

**Legend for fig. 1-1:**

**ENGINE ASSEMBLY (1).** Provides driving power for air compressor.

**AIR HEATER ASSEMBLY (2).** Provides heated air in engine and compressor compartment for cold weather starting.

**CLUTCH ASSEMBLY (3).** Connection between engine and compressor. Disengage for starting and stopping, engage for compressor operation.

**AIR COMPRESSOR ASSEMBLY (4).** Provides compressed air at rate of 15 CFM (0.43 M<sup>3</sup>/MIN) at pressure of 3500 PSI (246.05 KGS/CM<sup>2</sup>) by compression through four stages.

**AIR COOLER ASSEMBLY (5).** A four stage finned-type cooler to cool compressed air after each stage of compression. Cooling is accomplished by air being drawn through the cooling sections by a suction type fan attached to compressor crankshaft.

**COMPRESSOR ENCLOSURE (6).** A sheet metal housing with access doors providing a protective enclosure for the unit components.

**1-7. Location and Description of Major Components.** Refer to figure 1-1 for location and description of major components.

**AIR RECEIVER ASSEMBLY (7).** Provides a reservoir for the compressed air. Has capacity of 1370 CU IN. (22.45 liters).

**FUEL TANK (8).** Reservoir for engine and heater operating fuel (gasoline). Capacity of 20-3/4 gallons (78.45 liters).

**HAND BRAKE LEVER (9).** Actuates rear axle parking brakes.

**SAFETY CHAINS (10).** Safety attachment to towing vehicle.

**DEHYDRATORS AND FILTER GROUP (11).** Filtering medium for removal of moisture and contaminants from compressed air. Dehydrators use chemical-type cartridges, type MA-2.

**INSTRUMENTS AND CONTROL PANEL (12).** Contains all operating controls and indicating instruments necessary for unit operation.

**AIR SERVICE HOSE AND AIR CHUCK SERVICE VALVE (13).** Air service hose for supplying air to system being serviced. Air chuck service valve provided for control of service air at end of hose.

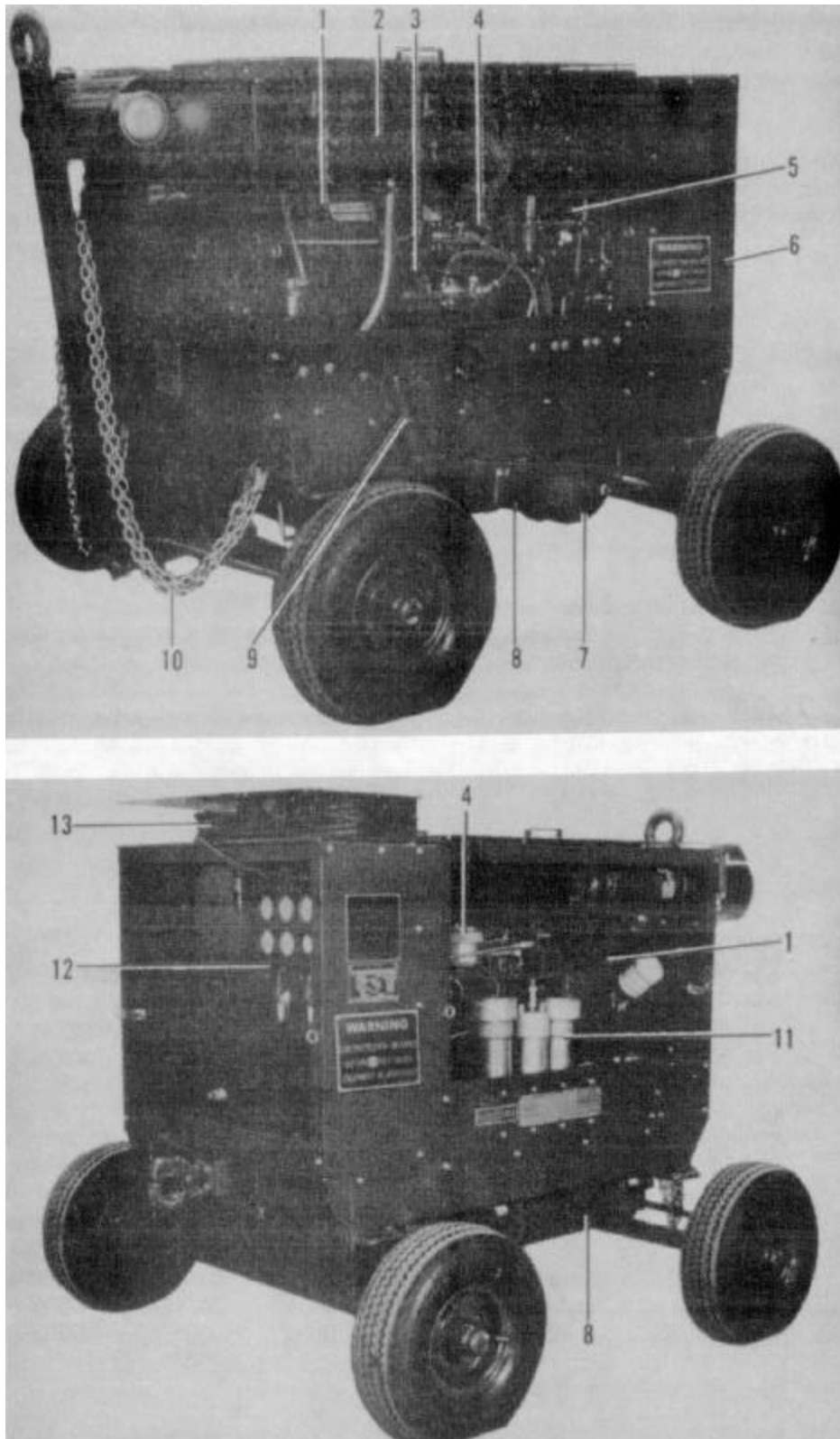


Figure 1-1. Location and description of major components



**Army Vehicle Registration Numbers - Continued**

(Unit serial numbers 33566 and up,  
model designation 4C41RDEW)

WS00J6	WS00JK	WS00JY	WS00KB
WS00J7	WS00JL	WS00JZ	WS00KC
WS00J8	WS00JM	WS00K0	WS00KD
WS00J9	WS00JN	WS00K1	WS00KE
WS00JA	WS00JP	WS00K2	WS00KF
WS00JB	WS00JQ	WS00K3	WS00KG
WS00JC	WS00JR	WS00K4	WS00KH
WS00JD	WS00JS	WS00K5	WS00KJ
WS00JE	WS00JT	WS00K6	WS00KK
WS00JF	WS00JU	WS00K7	WS00KL
WS00JG	WS00JV	WS00K8	WS00KM
WS00JH	WS00JW	WS00K9	
WS00JJ	WS00JX	WS00KA	

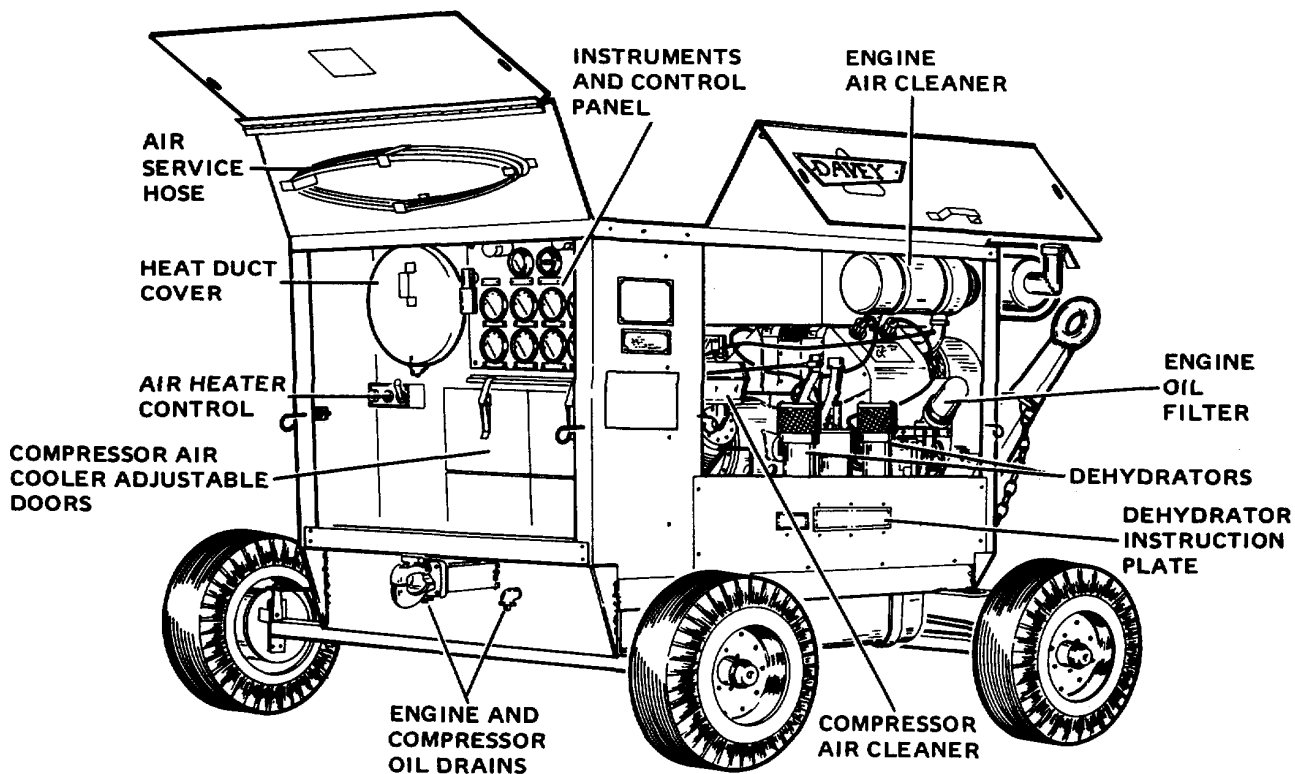
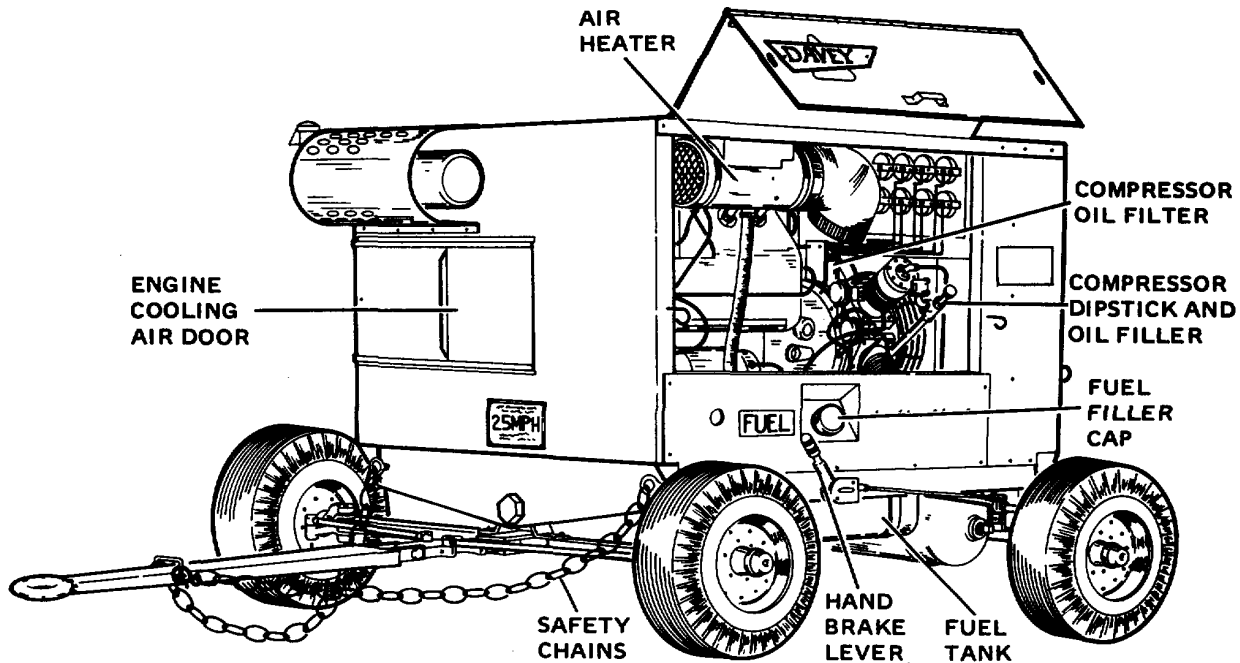


**Section III. TECHNICAL PRINCIPLES OF OPERATION**

**1-10. Technical Principles of Operation.** Refer to figure 1-2 for functional description of equipment operation within scope of the operator.

**1-11. Wiring Diagram.** Refer to figure 1-3 for unit wiring diagram.

**1-12. Air Flow Diagram.** Refer to figure 1-4 for unit air flow diagram.



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Figure 1-2. Technical principles of operation.

Legend for fig. 1-2:

**ENGINE COOLING AIR DOOR** - slide open for normal operation; slide closed, or partially closed, for cold weather operation. There is also a door on top of roof that should be open when operating.

**AIR HEATER** - is a gasoline burning heater with fuel supplied from unit fuel tank. Used for heating when engine-compressor compartment prior to starting in extremely cold weather. Not to be used after starting.

**COMPRESSOR OIL FILTER** - spin-off throw-away type. Change filter in accordance with LO 5-4310-365-12.

**COMPRESSOR DIPSTICK AND OIL FILTER** - pull dipstick out to check oil level. Use funnel in dipstick guide when adding or filling with oil. Change oil in accordance with LO 5-4310-365-12.

**FUEL FILLER CAP** - has vent hold in center of cap. Screen filter beneath cap in filler neck. Cap attached to filler neck by chain.

**FUEL TANK** - use gasoline only, capacity 20-3/4 gal (78.45 liters). Houses fuel level gauge on top of take next to filler neck. Drain plug in bottom of tank.

**HAND BRAKE LEVER** - operates the mechanical parking brakes on rear axle. Adjust lever action by turning handle of lever.

**SAFETY CHAINS** - equipped with safety-type grabhooks on end of each chain. Attach chains to towing vehicle for breakaway safety protection.

**AIR SERVICE HOSE** - high pressure service hose coiled on hangers inside operating controls compartment door. Has quick disconnect fitting for attachment to service outlet on control panel. Air chuck and service valve provided clipped on door for attachment to end of service hose.

**INSTRUMENTS AND CONTROL PANEL** - contains all operating controls and indicating instruments housed in a protective compartment. Refer to Chapter 2 for detailed descriptions and operating instructions.

**ENGINE AIR CLEANER** - dry type, cleanable element. Hose from intake elbow to restriction indicator on instrument panel. Indicator shows red when element cleaning is required.

**ENGINE OIL FILTER** - spin-off throw-away type. Change filter in accordance with LO 5-4310-365-12.

**DEHYDRATORS** - chemical type, replaceable MS-2 cartridges.

**DEHYDRATOR INSTRUCTION PLATE** - has instructions for changing dehydrator cartridges. Space provided for recording hourmeter reading when cartridges are changed.

**COMPRESSOR AIR CLEANER** - oil bath or dry type, cleanable element. Hose from intake elbow to restriction indicator on instrument panel. Indicator shows red when element cleaning is required.

**ENGINE AND COMPRESSOR OIL DRAINS** - remove plug from elbow to drain engine or compressor oil. Change oil in accordance with LO 5-4310-365-12.

**COMPRESSOR AIR COOLER ADJUSTABLE DOORS** - doors are opened for normal operation. Closed and adjusted for necessary cooling during cold weather operation.

**AIR HEATER CONTROL** - has press-to-test light for checking circuit, reset button for circuit breaker, and three position switch for air heater control. Operate heater only for warm-up of inside compartment prior to starting in extremely cold weather.

**HEAT DUCT COVER** - remove cover for attachment of 12-inch diameter heat duct from auxiliary heat source for compartment warm-up.

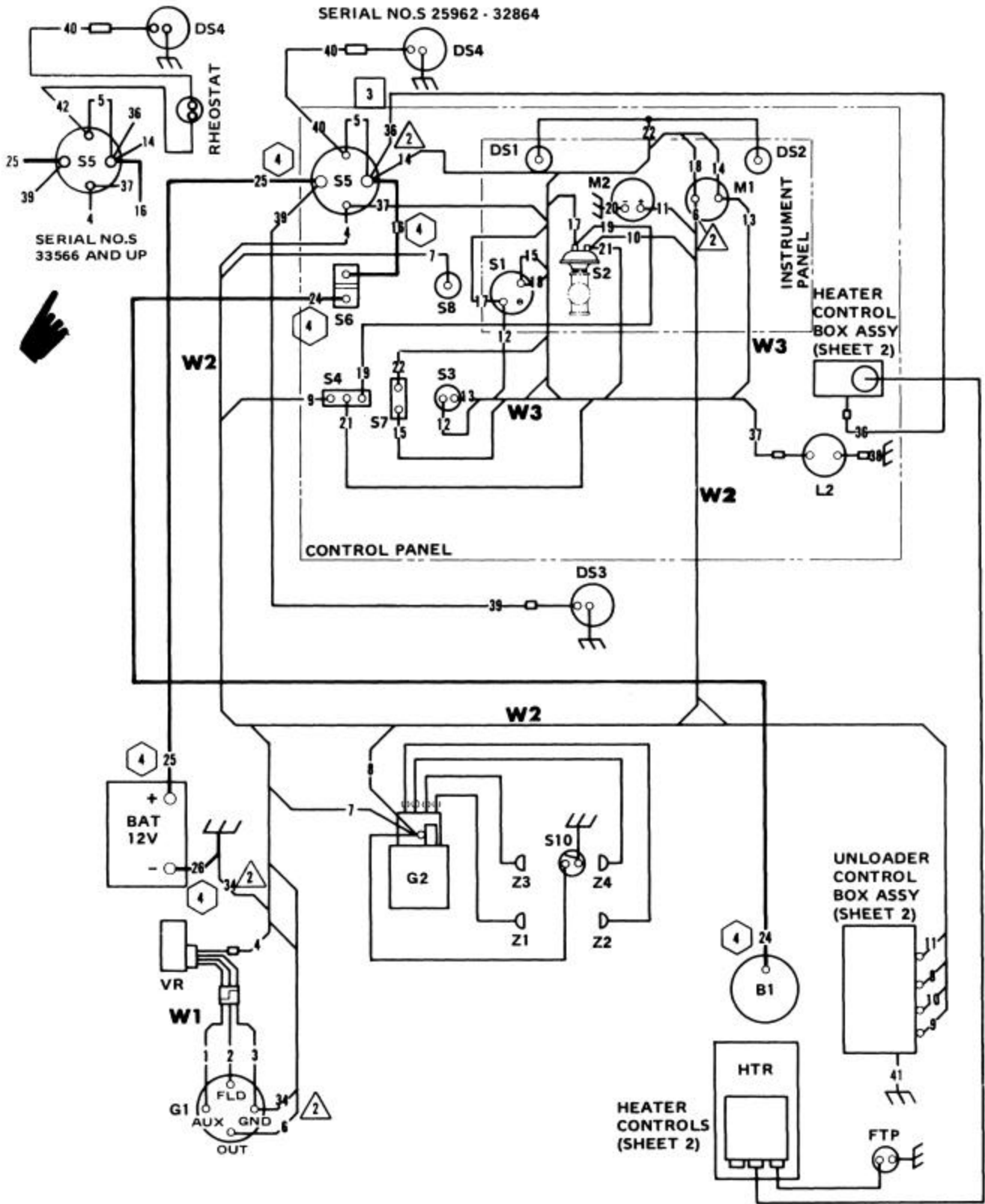
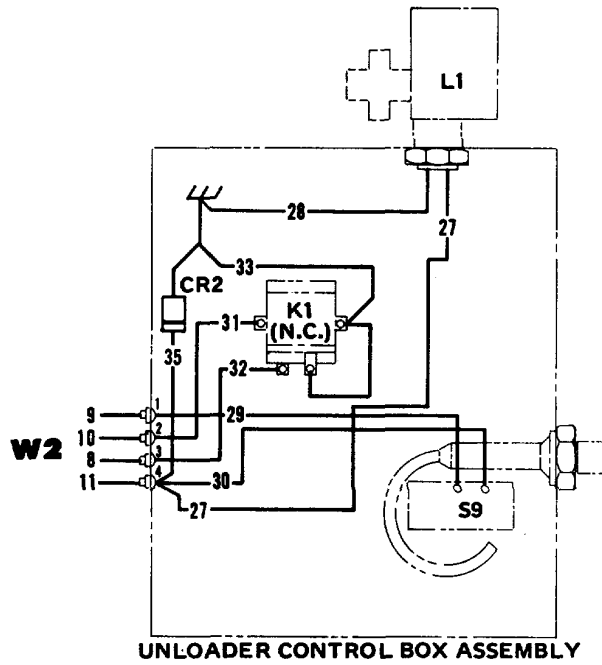


Figure 1-3. Wiring diagram (sheet 1 of 2)

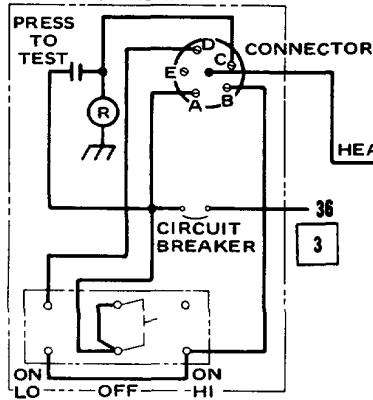
Legend for fig. 1-3:

- B1 Engine starting motor
- BAT Battery
- CR2 Diode assembly
- DS1 Panel lamp
- DS2 Panel lamp
- DS3 Compartment lamp
- DS4 Blackout lamp
- FTP Heater fuel pump
- G1 Alternator
- G2 Magneto
- HTR Winterization heater
- K1 Relay
- L1 Control solenoid valve
- L2 Receiver solenoid valve
- M1 Ammeter
- M2 Hourmeter
- S1 Engine oil press. switch

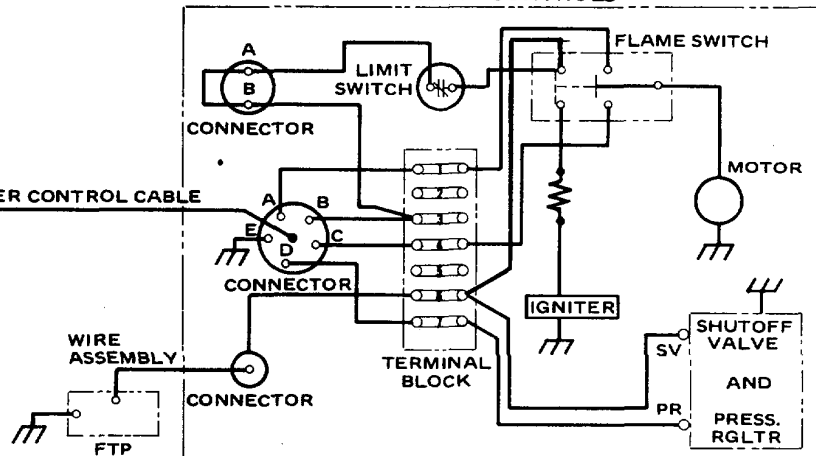
- S2 Compressor oil press. switch
- S3 Engine oil press. sw override
- S4 Compressor load-unload switch
- S5 Master switch
- S6 Start switch
- S7 Light switch
- S8 Ignition switch
- S9 Control pressure switch
- S10 Cylinder head temp switch
- VR Voltage regulator
- W1 Wiring harness
- W2 Wiring harness
- W3 Wiring harness
- Z1 Spark plug, No. 1 cyl
- Z2 Spark plug, No. 2 cyl
- Z3 Spark plug, No. 3 cyl
- Z4 Spark plug, No. 4 cyl



**HEATER CONTROL BOX ASSEMBLY**



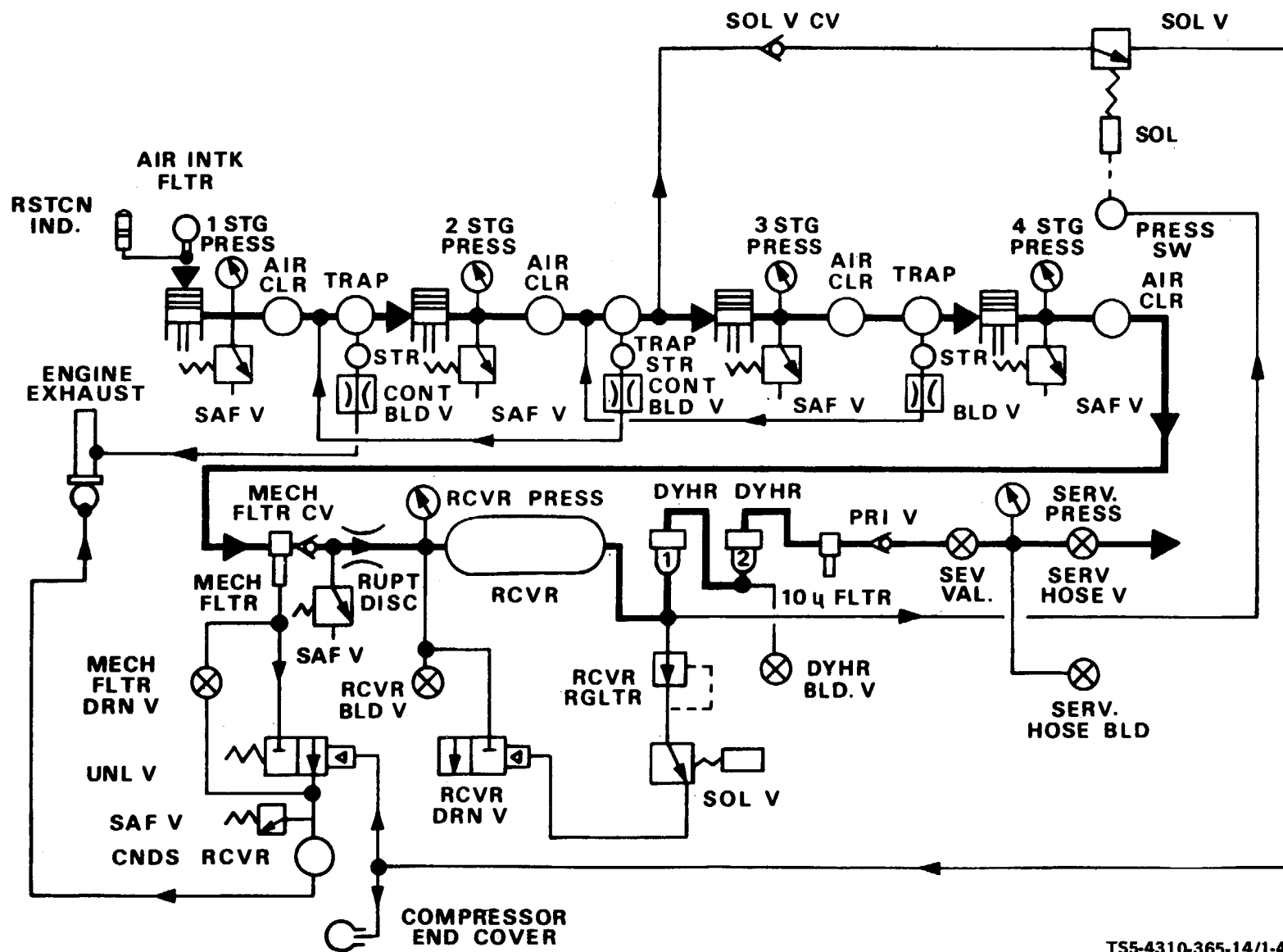
**HEATER CONTROLS**



- NOTES: 1. All wiring single conductor, stranded 14 ga THW, 600 V Polyvinyl insulated, except where noted.
- 2. Single conductor, stranded 10 ga THW, 600 V Polyvinyl insulated.
  - 3. Single conductor, stranded 12 ga THW, 600 V Polyvinyl insulated.
  - 4. Single conductor, stranded 04 ga THW, 600 V Polyvinyl insulated.

TS 5-4310-365-14/1-3 (2)

Figure 1-3. Wiring diagram (sheet 2 of 2)



TS5-4310-365-14/1-4

Figure 1-4. Air flow diagram

**CHAPTER 2  
OPERATING INSTRUCTIONS**

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**Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS**

**2-1. Operator's Controls.** Refer to figure 2-1 for description and use of operator's controls.

**2-2. Operating Indicators.** Refer to figure 2-2 for description and use of operator's indicators.

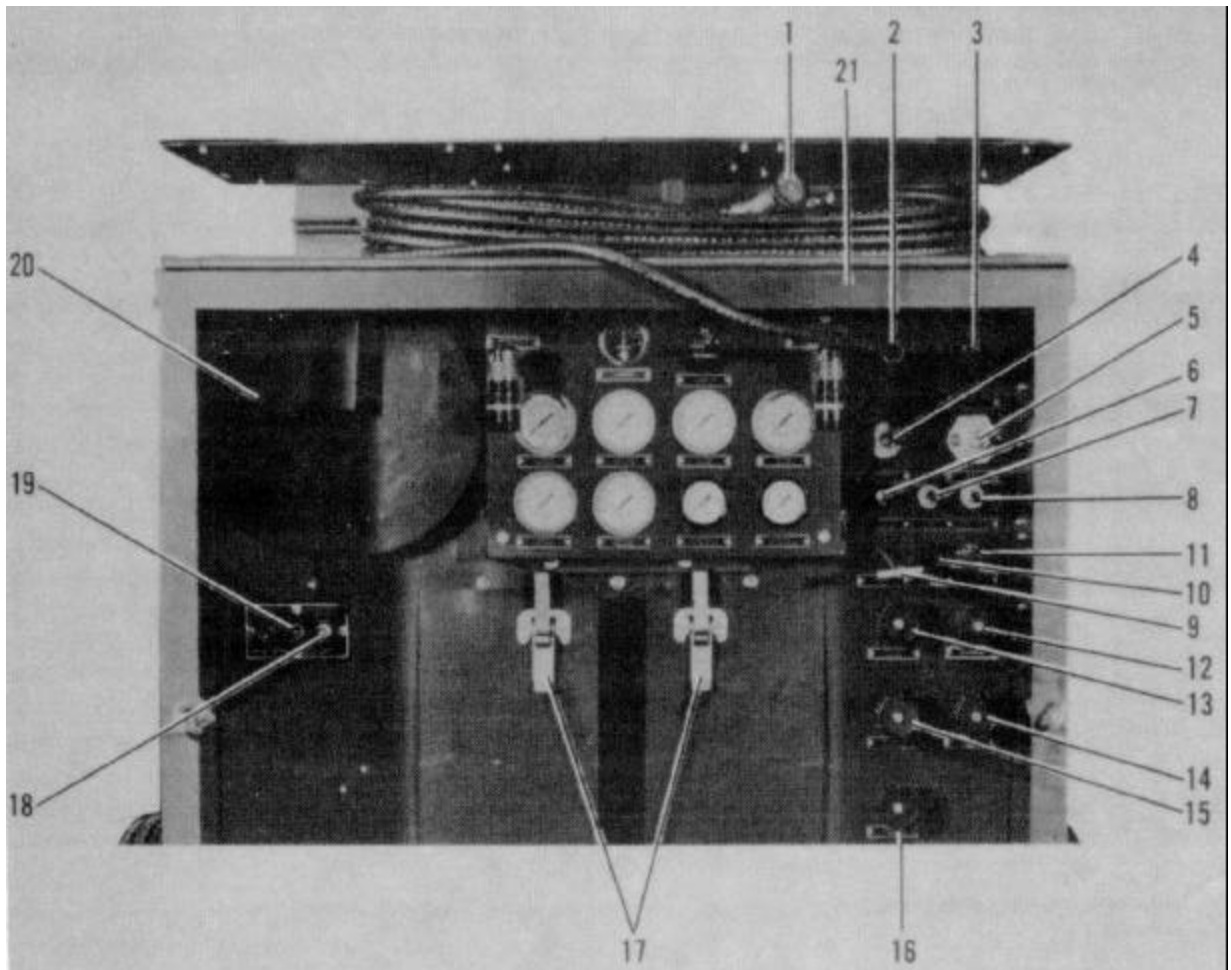
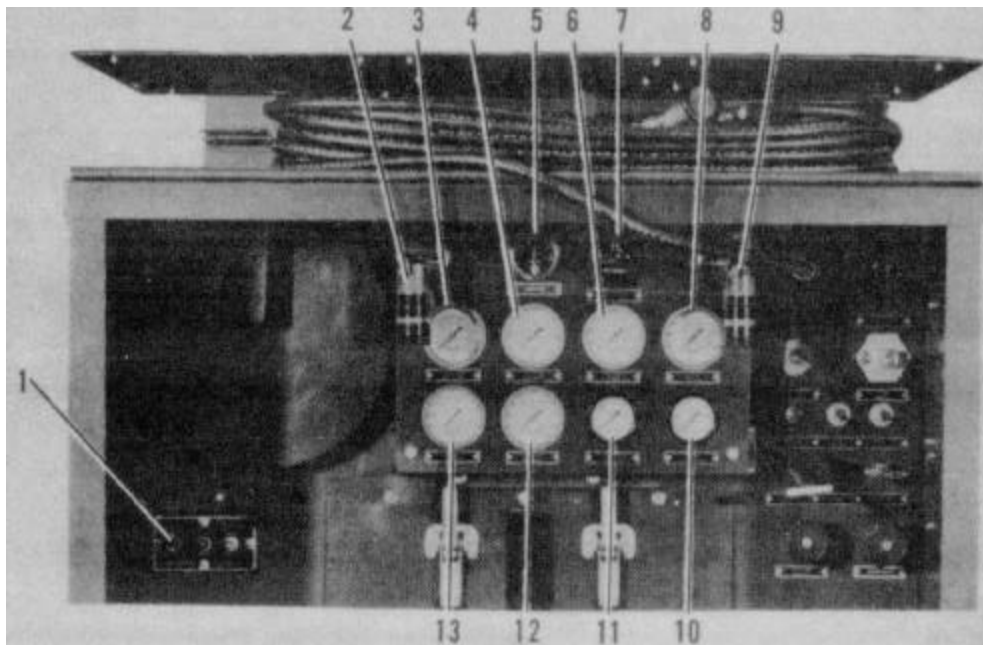


Figure 2-1. Description and use of operator's controls.



Legend for fig. 2-1:

KEY	OPERATING CONTROL	FUNCTION
1	Air chuck service valve	Regulate flow of air from service hose.
2	Service hose connection	A quick-disconnect type fitting for attaching service hose assembly to air source on panel.
3	Master switch	To turn ON and OFF the unit's main electrical system.
4	Ignition switch	To turn ON and OFF the engine electrical ignition system.
5	Start switch	To energize the engine electrical starting motor.
6	Safety override pushbutton	To override the safety shutdown pressure switches when starting.
7	Light switch	Turns instrument panel lights ON and OFF.
8	Compressor unloader switch	A two position switch to control the LOAD and UNLOAD operation of compressor.
9	Clutch handle	To engage and disengage the clutch drive between engine and compressor.
10	Choke	Closes or opens choke plate in engine carburetor.
11	Throttle	Controls engine speed. Handle turns clockwise to lock in position, counter-clockwise to unlock. When unlocked, handle pulls out to increase engine speed, push in to decrease.
12	Service outlet valve	Open valve to direct air to service hose connection. Close to shut off air flow.
13	Service hose bleed valve	Open to bleed off air trapped in service hose.
14	Receiver bleed valve	Open to bleed off air from air receiver.
15	Mechanical filter drain	Open to drain condensate, contaminants, and trapped air from mechanical filter.
16	Dehydrator bleed	Open to bleed off air trapped in dehydrators.
17	Air cooler adjustable doors	Doors slide and open to adjust air flow through air cooler.
18	Air heater control switch	Three position switch to control the heater operation in ON-HI, OFF, and ON-LO. Used only in extremely cold starting operation.
19	Circuit breaker reset	Circuit breaker in heater control provides overload protection in case of electrical wiring failure. If failure occurs, button will pop out. After failure is corrected, reset button is pushed in. May be used as master heater disconnect by pulling button out.
20	External, preheat duct connection	For attachment of 12-inch diameter preheat duct for cold weather heating of compressor-engine compartment.
21	Blackout dome light	To illuminate instrument and control panel under blackout conditions.
22	Blackout light rheostat (serial no. 33566 and up)	To control intensity of blackout light.
	Compressor compartment dome light (Not shown)	To illuminate the compressor compartment.



Legend for fig. 2-2:

KEY	OPERATING CONTROL	FUNCTION
1	Heater control indicator light and press-to-test	Light operates in response to heater flame switch and will remain on while heater is operating. Light will also be on, after heater is shut off, while combustible gases and fuel are being purged from heater. Light is also used as check of power supply to heater by press-to-test.
2	Compressor air restriction indicator	Indicator window, normally green, turns red when compressor air cleaner is restricted. Press top to reset to green after air cleaner element is cleaned.
3	1st stage pressure gauge	Indicates compression pressure of first stage cylinder.
4	2nd stage pressure gauge	Indicates compression pressure of second stage cylinder.
5	Ammeter gauge	Indicates charge or discharge rate of electrical system.
6	3rd stage pressure gauge	Indicates compression pressure of third stage cylinder.
7	Hourmeter	Indicates compressor running time in hours and tenths of hours.
8	4th stage pressure gauge	Indicates compression pressure of the fourth stage cylinder.
9	Engine air restriction indicator	Indicator window, normally green, turns red when engine air cleaner is restricted. Press top to reset to green after air cleaner element is cleaned.
10	Engine oil pressure gauge	Indicates pressure of engine lubricating oil.
11	Compressor oil pressure gauge	Indicates pressure of compressor lubricating oil.
12	Receiver pressure gauge	Indicates air pressure within the air receiver.
13	Service pressure gauge	Indicates air pressure being delivered to air service hose.

Figure 2-2. Description and use of operator's indicators.

## Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

**2-3. General.** Refer to table 2-1 for preventive maintenance checks and services (PMCS) and the following instructions.

**a. Before You Operate.** Always keep in mine the CAUTIONS and WARNINGS. Perform your before (B) PMCS.

**b. While You Operate.** Always keep in mine the CAUTIONS and WARNINGS. Perform your (D) PMCS.

**c. After You Operate.** Be sure to perform your after (A) PMCS.

**d. If Your Equipment Fails to Operate.** Troubleshoot with proper equipment. Report any deficiencies using the proper forms, see TM 38-750.

**2-4. PMCS Procedures.** PMCS procedures shown in table 2-1 are listed in a sequence requiring minimum time and motion to perform. The columns in the table are explained below.

**a. Item Number Column.** Checks and services are listed in chronological order regardless of interval. This column shall be used as a source of item numbers for the "TM Number" column on DA Form 2404,

Equipment Inspection and Maintenance Worksheet, in recording results of PMCS.

**b. Interval Columns.** The columns headed "B," "D," "A," "W," and "M" contain a dot (●) opposite the appropriate check. If a check is to be performed before operation, the dot appears opposite that check in the "B" column; if the check is to be accomplished during operation, the dot appears in the "D" column. If a check is to be made at two or more intervals, a dot appears in each applicable column.

**c. Item to be Inspected Column.** Items listed in this column are divided in groups indicating the portion of the equipment of which they are a part. Under these groupings, the name to be inspected is identified by its common name.

**d. Procedures Column.** This column contains a brief description of the procedure by which the check is to be performed.

**e. For Readiness Reporting, Equipment is Not Ready/Available If: Column.** This column contains the criteria which will cause the equipment to be classified as "not ready" because of inability to perform its primary task.

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services

**NOTE: Within designated interval, these checks are to be performed in the order listed.**

B - Before  
D - During

A - After  
W - Weekly

M - Monthly

ITEM NO	INTERVAL					ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING, EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A	W	M			
1		●			●	Muffler	Check for loose connections and holes of cracked seams	Holes in muffler or seams cracked.
2	●	●		●		Service hose and fittings	Inspect for damaged hose, cross-threading of fittings and operation of hand valve	Hose or fittings are damaged.
3					●	Compressor enclosure	Inspect for broken hinges, door latches, and for dents.	
4	●				●	Fuel lines and fittings	Check fuel line connections and fittings for tightness and leaks. Inspect fuel filter bowl for damage.	Broken or missing fuel lines, damaged fuel filter bowl.
5	●				●	Air lines and fittings	Check air line connections for tightness and any visible damage to lines.	Air lines are damaged.
6					●	Alternator and drive belt	Alternator tight, belt tension correct.	
7					●	Starter and cable connections	Check for secure mounting and terminal corrosion.	Starter is damaged.
8	●	●			●	Engine assembly	Check for any visible damage. Check oil level with dipstick. Service as necessary. (Refer to LO 5-4310-365-12.) Check for oil leaks and smooth running.	Engine is damaged; has missing parts, such as spark plugs.
9	●	●			●	Air compressor assembly	Check for any visible damage Check for oil leaks. Check oil level with dipstick. Service as necessary. (Refer to LO 5-4310-365-12.)	Compressor damaged, excessive oil usage, oil leaks.
10	●	●	●		●	Instrument and control panel	Check operation of switches. Check for damaged gauges. Check hand valves for sticking and free operation. Inspect for frayed or burned wiring. See table 2-2 for normal operating gauge readings and valve operations.	Switches, gauges, hand valves, wiring damaged.
11	●		●			Fuel level gauge	Check fuel level; add fuel as necessary.	

Table 2-1. Operator/Crew Preventive Maintenance Checks and Services - Continued

B - Before  
D - During

A - After  
W - Weekly

M - Monthly

ITEM NO	INTERVAL					ITEM TO BE INSPECTED	PROCEDURES CHECK FOR AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING, EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A	W	M			
12	●					Dehydrators	Check replacement interval and change cartridges as required.	Cartridge change is indicated and no new cartridge available.
13		●				Engine air cleaner	Squeeze rubber discharge valve once or twice a day to be sure it is not plugged with dirt.	
14				●		Engine air cleaner	Inspect cup assembly and element. Clean as necessary. Replace element after six cleanings.	
15		●				Restriction indicators	Check color of window. Normally green. When shows read, clean air cleaner element shown restricted.	
							<b>NOTE</b> Use distilled water or a good grade drinking water (excluding mineral water).	
16				●		Battery	Check electrolyte level and fill as necessary. Check cables for tightness and terminals for corrosion.	
17				●		Tires	Check for wear and correct tire pressure (30 psi) (2.11 kgs/cm <sup>2</sup> ).	Tires are flat.
18					●	Brakes	Check hand brake operation.	Hand brake will not hold unit.
19					●	Chassis and running gear	Inspect for proper operation and lubricate in accordance with LO 5-4310-365-12.	Unit does not steer properly; has damaged towbar.

Table 2-2. Operating Controls and Instruments Functions

<b>MANUAL CONTROL VALVES</b>					
<b>VALVE NAME</b>	<b>LOCATION</b>	<b>FUNCTION</b>	<b>STARTUP POSITION</b>	<b>OPERATING POSITION</b>	<b>SHUTDOWN POSITION</b>
Service hose bleed	13, Fig. 2-1	Bleed trapped air from service hose and lines.	Closed	Closed	Open to bleed, then, close.
Service outlet	12, Fig. 2-1	Control air supplied to service outlet.	Closed	Open	Close
Mechanical filter drain	15, Fig. 2-1	Drain moisture from mechanical filter.	Closed	Closed	Open to drain; then, close.
Receiver bleed	14, Fig. 2-1	Exhaust pressure and moisture from receiver.	Closed	Closed	Open to bleed; then, close.
Dehydrator bleed	16, Fig. 2-1	Drain moisture and air from dehydrators.	Closed	Closed	Open to bleed; then, close.
Air chuck service valve	1, Fig. 2-1	Regulate flow of air from service hose to air chuck.	Closed	Open as necessary	Closed
Condensate receiver drain cock		Drain condensate receiver trap	Closed	Closed	Open to drain; then, close.

**INSTRUMENT OPERATING RANGES**

<b>INSTRUMENT</b>	<b>LOCATION</b>	<b>INSTRUMENT RANGE</b>	<b>NORMAL OPERATING RANGE</b>
Restriction indicators	2, 9, Fig. 2-2	Green to red	Green
Ammeter	5, Fig. 2-2	-60 to +60 amp	0
Hourmeter	7, Fig. 2-2	0 to 9999.9 hours	Compressor load time
First stage pressure gauge	3, Fig. 2-2	0 - 100 psi (0 - 700 kPa)	50 - 60 psi (345 - 413 kPa)
Second stage pressure gauge	4, Fig. 2-2	0 - 600 psi (0 - 4000 kPa)	180 - 200 psi (1240 - 1378 kPa)
Third stage pressure gauge	6, Fig. 2-2	0 - 2000 psi (0 - 14000 kPa)	850 - 950 psi (5857 - 6546 kPa)
Fourth stage pressure gauge	8, Fig. 2-2	0 - 5000 psi (0 - 35000 kPa)	3500 - 3550 psi (24115 - 24450 kPa)

Table 2-2. Operating Controls and Instruments Functions - Continued

INSTRUMENT OPERATING RANGES - Continued			
INSTRUMENT	LOCATION	INSTRUMENT RANGE	NORMAL OPERATING RANGE
Service pressure gauge	13, Fig. 2-2	0 - 5000 psi (0 - 35000 kPa)	3500 - 3550 psi (24115 - 24460 kPa)
Receiver pressure gauge	12, Fig. 2-2	0 - 5000 psi (0 - 35000 kPa)	3500 - 3550 psi (24115 - 24460 kPa)
Compressor oil pressure gauge	11, Fig. 2-2	0 - 60 psi	20 - 30 psi
Engine oil pressure gauge	10, Fig. 2-2	0 - 15 psi	7 - 12 psi

**MANUAL SWITCHES AND CONTROLS**

VALVE NAME	LOCATION	FUNCTION	STARTUP POSITION	OPERATING POSITION	SHUTDOWN POSITION
Master switch	3, Fig. 2-1	To make or break unit electrical system	ON	ON	OFF
Ignition switch	4, Fig. 2-1	To make or break engine ignition system.	ON	ON	OFF
Start switch	5, Fig. 2-1	To energize electrical starting system	Press in to start		
Safety override switch	6, Fig. 2-1	To override safety shutdown pressure switch. (Low engine oil pressure)	Press in to start together with start switch until oil pressure is indicated; then, release.		
Light switch	7, Fig. 2-1	To turn panel lights on and off	ON	ON	OFF
Compressor unloader switch	8, Fig. 2-1	To control the compressor load and unload operation.	UNLOAD	LOAD	UNLOAD
Clutch handle	9, Fig. 2-1	To engage and disengage the clutch	Pulled out away from panel	Pushed in to engage clutch	Pulled out
Choke	10, Fig. 2-1	To close and open carburetor choke plate	Pulled out away from panel	Pushed in after engine is warmed.	Pushed in

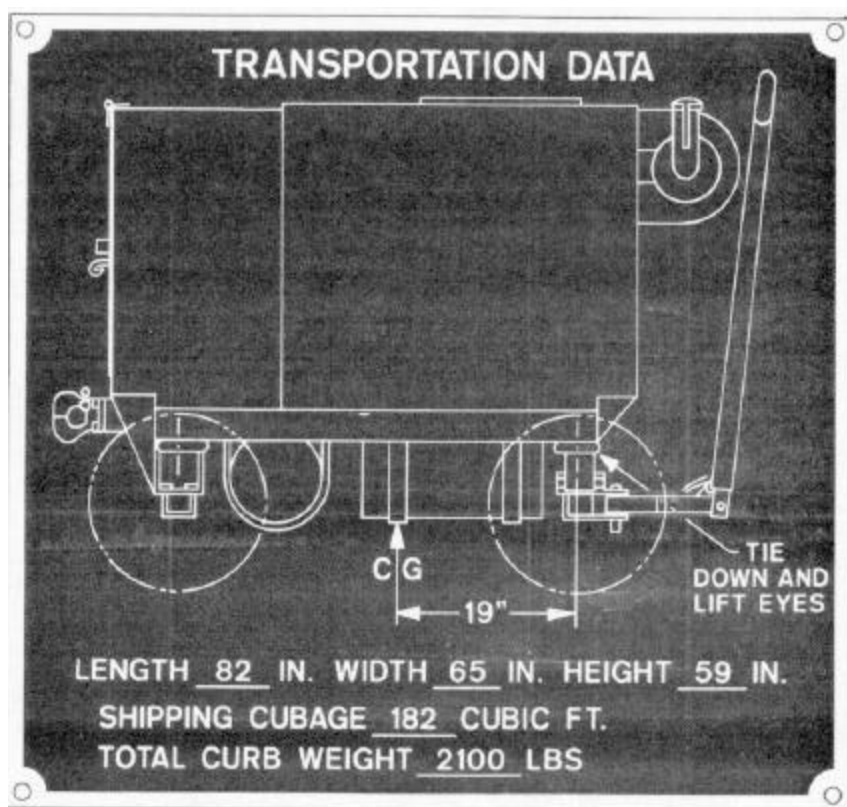
Table 2-2. Operating Controls and Instruments Functions - Continued

MANUAL SWITCHES AND CONTROLS - Continued					
VALVE NAME	LOCATION	FUNCTION	STARTUP POSITION	OPERATING POSITION	SHUTDOWN POSITION
Throttle	11, Fig. 2-1	To control engine speed.	Half way out and locked.	Full out and locked.	Full in and locked.
Heater control switch	18, Fig. 2-1	To activate the heater for cold weather unit warm-up.	See para 2-11 for operation of heater.	OFF	OFF

**Section III. OPERATION UNDER USUAL CONDITIONS**

**2-5. Assembly and Preparation for Use.** The air compressor is shipped as a completely assembled unit. Lifting and tiedown eyes are provided on the chassis frame as shown in figure 2-3.

**NOTE**  
The method of attachment to transporting equipment will be determined by the type of carrier used.



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Figure 2-3. Transportation data plate.



**WARNING**

**A lifting device used for unloading must be capable of lifting a minimum of 2 tons (1.82 metric tons.)**

**a. Unloading.** The unit can be unloaded from the transporting carrier by a lifting device or towed. When lifting device is used, attach to lifting eyes (shown in figure 2-3) and use spreader bars as necessary.

- (1) Remove all blocks and tie down securing unit to carrier.
- (2) Lift or tow unit off carrier. If being towed, release hand brake by pulling up on lever.
- (3) When unit reaches preparation site, set hand brake by pushing down on lever.

**b. Unpacking and Deprocessing.** Remove all crating, blocking, and protective material. Refer to DA Form 2258 (Depreservation Guide for Vehicles and Equipment) furnished with the unit and complete deprocessing as necessary before doing any servicing.

- (1) Refer to basic is issue items list (Appendix B) and check to see if you received all required items.
- (2) Check for and tighten any loose mounting screws and nuts.. Visually check for missing parts and for damage that may have occurred during shipment.

**WARNING**

**To prevent serious burns when filling battery, take precautions against spilling electrolyte on clothing or allowing it to come in contact with skin or eyes. Use rubber gloves and apron. If chemicals get on your skin, clothes, or equipment, wash immediately with water. If chemicals get in your eyes, wash them with plenty of water and get medical help immediately.**

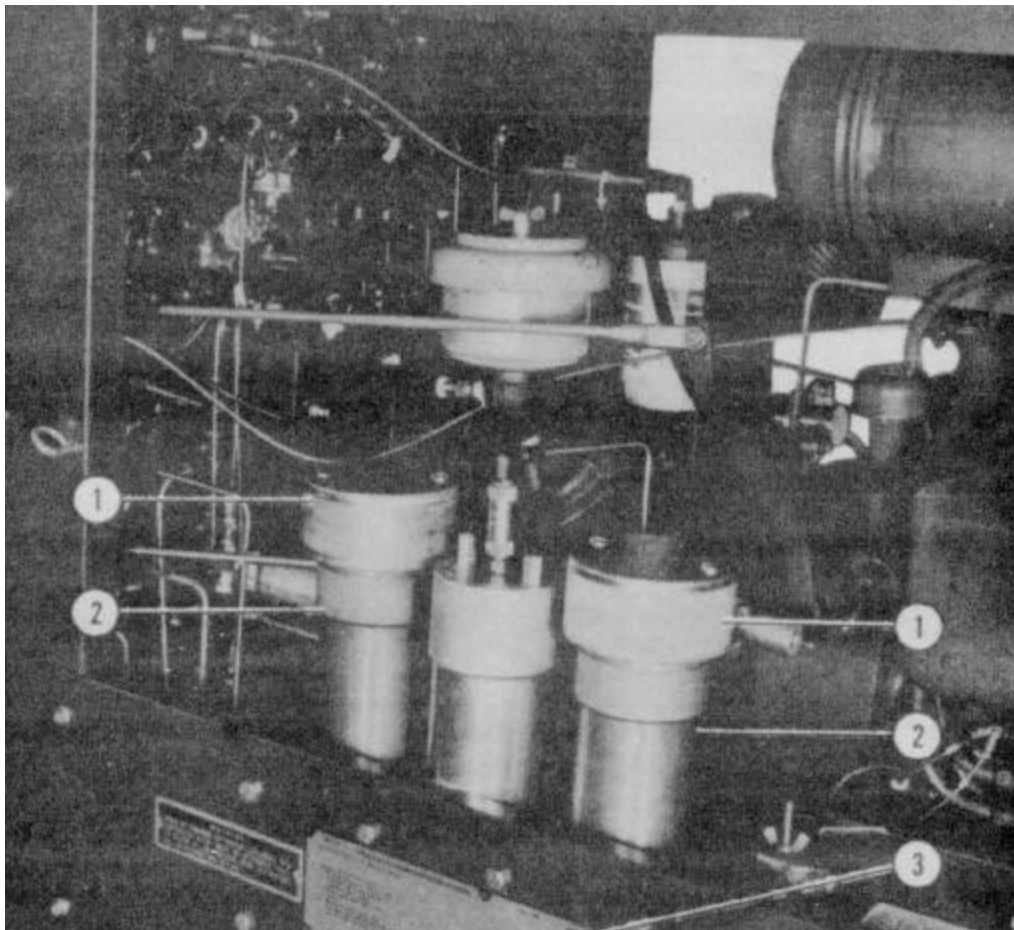
- (3) Battery electrolyte is shipped separately. Service and charge the battery in accordance with TM 9-6140-200-15.
- (4) Dehydrator cartridges are shipped separately. Install cartridges as shown in figure 2-4.

**WARNING**

**Never attempt to remove dehydrator caps until air pressure had been relieved. High pressure air is extremely dangerous to personnel. Unit should be shut down and DEHYDRATOR BLEED valve should be open.**

**CAUTION**

**Do not over-tighten dehydrator caps. Tighten securely by hand only. Do not spin cap on cylinder to bottom thread. This will make threads seize.**



- 1 Unscrew and remove dehydrator caps (1), lifting straight up to clear cartridge piercing blades of dehydrator cylinders (2). Use strap type wrench if necessary. Make certain cylinders are clean.
- 2 Install Type MA-2 cartridges in each of the cylinders (2) in accordance with instruction on cartridge overwrap.
- 3 Assemble caps (1) back onto cylinders (2). Apply enough force to the caps to pierce cartridges.. Screw caps down firmly against cylinders by hand. DO NOT OVERTIGHTEN. DO NOT SPIN CAP TO BOTTOM THREADS.
- 4 Record the hourmeter reading (7, fig. 2-2) in space provided on dehydrator instruction plate (3).

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Figure 2-4. Dehydrator cartridge installation.

**WARNING**

Do not operate the air compressor in an enclosed area unless exhaust gases are piped to outside. Inhalation fumes may result in serious illness or death.

- (5) Position unit where there is adequate ventilation and air circulation and make certain that exhaust fumes will be directed away from the operator.

**CAUTION**

The unit should never be operated in a position more than 15 degrees off level.

- (6) Refer to table 2-2 and make certain all switches, controls, and valves are in "Shutdown Position."

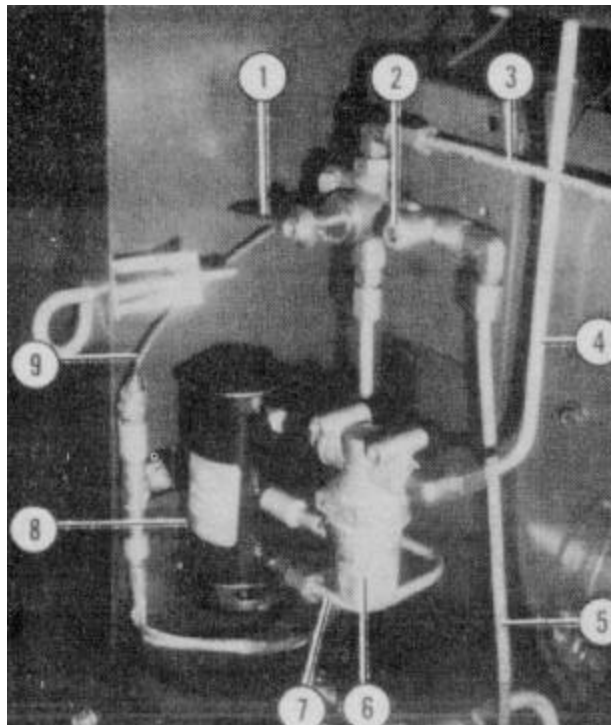
**2-6. Initial Adjustments, Daily Checks, and Self Test.**

Perform all before preventive maintenance checks and services (PMCS) shown in table 2-1 and the following:

**NOTE**

Lubricate in accordance with LO 5-4310-365-12.

- a. Open all access doors on sides, roofs, and both ends.
- b. If temperature is below 45°F (7.2°C), air cooler doors (17, fig. 2-1) should be left closed.
- c. Make certain fuel selector valve (1, fig. 2-5) is pointing in horizontal position for engine operation.



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**Legend for fig. 2-5:**

1. Selector valve handle (horizontal (shown) for engine running. Vertical for heater operation.)
2. External fuel supply connection
3. Engine fuel line
4. Heater fuel line
5. Fuel pickup line from tank
6. Heater fuel filter
7. Heater fuel pump line
8. Heater fuel pump
9. Control cable

Figure 2-5. Fuel selector valve and fuel lines.

**2-7. Operating Procedure.** The following steps are to be followed in sequence for proper operation under normal conditions.

**WARNING**

**Compressed air is extremely dangerous. Ensure that hose being used is serviceable and approved for 3500 psi (246 kgs/cm<sup>2</sup>). Do not overcharge systems.**

**a. Starting.**

- (1) Clutch handle (9, fig. 2-1) out.
- (2) Compressor unloader switch (8, fig. 2-1) in UNLOAD position.
- (3) Choke (10, fig. 2-1) out.

**NOTE**

**The amount of choking required depends on ambient temperature and whether engine is cold or hot. A warm engine requires little or no choking.**

- (4) Engine throttle (11, fig. 2-1) halfway out and locked.
- (5) All control valves (12, 13, 14, 15, 16, fig. 2-1) closed.
- (6) Master switch (3, fig. 2-1) on.
- (7) Ignition switch (4, fig. 2-1) on.
- (8) Light switch (7, fig. 2-1) on.
- (9) Push safety override switch (6, fig. 2-1) and start switch (5) at same time. Hold safety override switch (6) until engine oil pressure is indicated on gauge (10, fig. 2-2). Do not hold longer than 5 seconds. If engine oil pressure does not register in this time, shut off switches and notify Organizational Maintenance.
- (10) Adjust choke (10, fig. 2-1) for smooth running of engine. Allow engine to run for approximately 5 minutes; then, push in choke (10) and clutch handle (9). If compressor oil pressure does not register on gauge (11, fig. 2-2) within 5 seconds, disengage clutch, shut down unit and notify Organizational Maintenance.

**b. Operating:**

- (1) Unlock throttle (11, fig. 2-1) and pull out until it stops; then, lock. Switch compressor unloader switch (8, fig. 2-1) to LOAD position. Compressor will operate in load mode until receiver pressure will operate in load mode until receiver pressure reaches 3500 to 3675 psi (24115.00 to 25320.75 kPa), indicated on receiver working pressure is attained, unit will automatically unload in relation to air demand.
- (2) Adjust the air cooler doors (17, fig. 2-1) to provide cooling without freezing.
- (3) Momentarily open mechanical filter drain valve (15, fig. 2-1) to discharge condensate. Momentarily open receiver valve (14) to discharge condensate. Make sure all drain and bleed valves are closed.
- (4) Attach air service hose to coupling on panel (2, fig. 2-1). Make sure air chuck assembly is securely attached to service hose and that chuck service valve (1, fig. 2-1) is closed. Uncoil service hose from door hangers and take end of hose to equipment to be serviced with compressed air.
- (5) Open service valve (12, fig. 2-1). Connect hose to item being serviced and open air chuck service valve.
- (6) after desired pressure is reached in services item, close air chuck service valve (1, fig. 2-1) and disconnect hose from serviced item. Close service valve (12, fig. 2-1) and open service hose bleed valve (13, fig. 2-1).

**c. Stopping:**

- (1) After servicing is complete, coil service hose on door hangers and attach air chuck assembly to clip provided on door. It is not necessary to disconnect hose from panel connection.
- (2) Switch compressor unloader switch (8, fig. 2-1) to UNLOAD position. Disengage clutch (9); push throttle (11) all the way in and lock.
- (3) Allow engine to run approximately five minutes then, turn ignition switch (4, fig. 2-1) to OFF,

light switch (7) to OFF, and master switch (3) to off.

- (4) Perform the after operation PMCS, table 2-1.

**2-8. Preparation for Movement.** To move air compressor to a new worksite, prepare as follows:

- a. Close and latch all doors on sides, roof, and both ends.
- b. Attach towbar to towing vehicle and attach safety chains.
- c. Release parking brake by pulling handle up.

**CAUTION**

**Maximum towing speed is 25 MPH (40.23 km/hr) over smooth, paved surfaces or 10 MPH (16.09) kms/hr) over rough terrain.**

- d. Tow unit to new worksite, set parking brakes by pushing down on handle. Unhook safety chains and towbar from towing vehicle.
- e. If air compressor is to be transported by rail, or for long distances, drain fuel tank before shipment. Attach unit to carrier by using lifting and tiedown eyes and other blocking necessary. Refer to figure 2-3 for transportation data plate.

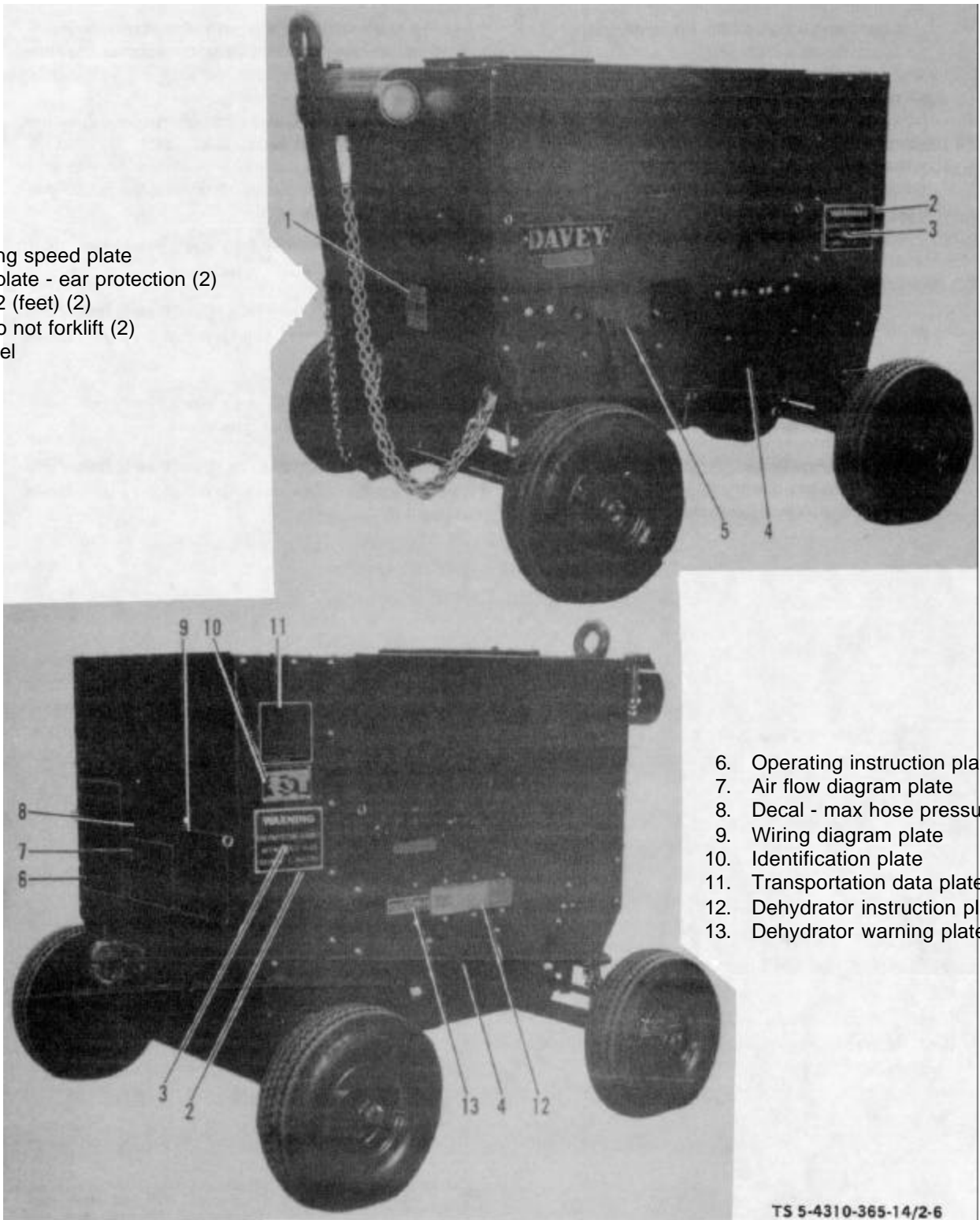
**CAUTION**

**Use spreader bars on lifting cables or chains as necessary.**

- f. Refer to paragraph 2-5 for assembly and preparation for use for reinstallation procedures.

**2-9. Operating Instructions on Decals and Instruction Plates.** The location of decals and instruction plates is shown in figure 2-6.

1. Max towing speed plate
2. Warning plate - ear protection (2)
3. Decal - 12 (feet) (2)
4. Decal - do not forklift (2)
5. Decal - fuel



6. Operating instruction plate
7. Air flow diagram plate
8. Decal - max hose pressure
9. Wiring diagram plate
10. Identification plate
11. Transportation data plate
12. Dehydrator instruction plate
13. Dehydrator warning plate

TS 5-4310-365-14/2-6

Figure 2-6. Location of decals and instruction plates.

## Section IV. OPERATION UNDER UNUSUAL CONDITIONS

### 2-10. Operation in Extreme Heat.

a. Keep unit side doors, roof door, air cooler doors, and engine cooling air door fully open.

b. Ensure that cooling air flow is not restricted.

c. Keep compressor and engine cylinder head cooling fins clean and free of obstructions. Make certain that compressor air cooler is not restricted.

d. If possible, provide shade to protect unit from sun.

e. Increase frequency of battery PMCS.

### 2-11. Operation in Extreme Cold.

a. Keep fuel tank full to minimize moisture condensation.

b. Service engine and compressor for cold weather operation in accordance with LO 5-4310-365-12.

c. Keep battery fully charged. After servicing battery, run engine with no load for minimum of one hour.

d. Switch fuel selector valve (1, fig. 2-5) to vertical position for air heater operation. Close ass side, top, and end doors, except control panel access door.

e. Switch heater control switch (18, fig. 2-1) to ON-HI or ON-LO, as desired. Heater ignition should take place within 30 to 45 seconds. If indicator light (1, fig. 2-2) does not light within 3 minutes, turn heater control switch to OFF and wait 5 minutes before restarting.

If ignition does not take place, switch heater control switch to OFF and notify Organizational Maintenance.

f. Allow heater to operate until engine and compressor oil warm up.

#### NOTE

**As an alternate preheat procedure, attach a 12-inch diameter duct from external heater to duct connection provided on unit control panel (20, fig. 2-1)**

g. After warmup, switch heater control switch OFF. Indicator light will stay on while combustible gases and fuel is being purged from heater. When light goes out, open side door and turn fuel valve to horizontal position for engine operation.

#### **Check hoses for evidence of cracks or other cold-weather damage prior to starting unit.**

h. Refer to paragraph 2-7 for operating procedure. Adjust engine air cooler door and compressor air cooler doors for adequate ventilation.

### 2-12. Operation in Salt Water Areas.

a. Avoid contact with salt water if possible. Place unit sheltered area to avoid corrosion that can occur from exposure to salt water.

b. If unit is exposed to salt water or spray, wash thoroughly with fresh water

c. Paint exposed metallic surfaces if paint has been chipped or otherwise removed. Coat exposed ferrous metal surfaces with standard issue rustproofing material if available, or cover parts with a light film of grease.

### 2-13. Operation in Dusty or Sandy Areas.

a. Shield the unit from dust. Take advantage of natural barriers which offer protection from blowing sand and dust. When not in operation, install a canvas cover over the unit.

b. Strain the fuel before adding it to the fuel tank. Make sure pouring vessels are clean.

c. Check and clean engine and compressor air cleaners more frequently. Make sure oil in compressor air cleaner is not dirty, as this condition will considerably shorten service life.

d. Clean the air compressor frequently. Wipe with a cloth dampened with an approved cleaning solvent.

### 2-14. Operation Under Rainy or Humid Conditions.

a. When the air compressor is not in operation, keep it in a sheltered area.

b. Keep fuel tank full at all times to prevent moisture condensation.

**2-15. Operation at High Altitudes.**

a. Engine power output will decrease at a rate of 3-1/2 percent for each 1000 feet (304.8 meters) elevation above sea level. There will be a corresponding loss in compressor efficiency.

b. Maintain maximum efficiency by following service instructions carefully. Ensure that engine and compressor air cleaners are kept clean.

**2-16. Emergency Procedures.** In case of emergency requiring immediate stopping of the unit, turn switch (4, fig. 2-1) to OFF position.

**2-17. Jamming and Electronic Countermeasure (ECM) Procedures.** The engine is equipped with radio interference suppression components. These are: shielded magneto, spark plugs, and ignition cables. There are no suppression components necessary for the compressor.



**LUBRICATION**

LO 5-4310-365-12

**ORDER**

**COMPRESSOR, RECIPROCATING, POWER DRIVEN: AIR; WHEEL MOUNTED, 4 WHEEL,  
PNEUMATIC TIRES; GASOLINE ENGINE; 15 CFM, 3500 PSI, TYPE II, CLASS 1,  
(DAVEY COMPRESSOR MODEL IMCAA) W/TELEDYNE WISCONSIN ENGINE MODEL VH4D-1**

REFERENCE: TM 5-4310-365-14

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

Relubricate after washing or fording.

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

Dotted circle indicates drain below.

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

Drain crankcase only when hot after operation; replenish and check level when cool.

**LUBRICANT - INTERVAL**

**INTERVAL - LUBRICANT**

**FOLD**

**FOLD**

<p>Tie Rod Yoke (Sparingly)</p> <p>King Pin (Sparingly)</p> <p>Wheel Bearing (PACK) (4)</p> <p>Compressor Dipstick and Oil Filler Tube (Check Level Before Starting)</p> <p>Handbrake Cross-Shaft Bearing Grease Fitting</p> <p>Engine Oil Drain</p> <p>Pintle Hook Grease Fittings</p>	<p><b>GAA 250</b></p> <p><b>GAA 250</b></p> <p><b>GAA 1000</b></p> <p><b>GAA 250</b></p> <p><b>OE 8</b></p> <p><b>GAA 100</b></p> <p><b>GAA 250</b></p> <p><b>GAA 1000</b></p> <p><b>GAA 100</b></p> <p><b>GAA 250</b></p>		<p><b>250 GAA</b></p> <p><b>250 GAA</b></p> <p><b>1000 GAA</b></p> <p><b>50</b></p> <p><b>8</b></p> <p><b>50 OE</b></p> <p><b>100 OE</b></p> <p><b>250 GAA</b></p> <p><b>1000 GAA</b></p> <p><b>100</b></p>	<p>Engine Oil Filter Throw Away Type</p> <p>Engine Dipstick (Check Level Before Starting)</p> <p>Engine Oil Filler Tube Compressor Air Filter, oil Both Type</p> <p>Compressor Oil Drain</p>
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- KEY -

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above +32°F	+40° to -10°F	0°F to -65°F	
<b>OE</b> -Oil, Engine, Heavy Duty		MIL-L-2104	MIL-L-2104	MIL-L-10295	Intervals given are in hours of normal operation.
Engine Crankcase	4 QT	<b>OE 30</b>	<b>OE 10</b>	<b>OES</b>	
Oil Can Points					
Compressor Crankcase	5 QT	MIL-L-26087	MIL-L-26087	MIL-L-26087	
Compressor Air Cleaner (NOTE 5)	1/3 PT				
<b>OES</b> -Oil, Engine Subzero				MIL-L-10295	
<b>GAA</b> -GREASE, Automotive and Artillery		All temperatures MIL-L-10924			

**NOTES:**

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

2. OIL FILTER. After installing new oil filter element, fill crankcase, operate engine 5 minutes, check filter housing for leaks, check crankcase oil level and bring to full mark.

3. OIL CAN POINTS. Every 50 hours, clean and lightly coat hinges, latches, clutch control, hand brake linkage and pintle hook with OE.

4. LUBRICANTS. Following is a list of lubricants with the Military Symbols and applicable specification numbers.

5. OIL BATH FILTER. This filter is used only on S/N Range 4C41RDEW-29563 thru 4C41RDEW-32575.

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

BY ORDER OF SECRETARY OF THE ARMY

E. C. MEYER  
General, United States Army  
Chief of Staff

FOLD

OE \_\_ MIL-L-2104 (Engine)  
MIL-L-26087 (Compressor)  
OES \_\_ MIL-L-10295 (Engine)  
GAA \_\_ MIL-G-10924

OFFICIAL:

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

## CHAPTER 3 OPERATOR MAINTENANCE INSTRUCTIONS

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### Section I. LUBRICATION INSTRUCTIONS

**3-1. General.** Keep all lubricants in closed containers and store in clean, dry area away from heat. Allow no dust, dirt, or foreign material to mix with lubricants. Keep lubricating equipment clean and ready for use.

#### **3-2. Lubrication Instructions.**

**a. Cleaning.** Keep all external parts that do not require

lubrication free of lubricants. Wipe all lubrication points to remove dirt and old grease. Clean all lubrication points after lubricating to prevent accumulation of dirt and foreign matter.

**b. Lubrication.** Refer to LO 5-4310-365-12 for points of lubrication, lubricants to be used, and lubrication intervals.

### Section II. TROUBLESHOOTING

#### **3-3. Introduction.**

**a.** The troubleshooting table lists the common malfunctions which you may find during operation or maintenance of the air compressor or its components. You should perform tests/inspections and corrective actions in order listed.

**b.** This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions.

If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

**3-4. Troubleshooting Table.** The troubleshooting table, Table 3-1, lists Malfunction, Test or Inspection, and Corrective Action. The table is based on symptoms which may be observed by you during PMCS as well as during normal operation. Only checks and corrective actions authorized for the operator are listed.

Table 3-1. Operator/Crew Troubleshooting

---

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
-------------	--------------------	-------------------

---

**1. ENGINE FAILS TO START OR IS DIFFICULT TO START.**

Step 1. Check if battery electrolyte is above top of plates.

**Add distilled water to battery cells if electrolyte is low (para 3-16). Level should be approximately 3/8 inch (9.5mm) above plates. Recharge battery and run engine with no load about one hour after recharging.**

Step 2. Inspect for loose, corroded, or broken battery cables.

**Clean corroded cables and battery terminals (para 3-16). Tighten loose connections at battery terminals, ground, starter, master switch, and start switch. If cables are broken or show signs of burning, notify organizational maintenance.**

Step 3. Check to see if fuel selector valve handle is in a horizontal position for engine operation (see fig. 2-5).

**Turn selector valve handle horizontal.**

Step 4. Inspect engine fuel strainer for dirty element.

**Service the fuel strainer (para 3-7).**

Step 5. Any other cause.

**Notify organizational maintenance.**

**2. ENGINE RUNS ROUGH, MISSES**

Step 1. Check choke adjustment.

**Adjust the choke for smooth running. Cold engine requires more choking; hot engine requires little or none.**

Step 2. Check for contaminated fuel.

**Service the fuel tank (para 3-15).**

Step 3. Any other causes.

**Notify organizational maintenance.**

**3. ENGINE OVERHEATS AND/OR BACKFIRES.**

Step 1. Check if correct fuel is being used.

**Service the fuel tank (para 3-15) and fill tank with recommended fuel.**

Table 3-1. Operator/Crew Troubleshooting-Continued

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

### 3. ENGINE OVERHEATS AND/OR BACKFIRES - Continued

Step 2. Check engine crankcase oil level.

**Stop engine, check oil level, add oil as necessary. Refer to LO 5-4310-365-12.**

Step 3. Check if engine cooling air door is adjusted for sufficient cooling.

**Adjust the door for sufficient cooling, open for normal operation, closing partially or fully for colder weather.**

Step 4. Check if roof door is open.

**Open roof door for normal operation to allow engine heat to dissipate.**

Step 5. Check engine cylinder heads for dirty or clogged cooling fins.

**Stop engine and clean the cylinder head cooling fins.**

Step 6. Any other causes.

**Notify organizational maintenance.**

### 4. ENGINE SPEED ERRATIC.

Step 1. Check if throttle handle is locked.

**Turn throttle handle clockwise to lock in position.**

Step 2. Check for water or contamination in fuel.

**Service the fuel tank (para 3-15).**

Step 3. Check for dirty or clogged fuel strainer.

**Service the fuel strainer (para 3-7).**

Step 4. Any other causes.

**Notify organizational maintenance.**

### 5. ENGINE STOPS.

Step 1. Check for empty fuel tank.

**Fill the fuel tank (para 3-15).**

Table 3-1. Operator/Crew Troubleshooting-Continued

---

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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**5. ENGINE STOPS - Continued**

Step 2. Check for dirty fuel strainer.

**Service the fuel strainer (para 3-7).**

Step 3. Check for overheated engine (high temperature safety switch activated).

**Add oil to engine crankcase if oil is low. Refer to LO 5-4310-365-12. Make certain there is no obstructions in engine cooling.**

Step 4. Check for low engine or compressor oil level (low oil pressure switch activated).

**Add oil to engine or compressor as necessary. Refer to LO 5-4310-365-12.**

Step 5. Check for dirty engine air cleaner.

**Service the engine air cleaner (para 3-9).**

Step 6. Any other cause.

**Notify organizational maintenance.**

**6. ENGINE KNOCKS.**

Step 1. Check for incorrect type of fuel being used.

**Service the fuel tank (para 3-15).**

Step 2. Any other causes.

**Notify organizational maintenance.**

**7. ALTERNATOR OUTPUT ERRATIC OR NO OUTPUT.**

Step 1. Check for loose alternator drive belt.

**Tighten drive belt, notify organizational maintenance.**

Step 2. Inspect for damaged ammeter gauge.

**Notify organizational maintenance if gauge is damaged.**

Step 3. Inspect alternator and ammeter for loose wiring connection.

**Tighten terminal connections if loose.**

---

**MALFUNCTION**  
**TEST OR INSPECTION**  
**CORRECTIVE ACTION**

---

**7. ALTERNATOR OUTPUT ERRATIC OR NO OUTPUT - Continued**

Step 4. Check alternator, regulator, and wiring for evidence of shorts, frayed wires, and burning.

**Notify organizational maintenance.**

Step 5. Any other causes.

**Notify organizational maintenance.**

**8. CLUTCH WILL NOT ENGAGE.**

Step 1. Check for broken or bent linkage and for proper clutch adjustment.

**Notify organizational maintenance for parts replacement and adjusting.**

Step 2. Any other causes.

**Notify organizational maintenance.**

**9. INSTRUMENT PANEL LIGHTS WILL NOT COME ON.**

Step 1. Check if master switch (3, fig. 2-1) is on.

**Turn master switch on for unit electrical circuit.**

Step 2. Check for burned out bulbs.

**Replace burned out bulbs (para 3-14).**

Step 3. Check for loose wiring connections on light switch.

**Tighten any loose connections.**

Step 4. Any other causes.

**Notify organizational maintenance.**

**10. RESTRICTION INDICATOR WINDOW SHOWS RED.**

Step 1. Check for dirty or restricted air cleaner for either compressor or engine, whichever shows red.

**Service the engine air cleaner (para 3-9). Service the compressor air filter (para 3-12). Reset restriction indicator to GREEN by pressing down on top of indicator after servicing air cleaners.**

Step 2. Any other causes.

**Notify organizational maintenance.**

---

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

**11. COMPRESSOR WILL NOT LOAD.**

Step 1. Check if unloader switch has been switched to LOAD position.

**Switch to LOAD position (8, fig. 2-1).**

Step 2. Check if mechanical filter drain valve (15, fig. 2-1), receiver bleed valve (14), and dehydrator bleed valve (16) are closed.

**Close these valves during compressor operation.**

Step 3. Any other causes.

**Notify organizational maintenance.**

**12. COMPRESSOR DOES NOT UNLOAD AT 3500 PSI (24115 kPa).**

Step 1. Check adjustment of unloader control pressure switch.

**Notify organizational maintenance.**

Step 2. Check unloader control solenoid and wiring.

**Notify organizational maintenance.**

Step 3. Any other causes.

**Notify organizational maintenance.**

**13. STAGE PRESSURE GAUGES DO NOT INDICATE CORRECT READINGS (see table 2-2).**

Step 1. Check tubing connection to gauges for leaks. Check gauges for visible damage.

**Tighten connections as needed. If tubing or gauges are damaged, notify organizational maintenance.**

Step 2. Any other causes.

**Notify organizational maintenance.**

**14. OIL PRESSURE GAUGES INDICATE LOW READING (see table 2-2).**

Step 1. Check oil level in compressor or engine, whichever indicated.

**Add oil as necessary. See LO 5-4310-365-12.**

Step 2. Check hose connections at gauges, engine, and compressor for leaks. Check for damaged hoses.

**Tighten loose connection. If fittings or hoses damaged, notify organizational maintenance.**



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<b>MALFUNCTION</b>
<b>TEST OR INSPECTION</b>
<b>CORRECTIVE ACTION</b>

---

**14. OIL PRESSURE GAUGES INDICATE LOW READING (SEE TABLE 2-2). - Continued**

Step 3. Any other causes.

**Notify organizational maintenance.**

**15. HEATER INDICATOR LIGHT DOES NOT LIGHT WHEN PRESSED-TO-TEST.**

Step 1. Check to see if circuit breaker is open.

**Push reset button (19, fig. 2-1) in.**

Step 2. Check wiring connections to control box.

**If wire sockets and connectors are tight and there are still open circuit, notify organizational maintenance.**

Step 3. Check for burned out indicator light.

**Notify organizational maintenance.**

Step 4. Any other causes.

**Notify organizational maintenance.**

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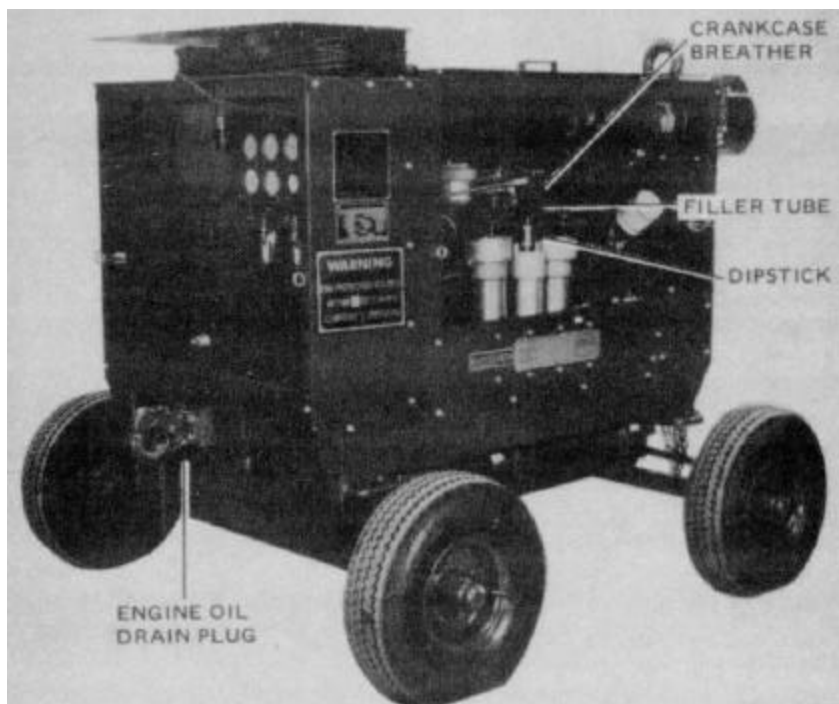
### Section III. OPERATOR MAINTENANCE PROCEDURES

**3-5. Introduction.** This section contains maintenance procedures that are the responsibility of the operator. These operator maintenance procedures are those assigned to this maintenance level by the Maintenance Allocation Chart (MAC), Appendix E.

**3-6. Engine Assembly Service.** Service the engine assembly as shown in figures 3-1.

#### WARNING

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 130°F (38°C -59°C).



TS 5-4310-365-14/3-1

- STEP 1. REMOVE CRANKCASE BREATHER.**
- STEP 2. PLACE CONTAINER UNDER ENGINE OIL DRAIN. MINIMUM CAPACITY OF CONTAINER: 1 GALLON (3.785 LITERS).**
- STEP 3. REMOVE ENGINE OIL DRAIN PLUG. WHEN OIL FLOW STOPS, REINSTALL PLUG.**
- STEP 4. SERVICE THE ENGINE IN ACCORDANCE WITH LO 5-4310-365-12.**

- STEP 5. CHECK OIL LEVEL WITH DIPSTICK.**
- STEP 6. CLEAN CRANKCASE BREATHER, AND AREAS WHERE OIL HAS SPILLED, WITH SOLVENT, FED SPEC P-D-680, OR EQUIVALENT.**
- STEP 7. REINSTALL CRANKCASE BREATHER ON FILLER TUBE.**

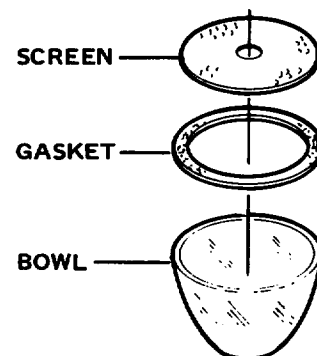
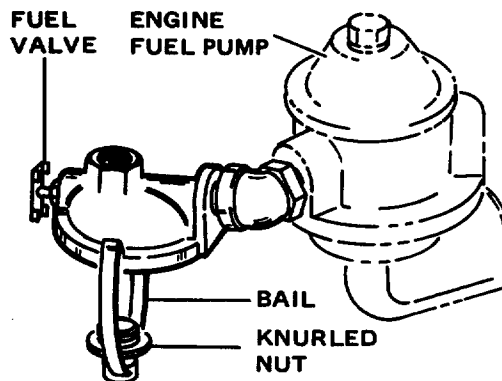
Figure 3-1. Engine assembly service.

**3-7. Engine Fuel Strainer Service.** Service the engine fuel strainer as shown in figure 3-2.

**WARNING**

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 130°F (38°C - 59°C).

- STEP 1. SHUT OFF FUEL VALVE. LOOSEN THE KNURLED NUT BELOW BOWL AND MOVE BAIL TO ONE SIDE.
- STEP 2. REMOVE BOWL, SCREEN, AND GASKET.
- STEP 3. CLEAN BOWL AND SCREEN WITH SOLVENT, FED SPEC P-D-680, OR EQUIVALENT.
- STEP 4. INSPECT GASKET AND REPLACE IF DAMAGED.
- STEP 5. REASSEMBLE THE GASKET, SCREEN, AND BOWL.
- STEP 6. MOVE BAIL INTO POSITION WITH THE KNURLED NUT ON BOTTOM OF BOWL. TIGHTEN THE KNURLED NUT SECURELY, FINGER TIGHT, AND OPEN FUEL VALVE.



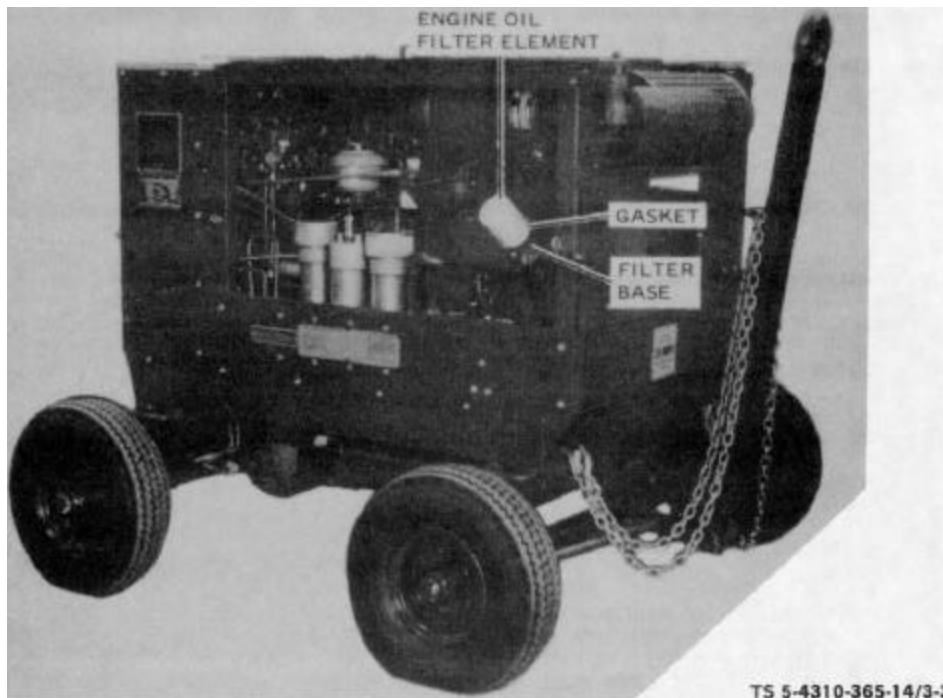
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Figure 3-2. Engine fuel strainer service.

**3-8. Engine Oil Filter Service.** Service the engine oil filter as shown in figure 3-3.

**WARNING**

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 130°F (38°C - 59°C).



**NOTE:** SERVICE ENGINE OIL FILTER IN ACCORDANCE WITH LO 5-4310-365-12.

**STEP 1.** USE A STRAP WRENCH OR EQUIVALENT TO UNSCREW FILTER ELEMENT.

**STEP 2.** DISCARD AND REPLACE ELEMENT AND GASKET.

**STEP 3.** ASSEMBLE NEW GASKET AND ELEMENT ON FILTER BASE. TIGHTEN SECURELY WITH STRAP WRENCH TO PREVENT OIL LEAK.

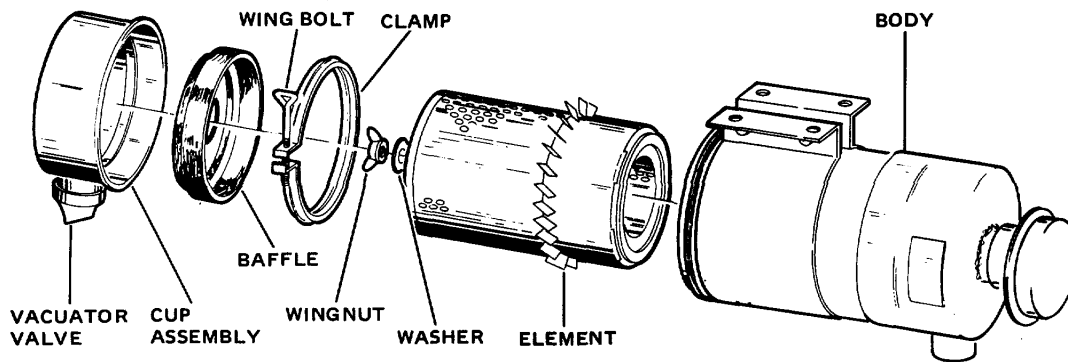
**STEP 4.** CLEAN AREAS WHERE OIL HAS SPILLED WITH SOLVENT, FED SPEC P-D-680, OR EQUIVALENT.

*Figure 3-3. Engine oil filter service.*

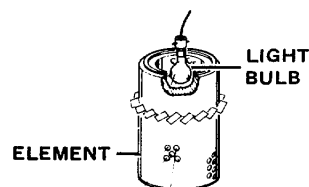
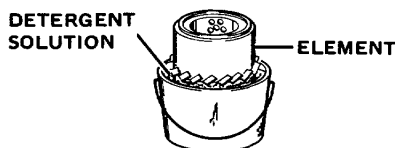
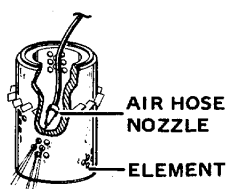
**3-9. Engine Cleaner Service.** Service the engine air cleaner as shown in figure 3-4.

**CAUTION**

When cleaning do not rupture element, damage fins or sealing surfaces. Do not allow dust or dirt to deposit on clear air side (outside) of element. Air pressure used for cleaning shall not exceed 100 psi (7.03 kgs/cm<sup>2</sup>).



**CLEANING ELEMENT:**



**DRY OR DUSTY ELEMENT:** USE A COMPRESSED AIR HOSE TO BLOW CLEAN, DRY AIR THROUGH ELEMENT IN OPPOSITE DIRECTION OF NORMAL AIR FLOW. (BLOW FROM INSIDE OUT.) KEEP NOZZLE AT LEAST ONE INCH AWAY FROM ELEMENT MOVING NOZZLE UP AND DOWN WHILE ROTATING ELEMENT.

**OILY OR SOOTY ELEMENT:** SOAK THE ELEMENT IN A SOLUTION OF WATER AND NON-SUDSING TYPE HOUSEHOLD DETERGENT FOR 15-MINUTES. RINSE WITH GARDEN TYPE WATER HOSE, 40 PSI MAXIMUM PRESSURE, UNTIL THOROUGHLY CLEANED AND RINSED. AIR DRY OR USE WARM FLOWING AIR, MAXIMUM 160°F (71°C).

AFTER THE ELEMENT IS THOROUGHLY DRIED, PLACE A BRIGHT LIGHT INSIDE ELEMENT SLOWLY TO INSPECT FOR DAMAGE. IF ANY RUPTURE, HOLES, OR DAMAGED FINS ARE FOUND, REPLACE ELEMENT.

TS 5-4310-365-14/3-4

- STEP 1. UNSCREW WING BOLT TO LOOSEN CUP ASSEMBLY CLAMP.
- STEP 2. REMOVE THE CUP ASSEMBLY FROM AIR CLEANER; REMOVE VACUATOR VALVE AND Baffle FROM CUP ASSEMBLY.
- STEP 3. CLEAN ACCUMULATED DUST AND DIRT FROM CUP ASSEMBLY. WIPE VACUATOR VALVE AND Baffle WITH A CLEAN LINT-FREE CLOTH.
- STEP 4. REMOVE WINGNUT AND WASHER THAT SECURES ELEMENT IN AIR CLEANER BODY. REMOVE ELEMENT.

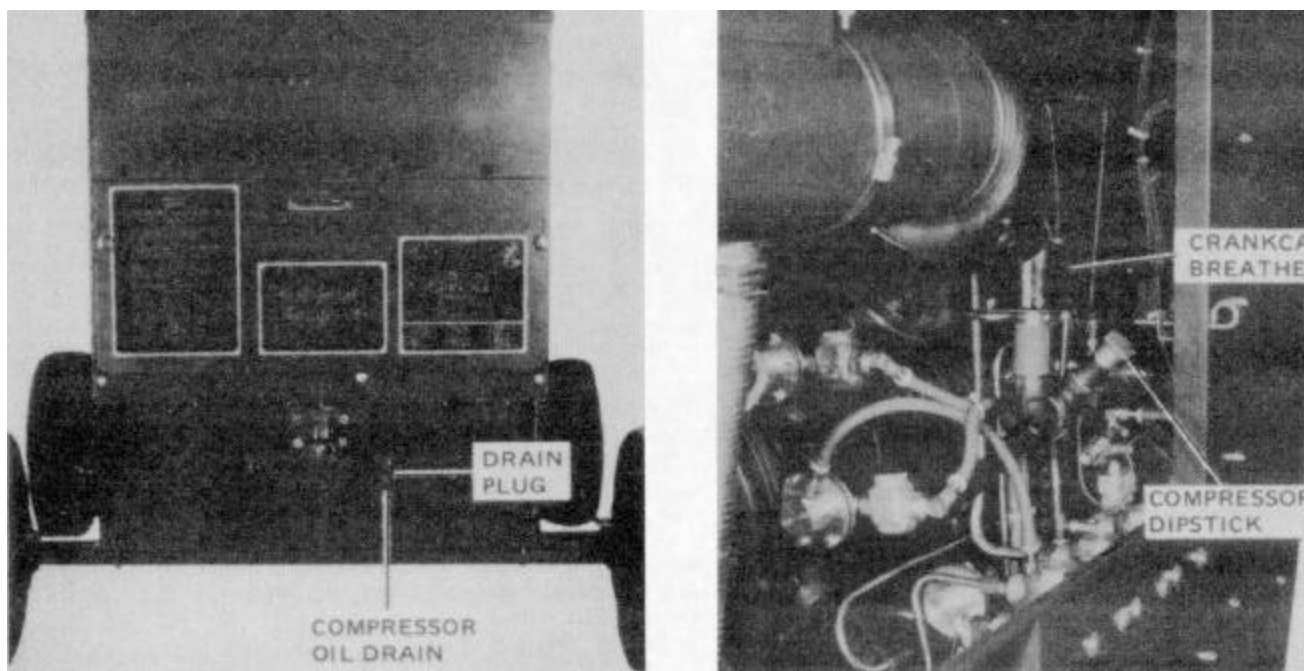
- STEP 5. CLEAN ELEMENT AS SHOWN IN ILLUSTRATION ABOVE. REPLACE ELEMENT AFTER SIX CLEANINGS OR ONE YEAR, WHICHEVER COMES FIRST.
- STEP 6. ASSEMBLE CLEAN ELEMENT IN BODY AND SECURE WITH WASHER AND WINGNUT.
- STEP 7. ASSEMBLE VACUATOR VALVE AND Baffle ON CUP ASSEMBLY.
- STEP 8. ASSEMBLE THE CUP ASSEMBLY ON AIR CLEANER BODY, TIGHTEN WING BOLT ON CLAMP, MAKE CERTAIN THAT CLAMP SEATS ALL THE WAY AROUND AND VACUATOR VALVE FACE DOWN.

Figure 3-4. Engine air cleaner service.

**3-10. Air Compressor Service.** Service the air compressor as shown in figure 3-5.

**WARNING**

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 130°F (38°C - 59°C).



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- STEP 1. PLACE A CONTAINER UNDER COMPRESSOR OIL DRAIN. MINIMUM CAPACITY OF CONTAINER: 1-1/2 GALLONS (5.68 LITERS).
- STEP 2. DRAIN WHILE COMPRESSOR IS WARM SO OIL WILL FLOW MORE FREELY. REMOVE COMPRESSOR OIL DRAIN PLUG. WHEN OIL FLOW STOPS, REINSTALL DRAIN PLUG.

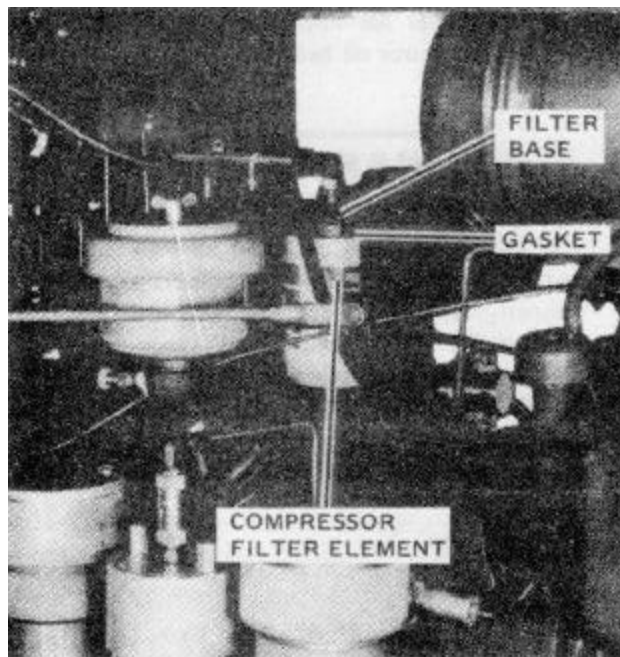
- STEP 3. REMOVE COMPRESSOR DIPSTICK AND SERVICE THE AIR COMPRESSOR IN ACCORDANCE WITH LO 5-4310-365-12. INSTALL DIPSTICK.
- STEP 4. CLEAN AREAS WHERE OIL HAS SPILLED WITH SOLVENT, FED SPEC P-D680, OR EQUIVALENT.

Figure 3-5. Air compressor service.

**3-11. Compressor Oil Filter Service.** Service the compressor oil filter as shown in figure 3-6.

**WARNING**

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° F - 130° F (38° C - 59° C).



**NOTE:** SERVICE THE COMPRESSOR OIL FILTER IN ACCORDANCE WITH LO 5-4310-365-12.

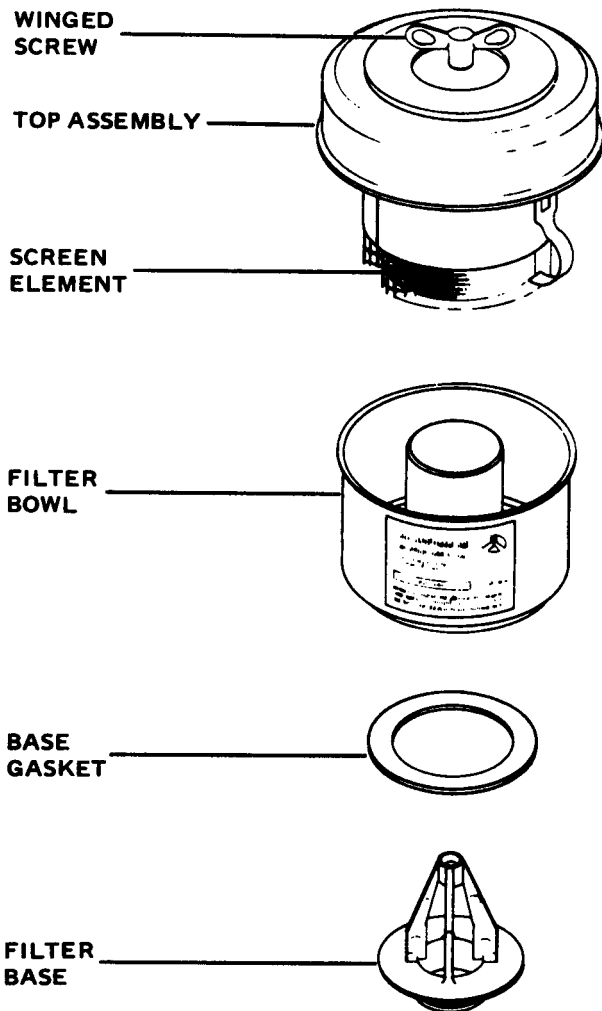
- STEP 1.** USE A STRAP WRENCH OR EQUIVALENT TO UNSCREW COMPRESSOR FILTER ELEMENT. REMOVE ELEMENT AND GASKET.
- STEP 2.** DISCARD AND REPLACE ELEMENT AND GASKET.
- STEP 3.** ASSEMBLE NEW GASKET AND ELEMENT ON FILTER BASE. TIGHTEN SECURELY WITH STRAP WRENCH TO PREVENT OIL LEAK.
- STEP 4.** CLEAN AREAS WHERE OIL HAS SPILLED WITH SOLVENT, FED SPEC P-D-680, OR EQUIVALENT.

*Figure 3-6. Compressor oil filter service.*

**3-12. Compressor Air Filter Service (Oil Bath Type).** Service the compressor oil bath type air filter as shown in figure 3-7.

**WARNING**

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° F - 130° F (38° C - 59° C).



**NOTE:** COMPRESSOR AIR FILTER IS OIL BATH TYPE. SERVICE IN ACCORDANCE WITH LO 5-4310-365-12.

**STEP 1.** UNSCREW CAPTIVE WINGED SCREW AND REMOVE TOP ASSEMBLY AND SCREEN ELEMENT.

**STEP 2.** CLEAN TOP ASSEMBLY AND ELEMENT OF DIRT AND OIL WITH SOLVENT, FED SPEC P-D--680, OR EQUIVALENT.

**STEP 3.** RE-OIL SCREEN ELEMENT BY DIPPING IN CLEAN COMPRESSOR OIL.

**STEP 4.** INSPECT OIL IN FILTER BOWL. IF DIRTY, POUR OUT OLD OIL, WIPE BOWL CLEAN WITH LINT-FREE CLOTH AND FILL BOWL TO BEAD MARK WITH CLEAN COMPRESSOR OIL. CAPACITY IS APPROXIMATELY 1/3-PINT (0.16 LITER).

**STEP 5.** INSERT BASE GASKET FOR DAMAGE. REPLACE AS NECESSARY.

**STEP 6.** ASSEMBLY GASKET ON MOUNTING BASE, BOWL, SCREEN ELEMENT WITH FELT END IN OIL, AND TOP ASSEMBLY. SECURE ASSEMBLY BY TIGHTENING WINGED SCREW.

**STEP 7.** CLEAN AREAS WHERE OIL MAY HAVE SPILLED WITH SOLVENT, FED SPEC P-D-680, OR EQUIVALENT.

Figure 3-7. Compressor air filter service, oil bath type.

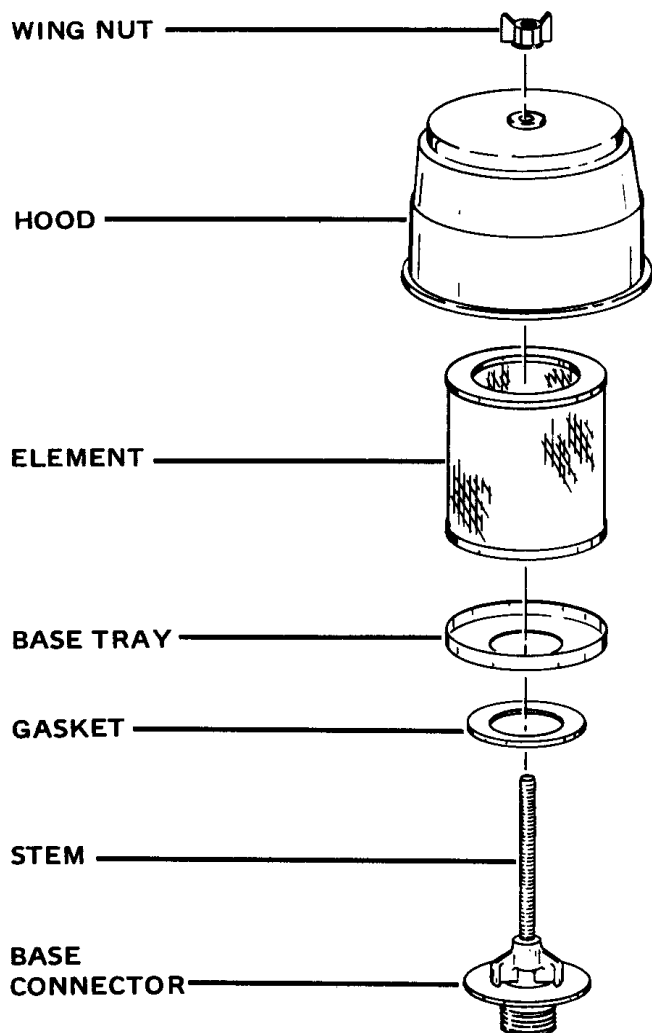


**3-12.1. Compressor Air Filter Service (Dry Type).**

Service the compressor dry type air filter as shown in figure 3-7.1.

**CAUTION**

Do not use cleaning solvents or fluids to clean components of dry type air filter. Use a mild detergent and warm water solution.



**STEP 1.** UNSCREW AND REMOVE WING NUT, HOOK, ELEMENT, BASE TRAY, AND GASKET FROM BASE CONNECTOR.

**NOTE:** STEM NEED NOT BE REMOVED FROM BASE CONNECTOR EXCEPT FOR REPLACEMENT.

**STEP 2.** TAP ELEMENT AGAINST YOUR HAND TO REMOVE ACCUMULATED DIRT FROM ELEMENT. IF DIRT CANNOT BE REMOVED BY TAPPING ON HAND, PROCEED TO STEP 3 OR STEP 4.

**STEP 3.** CLEAN ELEMENT USING COMPRESSED AIR WITH NOZZLE PRESSURE OF NO MORE THAN 30 PSI (206.7 kPa). DIRECT COMPRESSED AIR UP AND DOWN THE PLEATS ON THE ELEMENT CLEAN SIDE (INSIDE).

**STEP 4.** ALTERNATE CLEANING OF ELEMENT IS TO WASH THE ELEMENT IN A MILD DETERGENT AND WARM WATER SOLUTION. RINSE THOROUGHLY IN CLEAN WATER AND ALLOW ELEMENT TO DRY.

**STEP 5.** CLEAN WING NUT, HOOD, BASE TRAY, STEM, AND BASE CONNECTOR IN THE DETERGENT AND WATER SOLUTION. DRY WITH COMPRESSED AIR.

**STEP 6.** INSPECT GASKET AND ELEMENT FOR DAMAGE. REPLACE AS NECESSARY.

**STEP 7.** ASSEMBLY STEM (IF REMOVED) IN BASE CONNECTOR. ASSEMBLE GASKET, BASE TRAY, ELEMENT, AND HOOD. SECURE ASSEMBLY WITH WING NUT. TURN WING NUT FINGER TIGHT ONLY.

Figure 3-7.1. Compressor air filter service, dry type.

**3-13. Dehydrator Service.** Service the dehydrators as shown in figure 3-8.

**WARNING**

Never attempt to remove dehydrator caps until air pressure has been relieved. High pressure air is extremely dangerous to personnel. Unit should always be shut down before servicing dehydrators. See para 2-7.c for stopping procedure. Make certain that DEHYDRATOR BLEED valve is open.

- STEP 1. OBSERVE CARTRIDGE CHANGING WARNING PLATE.
- STEP 2. REMOVE DEHYDRATOR CYLINDER CAPS. USE A STRAP WRENCH IF NECESSARY. CHANGE THE TYPE MA-2 CARTRIDGES IN ACCORDANCE WITH INSTRUCTION PLATE.
- STEP 3. INSPECT O-RING SEAL AND REPLACE IF ANY DEFECT IS NOTED. ASSEMBLE CYLINDER CAPS AND TIGHTEN SECURELY HAND TIGHT. DO NOT OVERTIGHTEN. DO NOT SPIN CAPS TO BOTTOM THREADS.
- STEP 4. ON THE INSTRUCTION PLATE, RECORD DATE CARTRIDGES CHANGED AND HOURMETER READING IN SPACE PROVIDED.

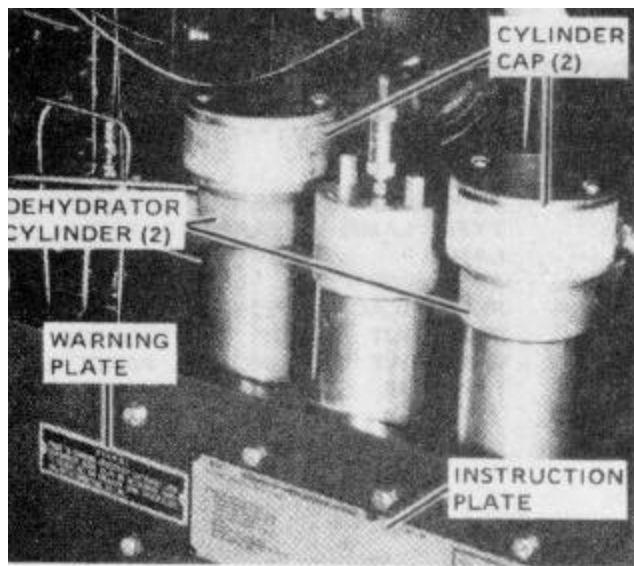


Figure 3-8. Dehydrator Service

**3-14. Lamp Service.** Service the instrument panel lamps, compressor compartment dome light, and control panel blackout light as shown in figure 3-9.

**INSTRUMENT PANEL LAMPS:**

- STEP 1. TURN AND REMOVE INSTRUMENT PANEL LAMP COVER AND LENS.
- STEP 2. TURN AND REMOVE THE BAYONET BASE TYPE LAMP. REPLACE BURNED OUT LAMP (12V).
- STEP 3. WIPE LENS AND COVER CLEAN. ASSEMBLE LENS AND COVER.

**CONTROL PANEL BLACKOUT LIGHT:**

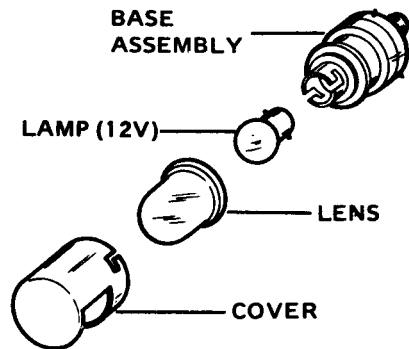
- STEP 1. TURN AND REMOVE BLACKOUT LIGHT LENS.
- STEP 2. TURN AND REMOVE THE BAYONET BASE TYPE LAMP. REPLACE BURNED OUT LAMP.

**NOTE:** FIXED BLACKOUT LIGHT USES 24V LAMP. BLACKOUT LIGHT CONTROLLED BY RHEOSTAT ON CONTROL PANEL USES 12V LAMP.

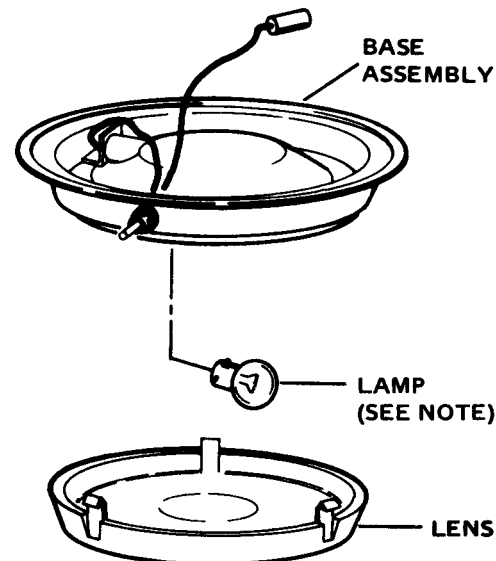
- STEP 3. WIPE LENS CLEAN AND INSTALL.

**AIR COMPRESSOR COMPARTMENT DOME LIGHT:**

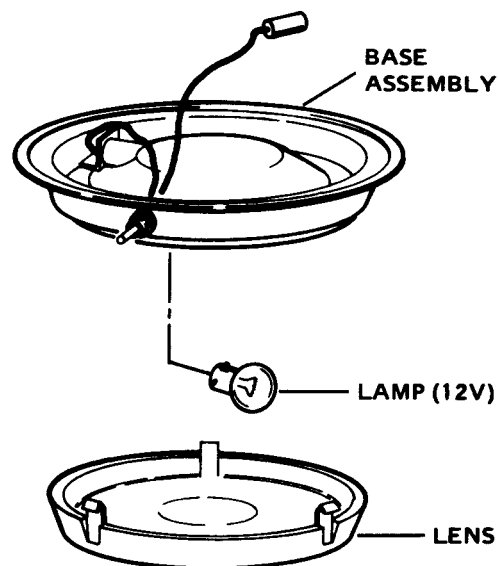
- STEP 1: TURN AND REMOVE DOME LIGHT LENS.
- STEP 2: TURN AND REMOVE THE BAYONET BASE TYPE LAMP. REPLACE BURNED OUT LAMP (12V)
- STEP 3. WIPE LENS CLEAN AND INSTALL.



**INSTRUMENT PANEL LAMPS**



**CONTROL PANEL BLACKOUT LIGHT**



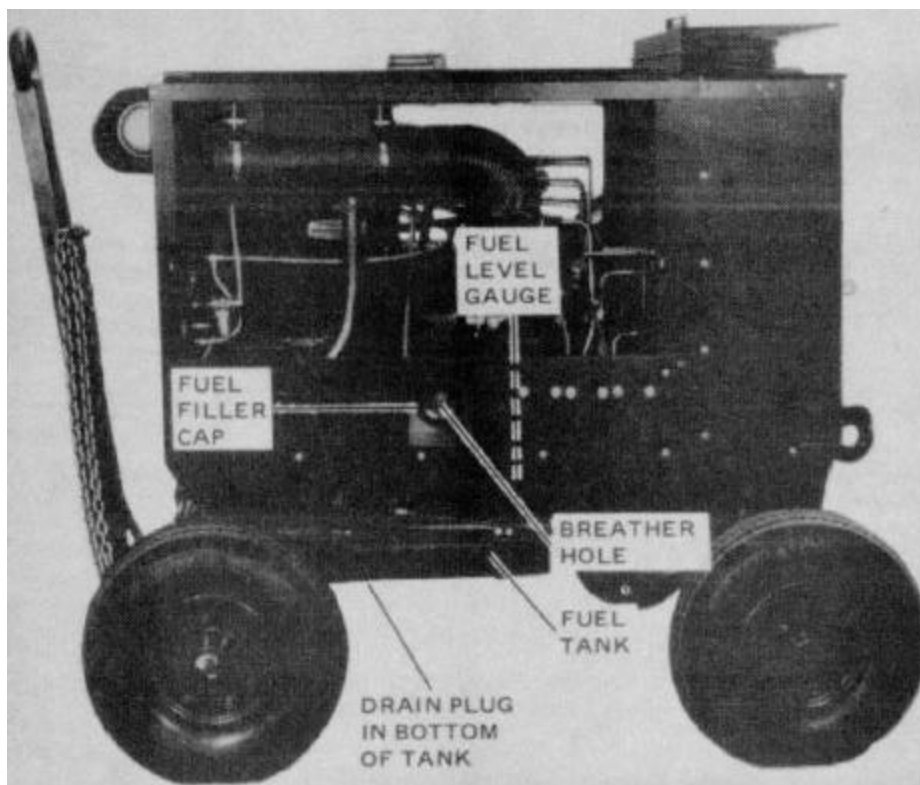
**AIR COMPRESSOR COMPARTMENT DOME LIGHT**

Figure 3-9. Lamp service.

**3-15. Fuel Tank Service.** Service the fuel tank as shown in figure 3-10.

**WARNING**

When filling fuel tank, always provide metal contact between filling container (or nozzle) and fuel tank filler neck to prevent a spark from being generated as gasoline flows over metal surfaces. Do not allow smoking or open flame near unit servicing fuel tank.



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- STEP 1.** TURN FUEL FILLER CAP AND REMOVE. (CAP IS ATTACHED TO FILLER NECK WITH A CHAIN.) CHECK BREATHER HOLE IN CENTER OF CAP FOR PLUGGING.
- STEP 2.** FILLER NECK HAS REMOVABLE FILTER SCREEN. REMOVE AND CLEAN SCREEN AS NECESSARY.
- STEP 3.** FUEL LEVEL GAUGE IS LOCATED ON TOP OF TANK. CHECK FUEL LEVEL AND ADD FUEL AS NEEDED.

TANK CAPACITY IS 20-3/4 GALLONS (78.45 LITERS).

- STEP 4.** WHEN DRAINING OF TANK IS NECESSARY, PLACE A CONTAINER UNDER TANK; REMOVE DRAIN PLUG FROM BOTTOM OF TANK. WHEN FLOW OF FUEL STOPS, INSTALL THE DRAIN PLUG.
- STEP 5.** AFTER SERVICING, INSTALL THE FILTER SCREEN AND FILLER CAP.

Figure 3-10. Fuel tank service.

**3-16. Battery Cables and Battery Service.** Service the battery cables and battery as shown in figure 3-11.

**WARNING**

To prevent serious burns, take necessary precautions when filling battery with electrolyte. Do not allow electrolyte. Do not allow electrolyte to come in contact with skin or eyes. Use rubber gloves and protective clothing.

**STEP 1. INSPECT BATTERY CABLES FOR TIGHTNESS AND CORROSION. CHECK BATTERY HOLDDOWN WING NUTS FOR TIGHTNESS ON J-BOLTS. TIGHTEN ANY LOOSE CONNECTIONS.**

**NOTE**

Use distilled water or a good grade drinking water (excluding mineral water).

**STEP 2. REMOVE THE BATTERY CELL CAPS AND CHECK LEVEL OF ELECTROLYTE. LEVEL SHOULD BE APPROXIMATELY 3/8-INCH (9.5 MM) ABOVE CELL PLATES. CHECK FOR DAMAGED OR MISSING CELL CAPS. ADD ELECTROLYTE AS NEEDED. INSTALL CELL CAPS.**

**STEP 3. AFTER ADDING ELECTROLYTE, AND AFTER CHARGING BATTERY, RUN ENGINE APPROXIMATELY ONE HOUR AT NO LOAD TO ENSURE FULL CHARGE OF BATTERY.**

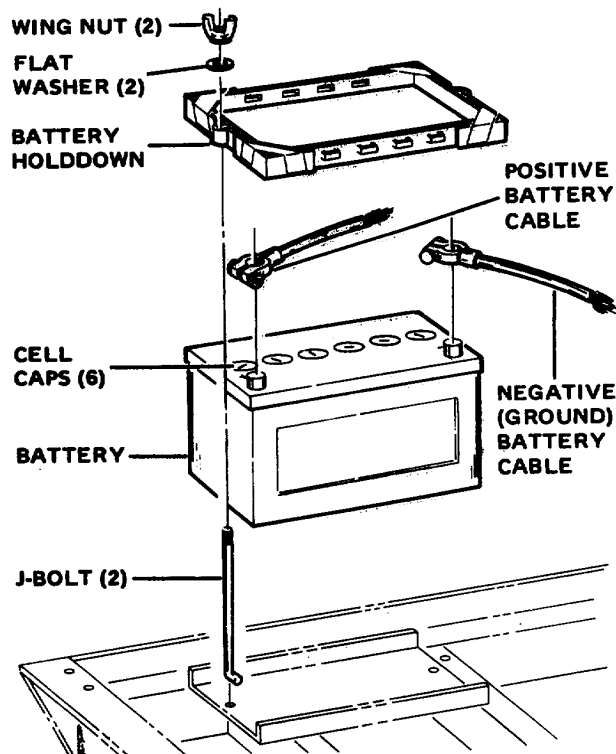
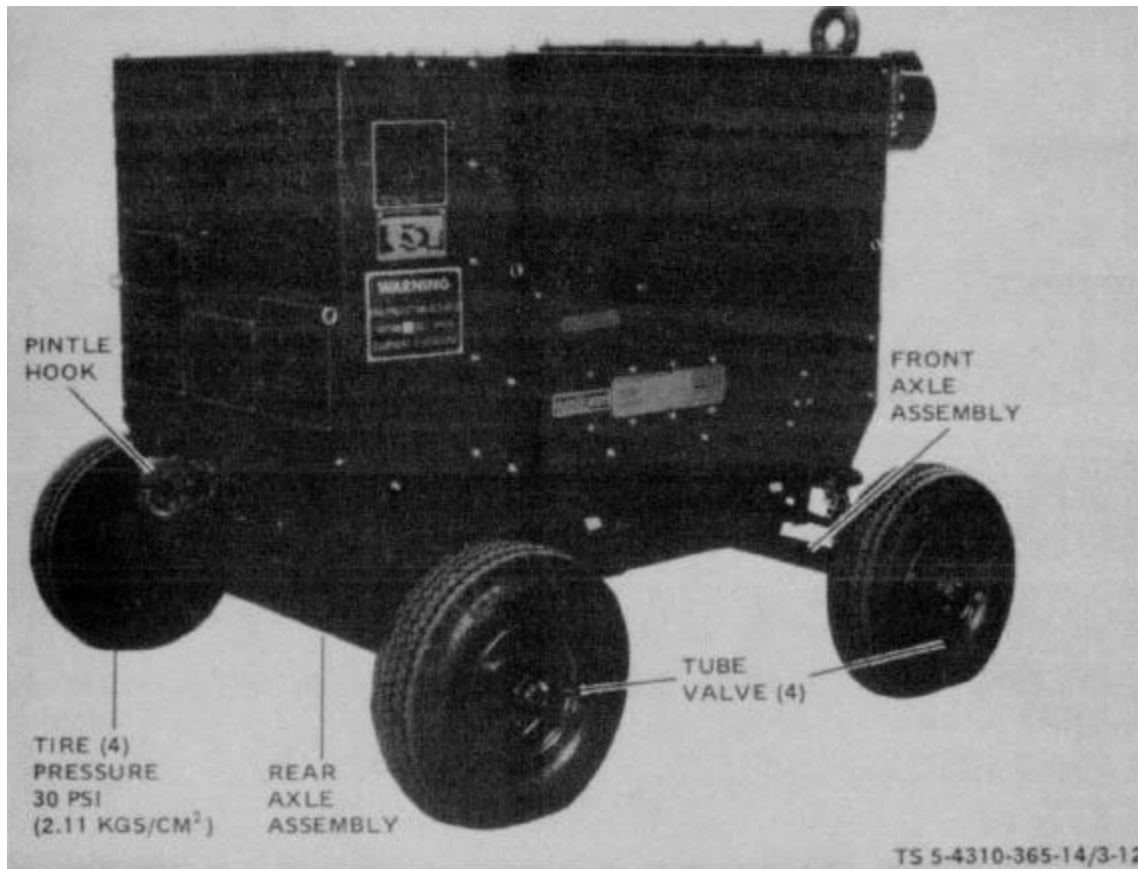


Figure 3-11. Battery cables and service.

**3-17. Chassis and Running Gear Service.** Service the chassis and running gear as shown in figure 3-12.



**STEP 1. CHECK TIRE PRESSURE. RECOMMENDED PRESSURE IS 30 PSI (2.11 kgs/cm<sup>2</sup>).**

**STEP 3. LUBRICATE RUNNING GEAR AND PINTLE HOOK IN ACCORDANCE WITH LO 5-4310-365-12.**

**STEP 2. CHECK FOR WORN, CUT, OR OTHERWISE DAMAGED TIRES. NOTIFY ORGANIZATIONAL MAINTENANCE FOR TIRE AND TUBE REPLACEMENT.**

*Figure 3-12. Chasis and running gear service.*

**CHAPTER 4  
ORGANIZATIONAL, DIRECT SUPPORT, AND  
GENERAL SUPPORT MAINTENANCE INTRODUCTION**

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**Section I. GENERAL INFORMATION**

**4-1. Scope.** Chapters 4 through 7 contain organizational, direct support, and general support maintenance instructions as prescribed by the maintenance allocation chart (MAC), Appendix E. These instructions are for:

Model 1MCAA Compressor, Reciprocating; Power - Driven, Air, 3500 PSI, Type II, Class 1, 15 CFM. Manufactured by Davey Compressor Company, Cincinnati, Ohio 45242. National Stock Number (NSN) 4310-01-070-5615.

Purpose of Equipment: To provide clean, dry, high-pressure air for charging air systems on missiles and flame throwers.

**4-2. Maintenance Forms, Records, and Reports.** Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System.

**4-3. Destruction of Army Material to Prevent Enemy Use.** Instructions for destruction of Army material to prevent enemy use is contained in TM 750-244-3.

**4-4. Preparation for Storage or Shipment.** Preparation for storage or shipment is detailed in Chapter 5, Section VI.

**4-5. Quality Assurance/Quality Control (QA/QC).** Refer to TB 43-0151, Inspection and Test of Air and Other Gas Compressors.

**4-6. Official Nomenclature, Names, and Designations.** Refer to paragraph 1-5 for nomenclature cross-reference list.

**4-7. Reporting Equipment Improvement Recommendations (EIR).** Refer to paragraph 1-3 for EIR instructions.

**Section II. EQUIPMENT DESCRIPTION AND DATA**

**4-8. Equipment Characteristics, Capabilities, and Features.** Refer to paragraph 1-6.

**4-9. Location and Description of Major Components.** Refer to paragraph 1-7.

## CHAPTER 5 END ITEM MAINTENANCE INSTRUCTIONS

### Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

**5-1. Common Tools and Equipment.** For authorized common tools and equipment refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

**5-2. Special Tools, TMDE, and Support Equipment.** Refer to TM 5-4310-365-24P, Organizational, Direct

Support and General Support Maintenance Repair Parts and Special Tools List.

**5-3. Repair Parts.** Repair parts are listed and illustrated in the repair parts and special tools list, TM-5-4310-365-24P, covering organizational maintenance for this equipment.

### Section II. SERVICE UPON RECEIPT

**5-4. Site and Shelter Requirements.** Tow the unit to site of operation and park on as level a surface as possible. Unit should not be operated when out-of-level more than 15 degrees in either direction (front to rear or side to side). Unit is totally enclosed in its own housing. When not in use, close and latch all doors. If not to be used for extended period, cover unit or park in a sheltered area to protect from the weather.

**5-5. Service Upon Receipt of Material.** Refer to paragraph 2-5 for unloading, unpacking and deprocessing. Refer to table 5-1 for service upon receipt.

#### 5-6. Checking Unpacked Equipment.

**a.** Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6, Packaging Improvement Report.

**b.** Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of TM 38-750.

**c.** Check to see whether the equipment has been modified.

#### 5-7. Installation Instructions.

**a. Tools, Test Equipment, and Materials Required for Installation.** The tools, test equipment, and materials required for installation are listed in the MAC, Appendix E.

**b. Assembly of Equipment.** The unit is shipped as a completely assembled unit; therefore, no assembly is required.

**c. Installation Instructions.** After unit is placed on site, set parking brakes and make installation as follows:

- (1) Open control panel door on rear of unit.
- (2) Connect the quick-disconnect fitting end of the service hose to fitting on control panel (2, fig. 2-1).
- (3) Uncoil service hose from door hangers. Remove air chuck service valve assembly (1, fig. 2-1) from clip on door. Attach valve assembly to service hose.
- (4) Take air chuck service valve assembly end of service hose to the item to be serviced.
- (5) Make certain service valve (1, fig. 2-1) and service outlet valve (12) are closed.
- (6) Unit is now ready to run and charge air system. Refer to Chapter 2 for operating instructions.

#### 5-8. Preliminary Servicing and Adjustment of Equipment.

- a.** Lubricate in accordance with LO 5-4310-365-12.
- b.** Perform the before operating PMCS, table 2-1.
- c.** Refer to table 2-2 and set all controls, valves, and switches in STARTUP POSITION.



Table 5-1. Service Upon Receipt

LOCATION	ITEM	ACTION	REMARKS
1. Running gear	Tires, hubs and axles	<ul style="list-style-type: none"> <li>a. Inspect for proper inflation pressure, cuts, and wear.</li> <li>b. Inspect for missing grease caps and dirt in hubs.</li> <li>c. Inspect for missing lubrication fittings and bent or broken parts.</li> </ul>	
2. Housing	Doors and panels	<ul style="list-style-type: none"> <li>a. Inspect for broken hinges, dents, paint damage, and rust.</li> <li>b. Inspect for missing identification plates.</li> <li>c. Inspect for missing and loose mounting hardware.</li> </ul>	
3. Control panel door	Service hose and air chuck assembly	<ul style="list-style-type: none"> <li>a. Inspect for missing or damaged service hose and air chuck assembly.</li> <li>b. Inspect for broken service hose hangers on door panel.</li> </ul>	
4. Alternator	Drive belt	<ul style="list-style-type: none"> <li>a. Inspect for missing or damaged belt.</li> <li>b. Check adjusting bracket for loose or missing hardware.</li> </ul>	
5. Starter and battery	Electrical cables	<ul style="list-style-type: none"> <li>a. Check for tightness of cables on terminals.</li> <li>b. Inspect for missing or damaged cables and damaged battery.</li> </ul>	
6. Dehydrators	Cartridges	<ul style="list-style-type: none"> <li>a. Check dehydrator instruction plate for recorded cartridge change date and recorded hourmeter reading.</li> <li>b. Make certain dehydrators contain cartridges.</li> </ul>	
7. Instrument and control panel	Gauges and control valves	<ul style="list-style-type: none"> <li>a. Inspect for any damaged gauges.</li> <li>b. Inspect for missing handles on control valves and free operation of the valves.</li> </ul>	
8. Fuel tank	Filler cap, neck, tank, and level gauge	<ul style="list-style-type: none"> <li>a. Inspect for missing filler cap and missing or damaged screen in filler neck.</li> <li>b. Inspect for damaged fuel level gauge on top of fuel tank.</li> <li>c. Inspect for a damaged fuel tank.</li> </ul>	

**Section III. PREVENTATIVE MAINTENANCE CHECKS AND SERVICES (PMCS)**

**5-9. Introduction.** Refer to table 5-2 for organizational preventative maintenance checks and services (PMCS). (Operator/Crew PMCS are found in table 2-1.) The PMCS in table 5-2 are those authorized for this maintenance level by the MAC, Appendix E.

**5-10. Explanation of Columns.** An explanation of table 5-2 column heads and codes follows:

**a. Item Number Columns.** Checks and services are numbered in logical order of performance regardless of the interval. This column is used as a source of item number for the TM Number Column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, in recording results of PMCS.

**b. Interval Column.** The columns headed "W", "M", "Q", "S", "A", "B", and "H" contain a dot (•) opposite the appropriate check. If a check is to be performed

weekly the dot appears opposite that check in the "W" column; if the check is accomplished monthly, the dot appears in the "M" column. If a check is to be made at two or more intervals, a dot appears in each applicable column.

**c. Item to be Inspected Column.** Items listed in this column are divided into groups indicating the portion of the equipment of which they are a part. Under these groupings, the item to be inspected is identified by its common name.

**d. Procedures Column.** This column contains a brief description of the procedure by which the check is to be performed. Reference to detailed paragraphs covering extensive procedure and check information may appear in this column.

Table 5-2. Organizational Preventative Maintenance Checks and Services

W - Weekly  
M - Monthly

Q - Quarterly  
S - Semiannually

A - Annually  
B - Biennially

H - Hours

ITEM NO.	INTERVAL							ITEMS TO BE INSPECTED	PROCEDURES
	W	M	Q	S	A	B	H		
1.		•						Exhaust muffler	Check for holes and cracked seams. Refer to para 6-2.
2.	•							Service hose and fittings	Inspect for damaged hose, cross-threading of fittings and free operation of hand valve. Replace defective parts.
3.		•						Compressor enclosure	Visually inspect for broken hinges and door latches, dents, and damage to painted surfaces that could result in rust forming. Refer to para 6-4.
4.		•						Fuel lines and fittings	Check fuel lines for evidence of leakage, crimped tubing, fitting tightness and seal, and for damaged fitting threads. Refer to para 6-6.
5.		•						Air lines and fittings	Check for crimping of lines and air leaks at fittings. Refer to para 6-8.
6.			•					Alternator and drive belt	Check belt tightness and adjust as necessary. Test alternator for proper output. Refer to para 6-10.
7.			•					Starter assembly	Test starter for proper operation. Refer to para 6-12.
8.			•					Engine assembly	Test engine for proper compression, ignition, and governed speed. Refer to para 6-14.
9.			•					Magneto	Inspect, test, and replace as necessary. Refer to para 6-14.
10.			•					Carburetor	Visually inspect for damaged fittings, cracks, and operation. Refer to para 6-18.
11.			•					Fuel pump	Test the fuel pump for plunger action. Refer to para 6-19.
12.			•					Governor	Visually inspect governor for broken or cracked actuating arm, bent or missing linkage. Notify direct support maintenance of defects.
13.				•				Temperature switch	Inspect wire assembly for damage. Test switch for operation. Refer to para 6-15.
14.					•			Intake and exhaust manifold	Inspect for cracks and evidence of leakage around gaskets. Refer to para 6-17.
15.			•					Crankcase breather	Replace crankcase breather when notified of defect by operator/crew.

Table 5-2. Organizational Preventative Maintenance Checks and Services - Continued

W - Weekly  
M - Monthly

Q - Quarterly  
S - Semiannually

A - Annually  
B - Biennially

H - Hours

ITEM NO.	INTERVAL							ITEMS TO BE INSPECTED	PROCEDURES
	W	M	Q	S	A	B	H		
16.				•				Spark plugs and cables	Check gap on plugs. Check for damaged insulation and shielding cover. Refer to para 6-14.
17.			•					Engine oil filter	Inspect for damaged oil hoses, cracked brackets and evidence of leaking. Refer to para 6-20.
18.				•				Clutch assembly and housing group	Inspect for damaged parts, adjust, repair or replace. Refer to para 6-22.
19.					•			Air compressor assembly	Test air compressor assembly by operational check. Refer any defects to direct support and general support maintenance. Refer to para 6-24.
20.					•			Compressor oil lines	Inspect for damaged hoses and fittings. Replace as necessary.
21.			•					Crankcase breather	Replace when notified by operator/crew of defects. Refer to para 6-26.
22.					•			Unloader and drain valve assembly	Check for proper operation and evidence of damage. Notify direct support and general support maintenance of defects.
23.	•							Moisture traps	Inspect and service in accordance with para 6-27.
24.			•					Air receiver	Inspect for tight mounting and fittings. Notify direct support and general support of defects.
25.				•				Instrument and control panel	Check operation of all switches and gauges. Test and replace as authorized by the MAC, Appendix E, and para 6-29.
26.					•			Engine and compressor drains	Replace all defective parts in accordance with para 6-31.
27.					•			Fuel tank filler cap, neck, hoses, straps, and fuel level gauge.	Inspect and replace in accordance with para 6-33. Notify direct support and general support maintenance of damaged fuel tank.
28.			•					Battery, holddown, and cables	Inspect, test, repair or replace in accordance with para 6-35.
29.					•			Chassis and running gear	Inspect, repair, or replace as authorized by the MAC, Appendix E, and para 6-37. Notify direct support and general support maintenance of defects in brake assembly and damage to chassis frame.

Table 5-2. Organizational Preventative Maintenance Checks and Services - Continued

W - Weekly  
M - Monthly

Q - Quarterly  
S - Semiannually

A - Annually  
B - Biennially

H - Hours

ITEM NO.	INTERVAL							ITEMS TO BE INSPECTED	PROCEDURES
	W	M	Q	S	A	B	H		
30.					•			Winterization equipment	Inspect for any damage to cables and for proper operation. Notify direct support and general support maintenance of any defects.

**Section IV. TROUBLESHOOTING**

**5-11. Introduction.** This section contains those checks and corrective actions which will isolate defects which can be corrected by performance of maintenance allocated to organizational maintenance technician by the MAC, Appendix E.

**5-12. Troubleshooting Table.** The troubleshooting table, Table 5-3, lists Malfunctions, Test or Inspection, and Corrective Action. The table is based on symptoms which may be observed by you during PMCS. Only checks and corrective actions authorized for organization are listed. (Operator/Crew Troubleshooting is found in Table 3-1)

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MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

---

**1. ENGINE FAILS TO START OR IS DIFFICULT TO START.**

- Step 1. Inspect for broken or burned battery and starter cables.  
**Repair or replace defective cable (para 6-35).**
- Step 2. Check specific gravity of battery electrolyte with hydrometer.  
**If specific gravity is below 1.250, add electrolyte and charge battery (refer to TM 9-6140-200-15).**
- Step 3. Inspect for loose wire connections to master switch, ignition switch, and start switch.  
**Tighten wire connections. If engine still will not start, check continuity of switches and replace a defective switch (para 6-29).**
- Step 4. Check ignition cables for loose connections on spark plugs and magneto.  
**Tighten connections as necessary.**
- Step 5. Inspect ignition cables for wear causing short circuit.  
**Replace damaged ignition cables (para 6-14).**
- Step 6. Inspect engine high temperature safety switch and wire for defect causing magneto to short.  
**Replace defective wire and/or switch (para 6-15).**
- Step 7. Check for damaged engine oil pressure switch.  
**Replace defective pressure switch (para 6-29.l).**
- Step 8. Inspect for defective safety override switch.  
**Replace defective switch (para 6-29.d).**
- Step 9. Any other causes.  
**Notify direct support and general support maintenance.**
- Step 10. Test the starter for malfunction.  
**Replace a defective starter (para 6-12).**

**2. ENGINE RUNS ROUGH, MISSES.**

- Step 1. Check for secure ignition wire connections.  
**Tighten connections on spark plugs and magneto.**

Table 5-3. Organizational Troubleshooting - Continued

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MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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**2. ENGINE RUNS ROUGH, MISSES - Continued**

- Step 2. Check for defective spark plugs.  
**Regap plugs or replace if defective (para 6-14.d).**
- Step 3. Check magneto breaker point adjustment.  
**Adjust breaker points in accordance with para 6-14.d.**
- Step 4. Check for correct carburetor adjustment.  
**Adjust carburetor with para 7-12.g.**
- Step 5. Any other causes.  
**Notify direct support and general support maintenance.**

**3. ENGINE RUNS ERRATIC.**

- Step 1. Check if governor spring is engaged in correct hole in governor lever.  
**Hook the spring in the seventh hole up from the shaft end of the lever.**
- Step 2. Check governor rod for proper adjustment.  
**Notify direct support and general support maintenance.**
- Step 3. Any other causes.  
**Notify direct support and general support maintenance.**

**4. ENGINE STOPS.**

- Step 1. Check for inoperative fuel pump.  
**Replace defective fuel pump (para 6-19).**
- Step 2. Check for damaged carburetor.  
**Replace damaged carburetor (para 6-18).**
- Step 3. Any other causes.  
**Notify direct support and general support maintenance.**

Table 5-3. Organization Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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**5. ENGINE KNOCKS.**

- Step 1. Check the magneto spark advance.  
**Time the magneto spark in accordance with para 6-14.e.**
- Step 2. Any other causes.  
**Notify direct support and general support maintenance.**

**6. ALTERNATOR OUTPUT ERRATIC OR NO OUTPUT.**

- Step 1. Check drive belt for correct adjustment.  
**Tighten drive belt in accordance with para 6-10.g.**
- Step 2. Test alternator for malfunction.  
**Test alternator/voltage regulator in accordance with para 6-10e.  
 Replace a defective alternator/voltage regulator in accordance with para 6-10.**
- Step 3. Any other causes.  
**Notify direct support and general support maintenance.**

**7. CLUTCH WILL NOT ENGAGE.**

- Step 1. Inspect for proper adjustment.  
**Adjust clutch in accordance with para 6-22.g.**
- Step 2. Inspect for broken or bent parts.  
**Repair or replace in accordance with para 6-22.**

**8. COMPRESSOR WILL NOT LOAD.**

- Step 1. Inspect for defective LOAD-UNLOAD switch on control panel.  
**Replace a defective switch (para 6-29.f).**
- Step 2. Check for open or leaking bleed and drain valves.  
**Close valves if open, tighten connections at valves if leakage is at connection points;  
 replace defective valves. Notify direct support and general support maintenance.**
- Step 3. Inspect for defective unloader control box.  
**Notify direct support and general support maintenance.**



Table 5-3. Organizational Troubleshooting - Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<b>8. COMPRESSOR WILL NOT LOAD - Continued</b>		
Step 4.	Any other causes.	<b>Notify direct support and general support maintenance.</b>
<b>9. COMPRESSOR DOES NOT UNLOAD AT 3500 PSI (24115 kPa).</b>		
Step 1.	Improper setting or defective control pressure switch or defective solenoid valve is indicated.	<b>Notify direct and general support maintenance.</b>
Step 2.	Any other causes.	<b>Notify direct and general support maintenance.</b>
<b>10. STAGE PRESSURE GAUGES DO NOT INDICATE CORRECT READINGS (see table 2-2).</b>		
Step 1.	Inspect for leakage at trap assemblies.	<b>Service the trap assemblies (para 6-27).</b>
Step 2.	Check for leakage at cooler safety valves.	<b>Notify direct support and general support maintenance.</b>
Step 3.	Inspect for faulty gauges.	<b>Replace defective gauges within scope of organizational maintenance, refer to MAC, Appendix E. All others, notify direct support and general support maintenance.</b>
Step 4.	Any other causes.	<b>Notify direct support and general support maintenance.</b>
<b>11. OIL PRESSURE GAUGES INDICATE LOW READING (see table 2-2)</b>		
Step 1.	Visually inspect gauges for damage.	<b>Replace damaged oil pressure gauges (para 6-29.o).</b>
Step 2.	Any other causes.	<b>Notify direct support and general support maintenance.</b>

Table 5-3. Organizational Troubleshooting - Continued

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**MALFUNCTION****TEST OR INSPECTION****CORRECTIVE ACTION**

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**12. EXCESSIVE OIL CONSUMPTION.**

Step 1. Inspect engine and/or compressor oil drain hoses for loose connections of defective hose.

**Tighten connections as necessary. Replace defective drain hoses.**

Step 2. Any other causes.

**Notify direct support and general support maintenance.**

**13. FUEL GAUGE INOPERATIVE.**

Step 1. Check for stuck float or defective gauge.

**Replace defective fuel gauge (para 6-33).**

Step 2. Any other fuel tank and filler defects.

**Inspect, repair or replace in accordance with para 6-33.**

**14. BATTERY WILL NOT HOLD CHARGE.**

Step 1. Check for defective cables that would cause short.

**Replace damaged cables (para 6-35).**

Step 2. Inspect battery for cracks.

**Replace damaged battery (para 6-35).**

**15. CHASSIS AND RUNNING GEAR.**

Step 1. Inspect tires for wear and cuts.

**Replace tires and tubes.**

Step 2. Inspect front and rear axle assemblies for broken and cracked components.

**Replace any defective parts (para 6-38 and 6-40).**

Step 3. Inspect pintle hook for broken or missing parts.

**Repair or replace in accordance with para 6-37.**

Step 4. Inspect brake assemblies for broken or missing parts.

**Replace brake assembly and notify direct support and general support maintenance for brake repair.**

Table 5-3. Organizational Troubleshooting - Continued

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<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>15. CHASSIS AND RUNNING GEAR - Continued</b>		
	Step 5. Inspect chassis frame for cracks and broken welds.	<b>Notify direct support and general support maintenance for chassis frame repair.</b>
<b>16. WINTERIZATION EQUIPMENT NOT OPERATING PROPERLY.</b>		
	Step 1. Check for overheating of equipment.	<b>Notify direct support and general support maintenance for repair and replacement of winterization equipment components.</b>

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**Section V. MAINTENANCE PROCEDURES**

**5-13. Introduction.** This section explains maintenance procedures which are the responsibility of the organizational maintenance technician as authorized by the MAC, Appendix E, and Source, Maintenance, and Recoverability (SMR) coded items.

**5-14. Maintenance Procedures.** Maintenance procedures are presented in the order listed below, as applicable. Complete instructions for maintenance operations for each unit Functional Group is provided in step-by-step procedures detailed in Chapter 6.

Maintenance Operations (as applicable):

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>Servicing</li> <li>Ground handling</li> <li>Operational check</li> <li>Inspection-installed items</li> <li>Removal</li> <li>Disassembly</li> <li>Cleaning</li> <li>Inspection-acceptance/<br/>rejection criteria</li> <li>Repair or replacement</li> </ul> | <ul style="list-style-type: none"> <li>Testing</li> <li>Painting</li> <li>Lubrication</li> <li>Reassembly</li> <li>Test procedures</li> <li>Installation</li> <li>Adjustment</li> <li>Radio interference<br/>suppression</li> <li>Placing in service</li> </ul> |
|---|---|

**Section VI. PREPARATION FOR STORAGE OR SHIPMENT**

**5-15. Types of Storage**

**a. Short Term (Administrative Storage).** Short term (administrative storage) is 1 to 45 days. This covers storage of equipment which can be readied for mission performance within 24 hours. Before placing an item in administrative storage, the next scheduled preventive maintenance checks and services should be performed, all known deficiencies corrected, and all current modification work orders applied.

Storage site should provide required protection from the elements and allow access for visual inspection.

**b. Intermediate Storage** = 46 to 180 days.

**c. Long Term Storage** = No time limit.

**5-16. Preparation for Storage or Shipment.** Refer to TB 740-94-2, Preservation of USAMECOM Mechanical Equipment for Shipment and Storage.

**CHAPTER 6**  
**ORGANIZATIONAL MAINTENANCE INSTRUCTIONS**

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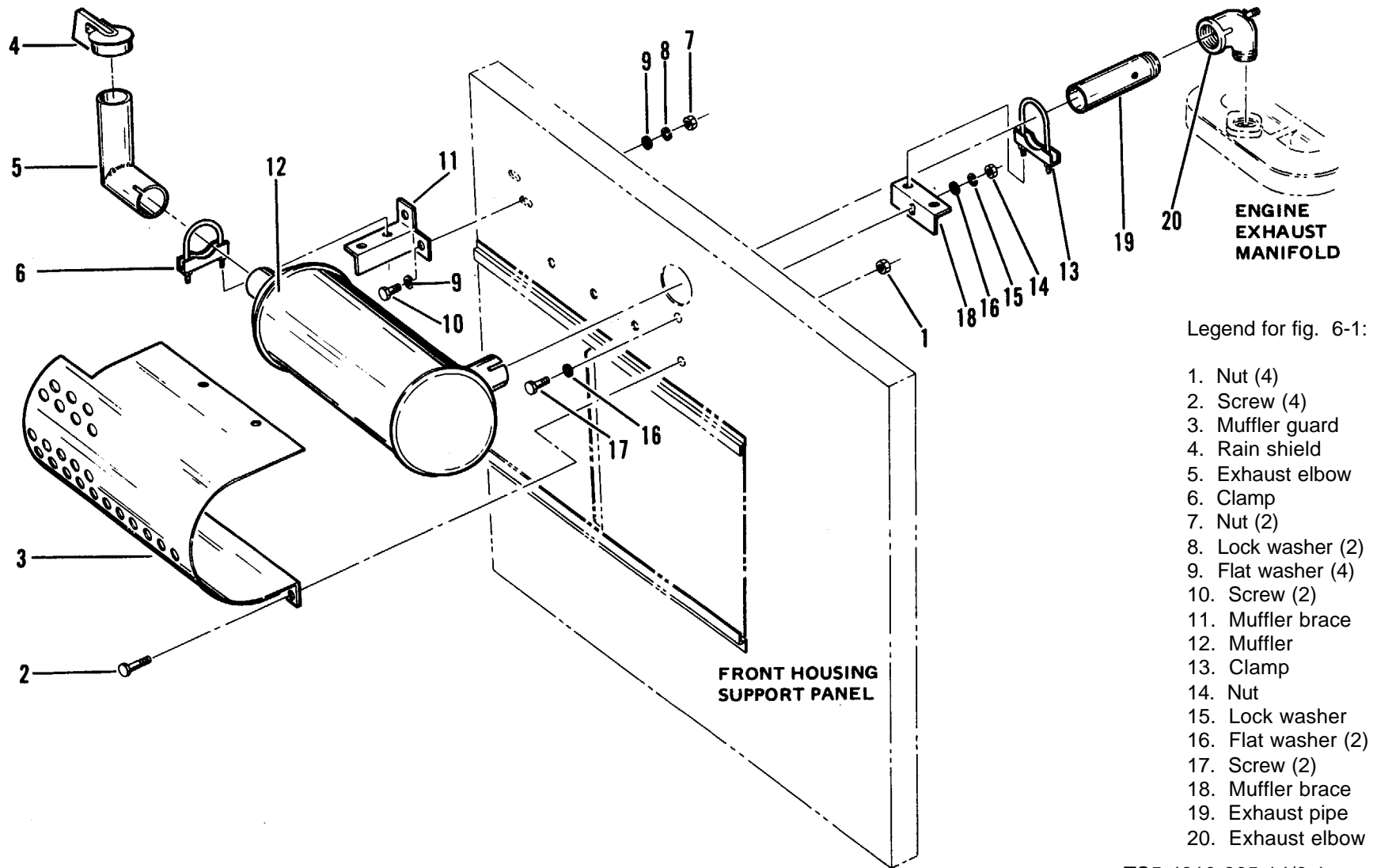
**Section I. MAINTENANCE OF EXHAUST MUFFLER GROUP**

**6-1. General.** This section contains inspection of installed components, removal, cleaning, inspection-acceptance, replacement, painting, and installation instructions for the exhaust muffler group.

**6-2. Maintenance of Exhaust Muffler Group.** Maintenance of this group is as follows.

**a. Inspection-Installed Item.** Inspect the exhaust muffler (12, figure 6-1) for holes, cracked seams, and dents. Inspect for loose and missing parts.

**b. Removal.** Remove the exhaust muffler and group components as follows:



Legend for fig. 6-1:

- 1. Nut (4)
- 2. Screw (4)
- 3. Muffler guard
- 4. Rain shield
- 5. Exhaust elbow
- 6. Clamp
- 7. Nut (2)
- 8. Lock washer (2)
- 9. Flat washer (4)
- 10. Screw (2)
- 11. Muffler brace
- 12. Muffler
- 13. Clamp
- 14. Nut
- 15. Lock washer
- 16. Flat washer (2)
- 17. Screw (2)
- 18. Muffler brace
- 19. Exhaust pipe
- 20. Exhaust elbow

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Figure 6-1. Exhaust muffler group

- (1) Unscrew and remove four nuts (1, fig. 6-1) and screws (2) that secure guard (3) to front housing support panel. Remove two locknuts and screws from enclosure roof to free guard. Reinstall the roof screws and locknuts to prevent their loss.
- (2) Loosen clamp nut and remove rain shield (4) from exhaust elbow (5). Remove nuts securing clamp (6) to muffler brace (11); remove exhaust elbow (5) and clamp (6).
- (3) Remove two nuts (7), lock washers (8), screws (10), four flat washers (9), and muffler brace (11). Remove nuts securing clamp (13) to muffler brace (18). Remove the clamp (13) and pull muffler (12) off exhaust pipe (19).
- (4) Remove nut (14), lock washer (15), screw (17), flat washers (16), and muffler brace (18).
- (5) When necessary to remove exhaust pipe and elbow (19, 20), disconnect the two condensate tube assemblies attached to these parts; then, unscrew elbow (20) from engine exhaust manifold.

#### WARNING

**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° F - 130° F (38° C - 59° C).**

**c. Cleaning.** Remove rust from components using a wire brush. Clean parts in solvent, P-D-680, or equivalent and air dry.

**d. Inspection-Acceptance.** Inspect all threaded parts for cross-threading and nicks. Inspect for bent or cracked components. Inspect for dents in guard (3, fig. 6-1). Straighten dents when possible. Inspect exhaust muffler (12) for holes, split seams, and excessive rusting.

**e. Replacement.** Replace all defective components.

**f. Painting.** Refer to TM 43-0139, Painting Instructions for Field Use.

**g. Installation.** Install exhaust muffler group as follows:

- (1) Screw exhaust elbow (20, fig. 6-1) into engine exhaust manifold with female end in line with hole in housing support panel. Screw exhaust pipe (19) into elbow (20).
- (2) Attach muffler brace (18) to inside of support panel with screw (17), two flat washers (16), lock washer (15), and nut (14).
- (3) Attach muffler brace (11) to outside of support panel with two screws (10), four flat washers (9), two lock washers (8) and nuts (7).
- (4) Install muffler (12) onto exhaust pipe (19) and secure muffler (12) onto exhaust pipe (19) and secure muffler (12) to brace (18) with clamp (13). Install exhaust elbow (5) on muffler (12) with extension positioned vertical. Secure to brace (11) with clamp (6). Install rain shield (4) and tighten shield clamp nut.
- (5) Remove two locknuts and screws from enclosure roof that secure top of guard (3) to roof. Attach guard (3) to support panel with four screws (2) and nuts (1). Reinstall the two screws and locknuts securing top of guard to roof. Connect two condensate tube assemblies to exhaust pipe (19) and elbow (20).

**Section II. MAINTENANCE OF COMPRESSOR ENCLOSURE GROUP**

**6-3. General.** This section contains inspection of installed items, removal and disassembly, cleaning, inspection-acceptance, repair or replacement, painting, reassembly and installation of the complete enclosure group.

Check dome light (66) and blackout light (73) for defective lamps (71, 74) and cracked or missing lens (70).

**b. Removal and Disassembly.** Remove and disassemble the enclosure components as follows:

**NOTE**

The lower side panels (17, 20, fig. 6-2) are components of subassemblies covered in later sections but shown on figure 6-2 for relationship to complete enclosure. Removal of enclosure components should be limited to that necessary for maintenance and for access to other unit components or assemblies. However, complete removal and/or disassembly is covered in this section.

- (1) Remove twelve locknuts (1, fig. 6-2) and screws (2) and remove the two side doors (3) and document tray (76). When replacement of document tray (76). When replacement of document tray (76) door strike and catch (11) is necessary, remove four nuts (8), lock washers (9), screws (10), and the door strike and catch (11). Remove two locknuts (41), screws (42), and nameplate (43) from each door (3). The rubber door bumpers (57), four per door (3) are attached with adhesive and should be removed for replacement. They are not reusable once removed.
- (2) Remove eleven locknuts (4), eighteen screws (5), rear door (6), and roof (7). Remove twelve self-tapping screws (38), operating instruction plate (50), wiring diagram plate (51), and air flow diagram plate (52) from rear door (6). Remove two nuts (53), lock washers (54), screws (55), and the service hose clamp (56). Door bumpers (57)

**6-4. Maintenance of Compressor Enclosure.**

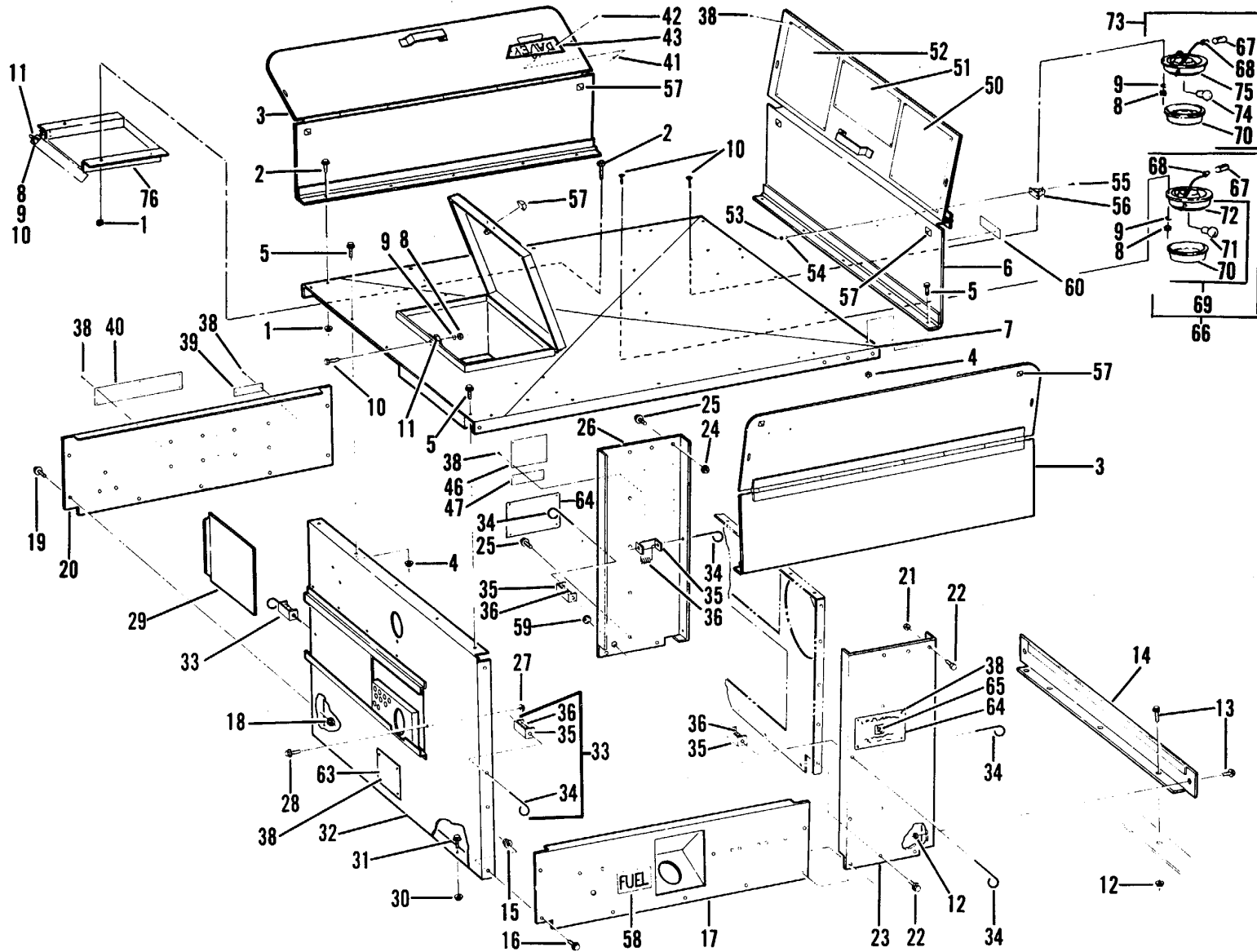
Maintenance of this group is as follows:

**a. Inspection-Installed Items.** Inspect all door hinges and latches for proper operation and missing parts. Inspect for dents and paint damage that could cause rusting. Inspect for damaged and missing identification plates (39, 40, 43, 46, 47, 50, 51, 52, 63, and 64) and decals (58, 60, 65).

Legend for fig. 6-2:

- |                               |                                  |                             |
|-------------------------------|----------------------------------|-----------------------------|
| 1. Locknut (12)               | 27. Locknut (2)                  | 52. Air flow diagram plate  |
| 2. Screw (12)                 | 28. Screw (2)                    | 53. Nut (2)                 |
| 3. Side door (2)              | 29. Housing support door         | 54. Lock washer (2)         |
| 4. Locknut (11)               | 30. Locknut (7)                  | 55. Screw (2)               |
| 4. Screw (18)                 | 31. Screw (7)                    | 56. Service hose clamp      |
| 6. Rear door                  | 32. Door latch kit (6)           | 57. Rubber door bumper (12) |
| 7. Roof                       | 33. Door latch kit (6)           | 58. Fuel decal              |
| 8. Nut (14)                   | 34. Latch eye                    | 59. Hole plug               |
| 9. Lock washer (14)           | 35. Latch bracket                | 60. Air pressure decal      |
| 10. Screw (14)                | 36. Latch spring                 | 61. Deleted                 |
| 11. Door strike and catch (2) | 37. Deleted                      | 62. Deleted                 |
| 12. Locknut (6)               | 38. Self-tapping screw (4)       | 63. Towing speed plate      |
| 13. Screw (6)                 | 39. Bleed warning plate          | 64. Noise level plate       |
| 14. End panel                 | 40. Dehydrator instruction plate | 65. Decal (12) feet         |
| 15. Locknut (7)               | 41. Locknut (4)                  | 66. Dome light assembly     |
| 16. Screw (7)                 | 42. Screw (4)                    | 67. Connector               |
| 17. Lower side panel          | 43. Nameplate (2)                | 68. Terminal                |
| 18. Locknut (7)               | 44. Deleted                      | 69. Light assembly          |
| 19. Screw (7)                 | 45. Deleted                      | 70. Lens                    |
| 20. Lower side panel          | 46. Transportation data plate    | 71. Lamp                    |
| 21. Locknut (5)               | 47. Identification plate         | 72. Lamp bowl               |
| 22. Screw (5)                 | 48. Deleted                      | 73. Blackout light assembly |
| 23. Side panel                | 49. Deleted                      | 74. Lamp                    |
| 24. Locknut (5)               | 50. Operating instruction plate  | 75. Blackout lamp bowl      |
| 25. Screw (5)                 | 51. Wiring diagram plate         | 76. Document tray           |
| 26. Side panel                |                                  |                             |





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Figure 6-2. Compressor enclosure group

and air pressure decal (60) should not be removed except for replacement.

- (3) Remove four nuts (8), lock washers (9), screws (10), and roof door strike and catch (11). Door bumper (57) need not be removed except for replacement. Remove six nuts (8), lock washers (9), screws (10), and the light assemblies (66, 73) from underside of roof (7).
- (4) As necessary, disassemble dome light assembly (66) by removing connector (67) and terminal (68) from wire lead of light assembly (69). Turn and remove lens (70) and lamp (71) from lamp bowl (72). As necessary, disassemble blackout light assembly (73) by removing connector (67), terminal (68), turn and remove lens (70), and lamp (74) from lamp bowl (75).
- (5) Remove six locknuts (12) and screws (13). Remove end panel (14). Remove seven locknuts (15) and screws (16) and lower side panel (17). Do not remove fuel decal (58) except for replacement. Remove seven locknuts (18) and screws (19) and remove lower side panel (20). Remove eight self-tapping screws (38), bleed warning plate (39), and dehydrator instruction plate (40).
- (6) Remove five locknuts (21) and screws (22) and remove side panel (23). Remove five locknuts (24) and screws (25) and remove side panel (26). Remove sixteen self-tapping screws (38), two noise level warning plates (64), transportation data plate (46), and identification plate (47) from side panels (23 and 26). Do not remove decals (65) from the two plates (64) unless replacement of decals is necessary. Remove hole plug (59) from panel (26).
- (7) Remove two locknuts (27) and screws (28). Slide housing support door (29) off front housing support (32). Remove seven locknuts (30) and screws (31) that secure front housing support (32) to frame and remove the support (32). Remove four self-tapping screws (38) and towing speed plate (63).
- (8) To remove the six door latch kits (33), two each on side panels (23, 26) and front housing support (32), use vise grip pliers to hold straight end of spring (36) against leg of bracket (35). Turn latch eye (34) clockwise pulling it out of press fit in small end of spring (36). Remove the eye (34), spring (36) and bracket (35).

#### WARNING

**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 130°F (38°C - 59°C).**

**c. Cleaning.** Clean all parts except light assemblies (66, 73, fig. 6-2) with solvent, P-D-680, or equivalent, and air dry. Wipe the light assembly (66, 73) components clean with a lint-free cloth moistened slightly with the solvent.

**d. Inspection-Acceptance.** Inspect all parts for damaged hinges, operable door latches, damaged screw threads, readable identification and instruction plates and decals, dents, and damage to painted surfaces that could cause rusting.

**e. Repair or Replacement.** Repair dents and bends in sheet metal parts by straightening or pounding-out. Replace door assemblies with damaged hinges. Replace all parts damaged beyond this repair. Inoperable light assemblies (66, 73, fig. 6-2) shall first be tested to see if lamps (71, 74) are burned out; if not, replace the assemblies.

**f. Painting.** Refer to TM 43-0139, Painting Instructions for Field Use. All instruction plates, identification plates, decals, and light assemblies shall not be painted and installed after component and/or unit painting.

**f. Painting.** Refer to TM 43-0139, Painting Instructions for Field Use. All instruction plates, identification plates, decals, and light assemblies shall not be painted and installed after component and/or unit painting.

**g. Reassembly and Installation.** Reassemble and install enclosure components as follows:

- (1) Assemble six door latch kits (33, fig. 62), two each on front housing support (32) and side panels (26, 23). Place bracket (35) against lip of panel, spring (36) between legs of bracket with smaller end of spring away from panel lip. Assemble latch eye (34) through hole in panel lip, through leg of bracket and into spring. Use vice grip pliers to hold straight end of spring against bracket and turn latch eye (34) counterclockwise forcing it into press fit in small end of spring.
- (2) Place front housing support (32) on unit frame and attach with seven screws (31) and locknuts (30). Slide door (29) into guides on support (32) and install two screws (28) and locknuts (27) on support (32) to make door (29) captive on support (32).

- (3) Install side panel (26) with five screws (25) and locknuts (24). Install side panel (23) with five screws (22) and locknuts (21).
- (4) Attach lower side panel (20) with seven screws (19) and locknuts (18). Attach lower side panel (17) with seven screws (16) and locknuts (15).
- (5) Install end panel (14) onto unit frame and side panels with six screws (13) and locknuts (12).
- (6) Assemble door strike and catch (11) on roof door and on document tray (76) with screws (10), lockwashers (9), and nuts (8), four for each of the two strike and catches (11).
- (7) Install roof (7) and rear door (6) and attach with eighteen screws (5) and eleven locknuts (4).
- (8) Install the two side doors (3) and document tray (76) using twelve screws (2) and locknuts (1).
- (9) Install lamp (74) in blackout lamp bowl (75), assemble lens (70) on bowl (75). Attach terminal (68) on bowl (75) wire lead and install connector (67). Attach blackout light assembly to underside of roof (7), in the instrument panel compartment, with three screws (10), lock washers (9), and nuts (8).
- (10) Install lamp (71) in lamp bowl (72) and assemble lens (70) on bowl (72). Attach terminal (68) on light assembly (69) wire lead and install connector (67). Attach dome light assembly (66) to underside of roof (7), in the compressor compartment, with three screws (10), lock washers (9), and nuts (8).
- (11) Touch-up any painted areas that may have been scratched during assembly. Then, install decals (65) on two noise level warning plates (64) and attach the plates (64) on side panels (23, 26) with self-tapping screws (38), four each plate. Attach identification plate (47) and transportation data plate (46) to side panel (26) with self-tapping screws (38), four each plate. Attach towing speed plate (63) to front housing support (32) with four self-tapping screws (38). Attach dehydrator instruction plate (40) to side panel (20) with six self-tapping screws (38) and bleed warning plate (39) with two self-tapping screws (38). Install two nameplates (43), one on each door (3), with two screws (42) and locknuts (41) each nameplate. Assemble service hose clamp (56) onto rear door (6) with two screws (55), lock washers (54) and nuts (53). Attach air flow diagram plate (52), wiring diagram plate (51), and operating instruction plate (50) to rear door (6) with self-tapping screws (38). Install two nameplates (43), one on each door (3), with two screws (42) and locknuts (41) each nameplate. Assemble service hose clamp (56) onto rear door (6) with two screws (55), lock washers (54) and nuts (53). Attach air flow diagram plate (52), wiring diagram plate (51), and operating instruction plate (50) to rear door (6) with self-tapping screws (38), four each plate.
- (12) If removed, install twelve rubber door bumpers (57), four each side door (3), one on roof door and three on rear door (6). Also, if removed, install air pressure decal (60), fuel decal (58), and hole plug (59).

### Section III. MAINTENANCE OF FUEL LINES AND FITTINGS

**6-5. General.** This section covers inspection of installed items, removal, inspection-acceptance, and installation of the fuel lines and fittings.

**6-6. Maintenance of Fuel Lines and Fittings.** Maintenance of the fuel lines and fittings is as follows:

**a. Inspection-Installed Items.** Inspect fuel line connections and fittings for evidence of fuel leakage. Check lever of shutoff valve (18, fig. 6-3) for free movement from vertical to horizontal.

**b. Removal.** Remove fuel lines and fittings as follows:

#### WARNING

**Do not allow smoking or an open flame near unit while performing maintenance on fuel lines and fittings to prevent fire. Keep a fire extinguisher handy.**

- (1) Drain fuel from tank before removing fuel pickup line. To drain, place a container under the fuel tank, remove fuel filler cap to aid in fuel flow, remove pipe plug from bottom of fuel tank. When fuel is drained, install pipe plug and filler cap.
- (2) Unscrew tubing nuts at each end of tube assembly (1, fig. 6-3) running from fuel tank to tee (13). Remove the tube assembly (1)
- (3) Unscrew tubing nuts at each end of tube assemblies (2, 3, 4) and remove the assemblies.
- (4) Remove three elbows (5), reducing bushing (6), connectors (7, 8), and three elbows (9). Unscrew and remove coupling (10) and close pipe nipple (11).
- (5) Unscrew tee (13) from shutoff valve (18) and, if necessary, remove pipe plug (12). When required remove heater fuel filter and remove pipe nipple (14) from heater fuel pump.

- (6) Remove two each locknuts (15), screws (16), and spacers (17) and remove shutoff valve (18).

**c. Inspection-Acceptance.** Inspect all screw threads for cross-threading or other damage that could cause fuel leakage. Examine fuel lines (1 thru 4, fig. 6-3) for collapse at bends, any dents that could cause restriction of flow, and seating areas at each end of assemblies. Make certain there are no obstructions in fuel lines or fittings. All defective parts are to be replaced.

**d. Installation.** Install fuel lines and fittings as follows:

- (1) Install shutoff valve (18, fig. 6-3) on engine flywheel shroud bracket with two each spacers (17), screws (16) and locknuts (15) with branch of valve facing rear of unit. If removed, install pipe nipple (14) in heater fuel pump outlet and install heater fuel filter on nipple (14), filter in vertical position.
- (2) If removed, install pipe plug (12) in branch of tee (13). Install tee (13) in branch of shutoff valve (18) with branch of tee (13) in line with valve handle stem.
- (3) Install close pipe nipple (11) in heater assembly inlet elbow. Install pipe coupling (10) on nipple (11). Install three tubing elbows (9), one in coupling (10), one in top of engine fuel strainer, one in heater fuel filter turned in directions shown on figure 6-3.
- (4) Install connector (8) in heater fuel pump inlet and connector (7) in shutoff valve (18) bottom run opening.
- (5) Install reducing bushing (6) in bottom of fuel tank. Install three tubing elbows (5) turned in directions shown on figure 6-3.
- (6) Install tube assemblies (4 thru 1) and tighten tubing nuts on their respective fittings shown on figure 6-3.
- (7) Service the fuel tank (para 3-15).

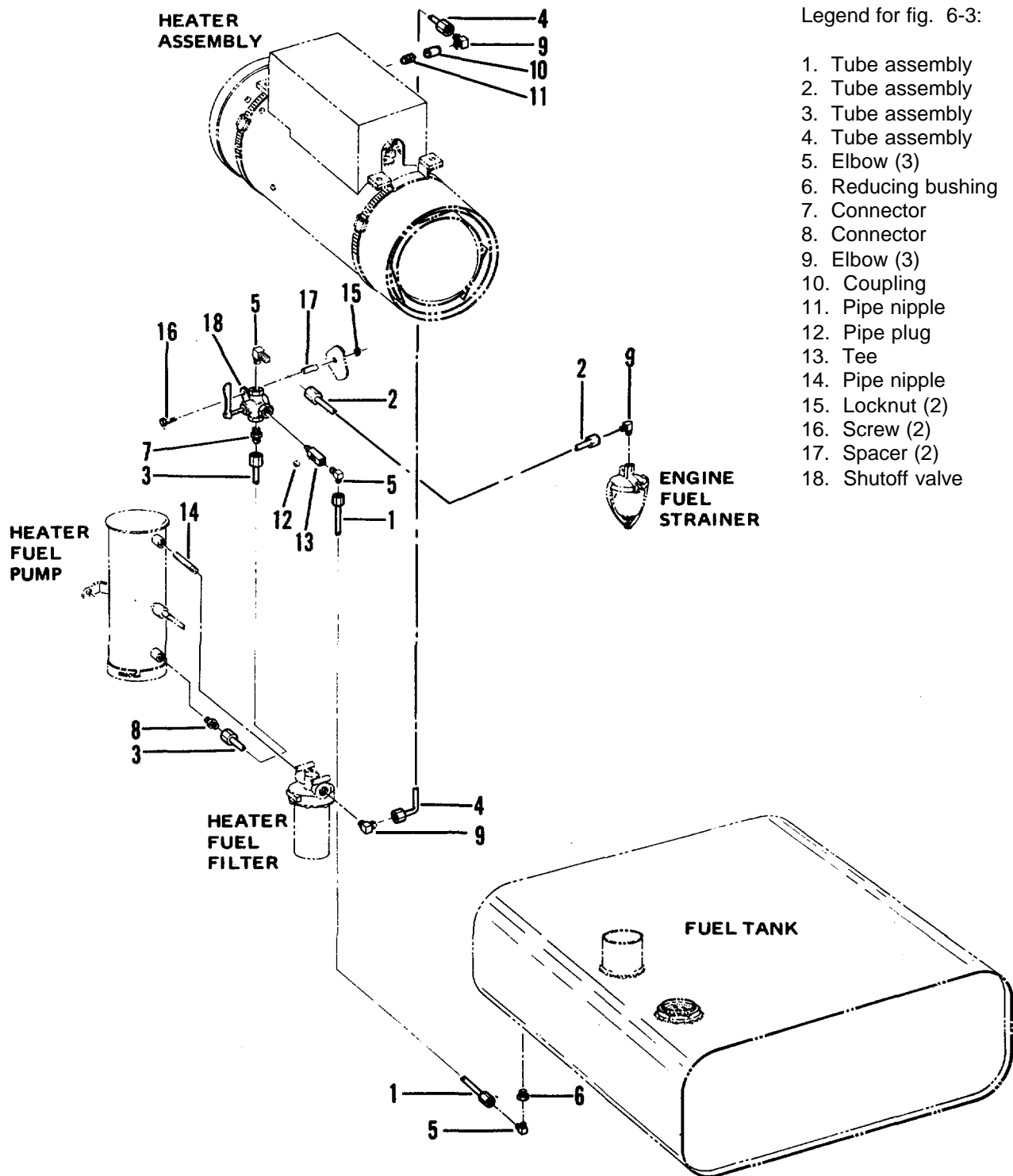


Figure 6-3. Fuel lines and fittings

TS5-4310-365-14/6-3

## Section IV. MAINTENANCE OF AIR LINES, HOSES, AND FITTINGS

**6-7. General.** Within the scope of organizational maintenance prescribed on the MAC, Appendix E, maintenance of air lines, hoses, and fittings is limited to replacement.

**6-8. Maintenance of Air Lines, Hoses, and Fittings.** When operator/crew detects leaking or damage during inspection, you will be notified. Replacement of air lines, hoses and fittings is as follows:

### WARNING

**Compressed air is extremely dangerous. Ensure that all air is expelled from systems by reviewing operation controls and instruments SHUTDOWN POSITIONS shown in table 2-2 before removing any air lines, hoses, or fittings.**

### NOTE

**As necessary when replacing air lines, remove and note location and quantity of tubing clips. A typical assembly arrangement is shown in Detail A, figure 6-4, sheet 2. To remove clips (23), remove locknut (21) and screw (22), spread clip (23) apart and remove from tube assembly being replaced. Install the clip on new tube assembly and reassemble. Hose assemblies are secured at various locations with plastic cable ties (33, figure 6-4, sheet 4). When necessary, cut and discard tie and replace with new ones when a hose assembly requires replacement.**

- a. Unscrew tubing nuts at each end of tube assembly (1, fig. 6-4) at first stage cylinder head outlet and air cooler first stage inlet. Remove and replace the tube assembly (1). Inspect each tube assembly when it is removed for correct setting of tubing sleeves as shown on fig. 6-4, sheet 5 and as follows:

### WARNING

**Correct setting of tubing sleeves and nuts on the steel tubing is very important. Improper set could cause separation of the tubing assembly. High pressure compressed air is dangerous and parting or separation**

**of a tubing assembly could cause serious injury.**

- (1) Cutting edge of sleeve shall be imbedded into its full depth.
- (2) Pilot edge of sleeve shall be close to, or touching, the outside diameter of the tubing.
- (3) Distance from the end of the tubing and leading or pilot edge of sleeve shall be a least 1/8 inch.
- (4) Metal shall be piled ahead of cutting edge of sleeve under pilot.
- (5) Contact area of the sleeve shall show evidence of being in perfect contact with tapered seat of mating fitting.
- (6) Sleeve shall show evidence of being bowed within its elastic limits.
- (7) Back of sleeve shall be in contact with tubing.
- (8) If any tube assembly does not conform to the above, refer to direct support maintenance for repair.

### NOTE

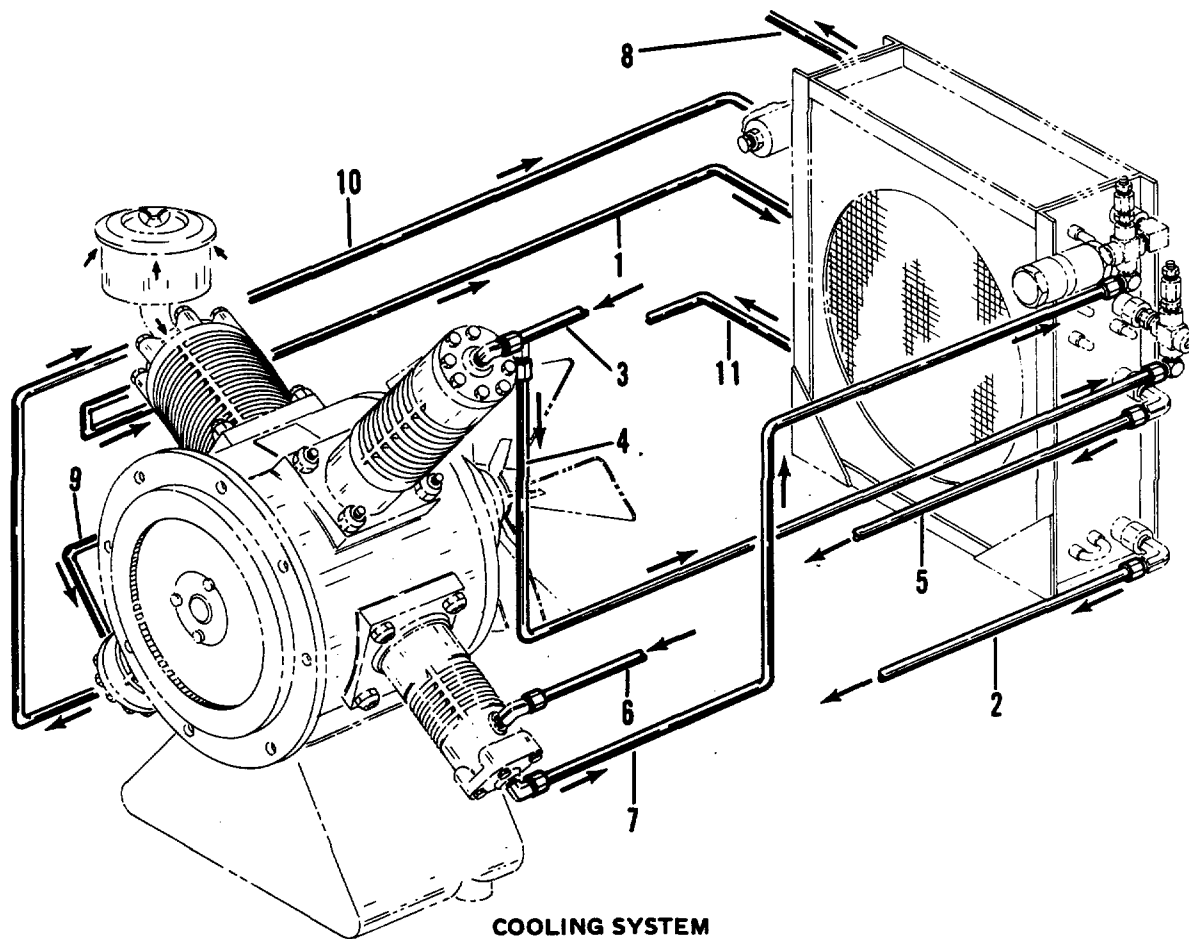
**Performance of the fitting will not be affected if sleeve rotates on tubing after disassembly.**

- (9) When installing a preset tubing assembly, lubricate the threads and seat of the fitting and the shoulder of the sleeve with a small amount of good grade lubricant, such as, clean compressor oil.

### CAUTION

**At installation of tubing assemblies, do no overtighten tubing nuts.**

- (10) Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.

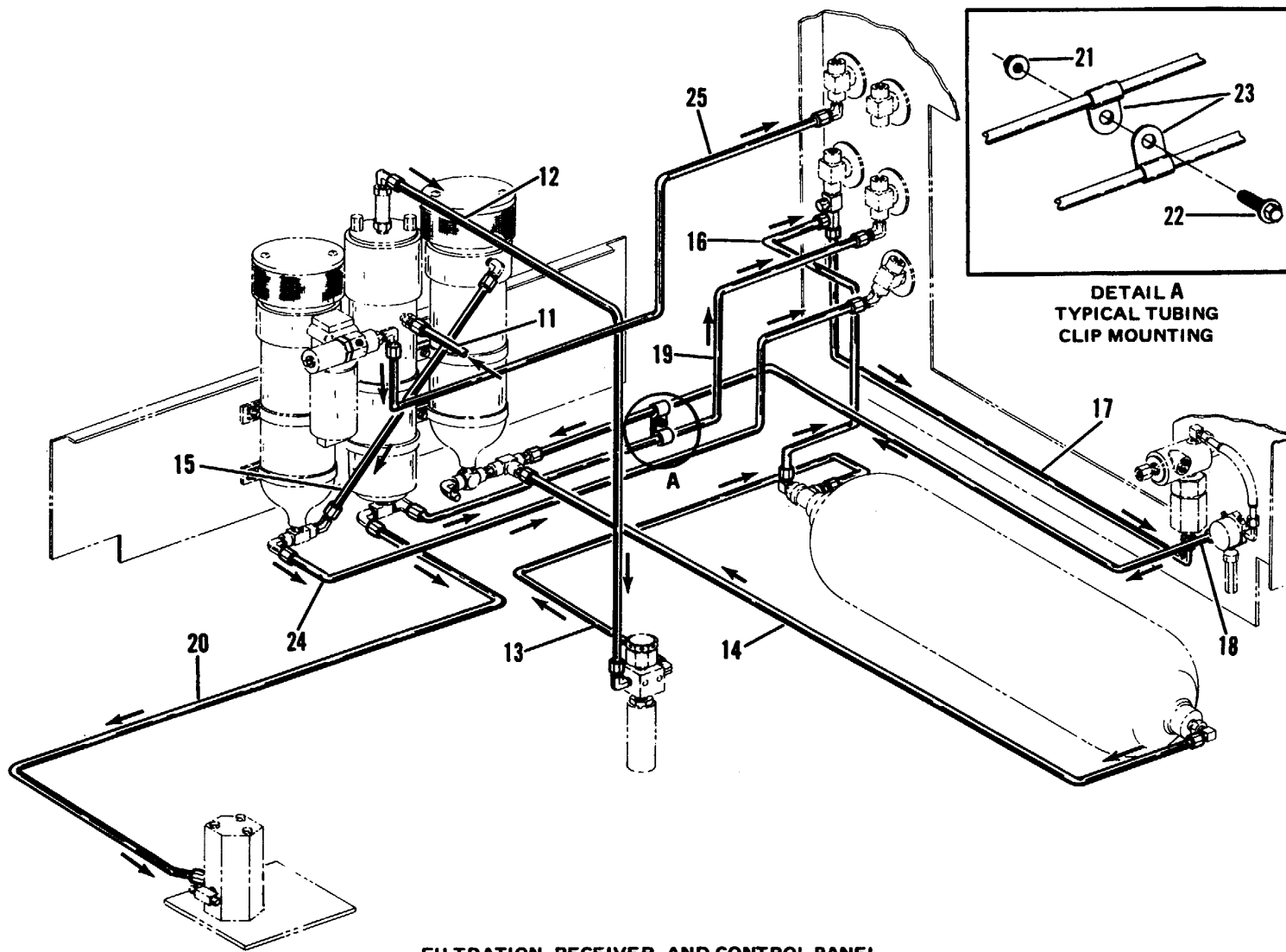


TS5-4310-365-14/6-4(4)

Legend for fig. 6-4:

- |                   |                      |                       |
|-------------------|----------------------|-----------------------|
| 1. Tube assembly  | 15. Tube assembly    | 29. Tube assembly     |
| 2. Tube assembly  | 16. Tube assembly    | 30. Tube assembly     |
| 3. Tube assembly  | 17. Tube assembly    | 31. Hose assembly     |
| 4. Tube assembly  | 18. Tube assembly    | 32. Hose assembly     |
| 5. Tube assembly  | 19. Tube assembly    | 33. Cable tie (7)     |
| 6. Tube assembly  | 20. Tube assembly    | 34. Hose assembly (2) |
| 7. Tube assembly  | 21. Locknut (4)      | 35. Hose assembly (2) |
| 8. Tube assembly  | 22. Screw (4)        | 36. Hose assembly     |
| 9. Tube assembly  | 23. Tubing clip (11) | 37. Deleted           |
| 10. Tube assembly | 24. Tube assembly    | 38. Hose assembly     |
| 11. Tube assembly | 25. Tube assembly    | 39. Connector         |
| 12. Tube assembly | 26. Tube assembly    | 40. Hose assembly     |
| 13. Tube assembly | 27. Tube assembly    | 41. Hose assembly     |
| 14. Tube assembly | 28. Tube assembly    | 42. Hose assembly     |

Figure 6-4. Air lines, hoses, and fittings (sheet 1 of 5)

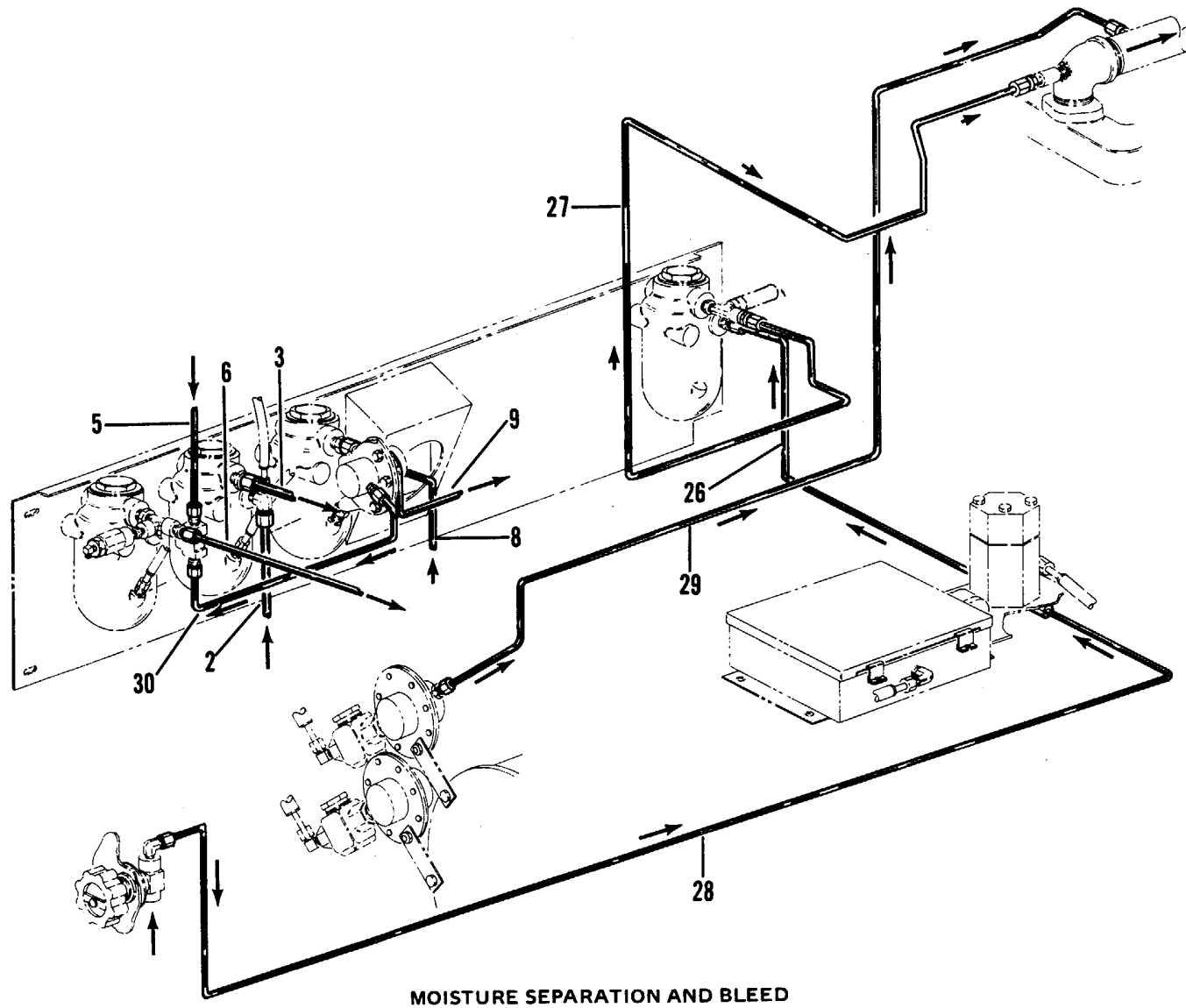


**FILTRATION, RECEIVER, AND CONTROL PANEL**

Figure 6-4. Air lines, hoses, and fittings (sheet 2 of 5)

TS5-4310-365-14/6-4(4)

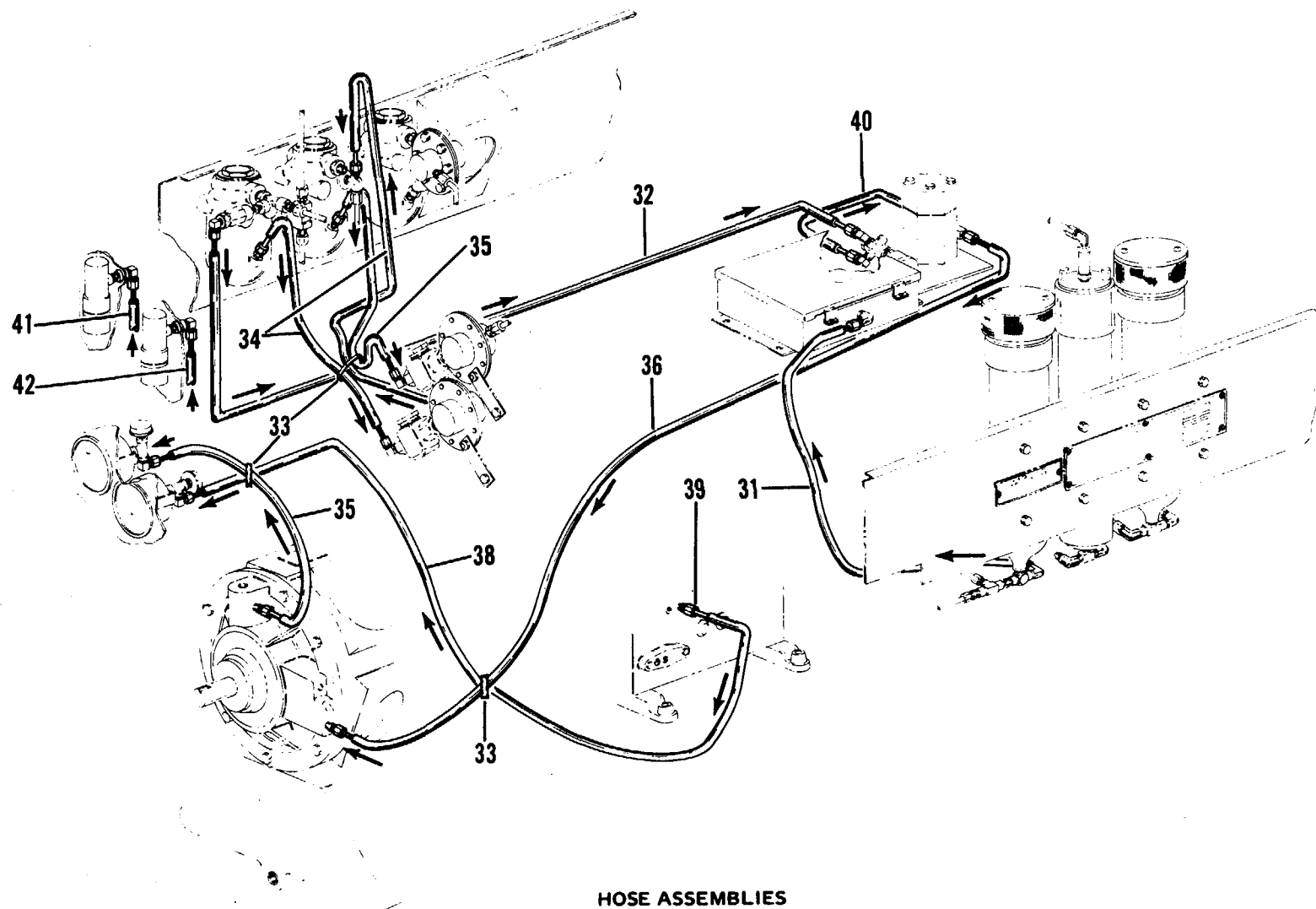




MOISTURE SEPARATION AND BLEED

TS5-4310-365-14/6-4(3)

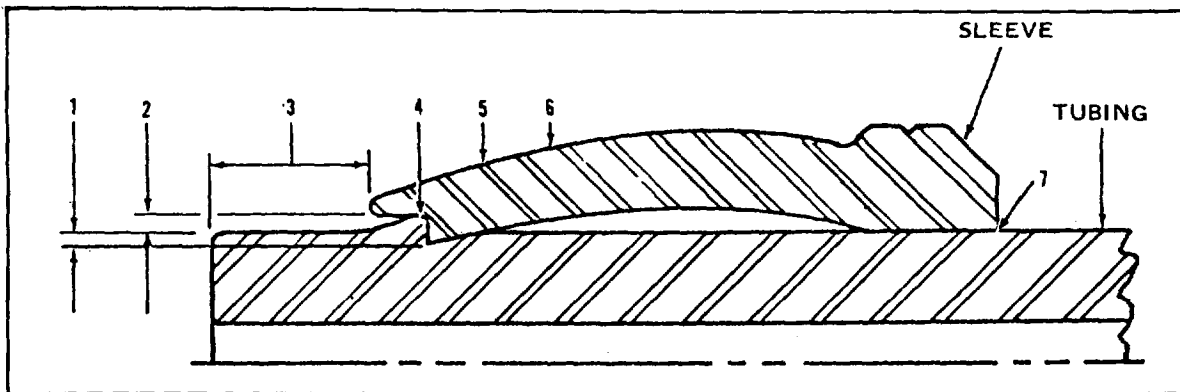
Figure 6-4. Air lines, hoses, and fittings (sheet 3 of 5)



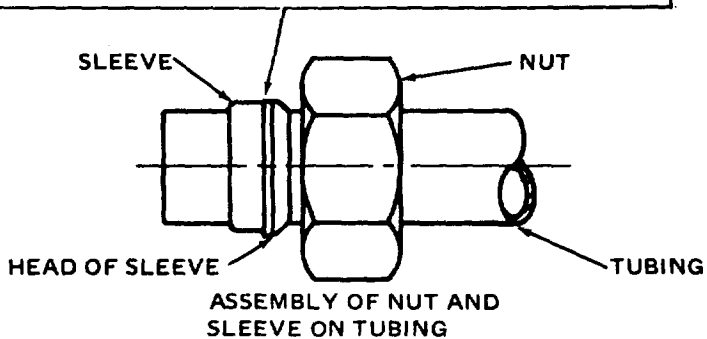
**HOSE ASSEMBLIES**

TS5-4310-365-14/6-4(4)

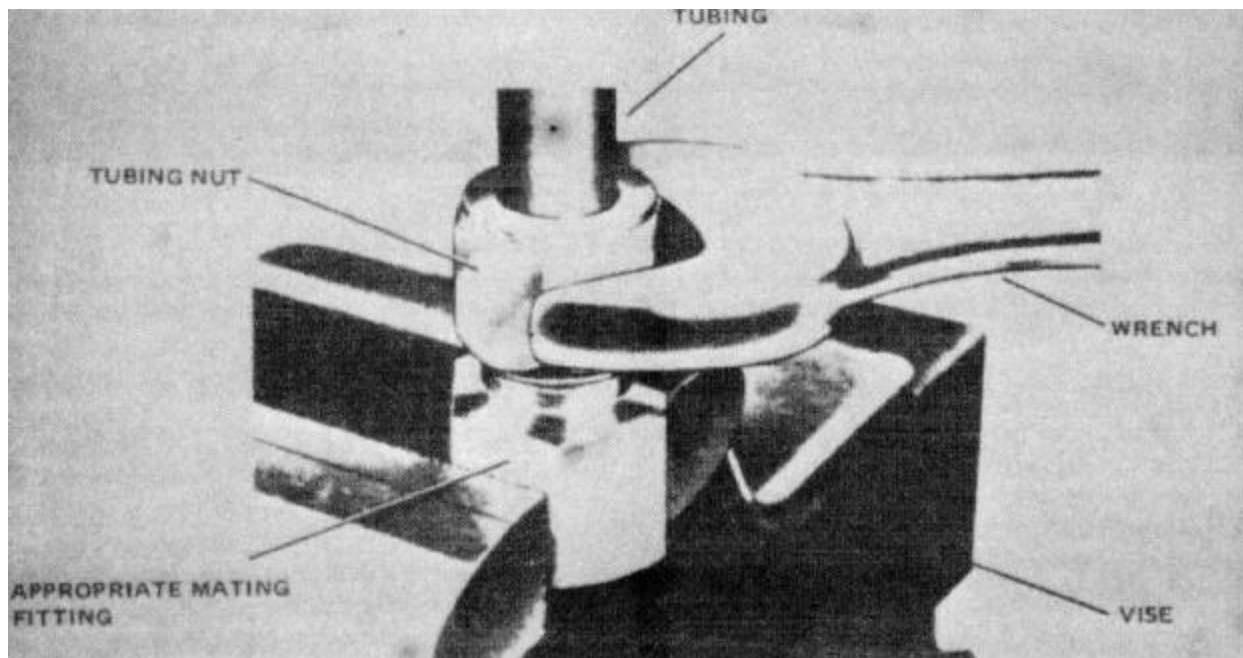
Figure 6-4. Air lines, hoses, and fittings (sheet 4 of 5)



1. CUTTING EDGE OF SLEEVE IMBEDDED TO ITS FULL DEPTH.
2. PILOT EDGE OF SLEEVE TOUCHING THE OUTSIDE DIAMETER OF THE TUBING.
3. DISTANCE FROM END OF TUBING AND LEADING OF SLEEVE AT LEAST 1/8 INCH.
4. METAL PILED AHEAD OF CUTTING EDGE OF SLEEVE UNDER PILOT.
5. CONTACT AREA OF THE SLEEVE IN PERFECT CONTACT WITH TAPERED SEAT OF MATING FITTING.
6. SLEEVE BOWED WITHIN ITS ELASTIC LIMITS.
7. BACK OF SLEEVE IN CONTACT WITH TUBING.



**TUBING, SLEEVE, AND NUT**



**PRESETTING TUBING SLEEVE**

TS5-4310-365-14/6-4 (5)

Figure 6-4. Air lines, hoses, and fittings (sheet 5 of 5)

## NOTE

**At this point where the torque starts to rise, the sleeve and tubing are just touching the seat. An additional 1/4 turn produces a seal with the fitting and restores the bow to the sleeve.**

- b.** Unscrew tubing nuts at each end of tube assembly (2) at cooler first stage outlet and first stage trap assembly inlet. Remove and replace tube assembly (2). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- c.** Unscrew tubing nuts at each end of tube assembly (3) at first stage trap assembly outlet and second stage cylinder inlet. Remove and replace tube assembly (3). Insert tubing assembly into fitting and tighten nut until a sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- d.** Unscrew tubing nuts at each end of tube assembly (4) at second stage cylinder head outlet and second stage cooler inlet. Remove and replace tube assembly (4). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- e.** Unscrew tubing nuts at each end of tube assembly (5) at second stage cooler outlet and second stage trap inlet. Remove and replace tube assembly (5). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- f.** Unscrew tubing nuts at each end of tube assembly (6) at second stage trap outlet and third stage cylinder inlet. Remove and replace tube assembly (6). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- g.** Unscrew tubing nuts at each end of tube assembly (7) at third stage cylinder head outlet and third stage cooler inlet. Remove and replace tube assembly (7). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- h.** Unscrew tubing nuts at each end of tube assembly (8) at third stage cooler outlet and third stage trap inlet. Remove and replace tube assembly (8). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- i.** Unscrew tubing nuts at each end of tube assembly (9) at third stage trap outlet and fourth stage cylinder inlet. Remove and replace tube assembly (9). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- j.** Unscrew tubing nuts at each end of tube assembly (10) at fourth stage cylinder head outlet and fourth stage cooler inlet. Remove and replace tube assembly (10). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- k.** Unscrew tubing nuts at each end of tube assembly (11) at fourth stage cooler outlet and air filter inlet. Remove and replace tube assembly (11). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- l.** Unscrew tubing nuts at each end of tube assembly (12) at air filter outlet and rupture disc inlet. Remove and replace tube assembly (12). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- m.** Unscrew tubing nuts at each end of tube assembly (13) at rupture disc outlet and air receiver inlet. Remove and replace tube assembly (13). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- n.** Unscrew tubing nuts at each end of tube assembly (14) at air receiver outlet and dehydrator number 1 inlet tee. Remove and replace tube assembly (14). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position

of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.

- o.** Unscrew tubing nuts at each end of tube assembly (15) at dehydrator number 1 outlet and dehydrator number 2 inlet tee. Remove and replace tube assembly (15). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- p.** Unscrew tubing nuts at each end of tube assembly (16) at air receiver drain and receiver bleed valve tee. Remove and replace tube assembly (16). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/5 additional turn to complete the assembly.
- q.** Unscrew tubing nuts at each end of tube assembly (17) at receiver bleed valve tee and drain valve assembly. Remove and replace tube assembly (17). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- r.** Unscrew tubing nuts at each end of tube assembly (18) at pressure regulator and dehydrator number 1 inlet tee. Remove and replace tube assembly (18). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- s.** Unscrew tubing nuts at each end of tube assembly (19) at tee on bottom of air filter and mechanical filter drain valve. Remove and replace tube assembly (19). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- t.** Unscrew tubing nuts at each end of tube assembly (20) at tee on bottom of air filter and drain valve. Remove and replace tube assembly (20). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- u.** Unscrew tubing nuts at each end of tube assembly (24) at dehydrator number 2 inlet tee and dehydrator bleed valve. Remove and replace tube assembly (24). Insert tubing assembly into fitting

and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.

- v.** Unscrew tubing nuts at each end of tube assembly (25) at priority valve and service outlet valve. Remove and replace tube assembly (25). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- w.** Unscrew tubing nuts at each end of tube assembly (26) at tee on bottom of drain valve and condensate receiver inlet. Remove and replace tube assembly (26). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- x.** Unscrew tubing nuts at each end of tube assembly (27) at condensate receiver outlet and engine exhaust elbow. Remove and replace tube assembly (27). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- y.** Unscrew tubing nuts at each end of tube assembly (28) at tee on bottom of drain valve and mechanical filter drain valve. Remove and replace tube assembly (28). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- z.** Unscrew tubing nuts at each end of tube assembly (29) at first stage continuous bleed valve and exhaust pipe. Remove and replace tube assembly (29). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.
- aa.** Unscrew tubing nuts at each end of tube assembly (30) at third stage continuous bleed valve and second stage trap inlet tee. Remove and replace tube assembly (30). Insert tubing assembly into fitting and tighten nut until a sharp rise in torque is felt. Starting at position of sharp torque rise, tighten the nut 1/4 additional turn to complete the assembly.

- ab.** Unscrew hose end nuts at each end of hose assembly (31) at tee on bottom of dehydrator number 1 and unloader control box pressure switch. Remove and replace hose assembly. (31).
- ac.** Unscrew hose end nuts at each end of hose assembly (32) at second stage trap and unloader control box solenoid port number 3. Remove and replace hose assembly (32).
- ad.** Unscrew hose end nuts at each end of two each hose assemblies (34, 35) at first and second stage traps, first and second stage continuous bleed valve assemblies, and compressor end cover and compressor oil pressure gauge. Remove and replace hose assemblies (34, 35).
- ae.** Unscrew hose end nuts at each end of hose assembly (36) at tee on side of drain valve and compressor end cover. Remove and replace hose assembly (36).
- af.** Unscrew hose end nuts at each end of engine oil pressure hose assembly (38) at connector (39) on engine crankcase and engine oil pressure gauge. Remove and replace hose assembly (38) and, if necessary because of damage, replace connector (39).
- ag.** Unscrew hose end nuts at each end of hose assembly (40) at unloader control box solenoid port number 1 and tee on side of drain valve. Remove and replace hose assembly (40).
- ah.** Unscrew hose end nuts at each end of hose assemblies (41, 42) at restriction indicators and compressor air cleaner elbow and engine air cleaner elbow respectively. Remove and replace hose assemblies (41, 42).

### Section V. MAINTENANCE OF ALTERNATOR GROUP

**6-9. General.** This section contains inspection of installed items, removal, cleaning, inspection-acceptance, testing, installation, and adjustment of the alternator group as prescribed by the MAC, Appendix E.

**6-10. Maintenance of Alternator Group.** Maintenance of the alternator group is as follows:

**a. Inspection-Installed Items.** Inspect alternator drive belt (1, fig. 6-5) for fraying, cuts, and proper tension. Inspect wire connections for tightness on terminals and for any evidence for cracked or burned insulation. Examine all parts for cracks, breaks, or missing parts.

**b. Removal.** Remove the alternator and mounting components as follows:

- (1) Disconnect wiring harness leads from alternator terminals and tag for assembly reference. Disconnect harness lead and cable assembly from voltage regulator (27, fig. 6-5) lead plugs.
- (2) Loosen screw (2) and nut (14). Move alternator (23) toward engine and remove drive belt (1) from alternator pulley and engine accessory drive pulley.
- (3) Remove adjusting bracket screw (2), lock washer (3), and flat washer(4). Remove nut (5), lock washer (6), screw (7), flat washer (8), and adjusting bracket (9).

(4) Remove two screws (10), lock washers (11) and flat washers (13), and the support bracket (12).

(5) Remove nut (14), lock washer (15), screw (16), flat washer (17), and the alternator assembly (23).

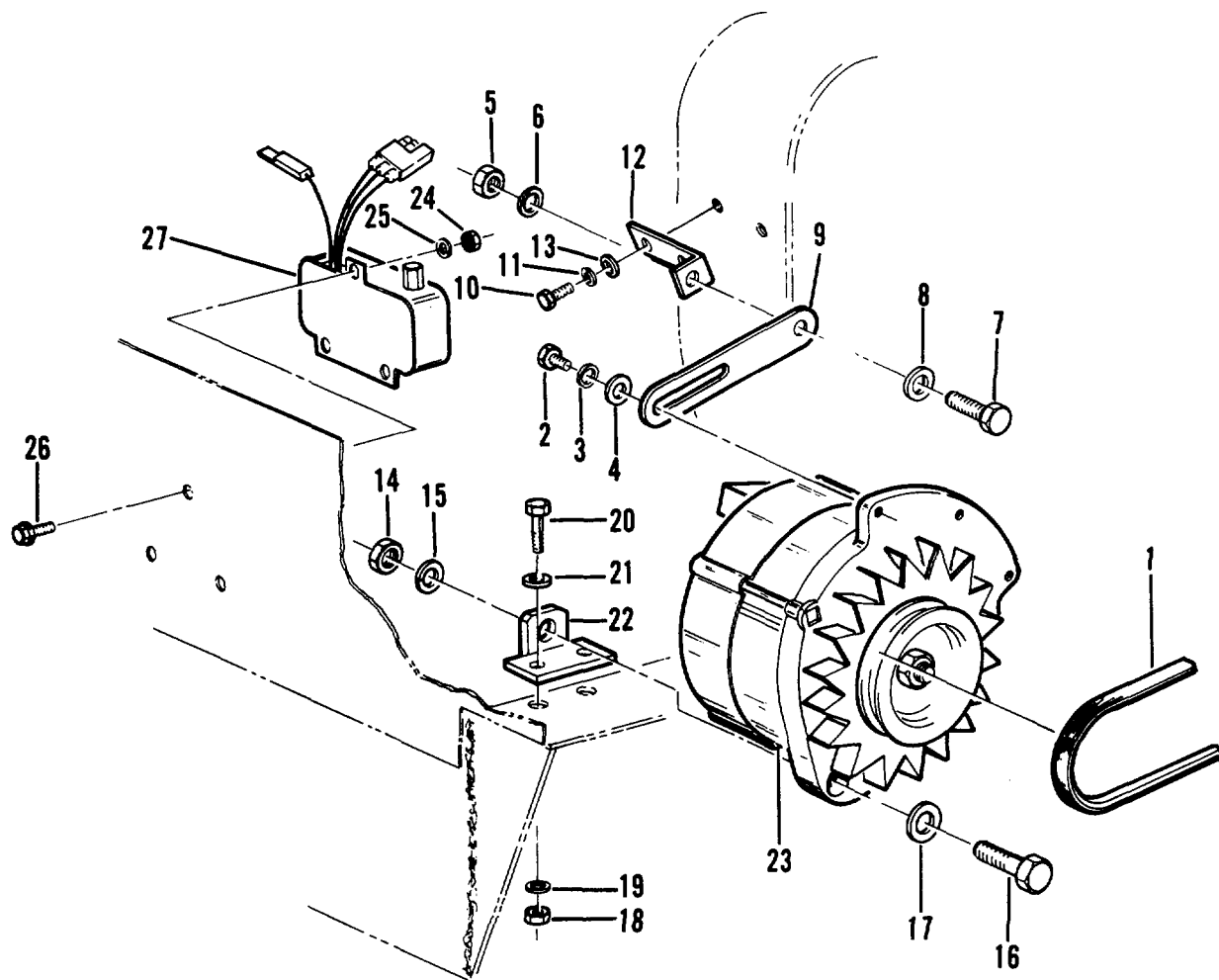
(6) Remove two nuts (18), lock washers (19), screws (20), flat washers (21), and mounting bracket (22).

(7) Remove three nuts (24), lock washers (25), screws (26), and voltage regulator (27).

### WARNING

**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° F - 130° F (38°C - 59°C).**

**c. Cleaning.** Wipe accumulated dust and dirt from alternator assembly (23) and voltage regulator (27) with a lintfree cloth moistened lightly with solvent, P-D-680, or equivalent. Do not use solvent to clean drive belt (1). Wipe belt with cloth. Clean all other parts with the solvent and air dry.



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Legend for fig. 6-5:

- |                      |                     |                         |
|----------------------|---------------------|-------------------------|
| 1. Drive belt        | 10. Screw (2)       | 19. Lock washer (2)     |
| 2. Screw             | 11. Lock washer (2) | 20. Screw (2)           |
| 3. Lock washer       | 12. Support bracket | 21. Flat washer (2)     |
| 4. Flat washer       | 13. Flat washer (2) | 22. Mounting bracket    |
| 5. Nut               | 14. Nut             | 23. Alternator assembly |
| 6. Lock washer       | 15. Lock washer     | 24. Nut (3)             |
| 7. Screw             | 16. Screw           | 25. Lock washer (3)     |
| 8. Flat washer       | 17. Flat washer     | 26. Screw (3)           |
| 9. Adjusting bracket | 18. Nut (2)         | 27. Voltage regulator   |

Figure 6-5. Alternator mounting group

**d. Inspection-Acceptance.** Inspect all screw threads for cross-threading or other defect. Examine all parts for cracks, breaks, bending, and evidence of burning due to electrical short. All damaged parts shall be replaced.

**e. Testing.** Perform operational test, insulation breakdown and continuity tests of alternator assembly (23, fig. 6-5) and voltage regulator (27) on Test Set as prescribed in the MAC, Appendix E. When malfunction of alternator assembly (23) is indicated, notify direct support maintenance for repair.

**f. Installation.** Install the alternator and mounting components as follows:

- (1) Install voltage regulator (27, fig. 6-5) with three screws (26), lock washers (25), and nuts (24).
- (2) Install mounting bracket (22) on unit frame with two flat washers (21), screws (20), lock washers (19), and nuts (18).
- (3) Mount alternator assembly (23) to bracket (22) with flat washer (17), screw (16), lock washer (15), and nut (14). Do not tighten nut (14) until after drive belt (1) is installed.
- (4) Install support bracket (12) on engine flywheel shroud with two flat washers (13), lock washers (11), and screws (10). Attach adjusting bracket (9) to bracket (12) with flat washer (8), screw (7), lock washer (6), and nut (5).
- (5) Attach adjusting bracket (9) to alternator assembly (23) with flat washer (4), lock

washer (3), and screw (2). Do not tighten screw (2) until after drive belt (1) is installed.

- (6) Install drive belt (1) on engine accessory drive pulley and alternator pulley. Pull alternator assembly away from engine to remove slack in drive belt (1). See para 6-10.g below for adjustment.
- (7) Connect cable assembly and wiring harness plugs to voltage regulator (27) lead plugs. Connect wiring harness leads to alternator terminals, harness leads tagged at removal. Refer to wiring diagram (fig. 1-3)

**g. Adjustment.** Adjust the drive belt (1, fig. 6-5) tension as follows:

- (1) Pull alternator assembly (23) away from engine applying tension on drive belt (1). Tighten screw (1) tight enough to hold alternator in position desired.
- (2) Push down on belt (1) at a point approximately mid way between engine and alternator pulleys. Deflection of belt should be 1/2 to 3/4 inch (12 to 19 mm). Move alternator assembly (23) away from engine to tighten belt; toward engine to loosen.
- (3) When proper deflection is attained, tighten adjusting bracket screw (2) and alternator mounting nut (14). Recheck tightness of nut (5).



**Section VI. MAINTENANCE OF ENGINE STARTER GROUP**

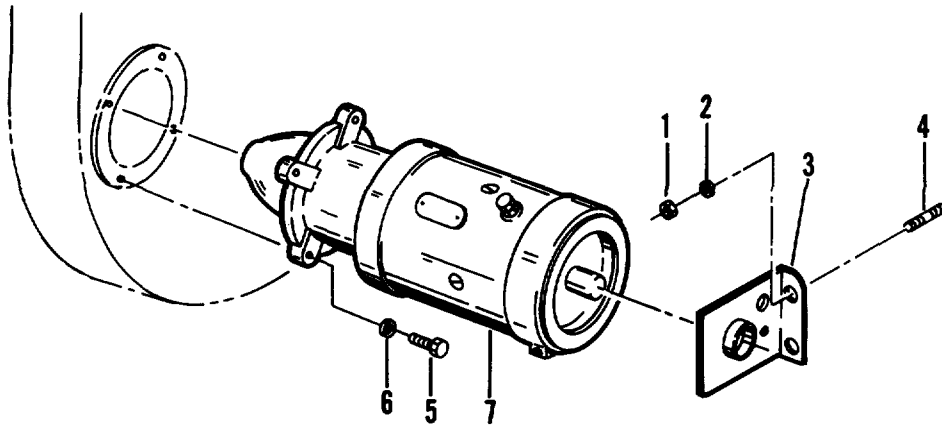
**6-11. General.** This section contains removal, testing, and installation of the engine starter group as prescribed by the MAC, Appendix E.

**6-12. Maintenance of Engine Starter Group.** Maintenance of the engine starter group is as follows:

**a. Removal.** Disconnect starter cable from terminal. Remove two nuts (1, fig. 6-6) and lock washers (2) that secure support bracket (3) on studs (4). Remove three screws (5) and lock washers (6). Remove starter assembly (7) from engine and pull support bracket (3) off starter.

**b. Testing.** Check starter continuity using a multimeter. If short or ground is indicated, notify direct support maintenance for repair of starter assembly.

**c. Installation.** Install support bracket (3, fig. 6-6) on starter assembly (7). Install starter assembly (7) on engine with support bracket (3) on studs (4). Attach starter assembly (7) to engine with three lock washers (6) and screws (5). Secure support bracket (3) on studs (4) with two lock washers (2) and nuts (1). Connect starter cable to terminal.



Legend for fig. 6-6:

- 1. Nut (2)
- 2. Lock washer (2)
- 3. Support bracket
- 4. Stud (2)
- 5. Screw (3)
- 6. Lock washer (3)
- 7. Starter assembly

TS5-4310-365-14/6-6

Figure 6-6. Starter mounting group

Section VII. MAINTENANCE OF ENGINE ASSEMBLY

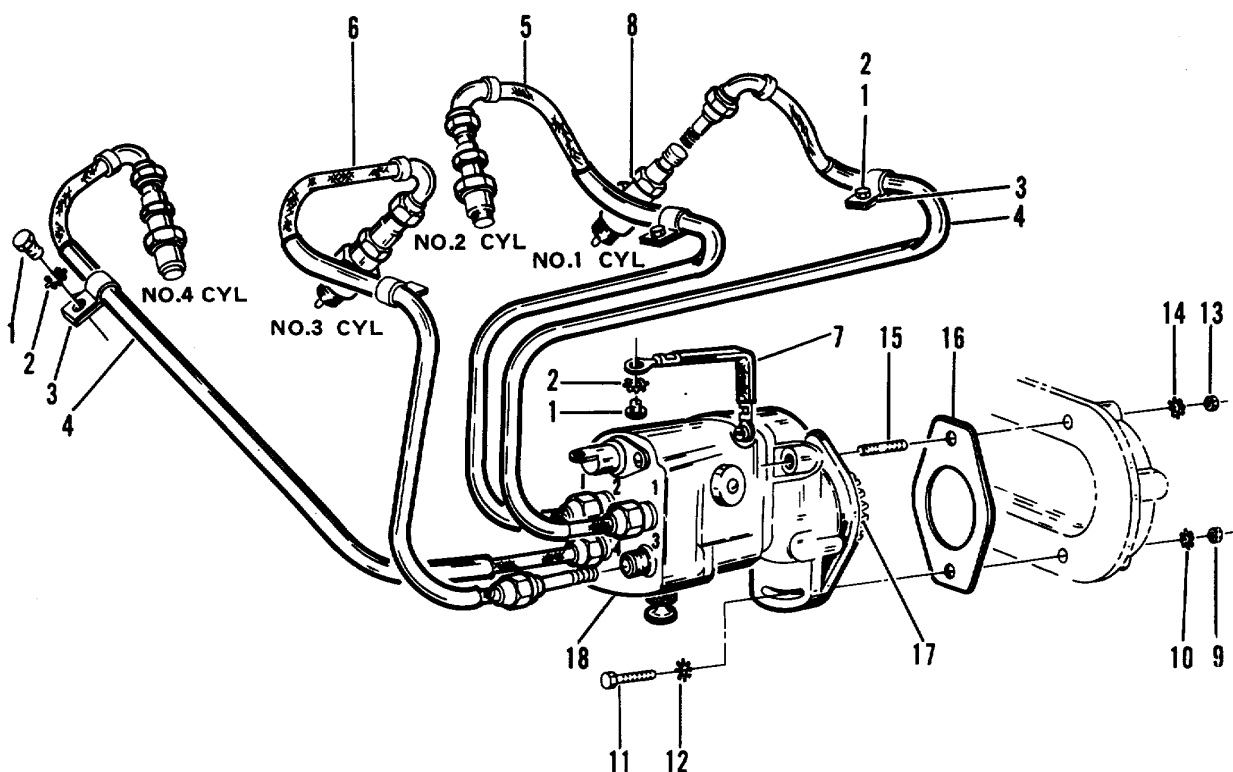
**6-13. General.** This section covers maintenance of the engine assembly components within the scope of organizational maintenance as prescribed by the MAC, Appendix E. Each component requiring maintenance at this level is covered in a separate paragraph.

**6-14. Maintenance of Ignition Leads, Spark Plugs, and Magneto.** This paragraph covers inspection of installed items, removal, cleaning, inspection-acceptance, and installation of the ignition leads, spark plugs, and magneto, as applicable.

**a. Inspection-Installed Items.** Inspect the ignition leads (4, 5, 6, fig. 6-7) for frayed shielding covers, exposed wires, and tight connections at spark plugs (8) and magneto (18). Inspect spark plugs (8) for tightness in head and evidence of cracks. Inspect magneto (18) for cracks, tightness of terminal connections, and missing mounting parts.

**b. Removal.** Remove ignition leads, spark plugs, and magneto as follows:

- (1) Remove five screws (1) and lock washers (2).



Legend for fig. 6-7:

- |                               |                      |
|-------------------------------|----------------------|
| 1. Screw (5)                  | 10. Lock washer      |
| 2. Lock washer (5)            | 11. Screw            |
| 3. Cable clamp (4)            | 12. Lock washer      |
| 4. Ignition wire assembly (2) | 13. Nut              |
| 5. Ignition wire assembly     | 14. Lock washer      |
| 6. Ignition wire assembly     | 15. Stud             |
| 7. Ground strap               | 16. Gasket           |
| 8. Spark plug (4)             | 17. Gear             |
| 9. Nut                        | 18. Magneto assembly |

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Figure 6-7. Ignition leads, spark plugs, and magneto mounting

is not necessary to remove the four cable clamps (4) except for replacement. Tag each ignition wire assembly (4, 5, 6) to identify which cylinder it is used on for assembly reference. Not that No. 1 and No. 4 are same length.

- (2) Unscrew each end of ignition wire assemblies (4, 5, 6) at spark plugs (8) and magneto (18). Remove the ignition wire assemblies (4, 5, 6). Remove ground strap (7).
- (3) Use a deep socket wrench and remove four spark plugs (8) and plug gaskets.
- (4) Disconnect battery cables. Remove the battery holdout and battery. Disconnect wire leads from magneto condenser. Remove nut (9), lock washer (10), screw (11), lock washer (12), nut (13), and lock washer (14). Remove the magneto assembly (18) and gasket (16). If stud (15) is damaged or magneto is to be replaced, remove stud (15) from magneto assembly (18).

**c. Cleaning.** Clean ignition wire assemblies (4, 5, 6, fig. 6-7), spark plugs (8), and magneto (18) as follows:

- (1) Clean ignition wire assemblies (4, 5, 6) of any accumulated grease or dirt by wiping with a cloth moistened with an approved solvent.

**CAUTION**

**Do not soak wire assemblies in solvent as insulation damage can occur.**

- (2) Clean threads in cylinder head spark plug holes with suitable brush. Clean spark plugs (8) with a stiff brush.

**NOTE**

**When excessive carbon deposits on spark plugs (8) can not be removed with wire brush, replace plug.**

- (3) Clean magneto assembly (18) of any accumulated grease or dirt by wiping with a cloth moistened with an approved solvent.

**d. Inspection-Acceptance.** Inspect ignition wire assemblies (4, 5, 6, fig. 6-7) for frayed shielding cover, damaged insulation, and continuity. Any defect is cause for replacement of damaged assembly. Inspect spark plugs (8)

for cracked insulation or damaged electrodes. Use a suitable spark plug gage and set gap to 0.030 inch (0.762 mm) as shown in figure 6-8. Remove the end cap from magneto and inspect breaker points for pitting. As necessary, resurface the points with a small tungsten file. If points are pitted badly or worn they are to be replaced. Check breaker point gap as shown in figure 6-9 and as follows:

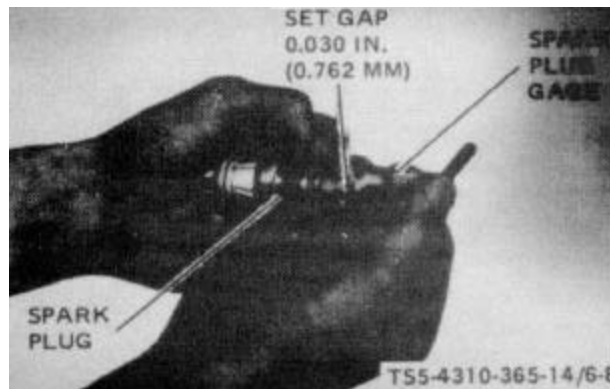


Figure 6-8. Setting spark plug gap

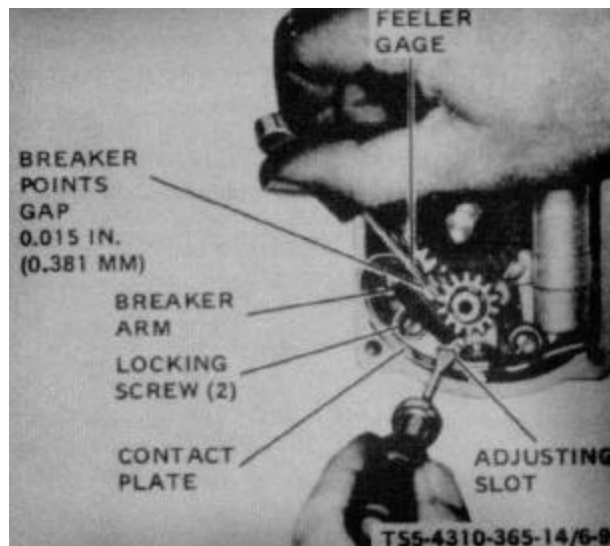


Figure 6-9. Magneto breaker point adjustment

- (1) Rotate the magneto gear (17, fig. 6-7) until breaker point gap is fully open. Measure gap with a feeler gage. Gap should be 0.015 inch (0.381 mm).
- (2) If gap is not correct, loosen two locking screws on contact plate, insert a small screwdriver into adjusting slot and open or close gap as required by moving contact plate.

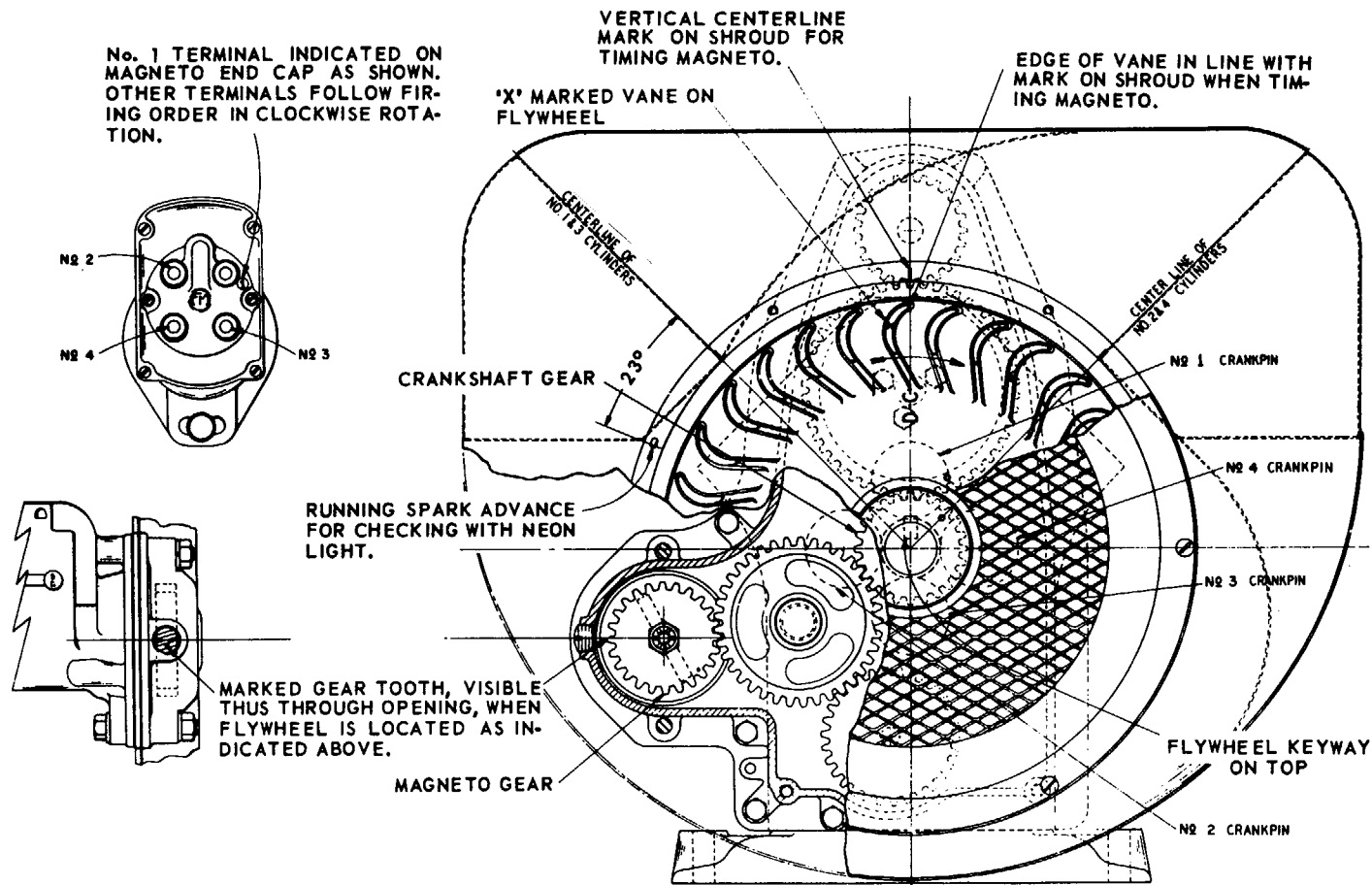
- (3) When gap is set, tighten two locking screws; then, recheck gap. Install the magneto end cap.

**e. Installation.** Install the magneto, ignition wire assemblies and spark plugs as follows:

- (1) Remove exhaust muffler group (para 6-2.b) and front housing support panel (32, fig. 6-2). Remove the flywheel screen (fig. 6-10).
- (2) Determine compression stroke by holding a finger over spark plug hole for No. 1 cylinder and slowly turning engine crankshaft in direction of rotation with handcrank. Compression stroke is determined by air blowing out spark plug hole.
- (3) Continue turning crankshaft until flywheel reference vane is aligned with vertical centerline mark on flywheel shroud. Refer to figure 6-10.
- (4) Connect the No. 1 ignition wire assembly to the No. 1 terminal of magneto. Hold the spark plug terminal end of ignition wire 1/8 inch (3.175 mm) from magneto body. Turn magnet drive-gear (17, fig. 6-7) clockwise (facing gear) until ignition wire terminal sparks.
- (5) Hold the gear in this position, install a new gasket (16, fig. 6-7) and install magneto

assembly (18) on engine. Install lock washer (14), nut (13), lock washer (12), screw (11), lock washer (10), and nut (9).

- (6) Install spark plug gaskets and plugs (8). Torque spark plugs (8) to 25 to 30 pound-feet (3.46 to 4.15 kg-m). Install ignition wire assemblies (4, 5, 6) (as tagged at removal) to magneto terminals and spark plugs. Secure assemblies to engine by attaching the four cable clamps (3) with lock washers (2) and screws (1).
- (7) Connect ground strap (7) and attach with lock washer (2) and screw (1). Connect wiring harness leads and temperature switch lead to magneto condenser as shown on wiring diagram (fig. 1-3).
- (8) Install battery and battery holddown and connect battery cables. To check timing, whiten edge of flywheel reference vane with chalk and connect a timing light to No. 1 terminal of magneto. Start the engine. Timing light should flash when reference valve is in line with slotted hole in flywheel shroud.
- (9) Stop the engine, remove timing light, install flywheel screen.
- (10) Install front housing support panel (32, fig. 6-2) and install exhaust muffler group (para 6-2.g).



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Figure 6-10. Magneto timing diagram

**6-15. Maintenance of High Temperature Safety Switch.**

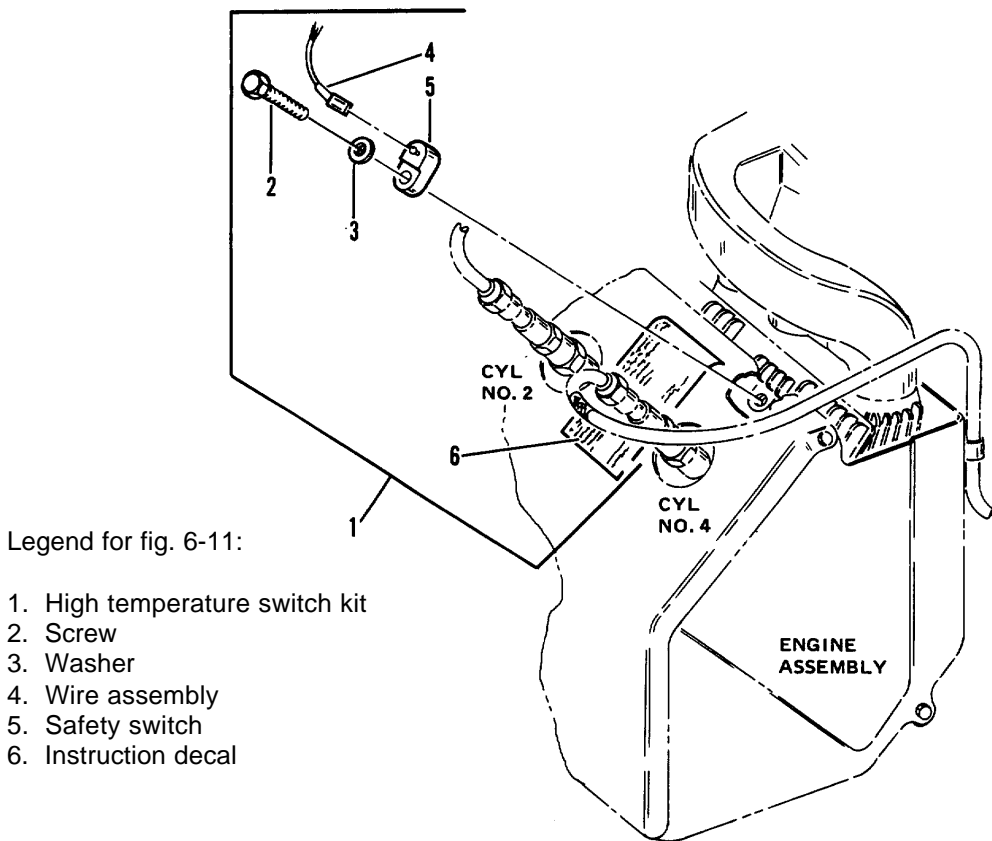
The engine high temperature safety switch is located on the cylinder head above cylinder No. 4 spark plug. It is supplied as a kit as shown in figure 6-11. Maintenance is as follows:

**a. Inspection-Installed Items.** Inspect wire assembly (4, fig. 6-11) for damaged insulation and evidence of shorting or burning. Examine safety switch (5) for any damage.

**b. Removal.** Disconnect wire assembly (4) from switch (5) and magneto condenser. Remove screw (2), washer (3) and safety switch (5). Replace instruction decal (6) as necessary.

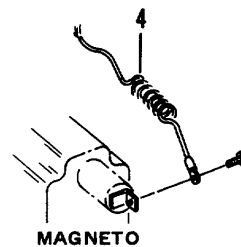
**c. Testing.** Test continuity of switch (5) and wire assembly (4) using a multimeter.

**d. Installation.** Install safety switch (5) on cylinder head with washer (3) and screw (2). Connect wire assembly (4) to switch (5) and magneto condenser. Install new instruction decal (6) as necessary.



Legend for fig. 6-11:

- 1. High temperature switch kit
- 2. Screw
- 3. Washer
- 4. Wire assembly
- 5. Safety switch
- 6. Instruction decal



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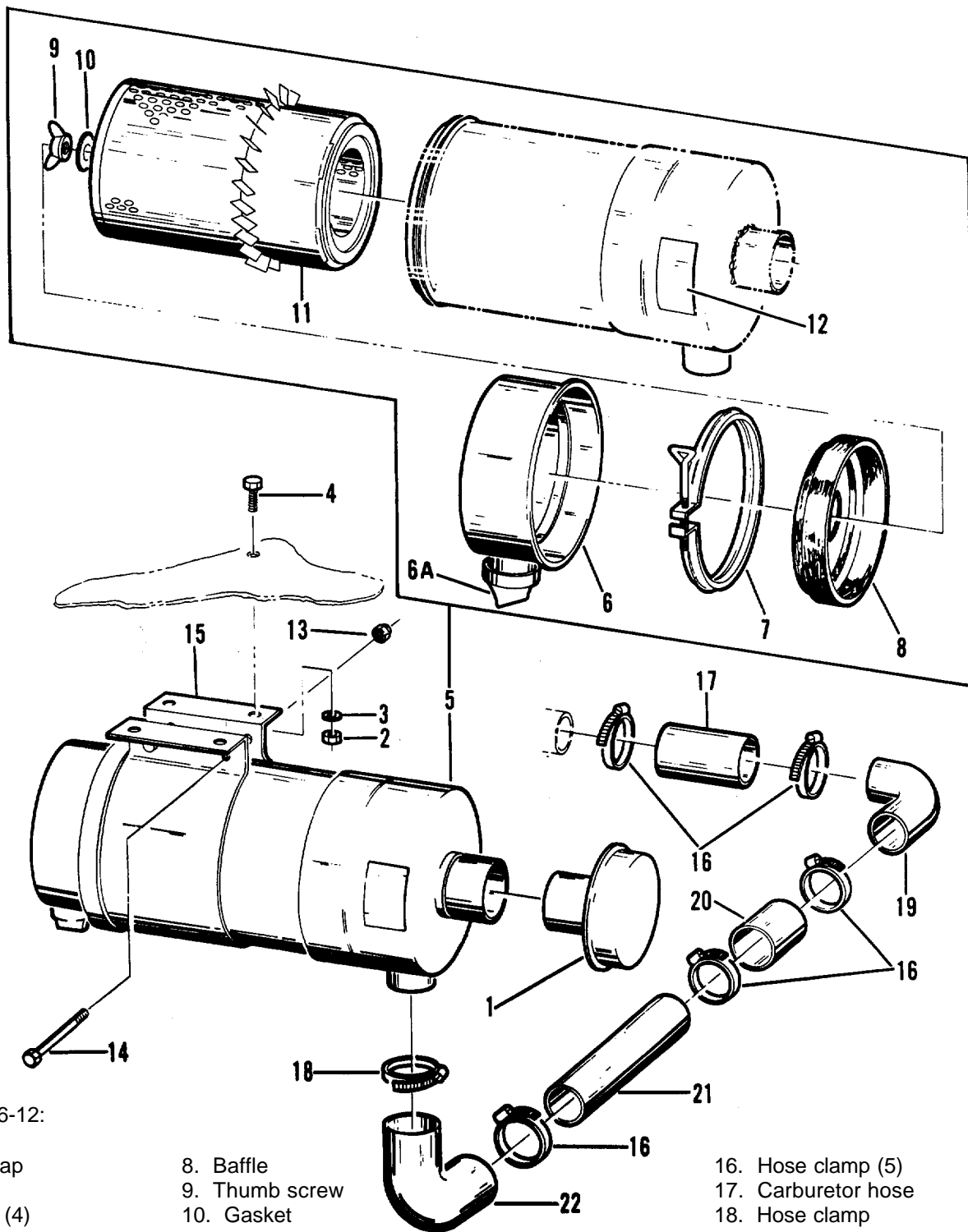
Figure 6-11. Engine high temperature safety switch

**6-16. Maintenance of Engine Air Cleaner.** Maintenance of the engine air cleaner is as follows:

**a. Inspection-Installed Items.** Inspect for loose hose clamps, damaged or deteriorated hose connections, and dents in the air cleaner.

**b. Removal.** Removal of air cleaner assembly (5, fig. 6-12 and group components is as follows:

- (1) Remove air cleaner cap (1, fig. 6-12)
- (2) Loosen hose clamp (18). Remove restriction indicator hose from elbow (22).



Legend for fig. 6-12:

- 1. Air cleaner cap
- 2. Nut (4)
- 3. Lock washer (4)
- 4. Screw (4)
- 5. Air cleaner assembly
- 6. Cup assembly
- 6A. Vacuator valve
- 7. Clamp
- 15. Mounting strap

- 8. Baffle
- 9. Thumb screw
- 10. Gasket
- 11. Element
- 12. Instruction transfer
- 13. Locknut (2)
- 14. Strap screw (2)

- 16. Hose clamp (5)
- 17. Carburetor hose
- 18. Hose clamp
- 19. Elbow
- 20. Hose
- 21. Tube
- 22. Elbow

Figure 6-12. Engine air cleaner group

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Remove four nuts (2), lock washers (3) and screws (4). Remove the air cleaner assembly (5) from unit.

(3) To disassemble air cleaner assembly (5), loosen winged bolt on clamp (7) and remove cup assembly (6). Remove clamp (7) as necessary. Remove thumb screw (9), gasket (10) and element (11). Remove instruction transfer (12), two locknuts (13), strap screws (14), and mounting strap (15) from air cleaner body only when necessary for replacement.

(4) Loosen five hose clamps (16), pull carburetor hose (17) off carburetor, separate and remove the five hose clamps (16), carburetor hose (17), elbow (19), hose (20), tube (21), hose clamp (18), and elbow (22).

**c. Cleaning.** Clean the air cleaner assembly in accordance with para 3-9. Clean all other components by removing accumulation of grease or dirt with a cloth moistened with an approved solvent.

**d. Inspection-Acceptance.** Inspect all parts for damage and deterioration. Replace all defective parts.

**e. Installation.** Install air cleaner components and air cleaner assembly as follows:

(1) Place hose clamp (18) and one hose clamp (16) on elbow (22). Place two hose clamps (16) on hose (20) and carburetor hose (17). Install carburetor hose (17) on carburetor intake and secure by tightening clamp (16) at carburetor end of hose. Assemble elbow (19) in hose (17), hose (20) on elbow (22) on tube (21). Do not tighten hose clamps (16, 18) until air cleaner assembly (5) is installed.

(2) If mounting strap (15) was removed from air cleaner body, install strap (15) on body with strap mounting legs 180° from body outlet tube; secure strap (15) to body with two screws (14) and locknuts (13). Install instruction transfer (12), if removed.

(3) Install element (11), gasket (10), and thumb screw (9). Place clamp (7) on end of air cleaner body over raised clamping ring. Install baffle (8) in cup assembly (6) and vacuator valve (6A) on bottom cup tube. Install cup assembly (6) onto end of body making certain it seats and seals all

the way around; then, tighten winged bolt of clamp (7) securing cup assembly to body. Note that vacuator valve (6A) faces down, in line with body outlet tube.

(4) Install air cleaner assembly (5) to underside of unit roof with four screws (4), lock washers (3) and nuts (2). Install air cleaner cap (1). Install elbow (22) on body outlet tube adjusting tube (21) and hose (20) positions for alignment of carburetor inlet components; then, tighten hose clamps (16, 18). Install restriction indicator hose to fitting on elbow (22).

**6-17. Maintenance of Intake and Exhaust Manifold.** Maintenance of the engine intake and exhaust manifold is as follows:

**a. Inspection-Installed Items.** While engine is running, inspect the intake-exhaust manifold (4, fig. 6-13) for evidence of cracks showing exhaust leakage around manifold gaskets (5) and broken mounting flanges.

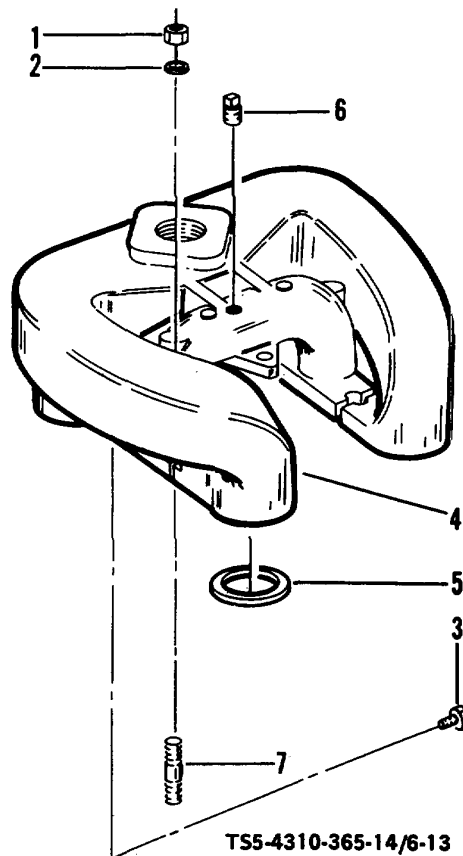


Figure 6-13. Intake and exhaust manifold



**b. Removal.** Remove intake-exhaust manifold as follows:

- (1) Remove exhaust muffler group (para 6-2.b).
- (2) Remove the enclosure roof (7, fig. 6-2).
- (3) Remove two screws and lock washers that attach carburetor to manifold flange. Remove four nuts (1, fig. 6-13) and washers (2). Remove four nuts (1, fig. 6-13) and washers (2). Remove screw (3). Carefully lift manifold (4) off manifold studs (7). Remove carburetor gasket and six manifold gaskets (5). Pipe plug (6) need not be removed.

**NOTE**

**Cover carburetor outlet and cylinder block inlets and outlets to prevent entry of foreign matter.**

**c. Cleaning, Inspection, and Repair.** Remove dirt and rust from manifold using a wire brush. Scrape

gasket surfaces of carburetor flange and manifold gasket flanges of all gasket material. Inspect manifold for any holes or cracks. Replace any damaged part.

**d. Installation.** Install intake-exhaust manifold as follows:

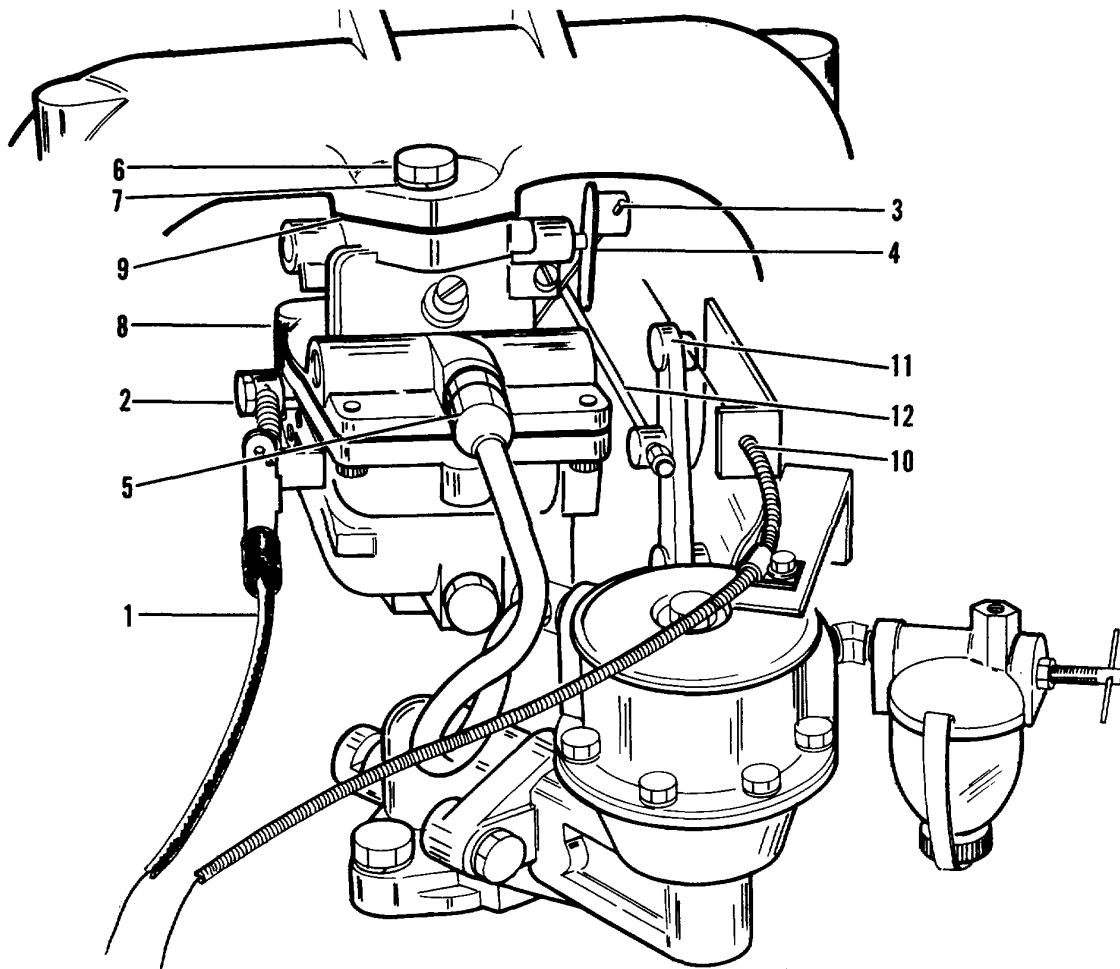
- (1) If pipe plug (6, fig. 6-13) was removed, install plug (6) in manifold (4).
- (2) Install six new manifold gaskets (5) and a new carburetor flange gasket.
- (3) Carefully install manifold (4) onto studs (7) and secure with four washers (2) and nuts (1). Torque nuts (1) to 18 pounds-feet (2.49 kg-m). Install screw (3). Install two lock washers and screws securing carburetor to manifold flange.
- (4) Install enclosure roof (7, fig. 6-2).
- (5) Install exhaust muffler group (para 6-2.g).

**6-18. Maintenance of Carburetor.** Maintenance of the carburetor is as follows:

**a. Inspection-Installed Item.** Inspect carburetor flange, body, and bowl for evidence of cracks or breaks. Inspect lever arms for breaks and free movement. Inspect governor rod connection to throttle lever and governor rod for bending. Inspect choke cable connection to choke lever.

**b. Removal.** Remove carburetor assembly from engine intake-exhaust manifold flange as follows:

- (1) Disconnect choke cable (1, fig. 6-14) from carburetor choke lever (2).



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Legend for fig. 6-14:

- |                       |                             |
|-----------------------|-----------------------------|
| 1. Choke cable        | 7. Lock washer (2)          |
| 2. Choke lever        | 8. Carburetor assembly      |
| 3. Governor lever rod | 9. Gasket                   |
| 4. Throttle lever     | 10. Throttle cable          |
| 5. Fuel line          | 11. Governor control lever  |
| 6. Screw (2)          | 12. Governor adjusting rod] |

Figure 6-14. Carburetor assembly

- (2) Disconnect governor rod (3) from throttle lever (4).
- (3) Disconnect fuel line (5).
- (4) Remove two screws (6) and lock washers (7) that secure carburetor to intake-exhaust manifold flange. Carefully lower carburetor assembly (8) and remove. Remove and discard gasket (9).

**c. Cleaning.** Wipe carburetor assembly clean of accumulated oil and dirt with a cloth moistened with an approved solvent.

**d. Inspection-Acceptance.** Inspect for broken mounting flange, cracked or broken body, bowl, or lever

arms. Notify direct support and general support maintenance for repair, overhaul, and adjustment.

**e. Installation.** Install the carburetor assembly as follows:

- (1) Install a new gasket (9, fig. 6-14) and attach carburetor assembly (8) with two lock washers (7) and screws (6).
- (2) Connect fuel line (5).
- (3) Connect governor rod (3) to throttle lever (4).
- (4) Connect choke cable (1) to choke lever (2).

**6-19. Maintenance of Fuel Strainer, Fuel Pump, and Adapter.** Maintenance of fuel strainer, fuel pump, and adapter is as follows:

**a. Inspection-Installed Items.** Inspect fuel strainer for broken bowl, clogged strainer, and damaged bail. Inspect for damaged fuel lines. Inspect fuel pump and adapter for cracked or broken mounting flanges and loose or damaged fittings.

**b. Removal.** Disconnect fuel line (2, fig. 6-3) at top of fuel strainer and remove elbow (9, fig. 6-3). Remove fuel strainer (3, fig. 6-15), fuel pump (8), and adapter (12) as follows:

(1) Disconnect and remove fuel line (1, fig. 6-15) and remove elbow (2). Unscrew

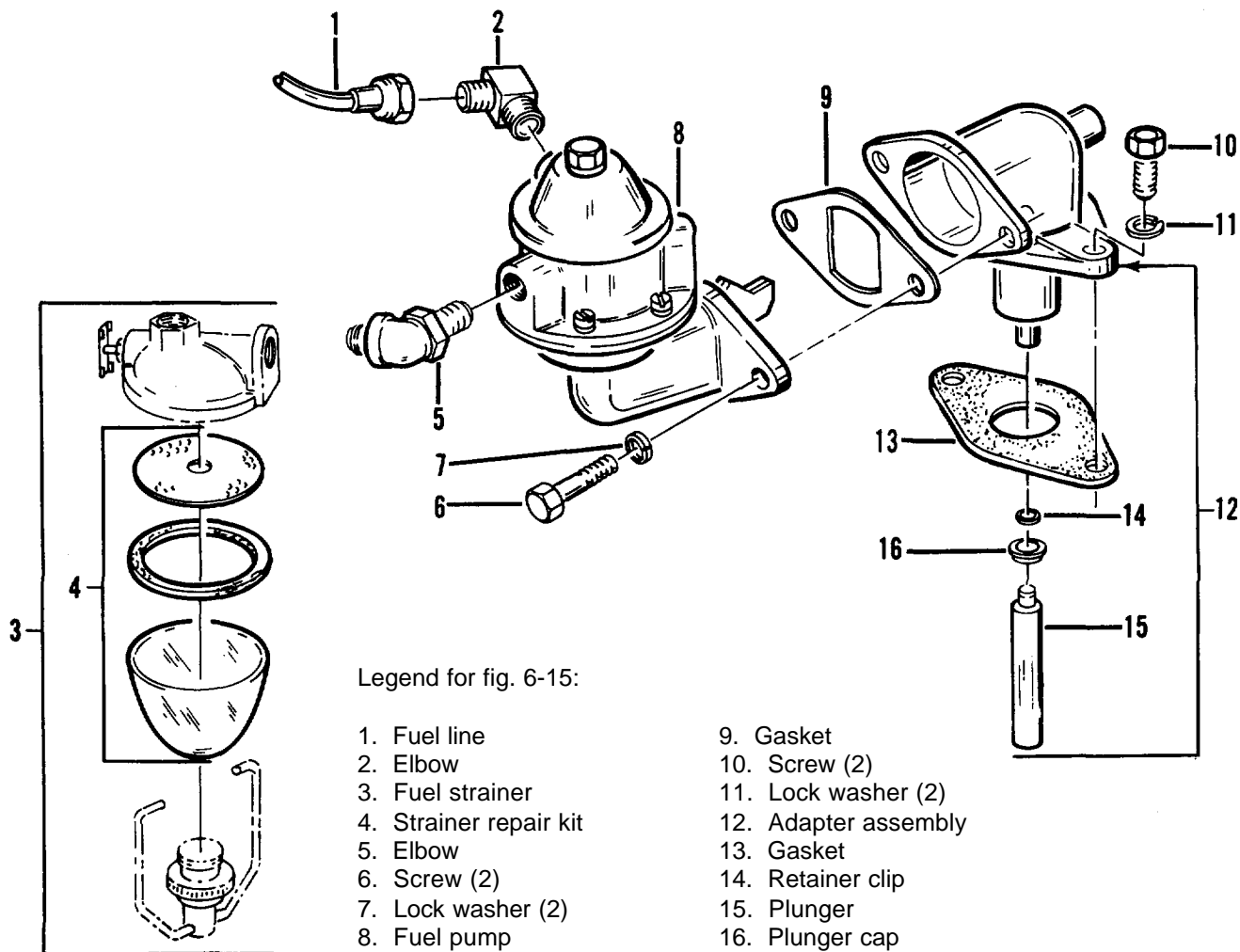
strainer assembly (3) from elbow (5) and remove the elbow (5). (Refer to para 3-7 for fuel strainer service)

(2) Remove two screws (6), lock washers (7), and remove fuel pump (8). Remove and discard gasket (9).

(3) Remove two screws (10), lock washers (11), and remove adapter assembly (12). Remove and discard gasket (13).

(4) Remove retainer clip (14), plunger (15) and plunger cap (16).

**c. Cleaning.** Wipe off accumulated oil and dirt with a cloth moistened with an approved solvent.



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Figure 6-15. Fuel strainer, fuel pump and adapter

**d. Inspection-Acceptance.** Inspect all parts for cracks, breaks, damaged threads, collapsed tubing, and fuel pump lever action. Notify direct support and general support maintenance for repair or overhaul.

**e. Installation.** Install these components as follows:

- (1) Install plunger cap (16), plunger (15) and retainer clip (14). Install a new gasket (13). Install adapter assembly (12) and secure to crankcase with two lock washers (11) and screws (10).

- (2) Install a new gasket (9) and assemble fuel pump (8) to adapter assembly (12) with two lock washers (7) and screws (6).

- (3) Install elbows (5, 2). Install fuel strainer (3) and connect carburetor fuel line (1).

- (4) Install elbow (9, fig. 6-3) and connect fuel line (2, fig. 6-3).

**6-20. Maintenance of Engine Oil Filter Group.**

Maintenance of the engine oil filter group is as follows:

**a. Inspection-Installed Items.** Inspect filter cartridge (8, figure 6-16) for dents and evidence of oil leakage at base assembly (10) and two oil pad covers (12). Inspect two oil hose assemblies (1) for cut or frayed covering and leakage due to damaged hose end fitting or the connecting fittings (2, 3).

**b. Removal.** Remove the engine oil filter group as follows:

- (1) Disconnect and remove the two oil hose assemblies (1). Remove three straight fittings (2) and restricted oil line fitting (3).
- (2) Remove two nuts (4), lock washers (5) and screws (6). Remove oil filter assembly (7). Disassemble oil filter assembly (7) by removing cartridge (8) and gasket (9) from base assembly (10).
- (3) Remove and discard gasket (11) installed between base assembly (10) and cover (12); remove one cover (12).
- (4) As necessary, remove two screws (13), lock washers (14), the second oil pad cover (12) and gasket (11). Oil filter bracket (15) need be removed from engine only when necessary to replace.

**c. Cleaning.** Wipe accumulated oil and dirt from all parts with a cloth moistened with an approved solvent.

**d. Inspection-Acceptance.** Inspect all parts for defects and damage. Replace defective or damaged parts.

**e. Installation.** Install engine oil filter group as follows:

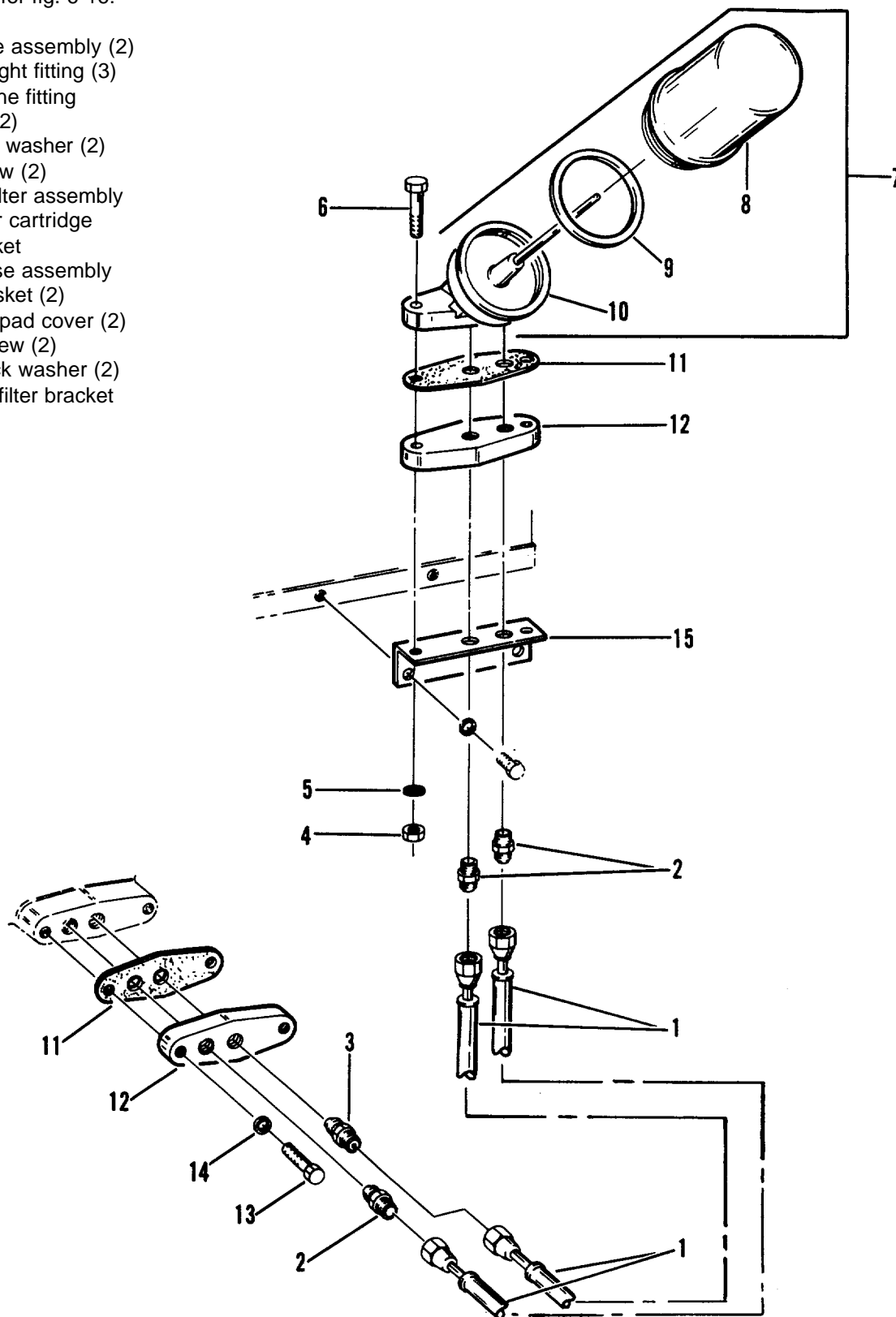
- (1) If removed for replacement, install filter bracket (15) using existing engine housing screws and lock washers.
- (2) Install new gasket (11) and one oil pad cover (12) on engine crankcase with two lock washers (14) and screws (13). Install one straight fitting (2) and restricted oil line fitting (3) in cover (12) as shown, restricted fitting in right-hand port facing pad cover (12).
- (3) Assemble gasket (9) and cartridge (8) to base assembly (10). Place one pad cover (12) and new gasket (11) on bracket (15). Install oil filter assembly (7) on pad and gasket securing these parts to bracket (15) with two screws (6), lock washers (5) and nuts (4).
- (4) Install two straight fittings (2) into pad cover (12). Install two oil hose assemblies (1).

**NOTE**

**When facing the oil pad and oil filter assembly, hose from restricted oil line fitting (3) must attach to straight fitting (2) located on the left-hand end of cover (12) under filter assembly (7).**

Legend for fig. 6-16:

- 1. Hose assembly (2)
- 2. Straight fitting (3)
- 3. Oil line fitting
- 4. Nut (2)
- 5. Lock washer (2)
- 6. Screw (2)
- 7. Oil filter assembly
- 8. Filter cartridge
- 9. Gasket
- 10. Base assembly
- 11. Gasket (2)
- 12. Oil pad cover (2)
- 13. Screw (2)
- 14. Lock washer (2)
- 15. Oil filter bracket



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Figure 6-16. Engine oil filter group

## Section VIII. MAINTENANCE OF CLUTCH ASSEMBLY AND HOUSING GROUP

**6-21. General.** This section contains inspection of installed items, removal and disassembly, cleaning, inspection-acceptance, repair or replacement, reassembly and installation, adjustment, and lubrication of the clutch assembly and housing group.

**6-22. Maintenance of Clutch Assembly and Housing Group.** Maintenance of this group is as follows:

**a. Inspection-Installed Items.** Actuate the clutch handle and check for proper engage and disengage action. Remove four screws (6, fig. 6-17) and lock washers (7) and handhole cover (8). Inspect for any cracked or broken parts.

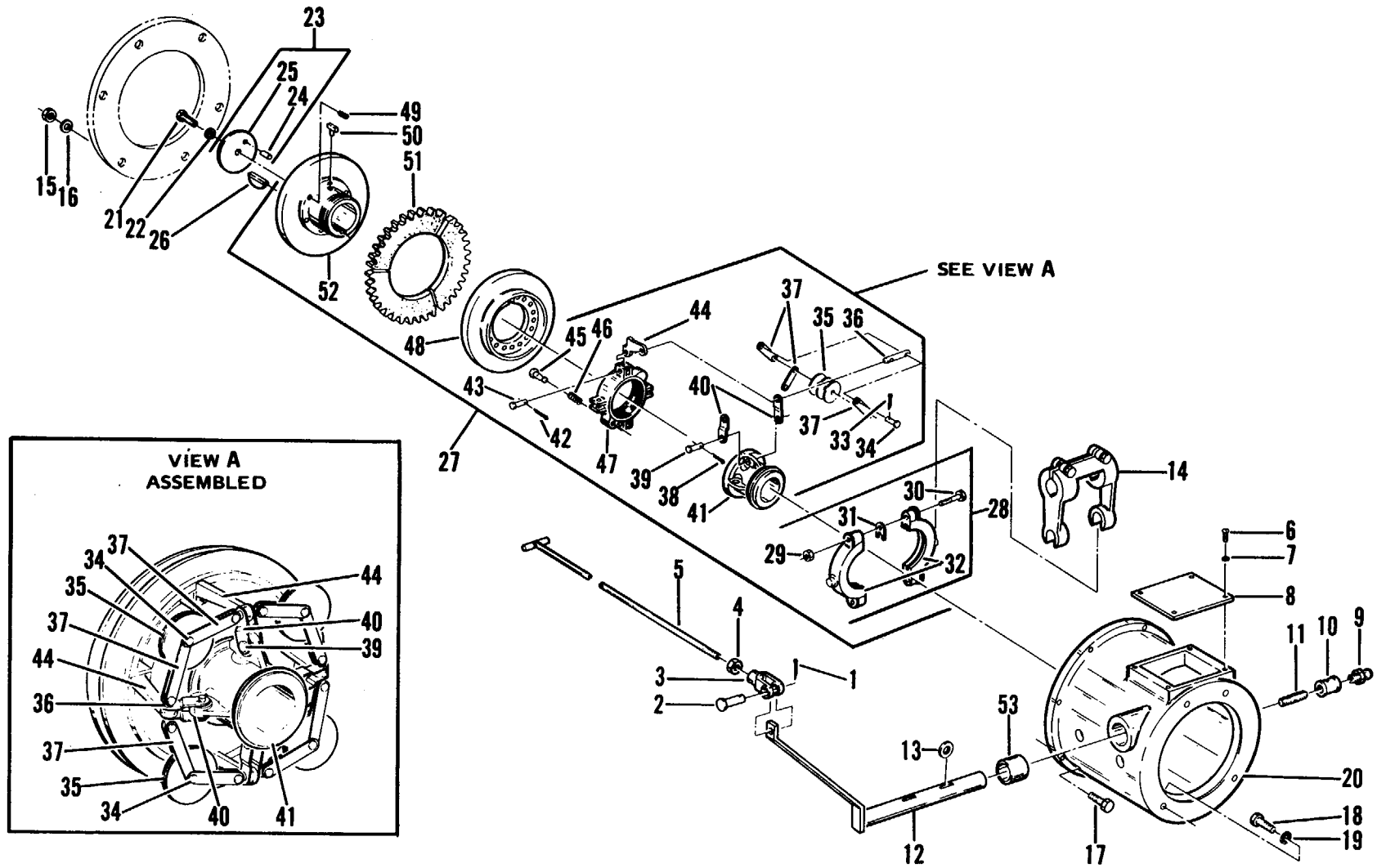
**b. Removal and Disassembly.** Remove and disassemble as follows:

- (1) Remove exhaust muffler (para 6-2.b).
- (2) Remove engine air cleaner (para 6-16.b).
- (3) Remove alternator drive belt and alternator adjusting bracket (para 6-10.b).
- (4) Remove the battery cables, battery holddown, and battery (para 6-35.b).
- (5) Disconnect wiring harness leads from magneto (fig. 1-3).
- (6) Disconnect fuel lines (1, 2, 3, 4, fig. 6-3) at fuel strainer, heater, tee (13), and valve (18).
- (7) Disconnect two control cables at heater. Remove heater assembly (para 7-45).
- (8) Disconnect engine oil drain hose at engine (para 6-31). Disconnect engine oil pressure hose at engine (38, fig. 6-4).
- (9) Remove enclosure roof (7, fig. 6-2) and front housing support (32).
- (10) Disconnect throttle cable and choke cable at engine (para 6-18).
- (11) Engage the clutch to hold driving plates (15, fig. 6-17) in place. Remove cotter pin(1) and clevis pin (2) disconnecting yoke (3) from clutch shaft assembly (12). To remove operating rod (5), loosen nut (4), remove yoke (3) from rod, remove nut (4) and pull rod (5) out from front of instrument panel.
- (12) Remove eight nuts (15), lock washers (16), and screws (17). These secure clutch housing to compressor. Remove or move components attached to compressor flange by these nuts and screws. Remove the engine (para 7-10.a) with housing and clutch assembly attached.
- (13) Remove four screws (6), lock washers (7), and handhole cover (8). Remove grease fitting (9), pipe coupling (10), and nipple (11). Loosen screws securing throwout yoke (14) to shaft

Legend for fig. 6-17:

- |                           |                           |                         |
|---------------------------|---------------------------|-------------------------|
| 1. Cotter pin             | 19. Lock washer (4)       | 37. Weight link (16)    |
| 2. Clevis pin             | 20. Clutch housing        | 38. Cotter pin (4)      |
| 3. Yoke                   | 21. Screw                 | 39. Lever pin (4)       |
| 4. Nut                    | 22. Lock washer           | 40. Lever link (8)      |
| 5. Clutch operating rod   | 23. Drive washer assembly | 41. Sliding sleeve      |
| 6. Screw (4)              | 24. Spring pin            | 42. Cotter pin (4)      |
| 7. Lock washer (4)        | 25. Clutch washer         | 43. Lever pin (4)       |
| 8. Handhole cover         | 26. Key                   | 44. Finger lever (4)    |
| 9. Grease fitting         | 27. Clutch assembly       | 45. Lock adjusting pin  |
| 10. Pipe coupling         | 28. Collar assembly       | 46. Pin spring          |
| 11. Pipe nipple           | 29. Nut (2)               | 47. Adjusting yoke      |
| 12. Clutch shaft assembly | 30. Screw (2)             | 48. Floating plate      |
| 13. Yoke key (2)          | 31. Spacer (2)            | 49. Release spring (6)  |
| 14. Throwout yoke         | 32. Clutch collar         | 50. Plate pin           |
| 15. Nut (8)               | 33. Cotter pin (12)       | 51. Driving plate       |
| 16. Lock washer (8)       | 34. Clevis pin (12)       | 52. Hub and back plate  |
| 17. Screw (8)             | 35. Clutch weight (12)    | 53. Housing bushing (2) |
| 18. Screw (4)             | 36. Link pin (4)          |                         |





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Figure 6-17. Clutch assembly and housing group.

- (12) . Slide shaft assembly (12) out of clutch housing (20) removing throwout yoke (14) and two yoke keys (13).
- (14) Remove four screw (18) and lock washers (19). Remove clutch housing (20) from engine. The two bushings (53) need not be removed unless replacement is necessary.
- (15) Remove screw (21), lock washer (22) and drive washer assembly (23) from engine crankshaft. Only when necessary for replacement of damaged parts, remove pin (24) from clutch washer (25).
- (16) Use a gear puller, or equivalent, to remove clutch assembly (27) from engine crankshaft and remove key (26).
- (17) Disassemble and remove collar assembly (28) by removing two nuts (29), screws (30), spacers (31), and collar (32).
- (18) Remove twelve cotter pins (33), twelve clevis pins (34), and twelve clutch weights (35). Remove four link pins (36) and sixteen weight links (37). Remove four cotter pins (38), four lever pins (39), and eight lever links (40); remove sliding sleeve (41).
- (19) Remove four cotter pins (42), four lever pins (43), four finger levers (44), lock adjusting pin (45), pin spring (46), and unscrew adjusting yoke (47) while removing the driving plates (51). Separate floating plate (48) and hub and back plate (52) while removing six release springs (49) and plate pin (50).

#### WARNING

**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 130°F (38°C - 59°C).**

**c. Cleaning.** Clean component parts of clutch assembly and housing group with solvent, P-D-680, or equivalent, and air dry.

**d. Inspection-Acceptance.** Inspect all parts for cracks and breaks. Inspect all screw threads for nicks and cross-threading. Inspect driving plate (51, fig. 6-17) for chipped and broken teeth. Inspect bore of sliding sleeve (41) for nicks or burrs.

**e. Repair or Replacement.** Replace all defective parts. Driving plate (51, fig. 6-17) is a three segment plate. Replace all three segments if one is damaged.

**f. Reassembly and Installation.** Reassemble the clutch and install as follows:

- (1) Assemble for finger levers (44) on adjusting yoke (47) with lever pins (43) and cotter pins (42). Assemble eight lever links (40) to sliding sleeve (41) with four lever pins (39) and cotter pins (38).
- (2) Assemble finger levers (44) between lever links (40) and install link pins (36). Assemble the weights (35) between links (37), insert clevis pins (34) and install cotter pins (33). (See assembled view A, fig. 6-17). This assembly connects sliding sleeve (41) to adjusting yoke (47).
- (3) Assemble collar assembly (28) on sliding sleeve (41) with spacers (31) between collar halves (32). Secure halves together with screws (30) and nuts (29).
- (4) Assemble pin spring (46) and lock adjusting pin (45). Install plate pin (50), six release springs (49) and assemble floating plate (48) and hub and back plate (52) to adjusting yoke (47).
- (5) Push clutch assembly (27) half way onto engine crankshaft, place key (26) in crankshaft keyway and complete assembly of clutch on crankshaft. If drive washer assembly (23) was disassembled, press spring pin (24) into washer (25). Install drive washer assembly (23) to end of crankshaft aligning pin (24) with hole in hub and back plate assembly (52). Secure with lock washer (22) and screw (21). Torque screw (21) to 80 foot-pounds (11.06 kg-m).
- (6) Disengage clutch, install driving plate segments (51) so that teeth of driving plate segments mesh with teeth of installing tool and segments are spaced with same separation between each

segment. Refer to figure 6-18. Engage clutch and remove installation tool.

**NOTE**

**Take care not to disturb spacing of driving plate (51, fig. 6-17) segments when mating with compressor drive ring at assembly.**

- (7) If bushings (53, fig. 6-17) were removed, press the two bushings (53) into bosses of housing (20), one on each side. Attach clutch housing (20) to engine with four lock washers (19) and screws (18).
- (8) Position throwout yoke (14) on clutch collar (28) with shaft bore of yoke (14) in line with operating shaft holes in housing (20). Assemble shaft assembly (12) through bushings in housing, through bore in yoke (14), install two keys (13), and secure throwout yoke (14) to shaft assembly (12). Install pipe nipple (11), coupling (10), grease fitting (9). Lubricate in accordance with LO 5-4310-365-12. Do not assemble handhole cover (8) until after clutch is adjusted, see para g below.

- (9) Install the engine on unit frame (para 7-10.b) while carefully aligning driving plate (51, fig. 6-17) teeth with compressor drive ring teeth. Position components that attach to compressor flange and attach clutch housing (20) to compressor with eight screws (17), lock washers (16) and nuts (15).
- (10) Install operating rod (5) through bushing in instrument panel, install nut (4), and yoke (3) on end of rod (5). Align yoke (3) with end of shaft assembly (12) and install clevis pin (2) and cotter pin (1).
- (11) Connect choke cable and throttle cable at carburetor (para 6-18).
- (12) Install front housing support (32, fig. 6-2) and enclosure roof (7).
- (13) Connect engine oil pressure hose at engine (38, fig. 6-4). Connect engine oil drain hose to engine (para 6-31).
- (14) Install the heater assembly (para 7-45). connect the two control cables at heater.

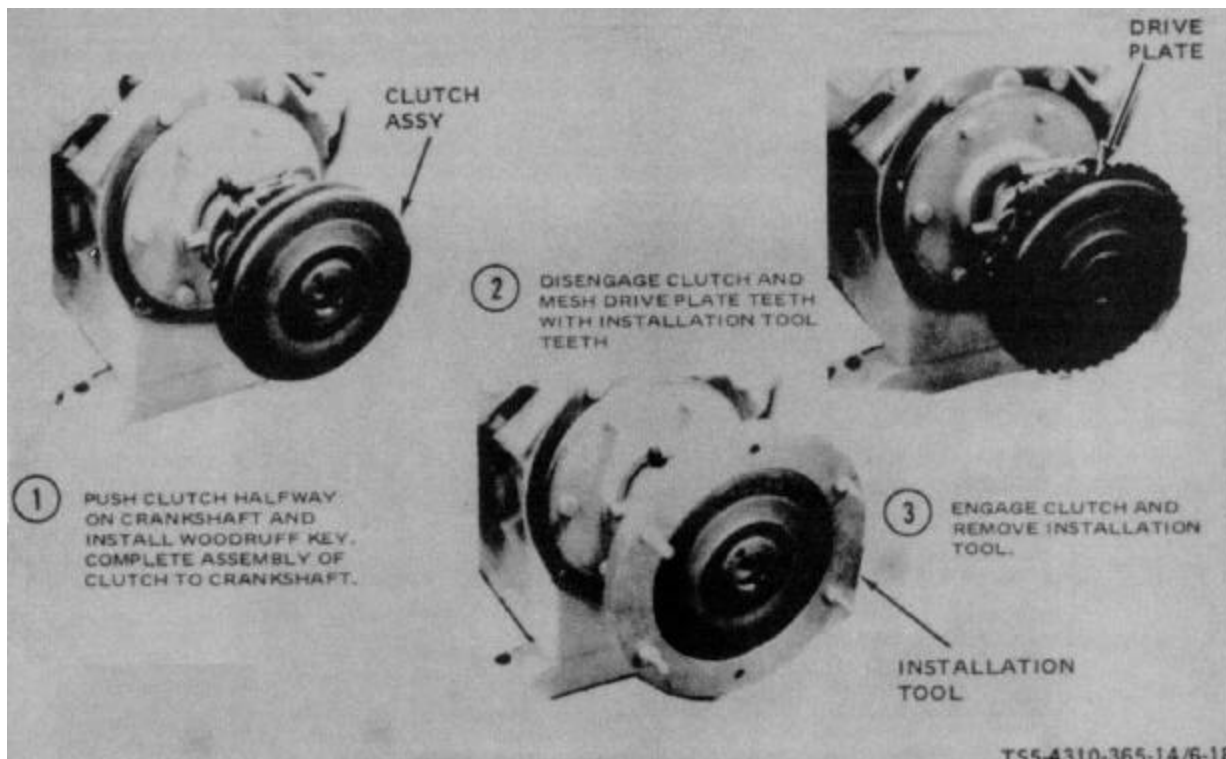


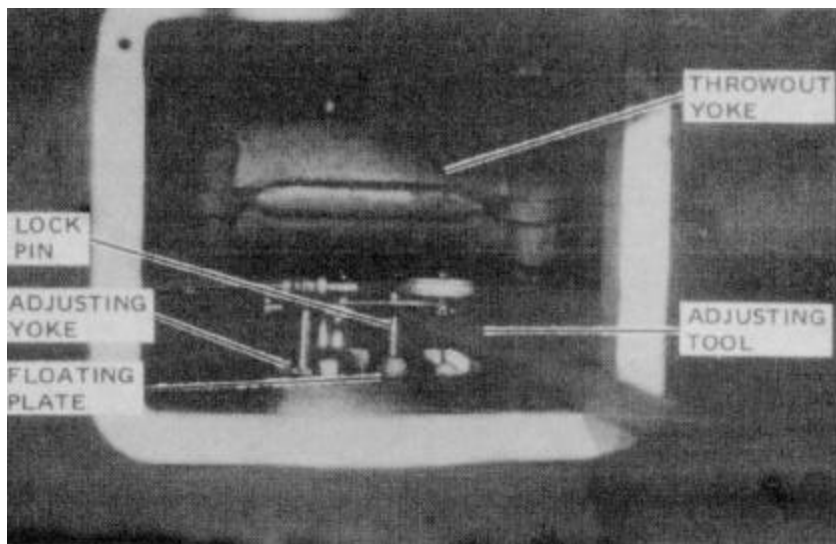
Figure 6-18. Clutch driving plate installing tool

- (15) Connect fuel lines (1, 2, 3, 4, fig. 6-3) at valve (18), tee (13), heater, and fuel strainer.
- (16) Connect wiring harness leads to magneto (fig. 1-3).
- (17) Install battery, battery holddown, and battery cables (para 6-35. d).
- (18) Install alternator adjusting bracket and drive belt (para 6-10. f and 6-10. g).
- (19) Install engine air cleaner (para 6-16. e).
- (20) Install exhaust muffler (para 6-2. g).

**g. Clutch Adjustment.** Disengage the clutch and adjust as follows:

- (1) Use the starting crank and manually rotate engine crankshaft in clockwise direction until adjusting lock pin is accessible through clutch housing handhole. Use clutch adjusting tool to disengage lock pin from floating plate as shown in figure 6-19.

- (2) Use a screwdriver to turn adjusting yoke in clockwise direction until lock pin in adjusting yoke has passed one or two adjusting holes in the floating plate.
- (3) Remove adjusting tool from lock pin and allow the spring loaded pin to seat in adjusting hole in floating plate.
- (4) Engage clutch. A Distinct pressure should be felt when clutch is engaged. If not, repeat steps (1) through (3) above until adjustment is correct. Then, install handhole cover (8, fig. 6-17) and attach with four lock washers (7) and screws (6).
- (5) If clutch operating rod (5, fig. 6-17) and shaft assembly (12) require adjustment to properly engage clutch, remove cotter pin (1) and clevis pin (2). Loosen nut (4) and turn yoke (3) either farther on or off of rod (5), as required, to shorten or lengthen effective stroke of operating rod.
- (6) Align yoke (3) with shaft assembly (12) lever, install clevis pin (2) and cotter pin (1). Tighten nut (4) against yoke (3).



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Figure 6-19. Clutch adjustment

**Section IX. MAINTENANCE OF PNEUMATIC SYSTEM**

**6-23. General.** This section contains maintenance functions within the pneumatic system as prescribed by the MAC, Appendix E. Each of the functional groups maintenance is covered in a separate paragraph.

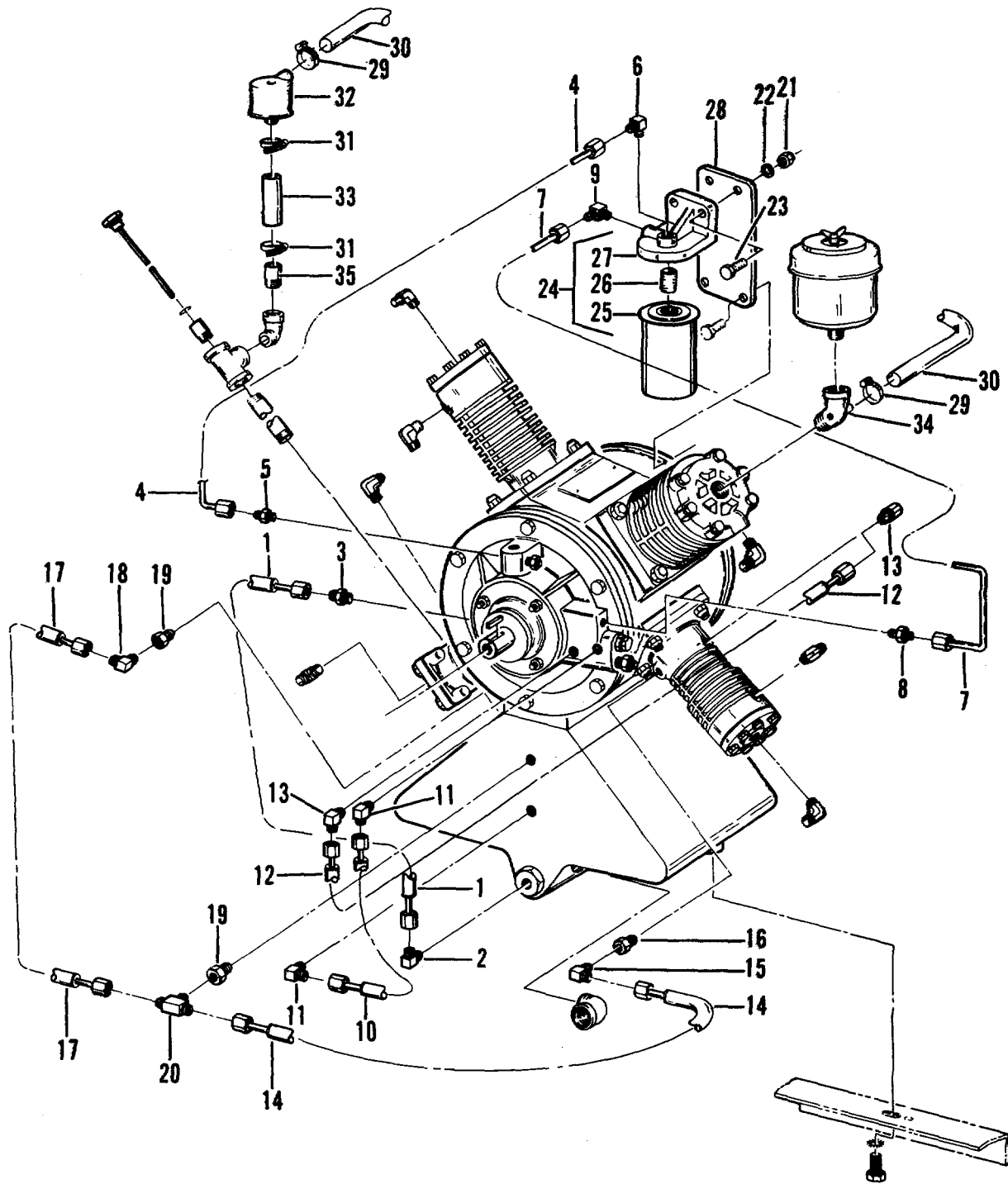
**6-24. Maintenance of Compressor Oil Lines and Fittings.** Maintenance of the compressor oil lines and fittings is limited to replacement of damaged parts at this maintenance level. Following notification by operator/crew inspection that defective parts are indicated, replace as follows:

**a.** As necessary to gain access to oil lines and fittings, remove compressor fan guard from air cooler shroud (para 7-37).

**b.** As necessary, drain oil from compressor (fig. 3-5).

**c.** Remove and replace only those oil lines and fittings that are defective as follows:

- (1) Remove hose assembly (1, fig. 6-20) from oil strainer to end cover. Remove elbow (2) from strainer and connector (3) from end cover.



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Figure 6-20. Compressor oil lines and fittings, oil filter, and crankcase breather

Legend for fig. 6-20:

1. Hose assembly	13. Elbow (2)	25. Filter cartridge
2. Elbow	14. Hose assembly	26. Adapter
3. Connector	15. Elbow	27. Filter bracket
4. Tube assembly	16. Reducing bushing	28. Mounting bracket
5. Connector	17. Hose assembly	29. Hose clamp (2)
6. Elbow	18. Elbow	30. Breather hose
7. Tube assembly	19. Reducing bushing (2)	31. Hose clamp (2)
8. Connector	20. Tee	32. Crankcase breather
9. Elbow	21. Locknut (2)	33. Hose
10. Hose assembly	22. Flat washer (2)	34. Air cleaner elbow
11. Elbow (2)	23. Screw (2)	35. Nipple
12. Hose assembly	24. Oil filter assembly	

(2) Remove tube assembly (4) from end cover to oil filter. Remove connector (5) from end cover and elbow (6) from filter bracket.

(3) Remove tube assembly (7) from oil filter to end cover. Remove connector (8) from end cover and elbow (9) from filter bracket.

(4) Remove hose assembly (10) from end cover to sump. Remove the two elbows (11).

(5) Remove hose assembly (12) from end cover and fourth stage cylinder. Remove the two elbows (13).

(6) Remove hose assembly (14) from fourth stage cylinder and oil sump tee (20). Remove elbow (15) and reducing bushing (16) from fourth stage cylinder.

(7) Remove hose assembly (17) from third stage cylinder to oil sump tee (20). Remove elbow (18) and reducing bushing (19) from third stage cylinder. Remove the oil sump tee (20).

d. Service the air compressor (fig. 3-5).

e. Install fan guard on air cooler shroud (para 7-37).

**6-25. Maintenance of Compressor Oil Filter.** When notified by operator/crew that inspection indicated oil filter damage, replace as follows:

a. Disconnect two oil tube assemblies (4, 7, fig. 6-20) and remove two elbows (6,9) from filter bracket (27).

b. Remove two locknuts (21), flat washers (22), screws (23), and the oil filter assembly (24).

c. To disassemble oil filter assembly (24), unscrew and remove filter cartridge (25) and adapter (26) from filter bracket (27).

d. Only if necessary, remove two nuts, lock washers, and screws that attach mounting bracket (28) to compressor end cover flange and clutch housing. Replace mounting bracket (28) as necessary and attach to compressor end cover flange with hardware just removed.

e. Assemble adapter (26) to filter bracket (27) and screw on a new filter cartridge (25). Attach oil filter assembly (24) to mounting bracket with two screws (23), flat washers (22) and locknuts (21).

f. Install the two elbows (9, 6) and attach tube assemblies (7, 4) to the elbows.

#### **6-26. Maintenance of Compressor Breather Assembly.**

When notified by operator/crew that inspection indicated damaged compressor crankcase breather (32, fig. 6-20) or breather hose (30), replace as follows:

a. Loosen two hose clamps (29) and remove breather hose (30) from crankcase breather (32) and air cleaner elbow (34). Remove the hose clamps (29) from hose (30).

b. Loosen top hose clamp (31) and remove crankcase breather (32). As necessary, loosen lower hose clamp (31) and remove hose (33). Remove two hose clamps (31) from hose (33).

c. If hose clamps (31, 29) are damaged so that they are not reusable, replace. Place two hose clamps (31) on new hose (33), install hose (33) on nipple (35) and tighten lower hose clamp (31).

d. Install new crankcase breather (32) in hose (33) with outlet facing front of unit. Tighten upper hose clamp (31).

e. Place a hose clamp (29) on each end of breather hose (30). Install hose (30) on breather (32) outlet and to air cleaner elbow (34). Tighten the two hose clamps (29).

**6-27. Maintenance of Moisture Traps.** Inspect and service the moisture traps as follows:

**a. Inspection-Installed Items.** Inspect tightness of all tube assembly and hose assembly connections to first, second, and third stage trap assemblies and condensate receiver (refer to figure 6-4, sheets 3 and 4). Inspect hoses for any type of defect. Defective hoses and tube assemblies shall be replaced (para 6-8).

**b. Servicing Moisture Traps and Strainers.** Service the traps and strainers as follows:

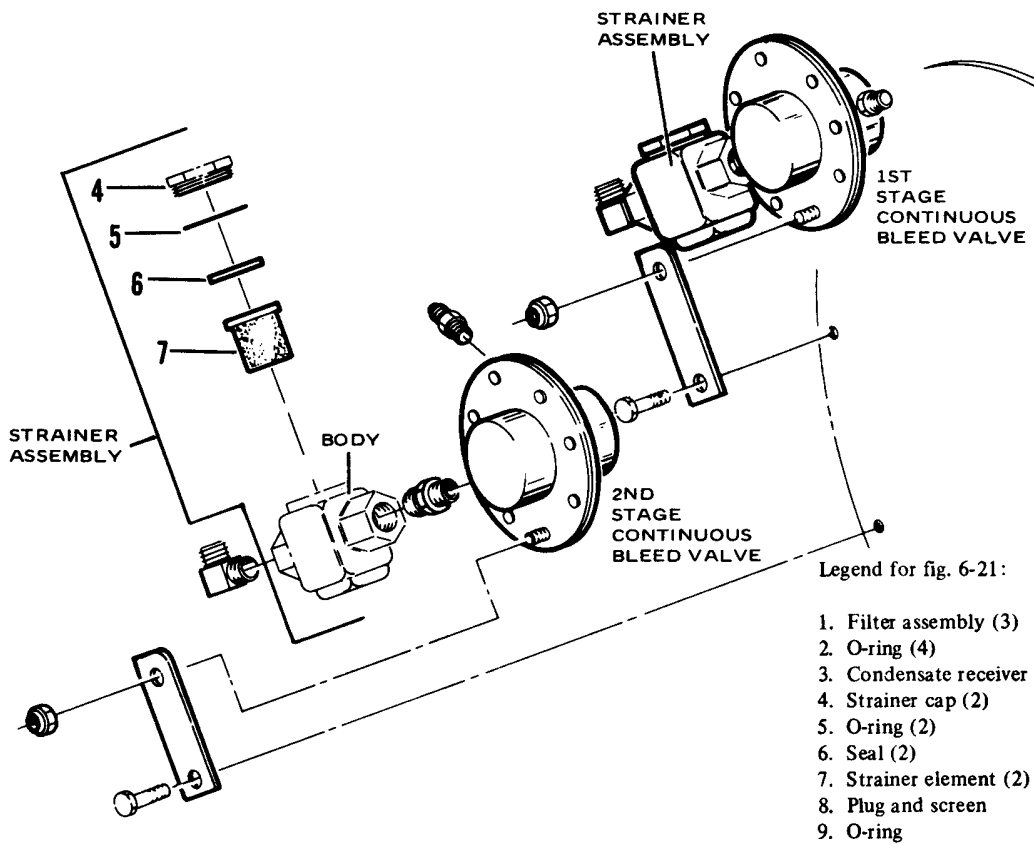
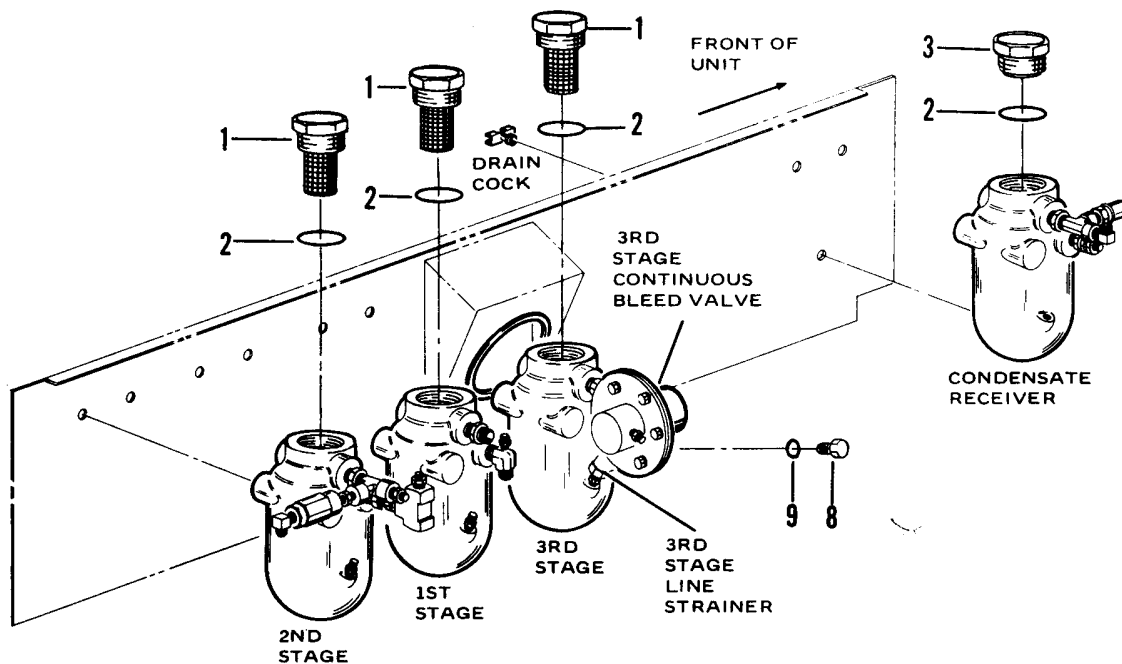
- (1) Unscrew and remove the filter assemblies (1, fig. 6-21) from first, second, and third stage trap assemblies. Remove the o-rings (2). Remove receiver screw (3) and o-ring (2) from condensate receiver.

#### WARNING

**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 130°F (38°C - 59°C).**

- (2) Clean the filter assembly (1) screens with P-D-680, or equivalent. Examine screens for holes and frayed mesh. Any damage is cause for replacement. Wipe o-rings (2) with a clean, lint-free cloth and examine for cuts and nicks. Replace damaged o-rings (2). Wipe out inside of traps with clean, lint-free cloth moistened with the solvent; then assemble o-rings (2), filter assemblies (1), and receiver screw (3).
- (3) Remove strainer caps (4), o-rings (5), seals (6) and strainer elements (7) from first and second stage continuous bleed valve strainer assemblies. Clean these parts with P-D-680, or equivalent. Examine o-rings (5), seals (6), and elements (7) for any damage. Replace defective parts as necessary. Wipe out strainer assembly body with a clean, lint-free cloth moistened with the solvent. Install elements (7), seals (6), o-rings (5), and strainer caps (4).
- (4) Unscrew and remove the third stage line strainer plug and screen (8) and o-ring (9). Clean the plug and screen (8) with P-D-680, or equivalent. Examine screen for holes and frayed mesh. Any damage is cause for replacement. Install o-ring (9) and plug and screen (8).





Legend for fig. 6-21:

- 1. Filter assembly (3)
- 2. O-ring (4)
- 3. Condensate receiver screw
- 4. Strainer cap (2)
- 5. O-ring (2)
- 6. Seal (2)
- 7. Strainer element (2)
- 8. Plug and screen
- 9. O-ring

Figure 6-21. Moisture traps and strainers

**Section X. MAINTENANCE OF INSTRUMENT AND CONTROL PANEL**

**6-28. General.** This section contains removal, testing, repair or replacement, and installation of components of the instrument and control panel as prescribed for organizational maintenance level by the MAC, Appendix E. You will be notified by operator/crew when a component is suspected of being faulty resulting from their inspection of the installed item.

**6-29. Maintenance of Instrument and Control Panel.** Each of the instrument and control panel components authorized for maintenance is covered below in subparagraphs.

**NOTE**

**Panel gauge tube assemblies are secured with tubing clips. As removal of required tube assembly arises, remove locknut (3, fig. 6-22), screw (4), and tubing clips (5), as necessary, as shown in typical detail A on figure 6-22.**

**a. Master Switch (56, fig. 6-22).** Disconnect and remove cable assembly (14), two light assembly wires (15A) used on serial numbers 25962 thru 32864 or one wire assembly (15A) and wire assembly (15B) used on serial numbers 33566 and up. Remove wire assembly (15). Disconnect wiring harness heads and starter cable from switch terminals. If harness lead identifiers are not legible or missing, tag leads for assembly reference. Remove screw that attaches switch lever, remove the lever and mounting nut from operator side of panel. Remove the master switch (56) from panel. Test the switch for continuity using multimeter. Replace a

faulty master switch (56). Install master switch (56) on panel and secure with mounting nut on operator side of panel. Install switch lever and attach with lever screw. Connect wiring harness leads and starter cable to switch terminals, as tagged at removal. Connect wire assembly (15), two light assembly wires (15A) used on serial numbers 25962 thru 32864 or one wire assembly (15A) and wire assembly (15B) used on serial numbers 33566 and up. Connect cable assembly (14). (See wiring diagram fig. 1-3.)

**a.1. Blackout Light Rheostat (55A, fig. 6-22).** (Used on serial numbers 33566 and up.) Disconnect wire assemblies (15B, 15C) from back of rheostat (55A) and remove from terminals. Loosen setscrew securing switch knob on the operator side of panel and remove knob. Unscrew and remove the mounting nut from operator side of panel. Remove the blackout light rheostat (55A) and rheostat identification plate (55B) from panel. Test the rheostat for continuity using a multimeter. Check operation of rheostat adjust shaft through full turn from OFF to BRIGHT. Replace a faulty blackout light rheostat (55A) on panel, install identification plate (55B) and secure rheostat and plate to panel with mounting nut on operator side of panel. Install switch knob and tighten knob setscrew. Connect wire assemblies (15B, 15C) to rheostat (55A) terminals. See wiring diagram fig. 1-3.)

**b. Ignition Switch (59, fig. 6-22).** Remove wiring harness lead from ignition switch (59). As necessary, tag lead for

Legend for fig. 6-22:

- |  |                          |                                    |  |
|--|--------------------------|------------------------------------|--|
| 1. Screw (5)                                 | 22. Elbow (8)            | 52. Quick disconnect nipple        | 78. Screw (12)   |
| 2. Control panel assembly                    | 23. Connector (3)        | 53. Locknut (2)                    | 79. Panel spacer (12)                                      |
| 3. Locknut (3)                               | 24. Reducing bushing (2) | 54. Screw (2)                      | 80. Locknut (3)  |
| 4. Screw (3)                                 | 25. Pipe cross           | 55. Nipple manifold                | 81. Screw (3)  |
| 5. Tubing clip (6)                           | 26. Pipe elbow           | 55A. Blackout light rheostat       | 82. Locknut (4)  |
| 6. Tube assembly                             | 27. Connector            | (serial no. 33566 and up)          | 83. Screw (4)  |
| 7. Tube assembly                             | 28. Elbow (2)            | 55B. Rheostat identification plate | 84. Self-tapping screw (26)                                |
| 8. Tube assembly                             | 29. Tubing tee           | (serial no. 33566 and up)          | 85. Service outlet plate (serial no. 25962 thru 32864)     |
| 9. Tube assembly                             | 30. Pipe tee             | 56. Master switch                  | 86. Master switch plate (serial no. 25962 thru 32864)      |
| 10. Tube assembly                            | 31. Valve assembly (5)   | 57. Locknut (2)                    | 86A. Switch identification plate (serial no. 33566 and up) |
| 11. Tube assembly                            | 32. Flat washer (5)      | 58. Screw (2)                      | 87. Ignition switch plate                                  |
| 12. Tube assembly                            | 33. Nipple               | 59. Ignition switch                | 88. Start switch plate                                     |
| 13. Tube assembly                            | 34. Screw (2)            | 60. Locknut (2)                    | 89. Switch identification plate                            |
| 14. Cable assembly                           | 35. Lock washer (2)      | 61. Screw (2)                      | 90. Control identification plate                           |
| 15. Wire assembly                            | 36. Spacer (2)           | 62. Starter switch                 | 91. Service hose bleed plate                               |
| 15A. Wire assembly (2)                       | 37. Solenoid valve       | 63. Light switch                   | 92. Service valve plate                                    |
| (serial no. 25962 thru 32864)                | 38. Nut (3)              | 64. Load-unload switch             | 93. Filter bleed plate                                     |
| 15A. Wire assembly (1)                       | 39. Lock washer (3)      | 65. Flat washer (2)                | 94. Receiver bleed plate                                   |
| (serial no. 33566 and up)                    | 40. Screw (3)            | 66. Indicator plate                | 95. Dehydrator bleed plate                                 |
| 15B. Wire assembly (serial no. 33566 and up) | 41. Flat washer (6)      | 67. Safety override switch         | 96. Control panel  |
| 15C. Wire assembly (serial no. 33566 and up) | 42. Door slide bar       | 68. Locknut                        | 97. Screw (4)  |
| 16. Wiring harness                           | 43. LH door assembly     | 69. Screw                          | 98. Special washer (4)                                     |
| 17. Tubing                                   | 44. RH door assembly     | 70. Preheat cover assembly         | 99. Rubber washer (8)                                      |
| 18. Locknut                                  | 45. Screw (8)            | 71. Chain                          | 100. Fan guard   |
| 19. Screw                                    | 46. Lock washer (8)      | 72. Rivet                          | 101. Wiring harness  |
| 20. Wire assembly                            | 47. Nutplate (2)         | 73. Throttle cable                 |  |
| 21. Hose assembly                            | 48. Door clamp (2)       | 74. Choke cable                    |  |
|  | 49. Locknut (2)          | 75. Retaining Ring                 |  |
|  | 50. Screw (2)            | 76. Clutch rod bushing             |  |
|  | 51. Door strike          | 77. Locknut (12)                   |  |

DETAIL B SERIAL NO.S 33566 AND UP

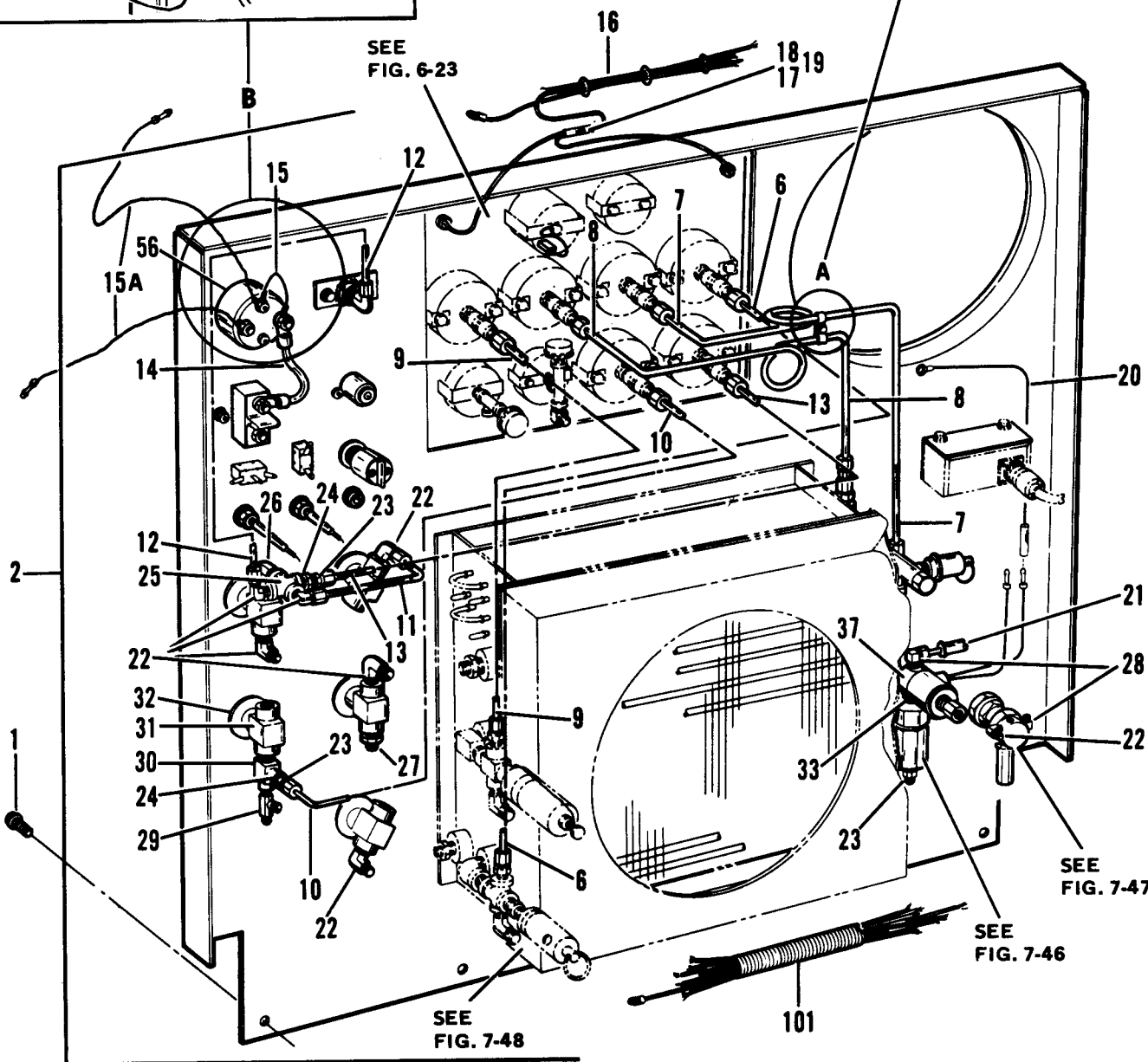
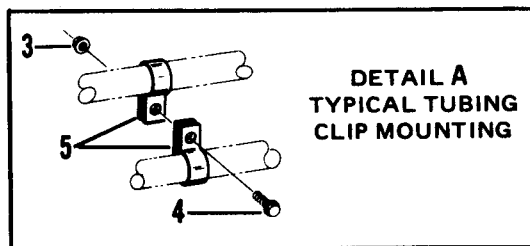
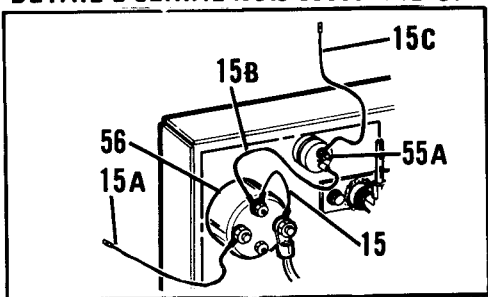


Figure 6-22. Instrument and control panel assembly (sheet 1 of 2)

DETAIL C SERIAL NO.S 33566 AND UP

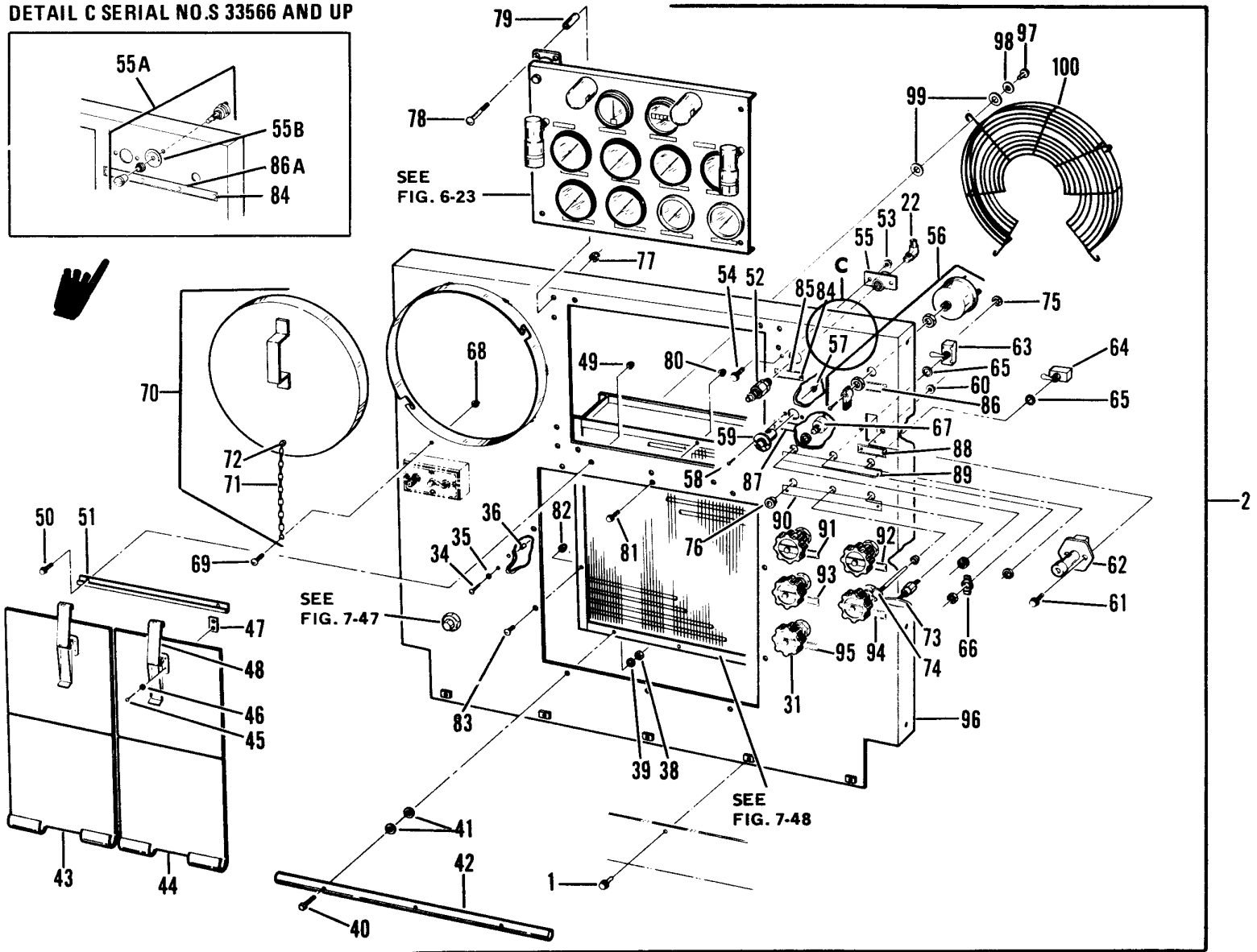


Figure 6-22. Instrument and control panel assembly (sheet 2 of 2)

assembly reference. Remove two locknuts (57), screws (58), and the ignition switch (59). Test the switch for continuity using multimeter. Replace a faulty ignition switch (59). Install ignition switch (59) on control panel and secure with two screw (58) and locknuts (57). Connect wiring harness lead. (See wiring diagram fig. 1-3.)

**c. Start Switch (62, fig. 6-22).** Disconnect cable assembly (14) and battery cable from start switch (62) terminals. Remove two locknuts (60) and screws (61) and remove start switch (62) from panel. Test switch continuity using multimeter. Replace a faulty switch. Install start switch (62) on control panel and secure with two screws (61) and locknuts (60). Connect battery cable and cable assembly (14) to start switch terminals. (See wiring diagram fig. 1-3.)

**d. Safety Override Switch (67, fig. 6-22).** Disconnect wiring harness leads from override switch (67). As necessary, tag the leads for assembly reference. Remove the knurled mounting nut from front of control panel and remove the override switch (67). Test switch for continuity using multimeter. Replace a faulty switch. Install override switch (67) and secure to control panel with knurled mounting nut. Connect wiring harness leads to switch terminals. (See wiring diagram fig. 1-3.)

**e. Light Switch (63, fig. 6-22).** Disconnect wiring harness leads from light switch (63). As necessary, tag leads for assembly reference. Remove mounting nut from front of control panel, remove ON-OFF indicator plate (66), remove light switch (63) and flat washer (65). Test switch for continuity using multimeter. Replace a faulty switch. Place flat washer (65) over switch actuating lever and install light switch (63) in panel. Place indicator plate (66) over lever against face of panel and secure light switch (63) with mounting nut. Connect wiring harness leads to switch (63) terminals. (See wiring diagram fig. 1-3.)

**f. Compressor Load-Unload Switch (64, fig. 6-22).** Disconnect wiring harness leads from load-unload switch (64). As necessary, tag leads for assembly reference. Remove the switch mounting nut from front of panel, remove the switch (64) and flat washer (65). Test switch for continuity using multimeter. Replace a faulty switch. Install flat washer (65) and load-unload switch (64) on panel and secure with switch mounting nut. Connect wiring harness leads to switch (64) terminals. (See wiring diagram fig. 1-3.)

**g. Chock Cable (74, fig. 6-22).** Disconnect choke cable (74) from carburetor lever (fig. 6-14). Remove the first stage cylinder head bolt that secures two tubing clips for choke cable and throttle cable. Remove choke cable from tubing clip. Remove choke cable mounting

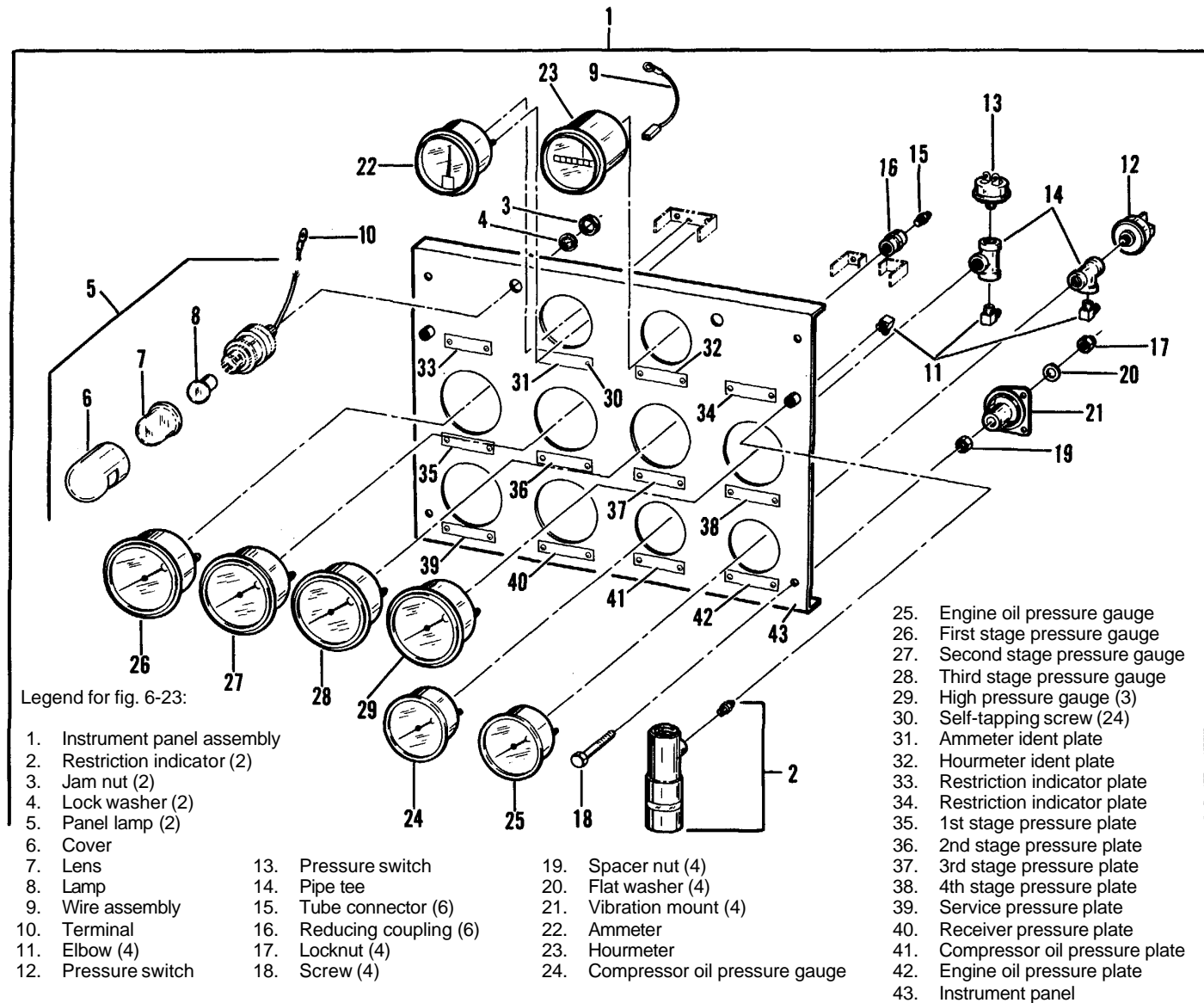
from rear of panel and remove choke cable (74, fig. 6-22). Inspect for broken actuating wire and replace choke cable assembly if defective. Install choke cable (74) by removing the panel mounting nut from the assembly, run choke cable through control panel from operator side. Install mounting nut back on cable and secure against control panel. Install tubing clip on cable and attach clip to first stage cylinder head with a cylinder head bolt. Connect choke actuating wire to carburetor choke lever (fig. 6-14).

**h. Throttle Cable (73, fig. 6-22).** Disconnect throttle cable (73) from governor control lever (fig. 6-14). Loosen cable clip securing throttle cable to bracket on engine cowl. Remove first stage cylinder head bolt that secures two tubing clips for choke cable and throttle cable. Remove throttle cable from clips. Remove throttle cable mounting cable (73, fig. 6-22). Inspect for a broken actuating wire and for lock-unlock action of throttle handle. Replace a defective throttle cable assembly. Install throttle cable (73) by removing the panel mounting nut from the assembly, run throttle cable through control panel from operator side. Install panel mounting nut back on cable and secure against control panel. Install clip on cable and attach to first stage cylinder with cylinder head bolt. Attach throttle cable to bracket on engine cowl with cable clip and attach throttle cable actuating wire to governor control level (fig. 6-14).

**i. Instrument Panel Assembly.** Remove the instrument panel assembly from control panel as follows:

- (1) Move heat shrink tubing (17, fig. 6-22) and disconnect lamp leads from wiring harness (16) by removing locknut (18) and screw (19) that connects lead terminals together. Tag harness lead if necessary.
- (2) Disconnect tube assemblies (6, 7, 8, 9, 10, 13, fig. 6-22) from rear of gauges. Disconnect restriction indicator hoses (41, 42, fig. 6-4). Disconnect compressor and engine oil pressure hoses (35, 38, fig. 6-4). Disconnect wiring harness leads from ammeter and hourmeter. Tag harness leads if necessary.
- (3) Remove twelve each locknuts (77, fig. 6-22), screws (78) and spacers (79). Remove instrument panel assembly from control panel.

**j. Restriction Indicators (2, fig. 6-23).** Unscrew and remove the two restriction indicators (2) with their safety filter fittings. Check if reset on top of indicator works properly and if indicator window portion is damaged. Inspect safety filter fitting for plugged and clean



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Figure 6-23. Instrument panel assembly

passage. Replace a defective fitting and indicator. Install safety filter fitting with filter end of fitting into indicator. Install restriction indicators (2) on panel (43).

**k. Instrument Panel Lamp (5, fig. 6-23).**

Unscrew and remove jam nut (3) and lock washer (4) attaching each of two panel lamps (5). Turn cover (6) and remove the cover, lens (7), and lamp (8). Test the lamp (8). Test lamp base for continuity with multimeter. As necessary, remove terminal (10). Replace all defective parts. Assemble lamp (8), lens (7) and cover (6) on lamp base. Run lamp lead through panel mounting hole and secure assembly (5) with lock washer (4) and jam nut (3).

**l. Pressure Switches (12, 13, fig. 6-23).** Unscrew and remove engine oil pressure switch (12) and compressor oil pressure switch (13) from pipe tees (14). Test switches for continuity with multimeter. Replace defective switches. Install the switches (12, 13) in pipe tees (14).

**m. Ammeter Gauge (22, fig. 6-23).** Remove the mounting nuts, washers, and clamp from rear of panel. Remove ammeter gauge (22). Replace a defective gauge. Install ammeter (22) and secure with mounting clamp, washers, and nuts supplied with gauge.

**n. Hourmeter Gauge (23, fig. 6-23).** Disconnect and remove wire assembly (9). Remove mounting nuts, washers, and clamps from rear of panel. Remove the hourmeter (23). Test for continuity with multimeter. Replace defective hourmeter. Install hourmeter (23) and secure with clamps, washers, nut supplied with gauge. Connect wire assembly (9).

**o. Oil Pressure Gauge (24, 25, fig. 6-23).** Unscrew and remove pipe tees (14) from compressor oil pressure gauge (24) and engine oil pressure gauge (25). (Pressure switches (12, 13) and elbows (11) need not be removed.) Remove the mounting nuts, washers, and clamps from rear of panel. Remove the oil pressure gauges (24, 25). Test the gauges and replace when

found defective. Install oil pressure gauges (24, 25) and secure with mounting clamps, washers, and nuts supplied with gauges. Install pipe tees (14) as shown on figure 6-23.

**p. Vibration Mounts (21, fig. 6-23).** From each of the four vibration mounts (21), remove locknut (17), screw (18), spacer nut (19), flat washer (20), and remove vibration mount (21). Examine for defects and replace vibration mount if defects are found. At each of the four corners of panel (43), install screw (18) through hole in panel. Place spacer nut (19) on screw (18), place vibration mount (21) on screw (18) with mounting flange away from panel and secure with flat washer (20) and locknut (17).

**q. Wire Assemblies and Harnesses.** Wipe all wire assemblies and harnesses free of any accumulation of dirt or grease. Ensure that all terminals are clean. Inspect for damaged terminals, worn insulation, evidence of burning due to shorts, or other damage. Test any suspect wire assembly or harness leads for continuity. Replace as required.

**NOTE**

**When replacing an electrical lead, ensure that replacement is same wire size as one being replaced and has minimum 600-volt rating. Use wire marker or tag replacement lead with same identification as that replaced. Refer to wiring diagram figure 1-3.**

**r. Air Cooler.** Open the sliding door assemblies (43, 44, fig. 6-22) and inspect the air cooler for any accumulation of dirt or foreign matter. Clean by blowing off dirt with compressed air. Examine for any damage. Notify general support maintenance for testing, repair, or replacement required.

**Section XI. MAINTENANCE OF ENGINE AND COMPRESSOR DRAINS**

**6-30. GENERAL.** This section contains removal and installation of engine and compressor oil drains. You will be notified by operator/crew when their inspection indicates damage to these components.

**6-31. Maintenance of Engine and Compressor Drains.** Drain oil from engine or compressor, whichever requires maintenance (see fig. 3-1 and fig. 3-5).

**a. Removal.** Unscrew and remove engine oil drain hose assembly (1, fig. 6-24). Unscrew and remove

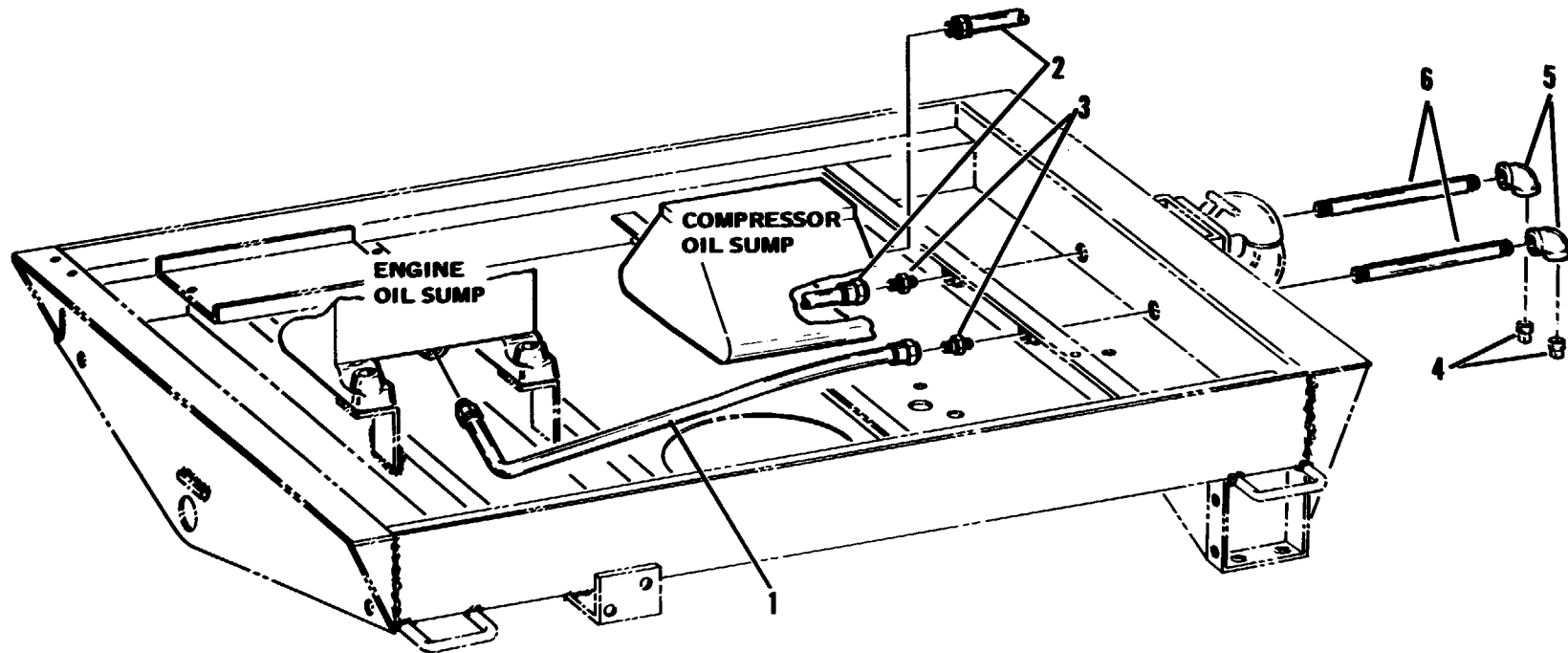
compressor oil drain hose assembly (2). Only when necessary, remove two pipe plugs (4), elbows (5), pipe nipples (6), and hose adapters (3).

**b. Installation.** Install the two pipe nipples (6), elbows (5), pipe plugs (4), and hose adapters (3). Connect compressor oil drain hose (2) to compressor and adapter (3). Connect engine oil drain hose (1) to engine and adapter (3). Service the engine and compressor in accordance with LO5-4310-365-12.



Legend for fig. 6-24

1. Engine oil drain hose assy
2. Compressor oil drain hose assy
3. Adapter (2)
4. Pipe plug (2)
5. Elbow (2)
6. Pipe nipple (2)



T55-4310-365-14/6-24

Figure 6-24. Engine and compressor oil drains

## Section XII. MAINTENANCE OF FUEL TANK GROUP

**6-32. General.** This section contains inspection, removal, repair or replacement, and installation of the fuel tank and mounting group.

**6-33. Maintenance of Fuel Tank Group.** Maintenance of the fuel tank and mounting group is as follows:

**a. Inspection.** Inspect filler cap (2, fig. 6-25) for broken chain connection to filler neck (6), for damaged sealing gasket and for a plugged vent hole. Inspect filler screen (5) for holes and frayed mesh. Inspect grommet (9) for cuts and deterioration. Check connection at filler neck hose connection (8) for tightness of two hose clamps (7) and for deterioration of hose (8). Inspect tank straps (12) for tightness and cracks or breaks. Inspect fuel level gauge (15) for proper operation. Notify direct support maintenance of fuel tank (17) damage for repair or replacement.

**b. Removal.** Remove fuel tank group components as follows:

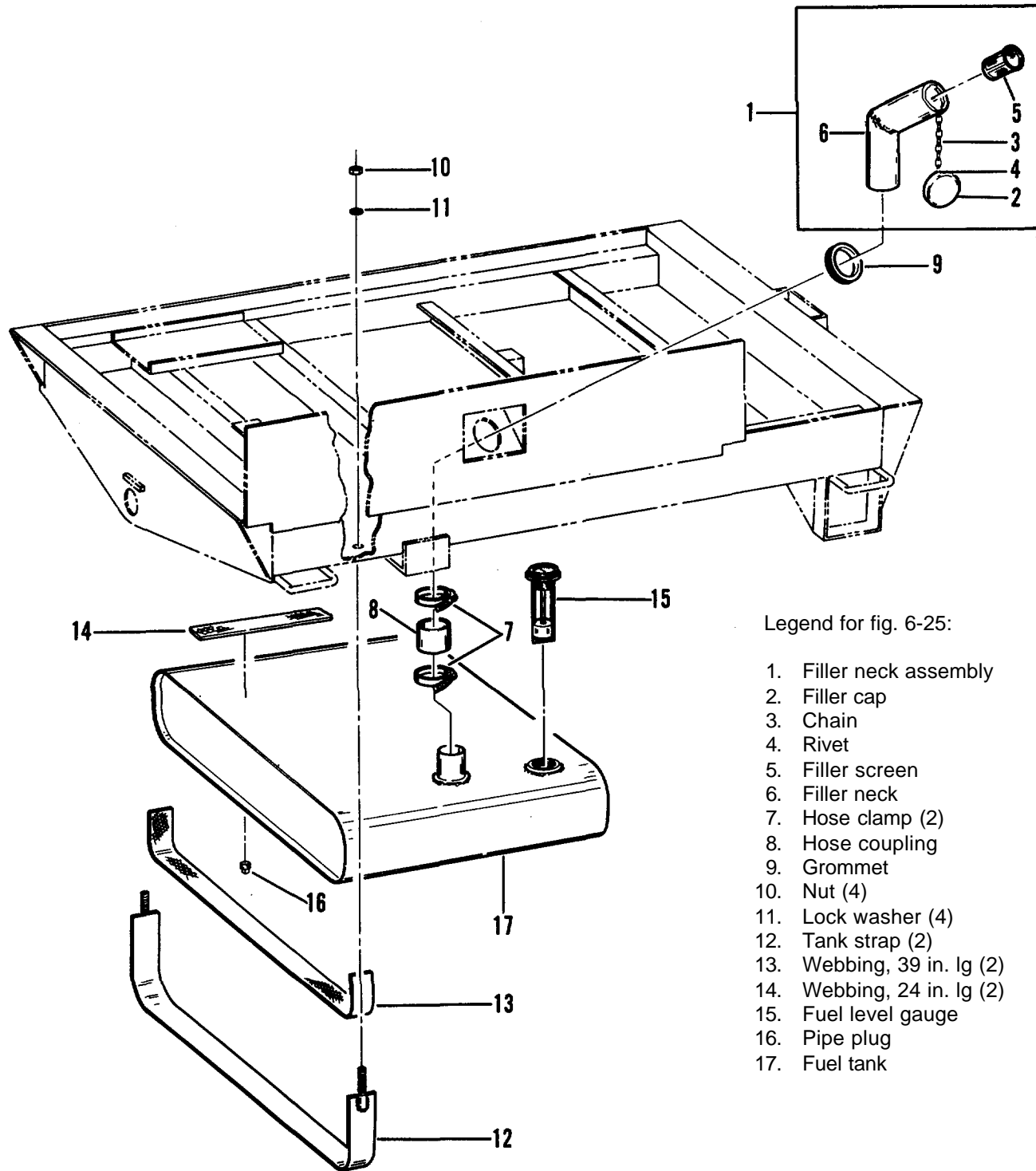
- (1) Remove filler cap (2, fig. 6-25) and lift out filler screen (5). Loosen top hose clamp (7) and pull filler neck assembly (1) out of hose (8) and grommet (9). Remove the grommet.
- (2) Loosen lower hose clamp (7), remove hose coupling (8) and the two hose clamps (7).
- (3) Unscrew and remove fuel lever gauge (15).
- (4) To remove one of the tank straps for repair or replacement, place a suitable support under the fuel tank (17) so that weight of tank rests on the support. Remove nuts (10)

and lock washers (11) from each end of strap (12); remove the strap. Install a repaired or replaced strap before the other strap is removed, if required. Both straps (12) are removed in the same manner.

**c. Repair or Replacement.** Tank straps (12) may be repaired by chasing damaged threaded ends or welding the strap if length of strap is not shortened. Replace all other defective parts. Notify direct support maintenance for repair or replacement of fuel tank (17).

**d. Installation.** Install fuel tank group components as follows:

- (1) Install fuel tank straps (12) with webbing (13) in place on strap against the tank (17). Secure straps (12) with lock washers (11) and nuts (10) on each end of strap. Remove support placed under tank (para 6-33.b.(4) above).
- (2) Install fuel level gauge (15) in top of tank (17).
- (3) Place a hose clamp (7) on each end of hose coupling (8), install hose on tank and tighten bottom clamp (7). Install grommet (9) in side panel opening. Work the filler neck assembly (1) through grommet (9) and into top of hose coupling (8). Tighten top hose clamp (7).
- (4) Install filler screen (5) into filler neck (6) and install filler cap (2). (Refer to para 3-15 for fuel tank service.)



Legend for fig. 6-25:

- 1. Filler neck assembly
- 2. Filler cap
- 3. Chain
- 4. Rivet
- 5. Filler screen
- 6. Filler neck
- 7. Hose clamp (2)
- 8. Hose coupling
- 9. Grommet
- 10. Nut (4)
- 11. Lock washer (4)
- 12. Tank strap (2)
- 13. Webbing, 39 in. lg (2)
- 14. Webbing, 24 in. lg (2)
- 15. Fuel level gauge
- 16. Pipe plug
- 17. Fuel tank

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Figure 6-25. Fuel tank and mounting

### Section XIII. MAINTENANCE OF BATTERY, HOLDDOWN, AND CABLES

**6-34. General.** This section contains testing of battery, removal, repair or replacement, and installation of the battery, holddown, and battery cables.

#### **6-35. Maintenance of Battery, Holddown, and Cables.**

**a. Testing Battery.** Remove cell caps of battery (7, fig. 6-26) and test specific gravity of electrolyte with a hydrometer. Specific gravity should be minimum of 1.250. Service the battery in accordance with para 3-16.

**b. Removal.** Remove components as follows:

- (1) Disconnect battery ground cable (1, fig. 6-26) from negative post of battery (7) and from engine. Disconnect battery cable (2) from battery (7) positive post and from control panel master switch. Disconnect cable (3) from control panel start switch and from starter terminal. Remove the cables (1, 2, 3).

#### **NOTE**

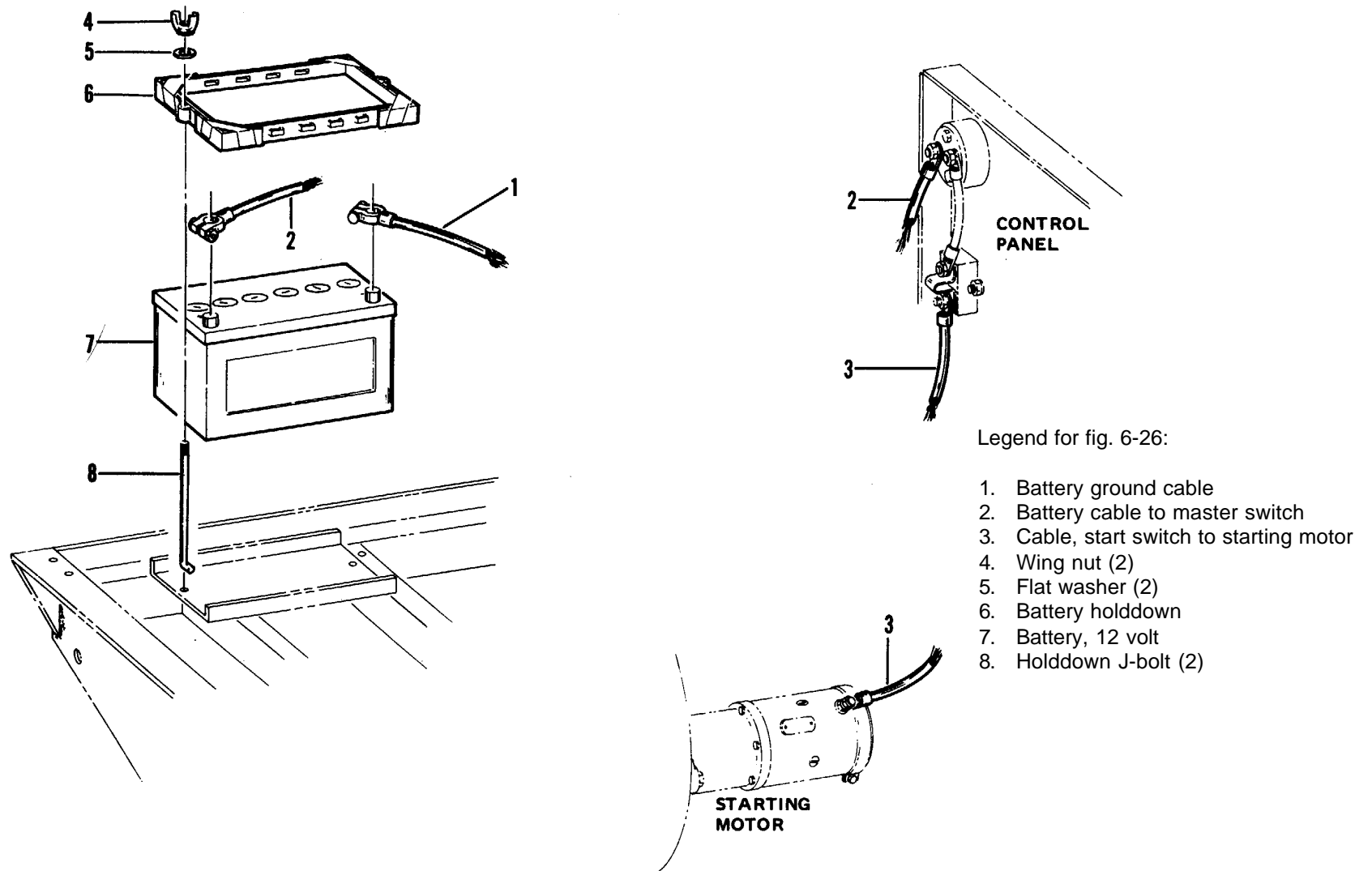
**To ease removal of battery, preventing electrolyte spillage, remove left screw and lock washer attaching engine oil filter bracket (15, fig. 6-16) to engine. Loosen right screw and move engine oil filter assembly to clear path of battery removal.**

- (2) Remove two wing nuts (4), flat washers (5), and the battery holddown (6). Lift out the battery (7) and remove the two J-bolts (8).

**c. Repair or Replacement.** Replace battery cables (1, 2, 3) if insulation is damaged or shows evidence of burning due to shorts or grounds. Replace cable terminals as necessary. Replace battery (7) if terminal posts or case is damaged. Replace all defective parts.

**d. Installation.** Install components as follows:

- (1) Install the two J-bolts (8). Set battery (7) in battery tray between the J-bolts (8). Install battery holddown (6) over battery (7) and onto J-bolts (8). Secure with two flat washers (5) and wing nuts (4).
- (2) Connect cable (3) to starter terminal and to start switch on control panel. Connect battery cable (2) to master switch on control and to positive battery (7) post. Connect battery ground cable (1) to engine and to battery (7) negative post.
- (3) Move engine oil filter assembly back into position and reinstall lock washer and screw attaching filter bracket (15, fig. 6-16) to engine. Tighten the other bracket attaching screw.



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Figure 6-26. Battery cables, battery and mounting

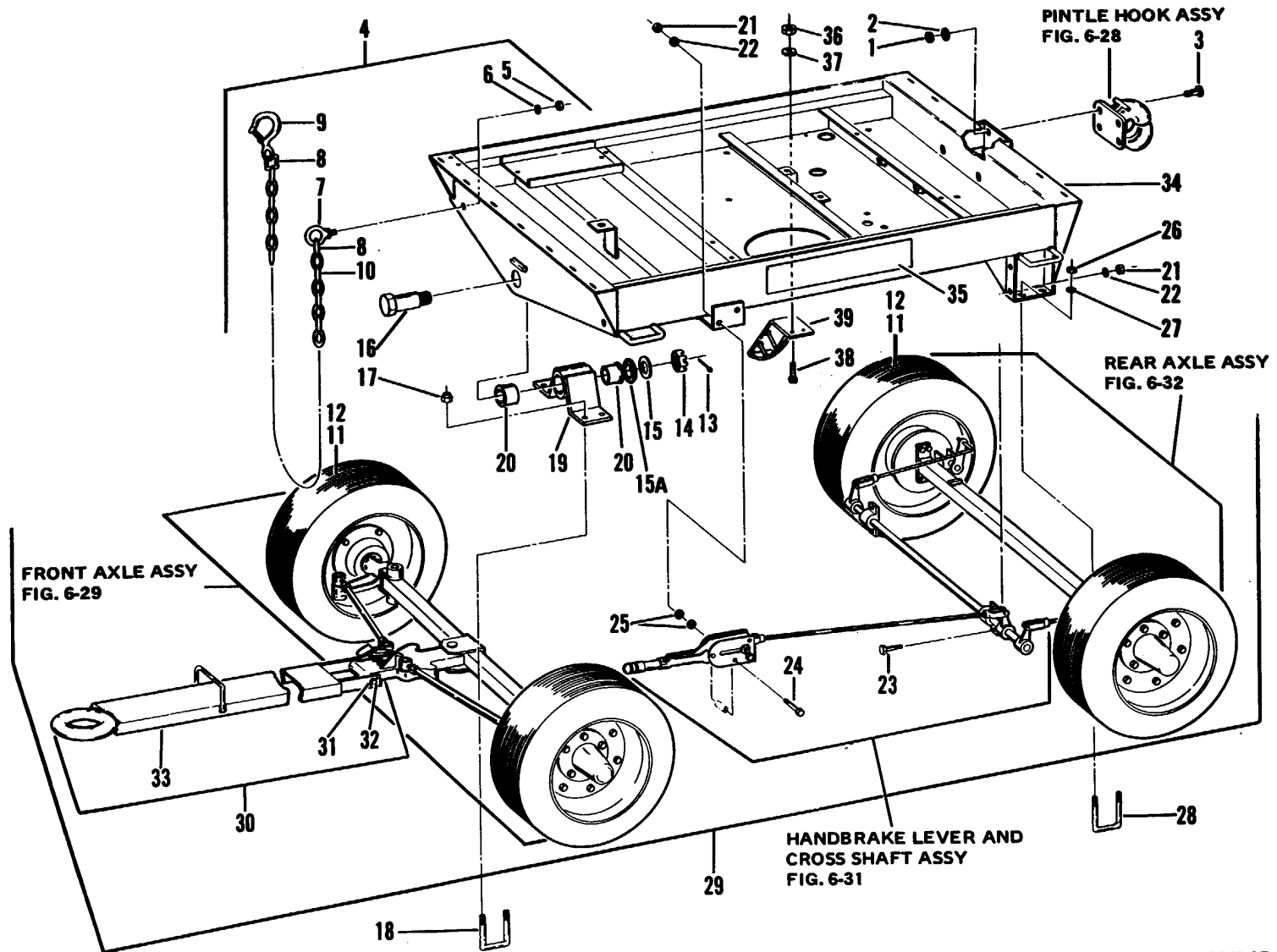
**Section XIV. MAINTENANCE OF CHASSIS AND RUNNING GEAR**

**6-36. General.** This section contains inspection of installed items, removal and disassembly, inspection-acceptance, repair or replacement, lubrication, reassembly and installation, and adjustment of the

chassis and running gear components. Each of the major components is covered in a separate paragraph. Refer to figure 6-27 for major component reference.

Legend for fig. 6-27:

- |                          |                          |                               |
|--------------------------|--------------------------|-------------------------------|
| 1. Nut (4)               | 15. SAE flat washer      | 28. Rear axle U-bolt (2)      |
| 2. Lock washer (4)       | 15A. Trunnion pin spacer | 29. Four wheel axle assy      |
| 3. Screw (4)             | 16. Trunnion pin         | 30. Drawbar assembly          |
| 4. Safety chain assy (2) | 17. Locknut (4)          | 31. Cotter pin (2)            |
| 5. Nut                   | 18. Trunnion U-bolt (2)  | 32. Hinge pin                 |
| 6. Lock washer           | 19. Trunnion block       | 33. Drawbar                   |
| 7. Eye bolt              | 20. Flange bearing (2)   | 34. Chassis frame             |
| 8. Connecting Link (2)   | 21. Nut (6)              | 35. Do not forklift decal (2) |
| 9. Safety hook           | 22. Lock washer          | 36. Nut (2)                   |
| 10. Chain                | 23. Screw (4)            | 37. Lock washer (2)           |
| 11. Tire (4)             | 24. Screw (2)            | 38. Screw (2)                 |
| 12. Tube (4)             | 25. SAE flat washer (4)  | 39. Receiver guard            |
| 13. Cotter Pin           | 26. Nut (4)              |                               |
| 14. Slotted nut          | 27. Lock washer (4)      |                               |

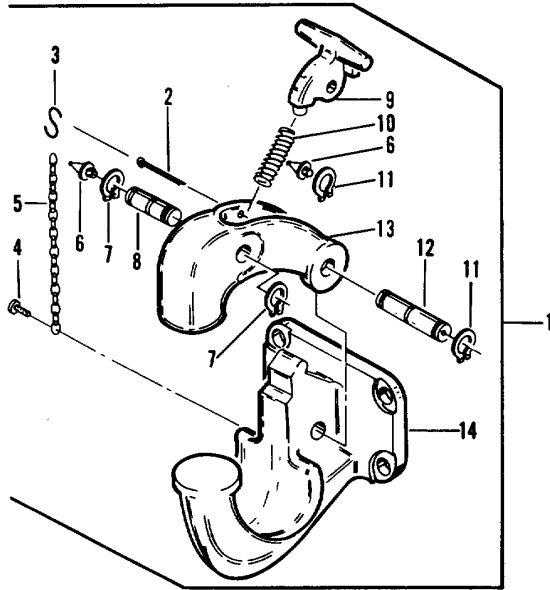


TS5-4310-365-14/6-27

Figure 6-27. Chassis and running gear

**6-37. Maintenance of Pintle Hook Assembly.**

**a. Inspection-Installed Item.** Inspect the pintle hook assembly (1, fig. 6-28) for cracked, broken, and missing parts. Check for free action of latch (9) and pintle lock (13).



TSS-4310-365-14/6-28

Legend for fig. 6-28:

- |                            |                        |
|----------------------------|------------------------|
| 1. Pintle hook assembly    | 8. Latch pin           |
| 2. Cotter pin              | 9. Latch               |
| 3. S-link                  | 10. Latch spring       |
| 4. Drive screw             | 11. Retaining ring (2) |
| 5. Chain                   | 12. Latch pin          |
| 6. Lubricating fitting (2) | 13. Pintle lock        |
| 7. Retaining ring (2)      | 14. Pintle             |

Figure 6-28. Pintle hook assembly

**b. Removal and Disassembly.** Remove four nuts (1, fig. 6-27), lock washers (2), and screws (3); remove pintle hook assembly (1, fig. 6-28) from chassis frame. Remove cotter pin (2, fig. 6-28) and, as necessary, remove S-link (3), drive screw (4), and chain (5). Remove two lubrication fittings (6). Remove two retaining rings (7), push out latch pin (8), and remove latch (9) and spring (10). Remove two retaining rings (11), push out latch pin (12), separate pintle lock (13) from pintle (14).

**c. Inspection-Acceptance.** Inspect spring (10) for broken coils and resiliency. Inspect for damaged lubrication fittings (6). Inspect all parts for cracks, breaks, nicks and burrs.

**d. Repair or Replacement.** Replace all defective parts.

**e. Lubrication.** After reassembly and installation, service pintle hook assembly in accordance with LO5-4310-365-12.

**f. Reassembly and Installation.** Place pintle lock (13, fig. 6-28) in position on pintle (15); install latch pin (12) and install two retaining rings (11). Assembly spring (10), latch (9), install latch pin (8) and two retaining rings (7). Install two lubrication fittings (6). Assembly chain (5) to pintle (14) with drive screw (4). Attach S-link (3) to chain (5) and cotter pin (2). Pinch S-link closed with pliers. Insert cotter pin (2) into pintle lock (13). Install pintle hook assembly (1) on chassis frame with four screws, lock washers, and nuts (3, 2, 1, fig. 6-27).

**6-38. Maintenance of Front Axle Assembly and Trunnion.**

**a. Inspection-Installed Item.** Inspect front axle assembly for bent or broken tie rod assemblies (15, fig. 6-29), damaged or missing lubrication fittings (19, 31), and any other cracks, breaks, bent wheels, and damaged or worn tires.

**b. Removal and Disassembly.** Raise unit up with hoist or jacks until front wheels are off the ground. Block the rear wheels to prevent movement of unit. Place safety blocking under chassis frame to prevent dropping while removing front axle assembly from frame. Remove and disassemble front axle assembly as follows:

- (1) Remove two cotter pins (31, fig. 6-27) and hinge pin (32). Remove the drawbar assembly (30). Remove four locknuts (17) and two trunnion U-bolts (18) freeing front axle assembly from unit.
- (2) Remove cotter pin (14), slotted nut (14), SAE flat washer (15), trunnion pin spacer (15A), trunnion pin (16), and trunnion block (19). As needed for replacement, remove two flange bearings (20) from trunnion block (19).
- (3) Remove five nuts and lock washers securing each of the two wheel assemblies to front axle assembly. Deflate the tubes, separate wheel assemblies and remove tires and tubes (11, 12).
- (4) Remove grease cap (3, fig. 6-29), cotter pin (4), spindle nut (5), spindle washer (6), and remove hub assembly (2) from front axle assembly (1).

**NOTE**

Hub assembly (2) and tie rod assembly (15) are the same for each steering knuckle assembly (34, 35) mounting. Removal and disassembly is therefore the same on both ends of axle (36).



Legend for fig. 6-29:

1. Front axle assembly
2. Hub assembly (2)
3. Grease cap
4. Cotter pin
5. Spindle nut
6. Spindle washer
7. Outer bearing cone
8. Grease seal
9. Inner bearing cone
10. Hub subassembly
11. Stud (5)
12. Bearing inner cup
13. Bearing outer cup
14. Hub
15. Tie rod assembly (2)
16. Cotter pin (2)
17. RH Ball joint with nut
18. LH Ball joint with nut
19. Lubrication fitting (2)
20. RH Jam nut
21. LH Jam nut
22. Tie rod tube
23. Cotter pin
24. Center arm pin
25. Flat washer
26. Center arm assembly
27. Spring pin
28. Latch pedal
29. Pedal spring
30. Center arm
31. Lubrication fitting (8)
32. Spring pin (2)
33. King pin (2)
34. RH Knuckle assy
35. LH Knuckle assy
36. Front axle

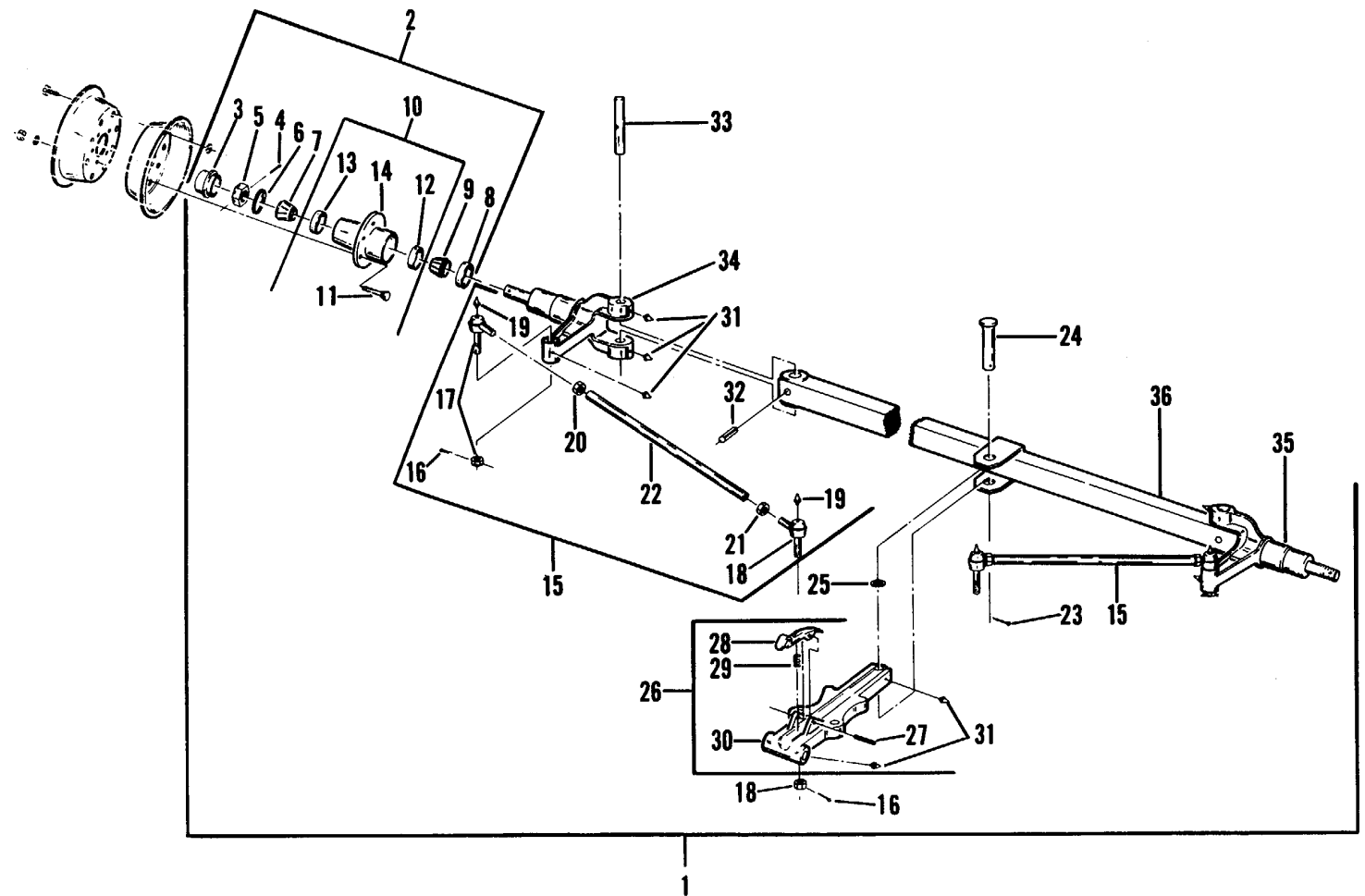


Figure 6-29. Front axle assembly

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- (5) Remove outer bearing cone (7), grease seal (8) and inner bearing cone (9). As necessary, press five studs (11), outer bearing cup (13), and inner bearing cup (12) out of hub (14).
- (6) Remove cotter pins (16) from each ball joint (17, 18), remove tie rod assembly (15) and reassemble nuts back onto their respective ball joints (17, 18).

#### NOTE

**Make note that tie rod ball joints (17, 18) have right and left-hand threads on tie rod (22) mounting studs. This allows adjusting of tie rod assembly (15) effective length for adjusting wheel toe-in.**

- (7) Loosen RH jam nut (2) and LH jam nut (21). Remove RH ball joint with nut (17) and LH ball joint with nut (18) from tie rod tube (22). As necessary, remove the jam nuts (20, 21) from ball joints (17, 18). Remove lubrication fittings (19) from ball joints (17, 18).
- (8) Remove cotter pin (23), center arm pin (24), flat washer (25) and center arm assembly (26). Drive out spring pin (27) and remove latch pedal (28) and pedal spring (29) from center arm (30). Remove the eight lubrication fittings (31), as necessary.
- (9) Drive out the two spring pins (32), remove two king pins (33), and remove RH steering knuckle assembly (34) and LH knuckle assembly (35) from front axle (36).

#### NOTE

**Tag the knuckle assemblies (34, 35) so they are not interchanged at assembly.**

**c. Inspection-Acceptance.** Inspect outer wheel bearings (7, 13, fig. 6-29) and inner wheel bearing (9, 12) for gritty action and any damage to bearing cones (7, 9). Inspect bearing cups (12, 13) for scoring and evidence of slipping in hub (14). Inspect all lubrication fittings for any damage and for missing fittings. Inspect spindles on knuckle assemblies (34, 35) for scoring, nicks, and burrs. Inspect all screw threads for cross-threading and any other defect. Examine all parts for cracks, breaks, bending, and any other defect.

**d. Repair or Replacement.** Replace all defective parts.

**e. Lubrication.** After reassembly and installation, service the front axle assembly in accordance with LO5-4310-365-12 and reassembly instructions.

#### **f. Reassembly and Installation.**

- (1) Assemble RH knuckle assembly (34, fig. 6-29) and LH knuckle assembly (35) on axle (36), install the two king pins (33) with spring pin hole in king pin (33) aligned with hole in axle (36). Press in two spring pins (32). If removed, install eight lubrication fittings (31).
- (2) Assemble pedal spring (29), latch pedal (28) and secure to center arm (30) by pressing in spring pin (27). Assemble center arm assembly (26) to axle (36) and install flat washer (25), center arm pin (24) and cotter pin (23).
- (3) If removed, install RH jam nut (20 on RH ball joint (17) and LH jam nut (21) on LH ball joint (18). Assemble the ball joints (17, 18) on ball joints (17, 18), assemble ball joints to center arm assembly (26) and knuckle assemblies (34, 35). Reinstall slotted nuts on ball joints (17, 18) and install cotter pins (16). Do not tighten jam nuts (20, 21) until after toe-in adjustment covered in para 6-38.g below. Install lubrication fittings (19).
- (4) If removed, press outer bearing cup (13), inner bearing cup (12), and five studs (11) into hub (14). Apply a light coating of grease on inner bearing cone (9) and position in hub subassembly (10). Press grease seal (8) into hub (14) until flush with face of hub. Fill cavity in hub (14) between the bearing cups (12, 13) about 1/3 full of grease (LO5-4310-365-12). Carefully assemble hub assembly (2) onto spindle of knuckle assemblies (34, 35), apply a light coating of grease on outer bearing cone (7), position cone against cup (13), install spindle washer (6), spindle nut (5), cotter pin (4), and grease cap (3).
- (5) Install tubes and tires (12, 11, fig. 6-27) on wheel assembly with tube valve stem through wheel half with hole. This half shall be the outer half of each side. Assemble wheel halves together with eight screws, lock washer, and nuts. Inflate tubes to 30 psi (2.11 kgs/cm<sup>2</sup>). Install wheel assemblies on studs (11, fig. 6-19) and secure with five lock washer and nuts. (Refer

to fig. 6-32, item 3 for wheel assembly reference.

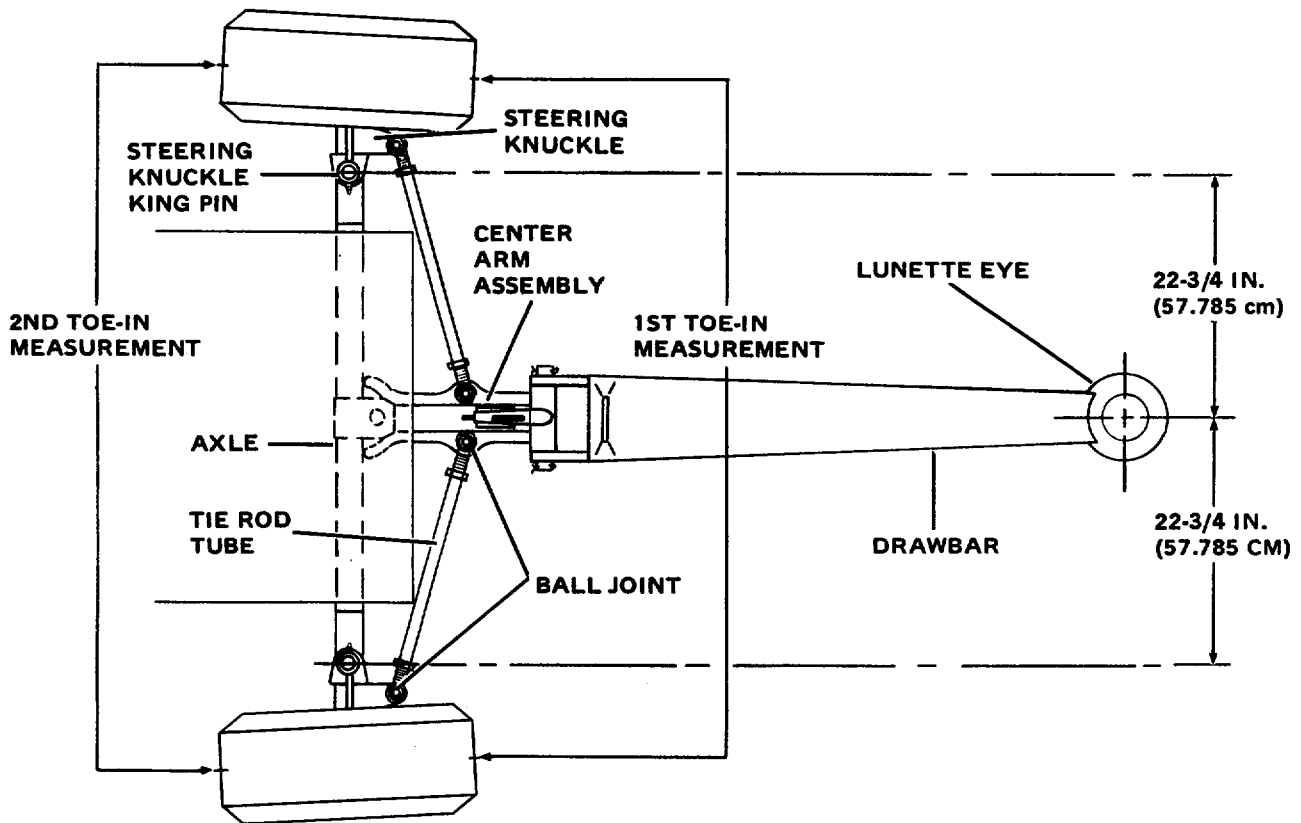
- (6) If removed, press two flange bearings (20, fig. 6-27) into trunnion block (19). Attach trunnion block (19) to frame (34) with trunnion pin (16) through frame and trunnion block bearings. Install trunnion pin spacer (15A), SAE flat washer (15), slotted nut (14) and cotter pin (13).
- (7) Attach front axle assembly to trunnion block (19) with two U-bolts (18) and four locknuts (17). Attach drawbar assembly (30) to center arm with hinge pin (32) and install two cotter pins (31).

**g. Adjustment of Toe-In.** Refer to figure 6-30 and adjust front wheel toe-in as follows:

- (1) Place drawbar lunette eye equidistant from each steering knuckle king pin. Adjust tie

rod tubes as necessary to obtain this centering and to adjust to approximate equal distant between ball joints at each end of tie rod tube.

- (2) Measure distance between centers of the tires at the front. Rotate both wheels 180 degrees and measure distance between the same center points. The first measurement should be approximately 1/4 inch (6.35 mm) less than second measurement.
- (3) If measurement is not correct, adjust each tie rod tube equally until the correct toe-in is obtained; then, tighten the ball joint jam nuts against tie rod tube to secure the adjusted tubes.
- (4) Remove safety blocking from under frame and lower unit to ground.



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Figure 6-30. Front wheel toe-in adjustment

### 6-39. Maintenance of Handbrake Lever and Cross Shaft Assembly.

**a. Inspection-Installed Item.** Inspect for bent or broken actuating rods, shaft lever arms, yokes, and cross shaft. Check action of handbrake lever.

**b. Removal and Disassembly.** Raise handbrake handle to off position and remove two nuts (21, fig. 6-27) lock washers (22), screws (24), and four SAE flat washers (25) that secure handbrake lever to frame. Remove four nuts (21), lock washers (22) and screws (23) that secure cross shaft bearings to frame. Remove two cotter pins (3, fig. 6-31), flat washers (12), and disconnect two brake rods (13) from brake levers. Disassemble handbrake lever and cross shaft assembly (1, fig. 6-31) as follows:

- (1) Remove cotter pin (3, fig. 6-31), flat washer (4), lever pin (5), and two spacers (6) from handbrake lever (7).
- (2) Remove three cotter pins (3), three yoke pins (8) from three of the four rod yokes (9). Loosen four nuts (10) away from yokes (9). Remove two yokes (9), two nuts (10) and brake rod (11).
- (3) Remove two yokes (9) and two nuts (10), one each from the two brake rods (13). Remove two lubrication fittings (14).
- (4) Drive out three roll pins (15) and remove three shaft levers (16). Remove two shaft bearings (17) from cross shaft (18).

**c. Inspection-Acceptance.** Inspect all screw threads for cross threading and any other damage. Inspect lever arms and yoke for cracks and breaks. Inspect brake rods for bending and cracks or breaks. Inspect cross shaft for bends that could cause binding.

**d. Repair or Replacement.** Replace all defective parts.

**e. Lubrication.** After reassembly and installation, service cross shaft bearings in accordance with LO5-4310-365-12.

#### **f. Reassembly and Installation.**

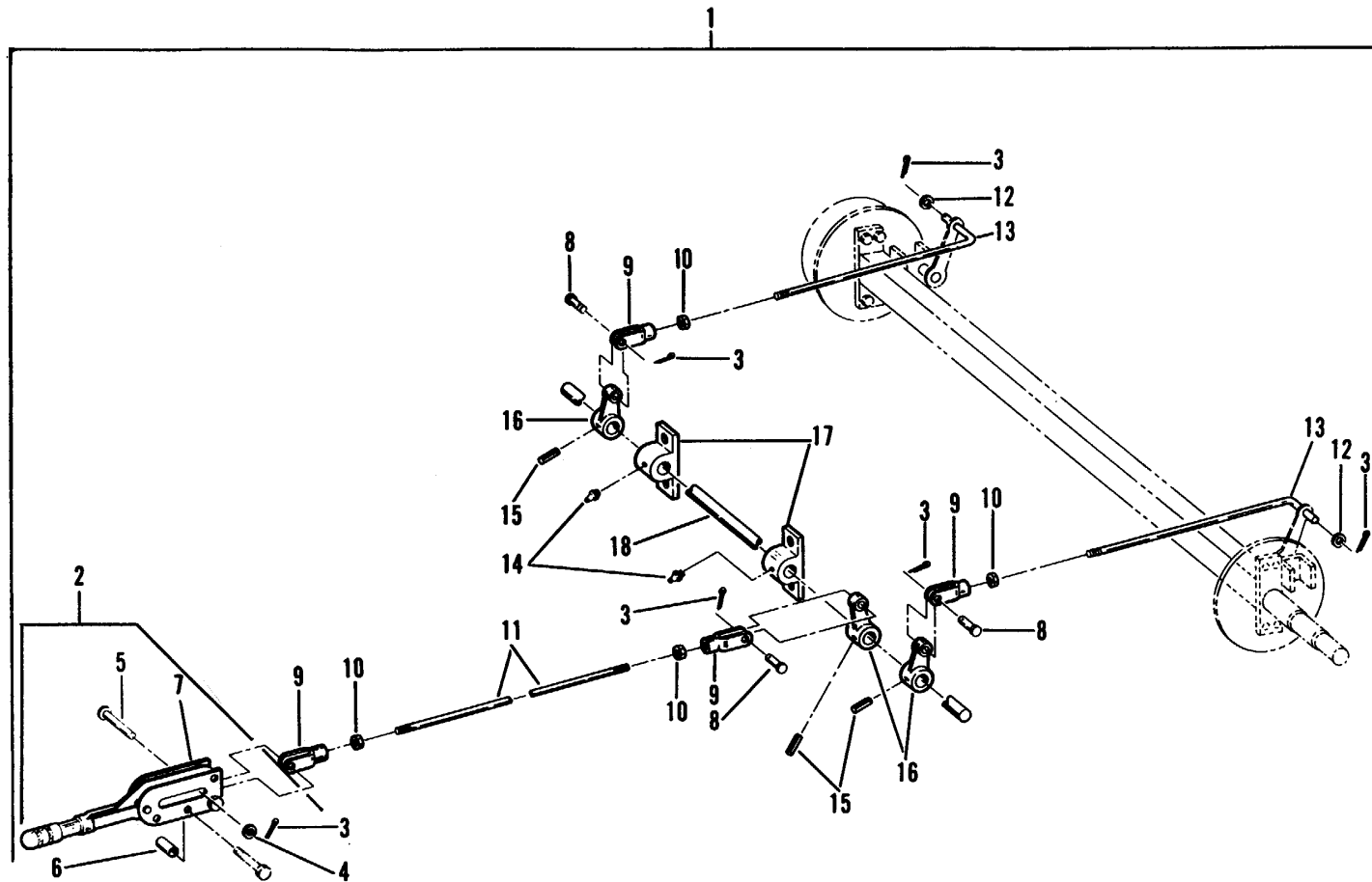
- (1) Slide two shaft bearings (17, fig. 6-31) onto cross shaft (18). Install three shaft levers (16) onto shaft (18) and press in three roll pins (15). Install two lubrication fittings (14).
- (2) Install one nut (10) and yoke (9) on each of the two brake rods (13). Assemble the cross shaft, bearings and levers onto unit

frame and attach bearings (17) with four screw (23, fig. 6-27), lock washers (22) and nuts (21). Connect two yokes (9, fig. 6-31) to cross shaft end levers (16) and install yoke pins (8) and cotter pins (3). Adjust both brake rods (13) so they connect with brake lever. Tighten nuts (10) against yokes (9) and install two flat washers (12) and cotter pins (3).

- (3) Assemble handbrake lever group (2, fig. 6-31) by installing yoke (9) on handbrake lever (7) with lever pin (5), flat washer (4) and cotter pin (3). Install two spacers (6) in line with mounting holes and attach handbrake lever group (2) to unit frame with two screws (24, fig. 6-27), four SAE flat washers (25), two lock washers (22) and nuts (21). Raise handle to off position.
- (4) Install two nuts (10, fig. 6-31) on brake rod (11) and screw rod (11) into yoke (9) at handbrake lever group (2). Install yoke (9) to other end of brake rod (11) and adjust so that yoke aligns with hole in cross shaft lever (16); install yoke pin (8) and cotter pin (3). Turn two nuts (10) against yoke (9) to secure brake rod (11).

**g. Handbrake Adjustment.** Push the handbrake lever down to apply the brakes. If lever will not go all the way down to applied position with normal hand force, or goes all the way down and brakes do not apply, adjust as follows:

- (1) Turn adjusting knob on handle counterclockwise to reduce amount of pressure required to apply brakes. Turn adjusting clockwise to increase pressure required.
- (2) If handbrake cannot be adjusted in this manner, effective stroke length of brake rod (11, fig. 6-31) may have to be either shortened or lengthened. Remove cotter pin (3) and yoke pin (8) at cross shaft lever (16) end of rod (11). Loosen nut (10) and turn yoke (9) farther onto rod (11) or off of rod (11), as required. Then, reinstall yoke pin (8), cotter pin (3) and tighten nut (10) against yoke (9). Recheck adjustment by repeating steps *g* and *g.(1)* above.



Legend for fig. 6-31:

- 1. Handbrake lever and cross shaft assembly
- 2. Handbrake lever group
- 3. Cotter pin (6)
- 4. Flat washer
- 5. Lever pin
- 6. Spacer (2)

- 7. Handbrake lever
- 8. Yoke pin (3)
- 9. Rod yoke (4)
- 10. Nut (4)
- 11. Brake rod
- 12. Flat washer (2)

- 13. Brake rod (2)
- 14. Lubrication fitting (2)
- 15. Roll pin (3)
- 16. Shaft lever (3)
- 17. Shaft bearing (2)
- 18. Cross shaft

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Figure 6-31. Handbrake lever and cross shaft assembly

**6-40. Maintenance of Rear Axle Assembly.**

**a. Inspection-Installed Item.** Inspect for bent wheels, damaged or worn tires, cracked or broken parts, missing parts, and for free action of brake levers.

**b. Removal and Disassembly.** Disconnect two brake rods (13, fig. 6-31) by removing cotter pin (3) and flat washer (12) and pull rods (13) out of brake lever assemblies. Raise unit with a hoist or jacks until rear wheels just clear the ground. Block the front wheels so unit will not move. Place safety blocking under chassis frame to prevent dropping while removing rear axle. Remove and disassemble as follows:

- (1) Remove four nuts (26, fig. 6-27) and lock washers (27) and two U-bolts (28) freeing rear axle assembly (7, fig. 6-32) from unit.
- (2) Remove five wheel nuts (1, fig. 6-32), lock washers (2), and remove the two wheel assemblies (3) with tires and tubes (11, 12, fig. 6-27). Deflate the tubes, remove eight nuts (4, fig. 6-32), lock washers (5) and screws (6). Separate the two halves of wheel assembly (3) and remove tire and tube.
- (3) Remove grease cap (9), cotter pin (10), spindle washer (12). Remove the two hub and drum assemblies (8).

**NOTE**

**Hub and drum assemblies (8) are the same for each end of axle (33). Removal and disassembly for each is therefore the same.**

- (4) Remove outer bearing cone (13), grease seal (14), and inner bearing cone (15). To disassemble hub and drum subassembly (16), press out five hub studs (17), separate drum (18) from hub (21), and as necessary, press bearing inner cup (19) and bearing outer cup (20) out of hub (21).
- (5) Examine brake assembly (25) on each end of axle. If repair is indicated by worn shoes (30) or other defective brake parts, remove brake assembly (25) by removing four nuts (22), lock washer (23) and screws (24) and each brake assembly. Notify direct support maintenance for brake repair.

**c. Inspection-Acceptance.** Inspect outer wheel bearings (13, 20, fig. 6-32) and inner wheel bearing (15,

19) for gritty action and any damage to bearing cones (13, 15). Inspect bearing cups (19, 20) for scoring and evidence of slipping in hub (21). Inspect spindles on each end of axle (33) for scoring, nicks, and burrs. Inspect brake drum (18) for cracks and breaks. Inspect all screw threads for cross-threading or other defect. Examine all parts for cracks, breaks, bending, or other defect.

**d. Repair or Replacement.** Notify direct support maintenance for brake assembly repair. Replace all other defective parts.

**e. Lubrication.** Lubricate in accordance with LO5-4310-365-12.

**f. Reassembly and Installation.**

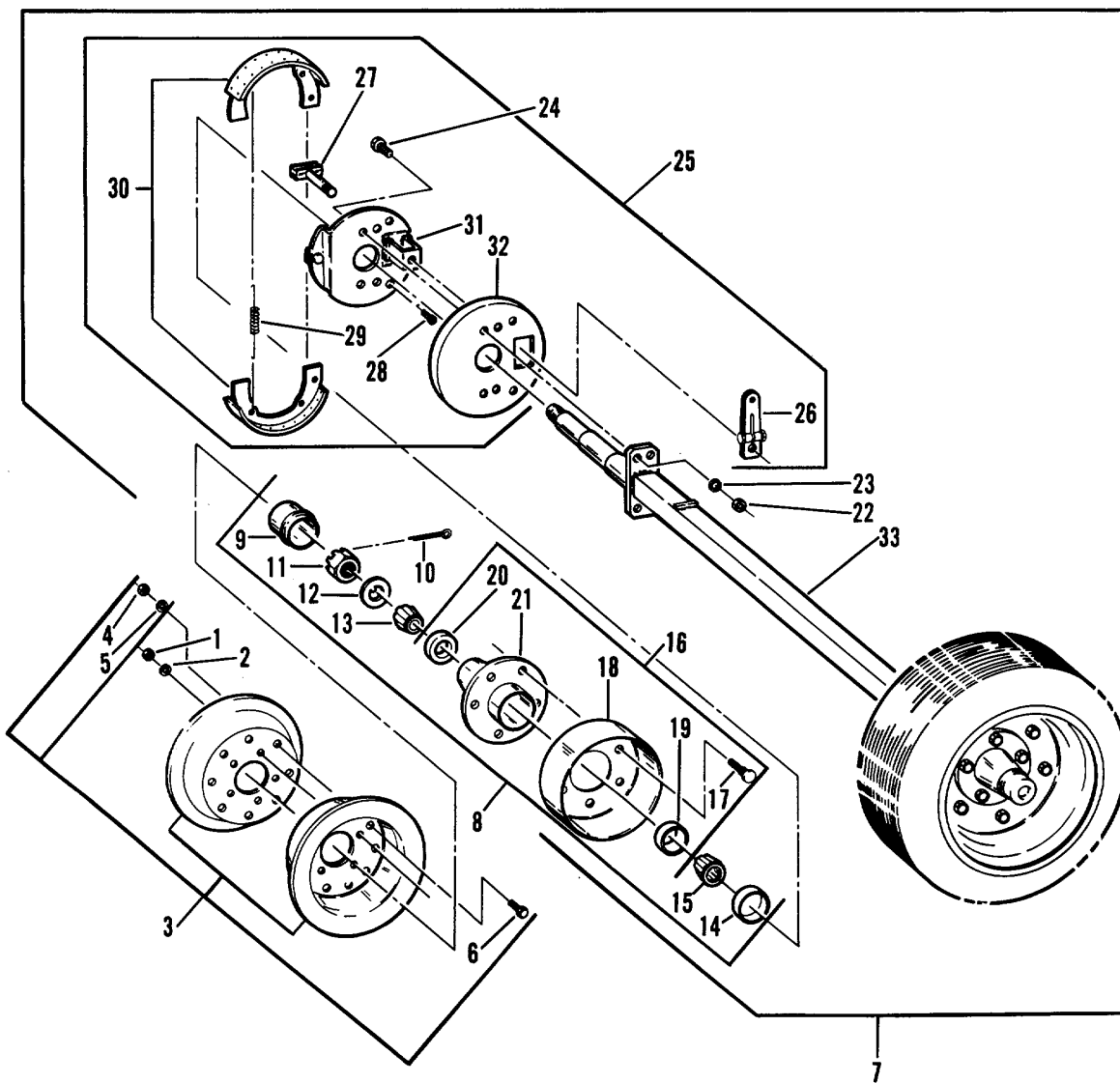
- (1) Install brake assemblies (25, fig. 6-32) to rear axle (33) with four screws (24), lock washers (23) and nuts (22). Note that brake lever assembly (26) is toward rear of unit on both sides.
- (2) If disassembled, press outer bearing cup (20) and inner bearing cup (19) into hub (21). Assemble brake drum (18) onto hub (21) and press in five studs (17). Fill cavity in hub and drum subassembly between bearing cups (19, 20) approximately 1/3 full of grease (LO5-4310-365-12).
- (3) Apply a light coating of grease on inner bearing cone (15) and install in position on cup (19). Press grease seal (14) into hub (21) flush with face of hub. Carefully install hub and drum assembly (8) onto axle spindle, apply light coating of grease on outer bearing cone (13), install spindle washer (12), spindle nut (11), cotter pin (10), and grease cap (9).
- (4) Assemble tube and tire on wheel assembly (3) with tube valve stem through wheel half with hole. This half shall be the outer half on each side. Assemble the wheel halves together with eight screws (6), lock washers (5) and nuts (4). Inflate tubes to 30 psi (2.11 kgs/cm<sup>2</sup>). Install wheel assemblies (3) onto hub and drum assembly studs (17) and secure with five lock washers (2) and nuts (1).
- (5) Attach rear axle assembly to chassis frame with two U-bolts (28, fig. 6-27) and four lock washers (27) and nuts (26). Connect the two brake rods (13, fig. 6-31) to brake levers on each side and

install flat washers (12) and cotter pins (3) on each rod (13).

(6) Remove safety blocking from under chassis

frame and front wheels. Lower unit to ground.

(7) Check and adjust brakes as necessary in accordance with para 6-39.g.



Legend for fig. 6-32

- |                          |                        |                        |                         |
|--------------------------|------------------------|------------------------|-------------------------|
| 1. Wheel nut (5)         | 10. Cotter pin         | 19. Inner bearing cup  | 28. Holddown spring (2) |
| 2. Lock washer (5)       | 11. Spindle nut        | 20. Outer bearing cup  | 29. Shoe return spring  |
| 3. Wheel assembly (2)    | 12. Spindle washer     | 21. Wheel hub          | 30. Lined shoe package  |
| 4. Nut (8)               | 13. Outer bearing cone | 22. Nut (8)            | 31. Support plate assy  |
| 5. Lock washer (8)       | 14. Grease seal        | 23. Lock washer (8)    | 32. Dust shield         |
| 6. Screw (8)             | 15. Inner bearing cone | 24. Screw (8)          | 33. Rear axle           |
| 7. Rear axle assembly    | 16. Hub and drum       | 25. Brake assembly (2) |                         |
| 8. Hub and drum assy (2) | 17. Hub stud (5)       | 26. Lever assembly     |                         |
| 9. Grease cap            | 18. Brake drum         | 27. Actuating camshaft |                         |

Figure 6-32. Rear axle assembly

**CHAPTER 7**  
**DIRECT SUPPORT AND GENERAL SUPPORT**  
**MAINTENANCE INSTRUCTIONS**

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**Section I. MAINTENANCE OF SERVICE HOSE AND FITTINGS**

**7-1. General.** This section contains testing and repair or replacement of the service hose and fittings as prescribed by the MAC, Appendix E.

**7-2. Maintenance of Service Hose and Fittings.**

**a. Testing.** Pressure test the air service hose and fittings (fig. 7-1) to pressure of 5250 psi (369.08 kgs/cm<sup>2</sup>). This is 1-1/2 times operating pressure of 3500 psi (246.05 kgs/cm<sup>2</sup>).

**b. Repair or Replacement.** Defective hose assemblies (1, 17, fig. 7-1) and fittings (2, 4, 16, 18) shall be replaced. Disassemble service valve assembly (5) and inspect, repair, or replace as follows:

(1) Remove locknut (6), identification plate (7), and handle (8).

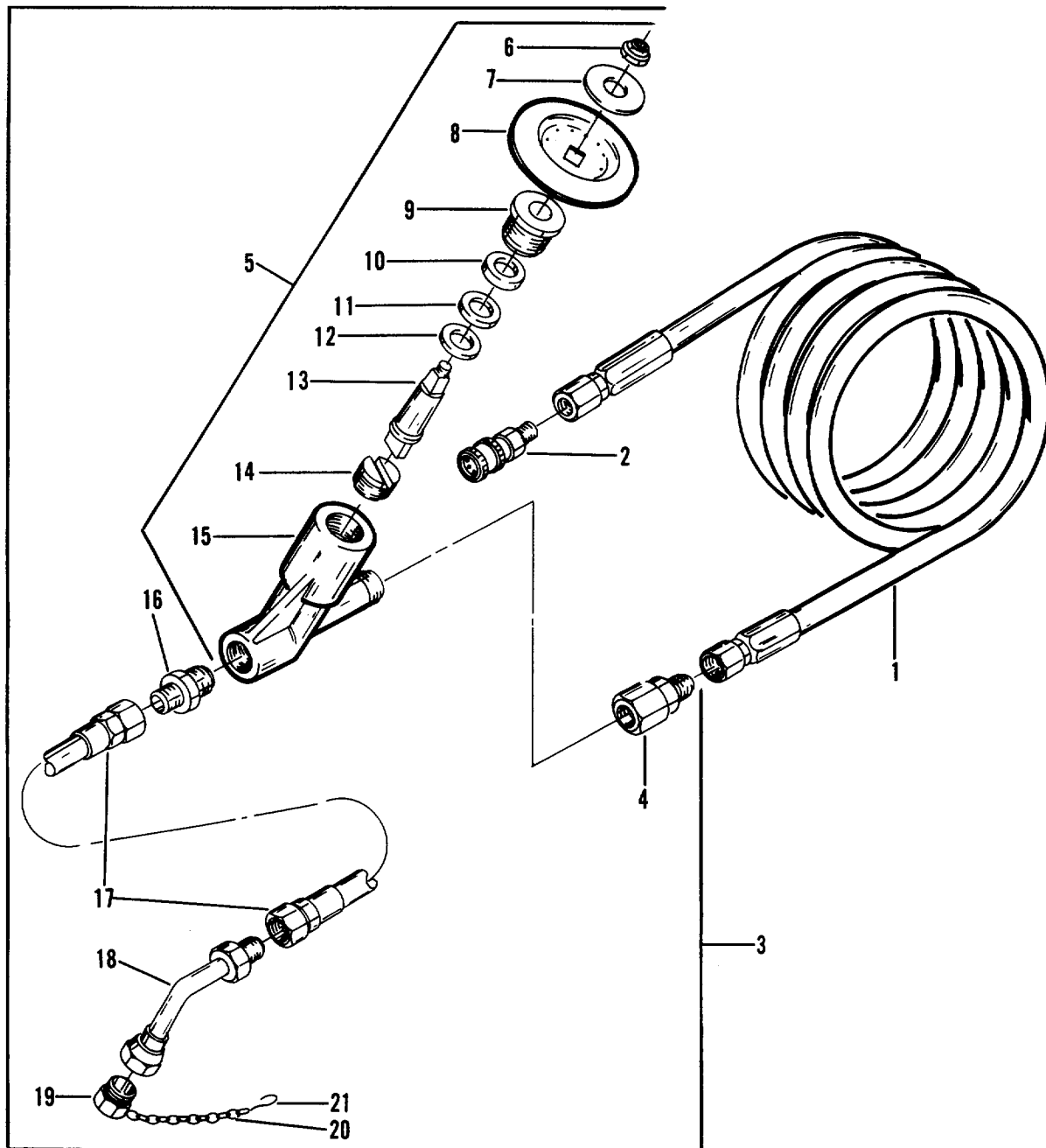
(2) Unscrew and remove packing nut (9), packing (10), packing washer (11), and bearing washer (12). Remove upper valve stem (13).

(3) Unscrew and remove the valve seat (14) from body (15). Examine all parts for cracks, nicks, and burrs. Replace all defective parts. Discard and replace packing (10), packing washer (11), and bearing washer (12).

(4) Install valve seat (14) in body (15). Assemble upper stem (13), new bearing washer (12), new packing washer (11), new packing (10) and install packing nut (9).

(5) Assemble valve handle (8) on stem (13), place identification plate (7) on handle and install locknut (6).





Legend for fig. 7-1:

- |                           |                    |                    |
|---------------------------|--------------------|--------------------|
| 1. Service hose assembly  | 8. Valve handle    | 15. Valve body     |
| 2. Disconnect coupler     | 9. Packing nut     | 16. Hose adapter   |
| 3. Air chuck & valve assy | 10. Packing        | 17. Hose assembly  |
| 4. Hose adapter           | 11. Packing washer | 18. Air chuck      |
| 5. Service valve assembly | 12. Bearing washer | 19. Air chuck plug |
| 6. Locknut                | 13. Stem upper     | 20. Chain          |
| 7. Identification plate   | 14. Valve seat     | 21. Wire           |

TS5-4310-365-14/7-1

Figure 7-1. Service hose and fittings

**Section II. MAINTENANCE OF AIR LINES, HOSES, AND FITTINGS**

**7-3. General.** Maintenance of air lines, hoses, and fittings in general is limited to replacement of defective component. The air lines used in this equipment are steel and it is recommended that these lines be replaced as assemblies.

**7-4. Maintenance of Air Lines, Hoses, and Fittings.**

*a. Removal, Repair, and Replacement.* Refer to para 6-8 and figure 6-4, sheets 1 through 5, for removal and replacement. Repair steel tube assemblies as follows:

**NOTE**

**Before attempting to repair tube fittings, make certain stainless steel tubing is of sufficient length to fit after cutting off end containing damaged fittings. If not, replace whole tube assembly.**

- (1) Cut off tubing just beyond damaged fitting.
- (2) Slide tubing nut and then the sleeve onto the tubing, refer to fig. 6-4, sheet 5. Make certain end of tubing is free of any burrs and is reasonable square.

- (3) Insert the end of the tubing into mating fitting, or presetting tool, see fig. 6-4, sheet 5. Make certain that tubing end is bottomed on fitting shoulder. Apply a good grade of lubricant on end of tubing (clean compressor oil).
- (4) Turn tubing nut slowly with wrench while turning tubing with other hand. When the sleeve grips the tubing, that is, when the tubing can no longer be turned by hand, stop turning nut and not position of wrench. This is termed the "ring grip" point.
- (5) Then, tighten the nut an additional 5/6th turn past the "ring grip" point.
- (6) Unscrew nut and remove the tubing from the mating fitting, or presetting tool. Inspect the preset as described in para 6-8.a and fig. 6-4, sheet 5.

*b. Hose Assemblies.* Hose assemblies (31, 32, 34, 35, 36, 38, 40, 41, 42, fig. 6-8) may be pressure tested to establish if replacement is necessary. Testing should be at 1-1/2 times operating pressure. Refer to table 7-1 for these pressures.

Table 7-1. Hose Assembly Operating and Test Pressures

FIG. 6-8 REF. NO.	HOSE DESCRIPTION	MAX OPERATING PRESSURE		TEST PRESSURE	
		PSI	KGS/CM <sup>2</sup>	PSI	KGS/CM <sup>2</sup>
31	Dehydrator No. 1 to unloader control pressure switch.....	3500	246.05	5250	383.25
32	Second stage trap to unloader control solenoid.....	200	14.06	300	21.90
34	Second stage trap to continuous bleed valve .....	200	14.06	300	21.90
34	Second stage continuous bleed valve to first stage trap.....	200	14.06	300	21.90
35	First stage trap to continuous bleed valve.....	60	4.22	90	6.33
35	Compressor end cover to oil pressure gauge.....	35	2.46	53	3.73
36	Drain valve to compressor end cover	200	14.06	300	21.90
38	Engine crankcase to oil pressure gauge .....	15	1.05	23	1.62
40	Unloader control solenoid to drain valve .....	200	14.06	300	21.90
41, 42	Restriction indicators.....	Vacuum		300	21.90

### Section III. MAINTENANCE OF ALTERNATOR ASSEMBLY

**7-5. General.** This section contains disassembly, cleaning, inspect repair or replacement, reassembly, and testing of the alternator assembly.

**7-6. Maintenance of Alternator Assembly.** Refer to para 6-10.b and remove the alternator assembly.

#### a. Disassembly.

- (1) Remove two screws (1, fig. 7-2) securing brush cover (2). Carefully pull and hold cover (2) away from rear housing (22). Remove two screws (11) and remove brush assembly (12) from rear housing. Remove nut (3), lock washer (4), flat washer (5), insulating washer (6), bolt (7), separate brush cable (8) and brush assembly (12) from cover (2) and remove square insulator (9) and gasket (10).
- (2) Remove two locknuts (13), insulating washer (14) and isolation diode assembly (17) from rectifier diode studs. Remove nut (15) and lock washer (16) from isolation diode assembly stud, as necessary.
- (3) Remove insulator sleeve (18), insulator washer (19), locknut (23), nut (24), locknut (26), nut (17) and two insulator washers (29). Remove four through bolts (2) and square nuts (21).
- (4) Carefully insert two screwdriver blades in opposite openings between stator (31) and front housing (46) and pry apart. Do not allow screwdriver blades to touch stator windings. Do not insert screwdriver blade more than 1/15 inch (1.59 mm). Separating stator (31) and housing (46) produces two subassemblies. One of the rear housing (22) and stator (31); the other of front housing (46) and rotor assembly (43).
- (5) Place opening end of stator (31) on clean work surface. Carefully and evenly tap rectifier diodes (25, 28) on studs and out of rear housing (22). Lift rear housing (22) off studs, remove two insulator sleeves (30), and two insulator washers (29). Remove rear bearing retainer (30A) from housing (22). It is necessary to unsolder the stator leads from the rectifier diode (25 and 28) terminals to properly test each diode. Use a heat sink, such as needle nose pliers, placed between the top of the diode and the diode body to protect is from heat damage

when unsoldering leads. Allow the solder joint to cool a few seconds before removing the heat sink after unsoldering the leads. Avoid bending or twisting the diode terminal.

- (6) Remove pulley nut (32), lock washer (33), pulley (34), key (35), fan (36) and spacer (37).
- (7) Unsolder the rotor (43) leads from the slip ring (41) terminals. Carefully unwind the ends of the rotor coil leads from the slip ring terminals.
- (8) Remove screw (38), lock washer (39) and flat washer (40). Thread a 1/4-28NF x 1-1/2 inch long cap screw into the slip ring (41) hub. This will back the slip ring assembly (41) off the rotor shaft. Hold rotor leads away from bearing puller contact area and pull rear bearing (42) off rotor (43) shaft (slip ring end).
- (9) Use a pair of long nose pliers and compress the ears of the front bearing retainer (44) and lift the retainer free of recess in housing (46). Tap the threaded end of rotor assembly (43) shaft extension on a wooden block to separate front housing (46) from front bearing (45) and remove the front housing (46).
- (10) Use a universal bearing puller, or equivalent, and pull the front bearing (45) off rotor shaft (threaded end).

#### b. Cleaning.

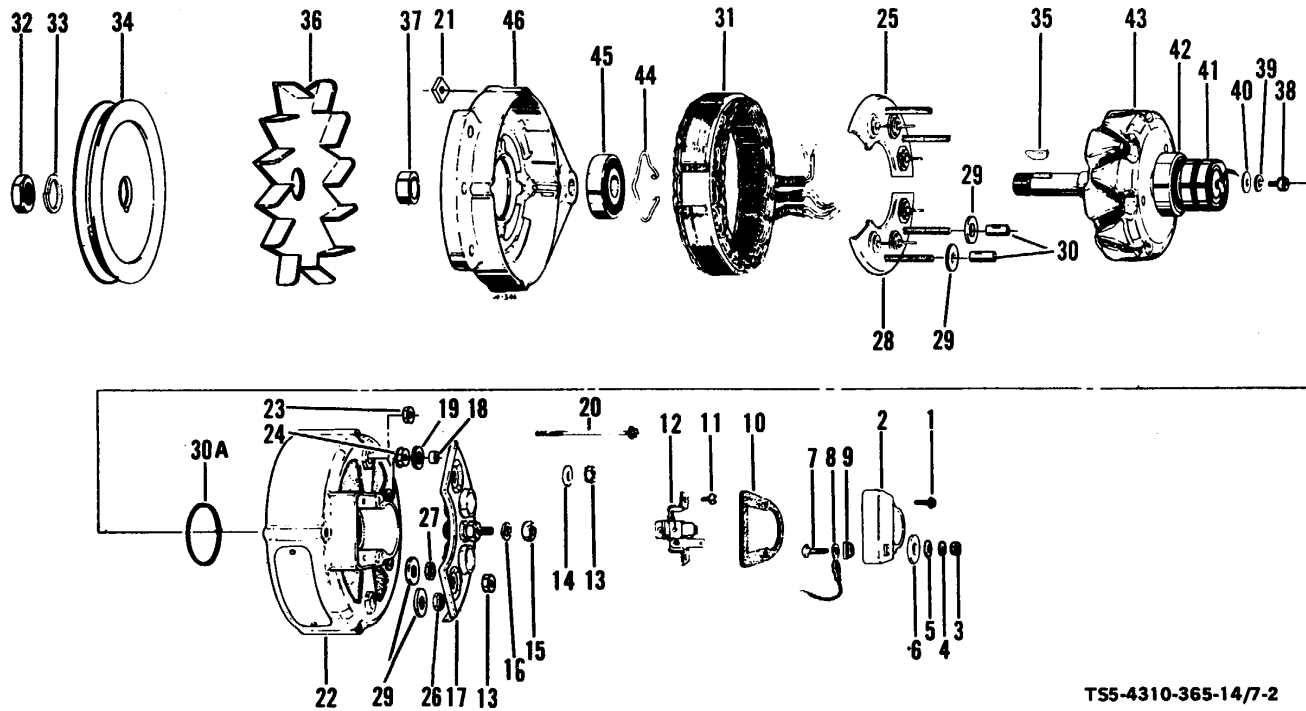
##### WARNING

**Provide adequate ventilation when using trichloroethane, or equivalent, to clean electrical components. Avoid prolonged breathing of vapors and minimize contact with skin.**

##### CAUTION

**Do not use steam or water to clean any electrical component.**

- (1) Use trichloroethane, or equivalent, to clean electrical components of alternator assembly. Dry thoroughly before testing or reassembly.



Legend for fig. 7-2:

- |                       |                                   |                         |
|-----------------------|-----------------------------------|-------------------------|
| 1. Screw (2)          | 17. Isolation diode assy          | 32. Pulley nut          |
| 2. Brush cover        | 18. Insulator sleeve              | 33. Lock washer         |
| 3. Nut                | 19. Insulator washer              | 34. Drive pulley        |
| 4. Lock washer        | 20. Through bolt (4)              | 35. Pulley key          |
| 5. Flat washer        | 21. Square nut (4)                | 36. Fan                 |
| 6. Insulating washer  | 22. Rear housing                  | 37. Fan spacer          |
| 7. Bolt               | 23. Locknut                       | 38. Screw               |
| 8. Brush cable        | 24. Nut                           | 39. Lock washer         |
| 9. Square insulator   | 25. Negative rectifier diode assy | 40. Flat washer         |
| 10. Cover gasket      | 26. Locknut                       | 41. Slip ring assembly  |
| 11. Screw (2)         | 27. Nut                           | 42. Rotor bearing       |
| 12. Brush assembly    | 28. Positive rectifier diode assy | 43. Rotor assembly      |
| 13. Locknut (2)       | 29. Insulator washer (4)          | 44. Bearing retainer    |
| 14. Insulating washer | 30. Insulator sleeve (2)          | 45. Front rotor bearing |
| 15. Nut               | 30A. Rear bearing retainer        | 46. Front housing       |
| 16. Lockwasher        | 31. Stator assembly               |                         |

Figure 7-2. Alternator assembly

**WARNING**

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° F - 130° F (38° C - 59° C).

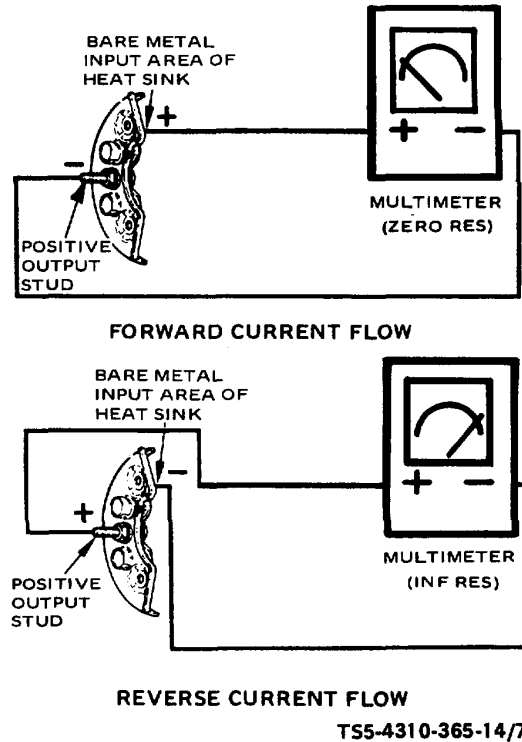
- (2) Solvent, P-D-680, or equivalent, may be used to clean nonelectrical components, such as drive pulley (34, fig. 7-2), fan (36), and the like.

**CAUTION**

Bearings (42, 45) are sealed and contain lubrication for the life of the bearing. Do not clean bearings in solvent that might dissolve lubricant.

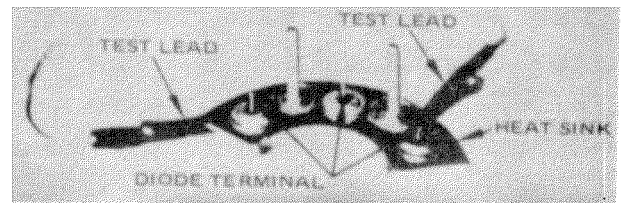
**c. Inspect, Repair or Replacement.**

- (1) Inspect length of brushes (12, fig. 7-2). They shall be at least 3/16 inch (4.76 mm) long and free of cracks. Brushes should not be oil soaked. Replace faulty or worn brush assembly (12).
- (2) Using multimeter, test isolation diode assembly (17) to determine if diodes will allow current flow in one direction, see figure 7-3. Reverse test leads, diodes should oppose current flow in the opposite direction. Replace faulty diode assembly.
- (3) Using multimeter test all diodes in the negative diode assembly (25) for forward current flow. Reverse test leads, there should be no reverse current flow. See figure 7-4. Replace the complete diode assembly (25) if any diode in the assembly is open or shorted.
- (4) Using multimeter test all diodes in the positive diode assembly (28) for forward current flow. See figure 7-4. Reverse test leads, there should be no reverse current flow. Replace the complete diode assembly (28) if any diode in the assembly is open or shorted.
- (5) Inspect stator winding (31) for discoloration of the winding insulating enamel. Discoloration is an indication of an overheated stator that may result in shorted or grounded windings.

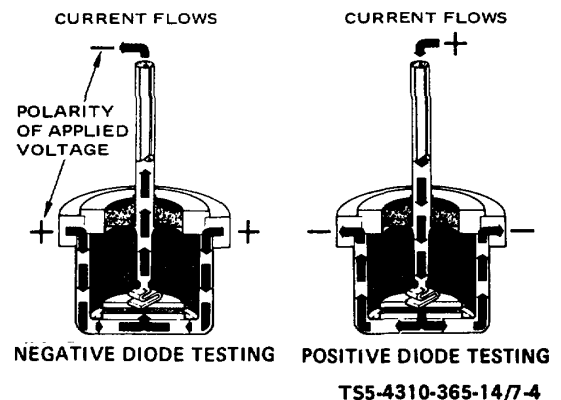


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Figure 7-3. Isolation diode testing



**DIODE TEST POINTS**



TS5-4310-365-14/7-4

Figure 7-4. Rectifier diode testing

**NOTE**

Alternator stator windings may be connected in a wye or delta configuration.

(6) See figure 7-5 and using multimeter, check each stator circuit winding for continuity. Also, Check for infinite resistance from each winding lead to laminated stator. Replace stator if test indicates open or grounded windings.

(7) Inspect rotor assembly (43) for the following conditions:

(a) Stripped threads on shaft

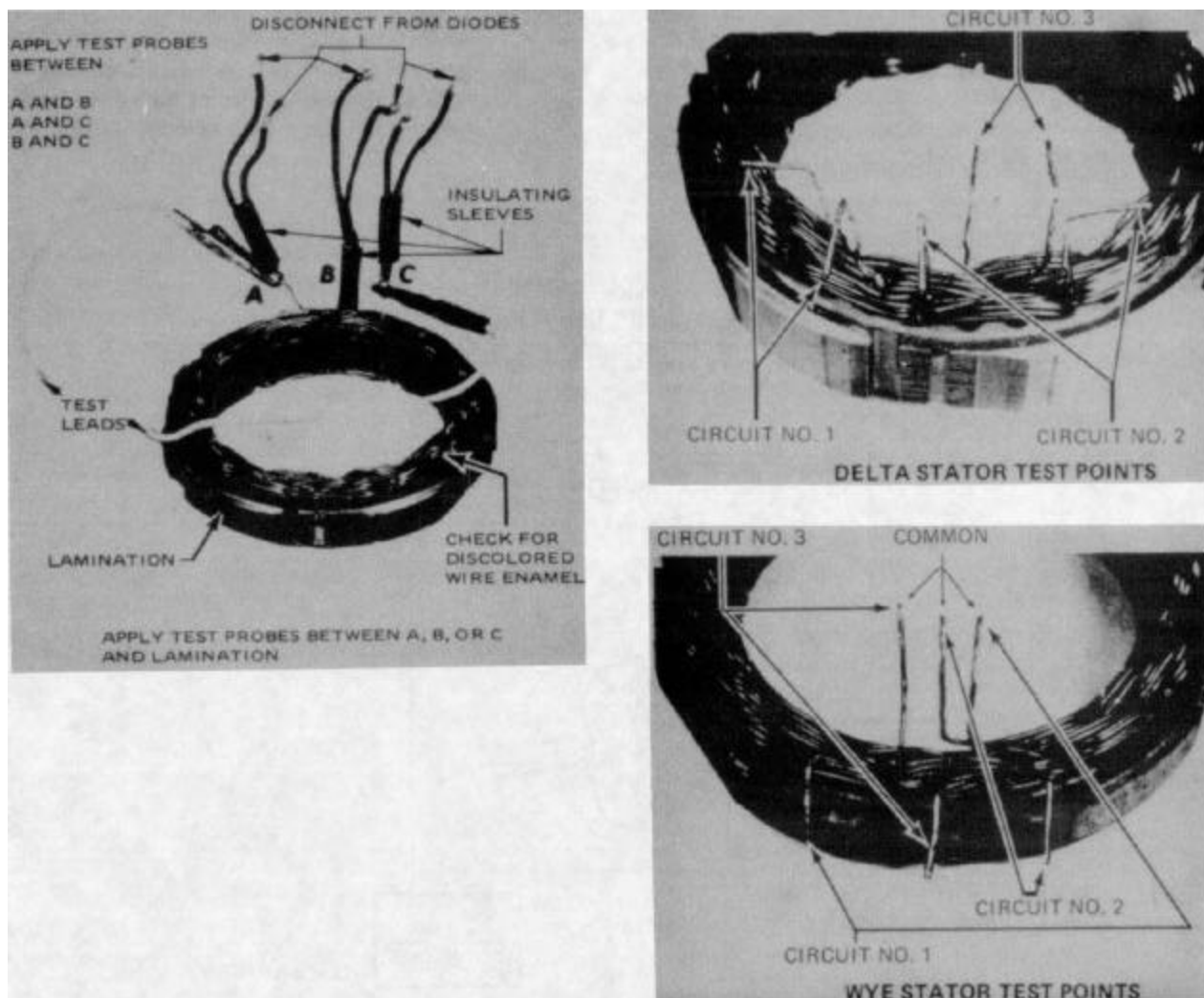
(b) Worn key slot

(c) Worn or dry rear bearing

(8) Replace rotor assembly (43) if any of the above indications are noted.

(9) Clean slip ring assembly (41) brush contacting surfaces with fine crocus cloth per Federal Specification P-C-458, or equivalent, wipe away residue. If surfaces are worn beyond this restoration, replace slip ring assembly (41).

(10) Using multimeter, an ammeter, a 12 volt battery, and rheostat connect equipment as illustrated in



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Figure 7-5. Stator testing

figure 7-6. Adjust rheostat until multimeter indicates  $11 \pm 1$  volts. Measure for  $1.95 \pm 0.30$  amps (at ambient temperature) between rotor slip rings (41). Also, check for resistance between slips rings (41) and rotor body (43). If the above conditions are not noted, replace rotor (43).

- (11) Inspect rear housing (22) for a cracked or broken casting, stripped threads or evidence of severe wear in the bearing bore due to worn bearing retainer (30A) or rotor bearing (42). If housing is to be reused, clean in P-D-680 solvent, dry with compressed air, and install a new bearing retainer (30A) and new bearing (42).
- (12) Inspect all other parts for cracks, breaks, damaged screw threads, or any other defect. Replace all defective parts.

(1) Remove any burrs or foreign material from bearing cavity in housing (46). Press bearing (45) into housing using driver tool that exerts pressure on the outer race only. Place bearing retainer (44) in recess, make certain retainer ears line up with opening in the housing (46). Use wooden dowel to exert pressure on the retainer while locking edge of retainer in recess.

(2) Support the pulley end of the rotor (43) on an arbor press. Place bearing (42) over the end of the shaft. Dress rotor leads away from work area. Select a bearing driver that contact only the inner bearing race, press bearing (42) on the shaft until inner race contacts the shoulder.

(3) Guide rotor (43) winding leads through the square passage in the slip ring (42) hub. Hand press the slip rings (41) on the shaft while maintaining alignment of the winding leads and passage. Install screw (38), lock washer (39), and flat washer (40). Tighten to 45 inch pounds (0.518 kgs-m).

**d. Reassembly.** Refer to figure 7-2 and reassemble the alternator as follows:

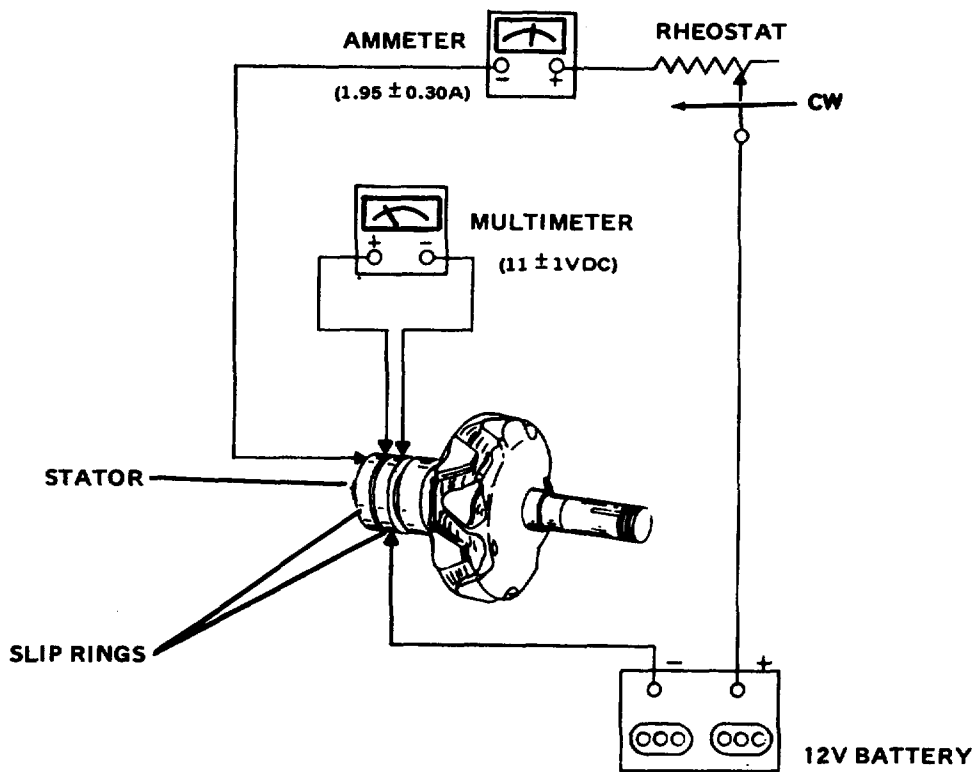


Figure 7-6. Rotor testing

TS5-4310-365-14/7-6

- (4) Wrap leads around slip ring terminals, solder with rosin core solder. Do not overheat. Secure wires to the end of the rotor with a synthetic sealer, such as G.E. Silicone Rubber, or equivalent. Retest electrical circuit to insure that a short circuit or ground did not develop during the repair operation (para 7-6.c(10)).
- (5) Place the rotor (43) on the bed of an arbor press, using two steel blocks for support. Place front housing (46) over shaft. Using driver sleeve that contacts inner bearing race only, press front housing down until inner bearing race contacts shoulder on the shaft.
- (6) Place pulley spacer (37) over rotor shaft. Install Woodruff key (35). Install fan (36). Install pulley (34), lock washer (33) and nut (32). Tighten nut (32) to 35 to 50 ft. lbs. (4.84 to 6.92 kgs-m). Spin rotor by hand to test freedom of bearing and seals.
- (7) Place two insulator washers (29) and insulator sleeves (30) over positive rectifier diode assembly (28) studs.
- (8) Solder stator (931) leads to diode assemblies (25,28). Assemble stator and diode assembly to rear housing (22) and install two insulator washers (29), nuts (27, 26, 24, 23), insulator washer (19) and insulator sleeve (18) on rectifier diode assembly studs.

**NOTE**

**Do not use oil to lubricate bearing retainer (30A). Use hydraulic brake fluid.**

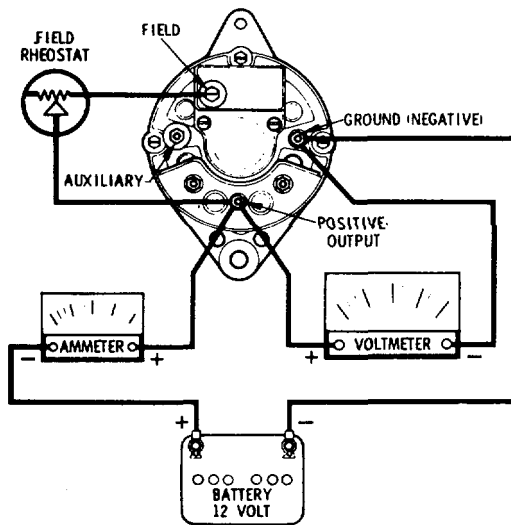
- (9) Assemble a new bearing retainer (30A) in recess of rear housing (22) bore. Lubricate exposed surface of the retainer with light coating of hydraulic brake fluid. Do not use oil.
- (10) Assemble isolation diode assembly (17) to studs using insulating washer (14), nuts (13). Install lock washer (26) and nut (15) on positive terminal.
- (11) Carefully assemble the rear housing and stator assembly and the front housing and rotor assembly together with front housing (46) three hole flange at 180° from isolation diode assembly (17). Secure together with

through bolts (20) and square nuts (21). Tighten through bolts evenly to 50-60 inch pounds (0.58 - 0.69 kgs-m). Spin fan and pulley by hand to test freedom of bearings.

- (12) If brush cable (8) was removed from brush assembly (12), solder to brush assembly terminal.
- (13) Place brush assembly (23) in housing cavity and secure with screws (11) tightened to 16-29 inch pounds (0.18-0.33 kgs-m). Attach brush assembly lead (8) to brush cover (2) with bolt (7), square insulator (9), insulating washer (6), flat washer (5), lock washer (4), and nut (3).
- (14) Position gasket (10) against housing (22) and assemble cover (2) to housing (22) with two screws (1). Tighten screws to 20-30 inch pounds (0.23-0.35 kgs-m).

**e. Testing.** Before installing alternator assembly on unit perform following test to determine current producing capability of repaired alternator assembly.

- (1) Mount the alternator in a test fixture capable of providing 3000 to 4000 alternator rpm. Connect fixture circuit leads and instruments to alternator terminals as shown in figure 7-7. Place field rheostat in maximum resistance position.



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Figure 7-7. Alternator pre-installation testing.



- (2) Turn fixture drive motor on and adjust to obtain 3000 to 4000 alternator rpm. Slowly reduce field rheostat resistance, alternator should develop a charge. Continue to reduce resistance until alternator reaches rated current output of 55 amperes. If alternator will deliver rated output, terminate test.

- (3) When pre-installation testing is complete, remove alternator assembly from test fixture and install on unit (para 6-5.f) and adjust (para 6-10.g).

**CAUTION**

**DO NOT operate alternator more than a few minutes in this manner due to the lack of voltage control.**

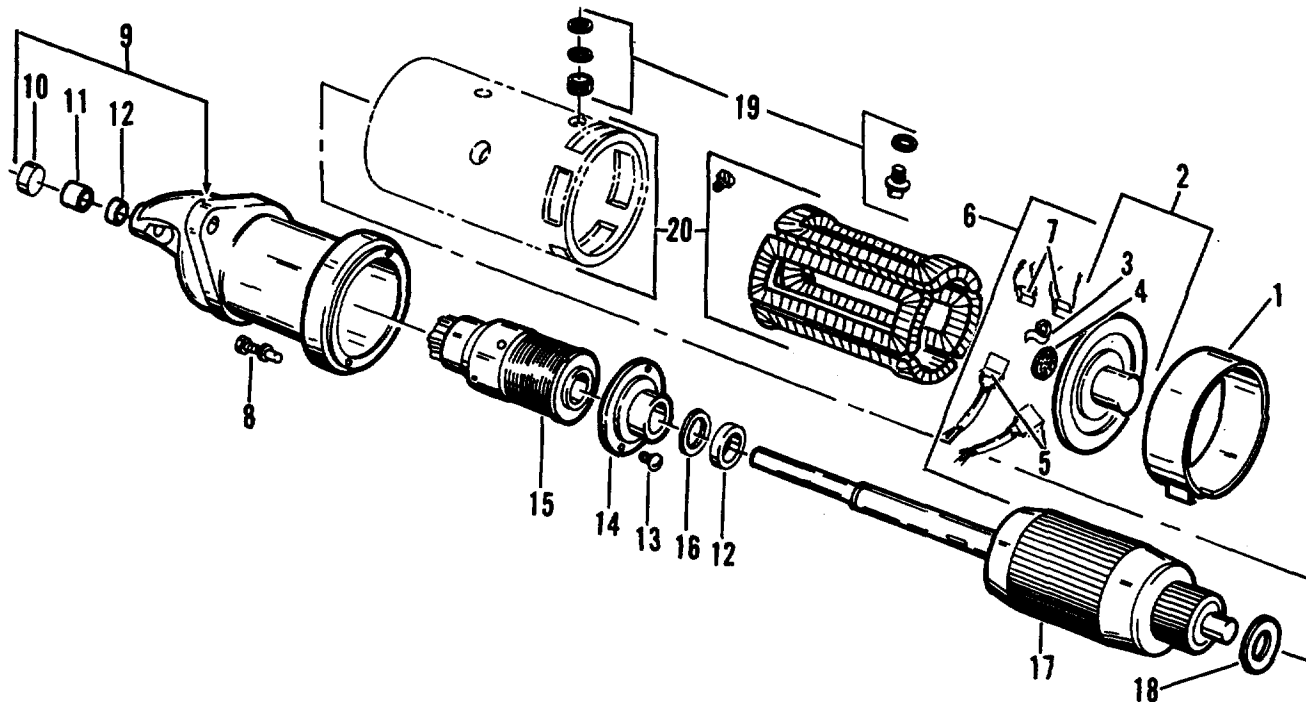
**Section IV. MAINTENANCE OF ENGINE STARTER ASSEMBLY**

**7-7. General.** This section contains disassembly, cleaning, inspect repair or replacement, and reassembly of the engine starter assembly.

**7-8. Maintenance of Engine Starter Assembly.**

**a. Disassembly.** Refer to para 6-12.1. and remove the starter assembly. Disassemble as follows:

- (1) Loosen clamp screw and remove cover band (1, fig. 7-8).
- (2) Remove end cover assembly (2, fig. 7-8), brush spring set (3), felt (4), and two grounded brushes (5).
- (3) Remove brush set (6), which for replacement includes grounded brushes (5) and brushes (7).



Legend for fig. 7-8:

- |     |                    |     |                      |
|-----|--------------------|-----|----------------------|
| 1.  | Cover band         | 11. | Bronze bearing       |
| 2.  | End cover assy     | 12. | Oil seal (2)         |
| 3.  | Brush spring set   | 13. | Screw (4)            |
| 4.  | Felt               | 14. | Bearing plate assy   |
| 5.  | Grounded brush (2) | 15. | Bendix drive         |
| 6.  | Brush set          | 16. | Gasket               |
| 7.  | Brush (2)          | 17. | Armature             |
| 8.  | Housing screw (4)  | 18. | Thrust washer        |
| 9.  | Housing assembly   | 19. | Stud package         |
| 10. | Bearing cap        | 20. | Frame and field assy |

TS5-4310-365-14/7-8

Figure 7-8. Engine starter assembly

- (4) Remove four housing screws (8) and separate housing assembly (9) from frame and field assembly (20). Remove bearing cap (10), bronze bearing (11) and one oil seal (12).
- (5) Remove four screws (13), bearing plate assembly (14), bendix drive (15), gasket (16) and oil seal (12).
- (6) Remove armature (17) and thrust washer (18). As necessary, remove the stud

package (19). The frame and field assembly (20) components are not individually replaceable, do not disassemble.

**b. Cleaning.**

- (1) Clean armature (17, fig. 7-8) and filed coils (20) using dry, compressed air.
- (2) An ultrasonic cleaner with approved cleaning solution may be used.

**WARNING**

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° F - 130° F (38° C - 59° C).

- (3) Clean other parts with solvent, P-D-680, or equivalent, and dry thoroughly.

**c. Inspect, repair or replacement.**

- (1) Visually inspect all parts for cracks, breaks, bending, condition of all screw threads, or other damage. Replace all parts having these defects.
- (2) Inspect brushes (5, 7) and replace with brush set (6) if maximum wear line on the brushes is not visible.
- (3) Inspect armature (17) for loose or misaligned contact bars. Inspect commutator surface for rough spots, discoloration, pitting, scoring, and high mica. As necessary, turn commutator using a lathe. Undercut mica after turning commutator. Replace armature if other defects are noted.

- (4) Inspect frame and field assembly (20) leads and windings for damaged insulation.
- (5) Refer to TM 5-764 and test armature (17) and field coils (20) for shorts, grounds, and open circuits. Replace defective parts.

**d. Reassembly.**

- (1) If removed, install stud package (19, fig. 7-8) in frame and field assembly (20). Assemble thrust washer (18) and armature (17).
- (2) Assemble one oil seal (12), gasket (16), bendix drive (15), bearing plate assembly (14) and secure with four screws (13).
- (3) Assemble oil seal (12), bronze bearing (11) and bearing cap (10) in housing assembly (9). Attach to frame and field assembly (20) with four screws (8).
- (4) If brush set (6) is being assembled, connect brushes (7) to leads. Assemble felt (4), brush spring set (3), grounded brushes (5) and assemble end cover assembly (2). Install cover band (1) and tighten clamp screw.
- (5) Refer to para 6-12.c and install the engine starter assembly.

**Section V. MAINTENANCE OF ENGINE ASSEMBLY**

**7-9. General.** This section covers maintenance of the engine assembly components within the scope of direct support and general support maintenance as prescribed by the MAC, Appendix E. Each component requiring maintenance at these levels is covered in a separate paragraph.

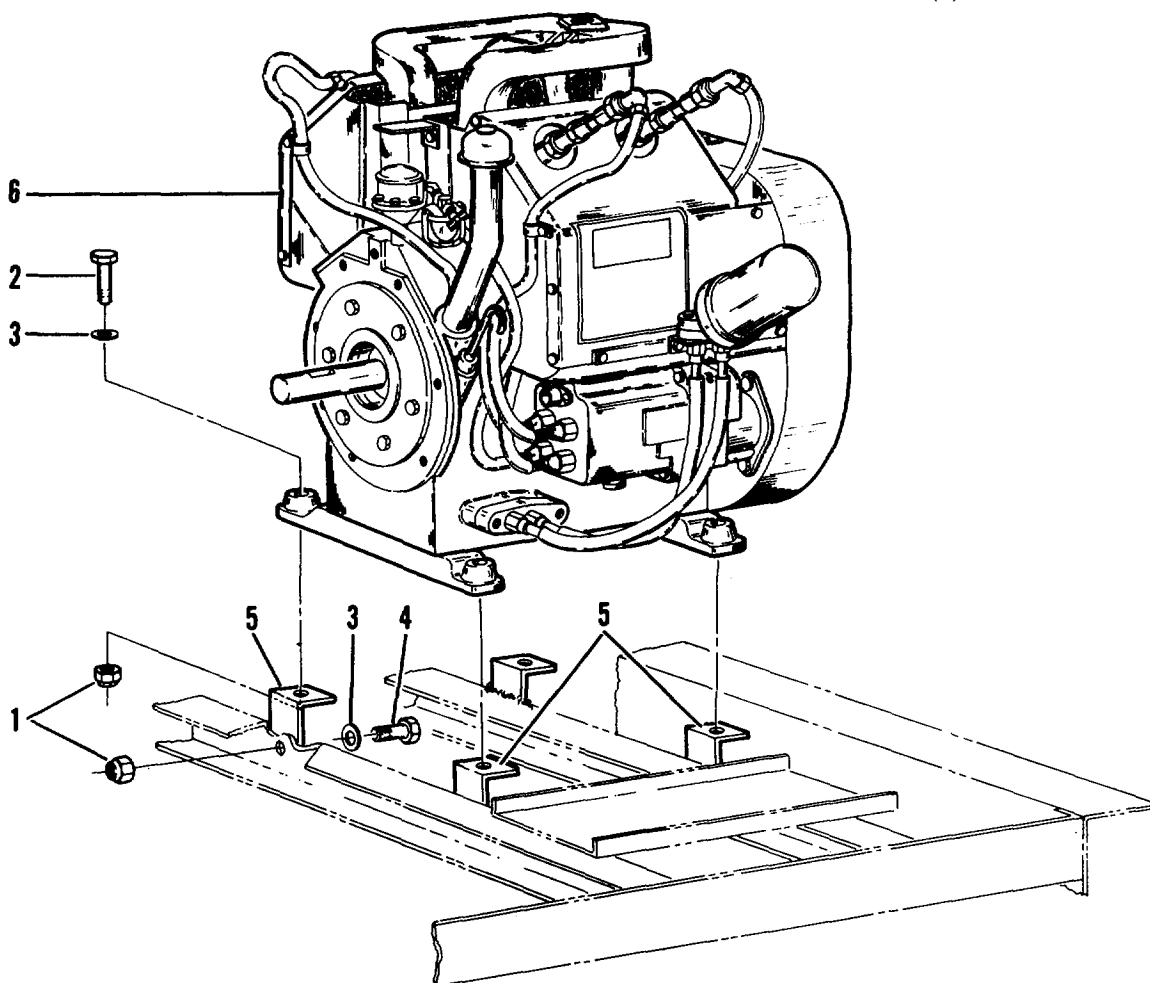
**7-10. Engine Assembly.**

**a. Removal.** Refer to fig. 6-24 and remove engine drain plug (4), drain engine oil and disconnect drain hose (1) from engine. Remove engine from unit as follows:

- (1) Refer to figure 6-4, sheet 3, and disconnect tube assemblies (27, 29) from engine exhaust elbow and pipe. Disconnect engine oil pressure hose (38, fig. 6-4) at connector (39).
- (2) Refer to para 6-2.b. and remove exhaust muffler group.

- (3) Refer to figure 6-12 and remove engine air cleaner group as follows:
  - (a) Loosen hose clamps (16) at carburetor inlet and slide carburetor hose (17) off carburetor. Disconnect restriction indicator hose from elbow (22).
  - (b) Remove four nuts (2), lock washers (3) and screws (4). Remove the air cleaner and mounding group from unit.
- (4) Refer to figure 7-49 and disconnect heater control cable assembly (1) and fuel pump wire assembly (3) from heater. Loosen exhaust tube clamp (4) and remove exhaust tube (5) from heater. Refer to figure 6-3; disconnect and remove fuel line tube assemblies (2, 3, 4). Disconnect tube assembly (1) at elbow (5) on tee

- (13). Tube assembly (1) need not be removed. Remove four nuts (13, fig. 7-49), lock washers (14), screws (15) and spacers (16); remove heater assembly from unit.
- (5) Refer to para 6-35.b. and remove battery, hold-down, and cables.
- (6) Refer to fig. 6-2 and remove roof (7) and front housing support (32).
- (7) Refer to para 6-10.b. and fig. 6-5. Remove alternator drive belt (1, fig. 6-6), nut (5), lock washer (6), screw (7), and flat washer (8). Loosen screw (2) and move adjusting bracket (9) away from engine.
- (8) Refer to fig. 6-14. Disconnect choke cable and throttle cable from carburetor and governor control.
- (9) Refer to fig. 1-3, wiring diagram, and disconnect wiring harness leads from magneto.
- (10) Refer to fig. 6-17. Remove cotter pin (1), and clevis pin (2) to disconnect clutch operating rod yoke (3) from shaft assembly (12). Remove eight nuts (15), lock washers (16), and screws (17) attaching clutch housing (20) to air compressor.
- (11) Refer to figure 7-9. Remove four locknuts (1), screws (2), and flat washers (3) that attach engine assembly (6) to mounting brackets (5).



Legend for fig. 7-9:

- |                |                         |
|----------------|-------------------------|
| 1. Locknut (7) | 4. Screw (3)            |
| 2. Screw (4)   | 5. Mounting bracket (3) |
| 3. Flat washer | 6. Engine assembly      |

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Figure 7-9. Engine assembly mounting

Remove engine assembly (6) from unit with clutch housing and clutch assembly attached using a lifting sling attached to manifold. The mounting brackets (5) need not be removed from frame.

- (12) Refer to para 6-22.*b.* and fig. 6-17. Remove clutch housing and clutch assembly from engine.

**b. Installation.**

- (1) Refer to para 6-22.*f.* and fig. 6-17. Install clutch assembly on engine crankshaft and install clutch housing.
- (2) Use a lifting sling attached to engine manifold and install engine assembly (6, fig. 7-9) on unit aligning clutch drive plate with compressor drive ring. Secure engine to frame and mounting brackets (5) with four flat washers (3), screws (2) and locknuts (1).
- (3) Secure clutch housing (20, fig. 6-17) to compressor with eight screws (17), lock washers (16), and nuts (15). Attach operating rod yoke (3) to clutch shaft lever with clevis pin (2) and cotter pin (1). Adjust the clutch (para 6-22.*g.*).
- (4) Connect wiring harness leads to magneto (fig. 1-3).
- (5) Connect choke cable to carburetor and connect throttle cable to governor control (fig. 6-14).
- (6) Connect alternator adjusting bracket (9, fig. 6-1) with flat washer (8), screw (7), lock washer (6), and nut (5). Install alternator drive belt (1) and adjust belt tension (para 6-10.*g.*).
- (7) Install front housing support (32, fig. 6-2) and roof (7).

- (8) Install battery, holddown, and cables (para 6-35.*d.*).

- (9) Install heater assembly using four spacers (16, fig. 7-49), screws (15), lock washers (14), and nuts (13). Refer to fig. 6-3 and connect tube assembly (1) to elbow (5) on tee (13). Install fuel line tube assemblies (2, 3, 4). Install heater exhaust tube (5) and tighten clamp (4). Refer to fig. 7-49 and connect fuel pump wire assembly (3) and heater control cable assembly.

- (10) Refer to 6-12 and install engine air cleaner group as follows:

- (a) Attach air cleaner and mounting group to underside of roof with four screws (4), lock washers (3) and nuts (2).

- (b) Connect restriction indicator hose to elbow (22). Slide carburetor hose (17) onto carburetor inlet. Tighten hose clamps (16).

- (11) Install exhaust muffler group, para 6-2.*g.*

- (12) Connect engine oil pressure hose (38, fig. 6-4, sheet 4) to connector (39). Connect tube assemblies (27, 29, fig. 6-4, sheet 3) to exhaust elbow and pipe.

- (13) Connect engine oil drain hose (1, fig. 6-24). Service the engine in accordance with LO5-4310-365-12.

**7-11. Maintenance of Magneto Assembly.**

**a. Removal.** Refer to para 6-14.*b.* and remove the magneto from the engine.

**b. Disassembly.** Refer to fig. 7-10 and disassemble magneto assembly.

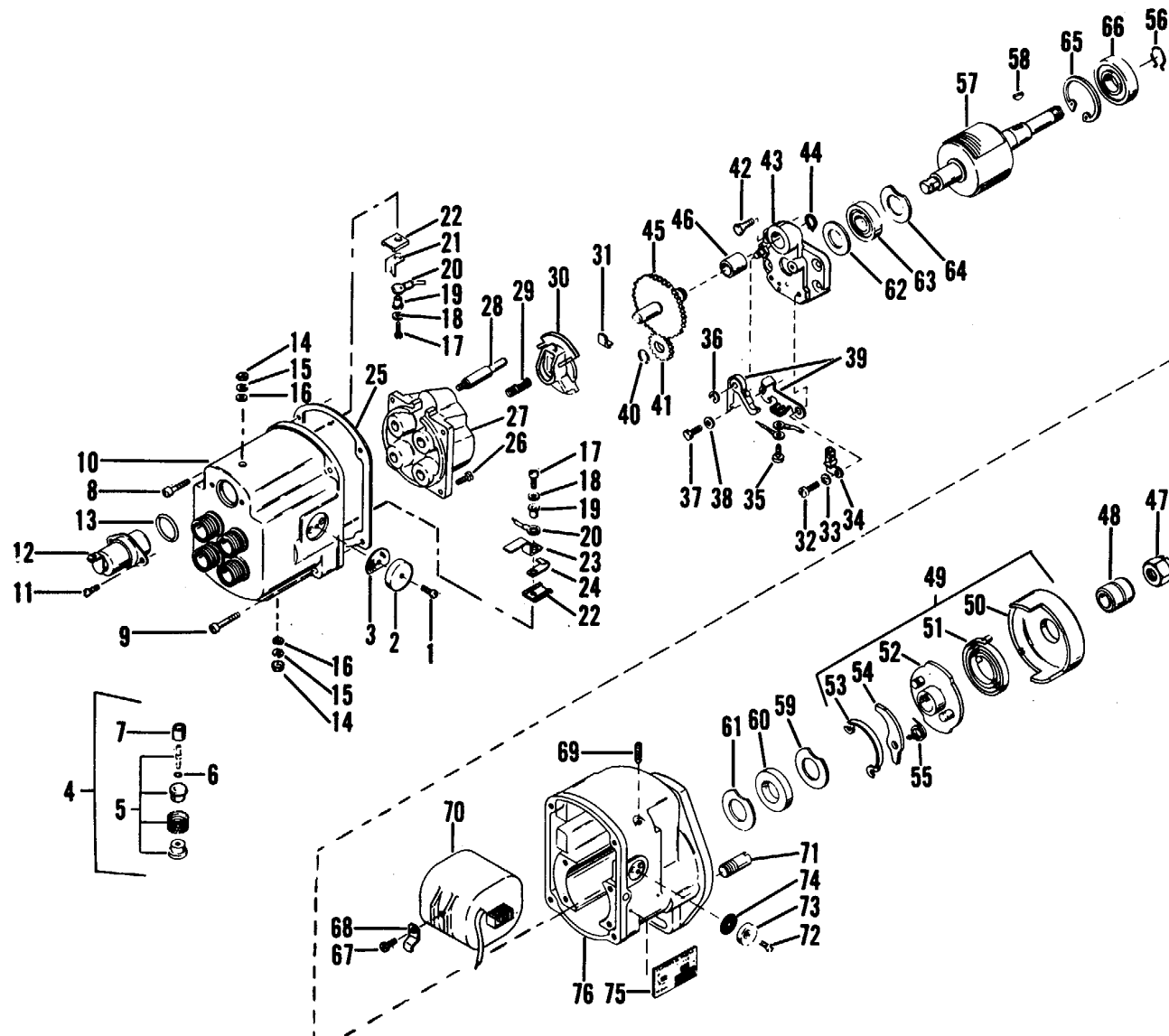


Figure 7-10. Magneto assembly

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Legend for fig. 7-10:

1. Screw	27. Distributor block	52. Hub assembly
2. Vent cover	28. Lead rod	53. Lock spring
3. Vent screen	29. Brush and spring	54. Coupling pawl (2)
4. Ground switch assembly	30. Distributor rotor	55. Pawl Spring (2)
5. Plunger, nut, & button assy	31. Rotor spring clip	56. Retaining ring
6. Switch spring	32. Support screw	57. Rotor
7. Spacer	33. Washer	58. Key
8. Screw (2)	34. Cam wick	59. Outer seal washer
9. Screw (2)	35. Terminal screw	60. Shaft seal
10. End cap assembly	36. Retaining ring	61. Inner seal washer
11. Screw (2)	37. Support screw	62. Outer retaining washer
12. Condenser	38. Point set	63. Cam end bearing
13. O-ring	39. Point set	64. Inner retaining washer
14. Nut (2)	40. Gear retaining ring	65. Retaining ring
15. Lock washer (2)	41. Rotor gear	66. Drive end bearing
16. Washer (2)	42. Support screw (4)	67. Screw
17. Screw (2)	43. Bearing support	68. Coil clip
18. Washer (2)	44. Shaft retaining ring	69. Setscrew (2)
19. Bushing (2)	45. Shaft and gear	70. Coil
20. Wire assembly	46. Distributor bearing	71. Pawl stop pin
21. Condenser contact	47. Nut	72. Cover screw (2)
22. Strip guide (2)	48. Bushing	73. Vent cover (2)
23. Contact support	49. Impulse coupling	74. Vent screen (2)
24. Contact support	50. Shell	75. Nameplate
25. Cap gasket	51. Drive spring	76. Housing
26. Screw (4)		

(1) Remove screw (1), vent cover (2), and screen (3). Remove ground switch assembly (4) by removing the plunger, nut, and button assembly (5), switch spring (6), and spacer (7).

(2) Remove two screws (8), two screws (9) and separate end cap assembly (10) from housing (76). Remove gasket (25). Remove two screws (11), condenser (12) and o-ring (13). Remove, two each, nuts (14), lock washers (15), washers (16), screws (17), washers (18), bushings (19), wire assemblies (20), and strip guides (22). Remove condenser contact (21) and contact supports (23, 24).

(3) Remove four screws (26), distributor block (27), lead rod (28), brush and spring (29), distributor (30) and rotor spring clip (31).

(4) Remove screw (32), washer (33), cam wick (34), terminal screw (35), retaining ring (36), support screw (37), washer (38), and point set (39). Remove retaining ring (40) and rotor gear (41). Remove four screws (42) and bearing support (43). Remove retaining ring (44), shaft and gear (45), and distributor bearing (46).

(5) Remove nut (47), bushing (48), and impulse coupling (49). Disassemble shell (50), drive

spring (51), hub assembly (52), lock spring (53), two pawls (54) and pawl springs (55).

(6) Remove retaining ring (56), rotor (57) and key (58). Disassemble outer seal washer (59) shaft seal (60) and inner seal washer (61). Disassemble outer retaining washer (62), cam end bearing (63), and inner retaining washer (64). Remove retaining ring (65) and bearing (66).

(7) Remove screw (67), coil clip (68), two setscrews (69) and coil (70). Remove pawl stop pin (71), two screws (72), vent covers (73), and screens (74). Do not remove nameplate (75) unless replacement is necessary.

#### **WARNING**

**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100° F - 130° F (38° C - 59° C).**

**c. Cleaning.** Clean parts except condenser (12, fig. 7-10), o-ring (13), wire assemblies (20), cam wick (34), rotor (57), bearings (63, 66), and coil (70) with solvent P-D-680, or equivalent. Wipe these parts clean with a clean, lint-free cloth.

**d. Inspection, Repair or Replacement.**

(1) Inspect cam wick (34, fig. 7-10) for evidence of dirt and grease. Replace if dirty or saturated with grease.

(2) Inspect coil (70) for electrical shorts or opens. Check for damaged insulation. Replace a damaged coil.

(3) Check teeth on gears (41, 45 for nicks, breaks, and wear. Replace defective gear.

(4) Replace all parts with like parts furnished in service kit. Replace all damaged parts.

**e. Reassembly.** Refer to fig. 7-10 and reassemble magneto assembly as follows:

(1) If removed, install name plate (75) on housing (76). Install, two each, vent screens (74), covers (73), and screws (72). Install pawl stop pin (71). Attach coil clip (68) with screw (67). Assemble coil (70) into housing (76) and install two setscrews (69) and seal with a drop or two of gasket varnish, or equivalent.

(2) Pack bearings (66, 63) with FMC011 magneto bearing grease, or equivalent. Install bearing (66) and retaining ring (65). Install inner retaining washer (64), cam end bearing (63) and outer retaining washer (62). Assemble inner seal washer (61), shaft seal (60), and outer seal washer (59). Install rotor (57), retaining ring (56) and key (58).

(3) Assemble two pawl springs (55), two pawls (54) and lock spring (53) on hub assembly (52). Install drive spring (51) in shell (50) onto spring anchor in shell with coil clockwise. Place inner end of drive spring (51) in the slot of coupling hub (52). Wind the drive spring (51) one full turn, push impulse coupling (49) onto rotor shaft and key. Install bushing (48) and nub (47).

(4) If removed, assemble distributor bearing (46) into bearing support (43). Assemble shaft and gear (45) and install retaining ring (44). Install bearing support (43) and secure with four screws (42). Install rotor gear (41) with tooth of rotor gear painted red meshed between the two teeth on distributor gear marked "C." Slide pint set (39) onto fulcrum pin on bearing support (43) and install retaining ring (36). Install washer (38) and screw (37). Install cam wick (34) with washer (33) and screw (32). Attach coil lead terminal and terminal of ground switch with terminal screw (35). Refer to para 6-14.d.(1) and set breaker point clearance.

(5) Assemble rotor spring clip (31), rotor (30), brush and spring (29), and lead rod (28). Assemble contact supports (24, 23), condenser contact (21), and two each, strip guides (22), wire assemblies (20), bushings (19), washers (18), screws (17), washers (16), lock washers (15), and nuts (14). Install distributor block (27) and four screws (26).

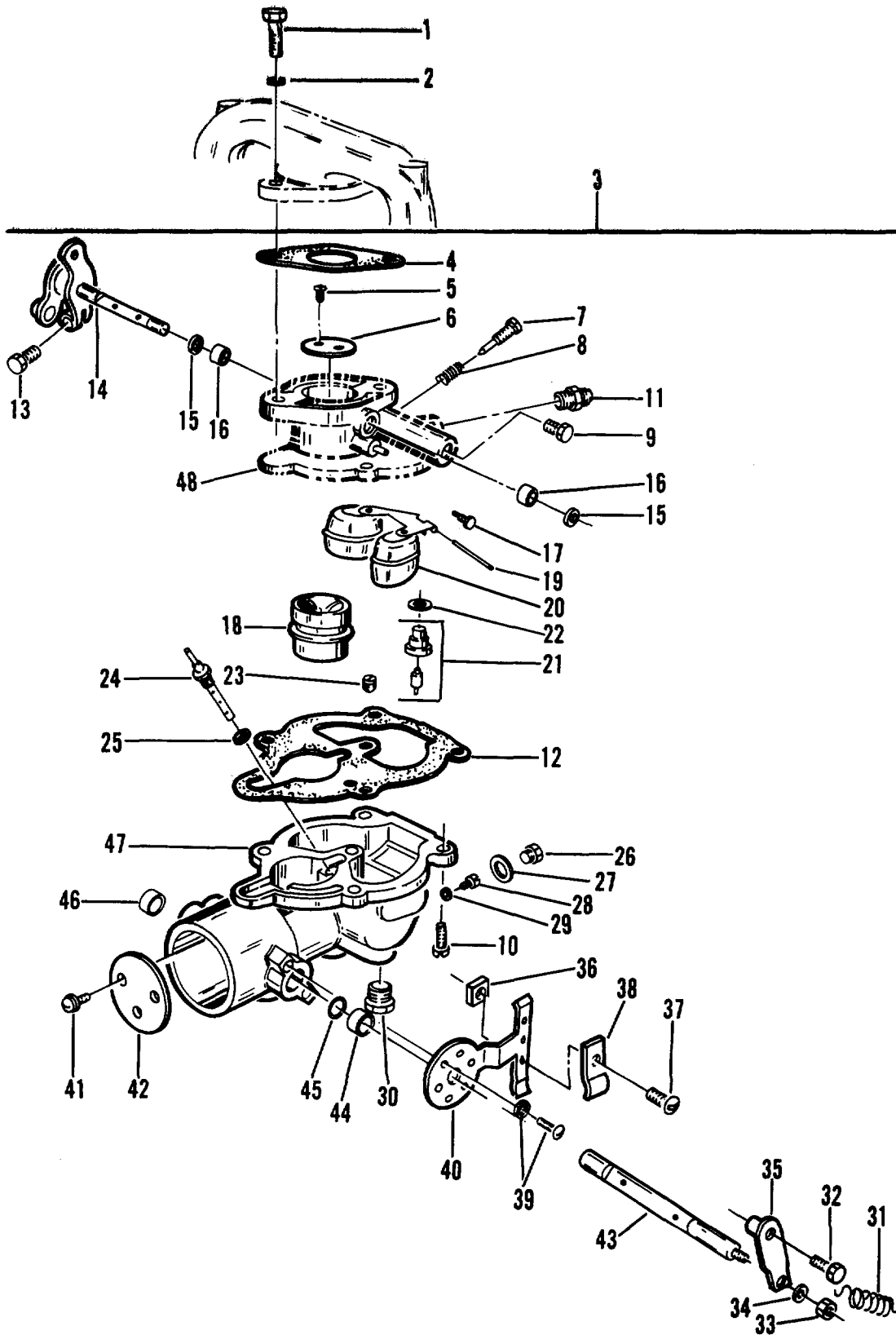
(6) Assemble o-ring (13), condenser (12) and two screws (11). Assemble spacer (7), switch spring (6), and plunger, nut and button assembly (5) making ground switch assembly (4). Use a new gasket (25) and assemble end cap assembly (10) to housing (76) with two screws (9) and two screws (8). Install vent screen (3). cover (2) and screw (1).

**f. Installation.** Refer to para 6-14.e. and install and time the magneto.

**7-12. Maintenance of Carburetor Assembly.**

**a. Removal.** Refer to para 6-18.b. and remove carburetor assembly from engine intake-exhaust manifold by removing the two screws (1, fig. 7-11) and lock washers (2) that secure the carburetor assembly (3). Remove and discard gasket (4).





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Figure 7-11. Carburetor assembly

Legend for fig. 7-11:

1. Screw (2)	25. Discharge jet washer
2. Lock washer (2)	26. Main jet passage plug
3. Carburetor assembly	27. Washer
4. Gasket	28. Main jet
5. Screw (2)	29. Main jet washer
6. Throttle plate	30. Bowl drain plug
7. Idle adjusting needle	31. Return spring
8. Spring	32. Swivel screw
9. Plug	33. Choke shaft nut
10. Screw (4)	34. Lock washer
11. Fitting	35. Choke lever
12. Bowl gasket	36. Clamp screw nut
13. Throttle stop screw	37. Clip screw
14. Throttle shaft and lever	38. Clip
15. Seal retainer (2)	39. Choke bracket screw (2)
16. Shaft seal (2)	40. Choke bracket
17. Idle jet	41. Choke plate screw (2)
18. Venturi	42. Choke plate
19. Float axle	43. Choke shaft
20. Float and hinge assy	44. Seal retainer
21. Valve and seat	45. Choke shaft seal
22. Washer	46. Hole plug
23. Well vent jet	47. Fuel bowl
24. Discharge jet	48. Throttle body

**b. Disassembly.** Disassemble carburetor assembly (fig. 7-11) to extent necessary as follows:

- (1) Remove two screws (5) and throttle plate (6). Remove idle adjusting needle (7) and spring (8). Plug (9) need not be removed from body (48). Remove four screws (10) and separate throttle body (48) from fuel bowl (47). Remove gasket (12) and fitting (11).
- (2) As necessary, remove screw (13) and throttle shaft and lever (14). Remove the two seal retainers (15) and shaft seals (16). Remove idle jet (17).
- (3) Remove venturi (18), press out float axle (19), and remove float and hinge assembly (20). Remove valve and seat (21) and washer (22).
- (4) Remove well vent jet (23), discharge jet (24), and discharge jet washer (25). Remove main jet passage plug (26), washer (27), main jet (28), and main jet washer (29). Remove bowl drain plug (30).
- (5) Disconnect and remove return spring (31), swivel screw (32), choke shaft nut (33), lock washer (34), and choke lever (35). Remove clamp screw nut (36), clip screw (37), and clip (38). Remove two choke bracket screws (39) and the choke bracket (40).

- (6) Remove two choke plate screws (41) and choke plate (42). Remove the choke shaft (43), seal retainer (44), choke shaft seal (45), and hole plug (46) from fuel bowl (47).

### **WARNING**

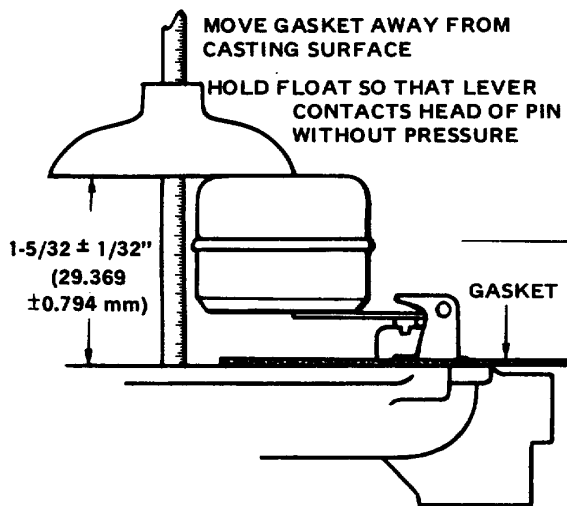
**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° F - 130° F (38° C - 59° C).**

**c. Cleaning.** Clean parts with solvent, P-D-680, or equivalent, and dry thoroughly.

**d. Inspect, Repair or Replacement.** Inspect all parts for any damage, such as cracks, breaks, thread damage, bending or any other defect. Replace all defective parts. Replace all gaskets and seals.

### **e. Reassembly.**

- (1) Assemble hole plug (46, fig. 7-11) in fuel bowl (47)., Install choke shaft seal (45) and seal retainer (44). Carefully install choke shaft (43) into fuel bowl (47) and assemble choke plate (42) to shaft (43) with two screws (41).
- (2) Assemble choke bracket (40) with two screws (39), attach clip (38) to bracket (40) with screw (27) and nut (36). Assemble choke lever (35) onto choke shaft (43) and secure with lock washer (34) and nut (33). Install swivel screw (32) and the return spring (31).
- (3) Install drain plug (30). Assemble main jet washer (29), main jet (28), washer (27), and main jet passage plug (26). Assemble discharge jet washer (25), discharge jet (24), and well vent jet (23).
- (4) Install washer (22) and valve and seat (21). Install float and hinge assembly (20) with float axle (19). Check float position as shown in figure 7-12. If position is not as shown use long nose pliers and bend lever close to float body to obtain correct setting.



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Figure 7-12. Carburetor float setting

- (5) Assemble venturi (18, fig. 7-11), idle jet (17), two shaft seals (16) and seal retainers (15). Carefully assemble throttle shaft and lever (14) into throttle body (48) and if removed,

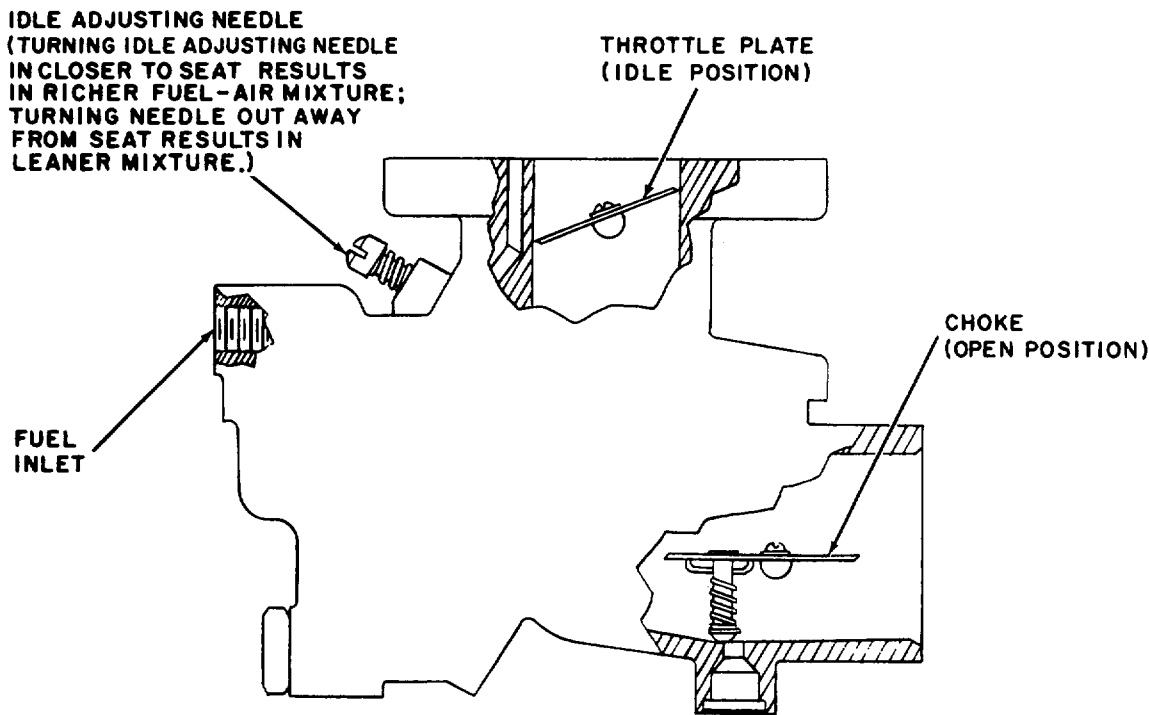
install stop screw (13). Assemble throttle plate (6) to shaft (14) with two screws (5).

- (6) Place new gasket (12) on fuel bowl (47) and assemble throttle body (48) with four screws (10). Install fitting (11). IF removed, install plug (9). Assemble spring (8) and idle adjusting needle (7).
- (7) Use a new gasket (4) and attach carburetor assembly (3) to intake-exhaust manifold with two lock washers (2) and screws (1).

**f. Installation.** Refer to para 6-18.e. and complete installation of carburetor.

**g. Adjustment.** The main metering jet is of the fixed type and requires no adjustment. Adjust idle needle for best low speed as follows:

- (1) Start engine and allow to warm up to operating temperature.
- (2) Adjust carburetor for smooth idle operation. Turning idle adjusting needle inward enriches fuel-air mixture; turning outward results in leaner mixture. See figure 7-13.



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Figure 7-13. Carburetor adjustment

**7-13. Maintenance of Fuel Pump.**

**a. Removal.** Refer to para 6-19.b. and remove the fuel strainer and fuel pump.

**b. Disassembly.** Refer to fig. 7-15 and disassemble fuel pump as follows:

- (1) File a groove at union of fuel head (2, fig. 7-14) and mounting bracket (17) for inlet and outlet positioning at reassembly.
- (2) Remove six screws (1) and separate fuel head (2) from mounting bracket (15). Remove cover screw (3), lock washer (4), cover (5) and cover gasket (6).
- (3) Turn fuel head (2) over and remove two valve assemblies (7) and valve gaskets (8).

**NOTE**

**Make note of valve assembly positions for reassembly reference**

- (4) Use a small screwdriver to remove rocker arm spring (9). Hold mounting bracket (15) in one hand with rocker arm (14) toward you and thumb nail on end of rocker arm link (10). Use the heel of your other hand on diaphragm (11), compress spring (12), and at same time pull toward your body. Unhook link (10) from end of diaphragm (11). Remove diaphragm (11) and spring (12).
- (5) Drive the tapered rocker arm pin (13) out of mounting bracket (15) with a punch. Drive from small end of pin (13). Remove rocker arm link (10), rocker arm (14), and bushing (15) from mounting bracket (16).

**c. Cleaning.** Clean all components not in repair kit with an approved solvent.

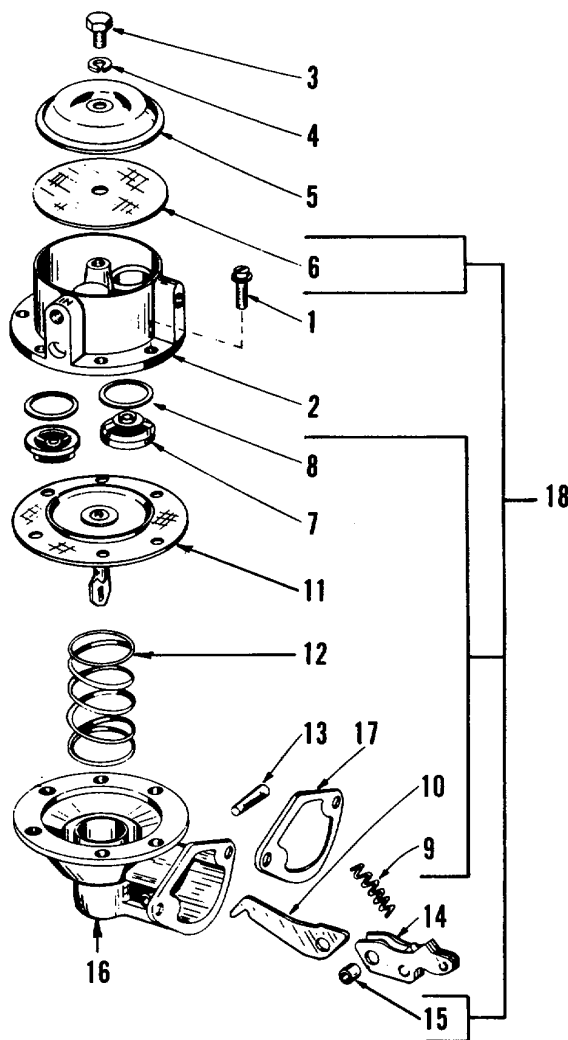
**d. Inspection, Repair or Replacement.** Inspect parts not supplied in repair kit (18, fig. 7-14) for cracks, breaks, damaged screw threads, and bending. Replace all defective parts. Use repair kit (18) and discard old parts.

**e. Reassembly.** Use new parts contained in repair kit (18, fig. 7-14) at reassembly and discard old parts.

- (1) Assemble bushing (15), rocker arm (14), link (10), install in mounting bracket (16), and

press in pin (13). Stake pin (13) in bracket (16).

- (2) Please spring (12) into mounting bracket (16). Assemble diaphragm (11), compressing spring (12) and hooking link (10) to bottom of diaphragm (11). Install rocker arm spring (9).



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Legend for fig. 7-14:

- |                       |                      |
|-----------------------|----------------------|
| 1. Screw (6)          | 10. Rocker arm link  |
| 2. Fuel head          | 11. Diaphragm        |
| 3. Cover screw        | 12. Diaphragm spring |
| 4. Lock washer        | 13. Rocker arm pin   |
| 5. Cover              | 14. Rocker arm       |
| 6. Cover gasket       | 15. Bushing          |
| 7. Valve assembly (2) | 16. Mounting bracket |
| 8. Valve gasket (2)   | 17. Flange gasket    |
| 9. Rocker arm spring  | 18. Repair kit       |

Figure 7-14. Engine fuel pump assembly

- (3) Attach this assembly to adapter on engine using new gasket (17). Crank engine by hand to a position where diaphragm (11) is laying flat on mounting bracket (16).
- (4) Assemble two valve gaskets (8) and valve assemblies (7) in fuel head (2). Make certain valve assemblies (7) are positioned correctly as noted at disassembly.

**CAUTION**

**Press valve assemblies (7) into fuel head (2) evenly without any distortion. Stake in place.**

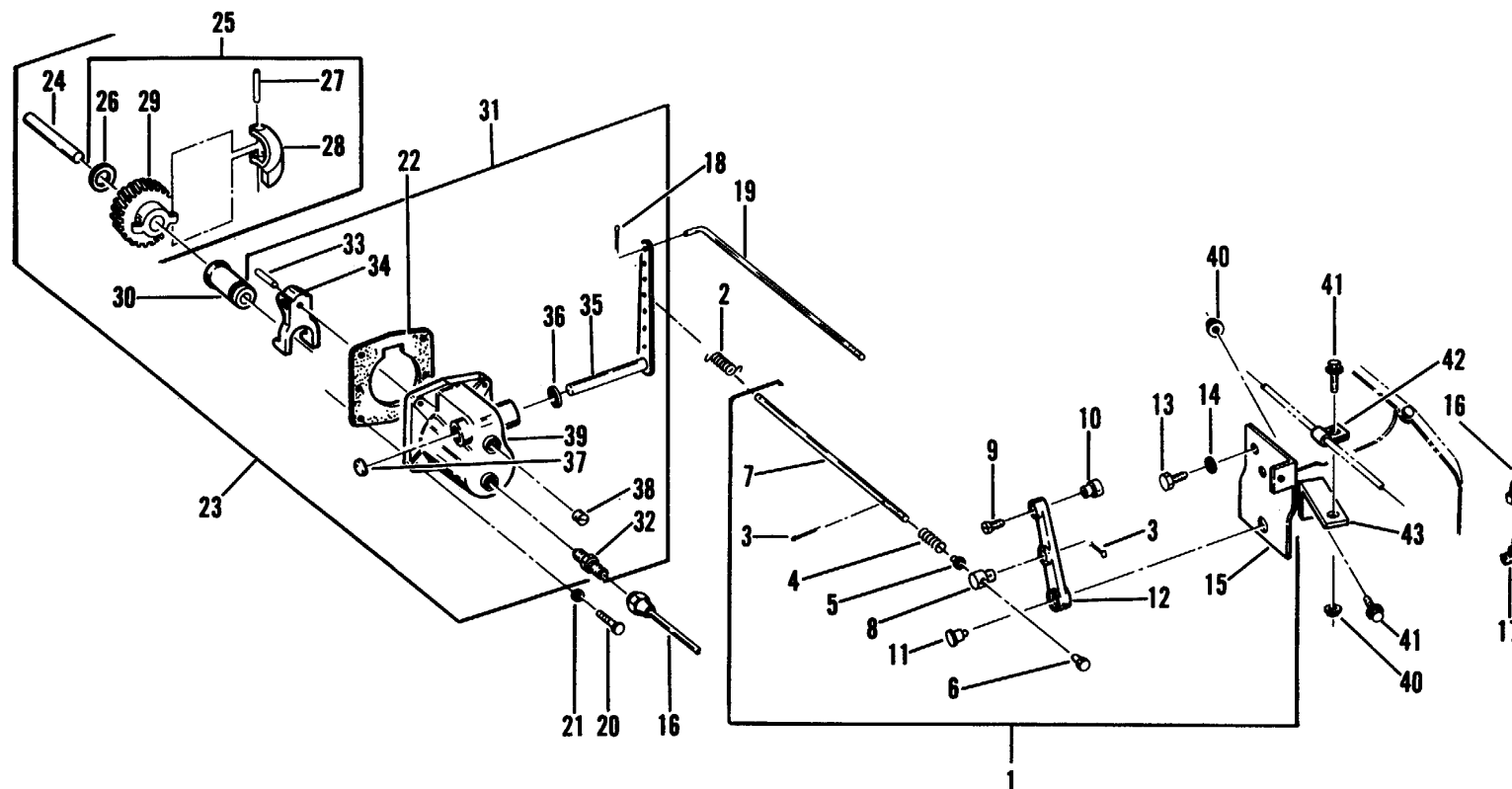
- (5) Assemble cover gasket (6), cover (5), and secure with lock washer (4) and screw (3).
- (6) Assemble fuel head assembly onto mounting bracket (16) with port locating

grooves aligned (grooves made at disassembly for this purpose). Install the six screws (1) and turn approximately three turns each. Again, crank the engine to where diaphragm (11) is pulled down into mounting bracket (16) to lowest point. Then, tighten the six screws (10).

**f. Installation.** Refer to para 6-19.e. and complete installation of fuel pump and strainer.

**7-14. Maintenance of Governor Controls and Governor.**

**a. Removal and Disassembly.** Refer to para 6-17.b. and remove intake-exhaust manifold and para 6-18.b. to remove carburetor assembly. Remove and disassemble governor controls (1, fig. 7-15) and governor assembly (23) as follows:



Legend for fig. 7-15:

- |                            |                            |                      |
|----------------------------|----------------------------|----------------------|
| 1. Governor control assy   | 16. Governor oil line      | 30. Thrust sleeve    |
| 2. Governor spring         | 17. Elbow                  | 31. Housing assembly |
| 3. Cotter pin (2)          | 18. Cotter pin             | 32. Oil fitting      |
| 4. Adjusting screw spring  | 19. Carburetor control rod | 33. Yoke pin         |
| 5. Retainer                | 20. Screw (4)              | 34. Yoke             |
| 6. Locknut                 | 21. Lock washer (4)        | 35. Shaft and lever  |
| 7. Adjusting screw         | 22. Gasket                 | 36. Oil seal         |
| 8. Adjusting screw pin     | 23. Governor assembly      | 37. Expansion plug   |
| 9. Screw                   | 24. Governor shaft         | 38. Pipe plug        |
| 10. Control wire connector | 25. Flyweight assembly     | 39. Housing          |
| 11. Fulcrum pin            | 26. Gear washer            | 40. Locknut (2)      |
| 12. Control lever          | 27. Weight pin (2)         | 41. Screw (2)        |
| 13. Screw                  | 28. Weight assembly        | 42. Cable clip       |
| 14. Lock washer            | 29. Governor gear          | 43. Throttle bracket |
| 15. Control lever bracket  |                            |                      |

Figure 7-15. Governor controls and governor

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- (1) Disconnect and remove governor spring (2, fig. 7-15) from governor lever and adjusting screw. As necessary for repair or replacement of governor control assembly (1) only, remove one cotter pin (3) from adjusting screw (7), remove spring (4), and spring retainer (5). Remove locknut (6) and the adjusting screw (7).
- (2) Remove cotter pin (3) and adjusting screw pin (8). Remove screw (9) and control wire connector (10). Remove fulcrum pin (11) and control lever (12). Only when necessary, remove screw (13), lock washer (14), existing engine hardware attaching lever bracket, and remove the bracket (15).
- (3) Disconnect oil line (16) at governor fitting (32) and, as necessary, from elbow (17) on side of engine and remove the oil line (17). Remove cotter pin (18) and carburetor control rod (19). Remove four screws (20) and lock washers (21), remove governor assembly (23) and gasket (22).
- (4) Remove flyweight assembly (25), governor shaft (24), and gear washer (26). As necessary, drive out two weight pins (27) and separate the two weight assemblies (28) from governor gear (29). Remove thrust sleeve (30).
- (5) To disassemble housing assembly (31), remove oil fitting (32), and remove pipe plug (38), drive out yoke pin (33) securing yoke (34) to shaft (35), yoke (34), oil seal (36), and expansion plug (37) from housing (39).
- (6) The throttle control cable bracket (43), cable clip (42) and their hardware (40, 41) need not be removed except for replacement.

#### **WARNING**

**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° F - 130° F (38° C - 59° C).**

#### ***b. Cleaning, Inspection, Repair or Replacement.***

Clean all parts with solvent, P-D-680, or equivalent, and dry thoroughly. Inspect all parts for cracks, breaks, damaged screw threads, bending and distortion. Replace all defective parts.

***c. Reassembly and Installation.*** Reassemble and install the governor assembly (23, fig. 7-15) and governor controls (1) as follows:

- (1) If removed, attach throttle bracket (43) and clip (42) to engine cowl with two screws (41) and locknuts (40).
- (2) To reassemble housing assembly (31), install oil seal (36) in housing (39). Carefully assemble shaft and lever (35) and yoke (34) into housing (39) leading shaft through seal (36) and bore in yoke (34) and into shaft support hub in housing. Install yoke pin (33) securing yoke (34) to shaft (35). Install expansion plug (37) and pipe plug (38). Install oil line fitting (32).
- (3) Assemble two weight assemblies (28) to governor gear (29) and drive in two weight pins (27). Install governor shaft (24) gear washer (26), flyweight assembly (25), and thrust sleeve (30).
- (4) Use a new gasket (22) and assemble gasket (22) and governor assembly (23) to engine with four lock washers (21) and screws (20). Attach carburetor control rod (19) to shaft lever (35) with cotter pin (18). If removed, install oil line elbow (17) in side of engine block and install governor oil line (16).
- (5) If removed, assemble control lever (12) to lever bracket (15) with fulcrum pin (11). Install lever bracket to engine cowl using lock washer (14), screw (13) and existing cowl hardware in other bracket mounting hole.
- (6) Assemble control wire connector (10) to lever (12) and install screw (9). Install adjusting screw pin (8) and secure to lever (12) with one cotter pin (3). Install second cotter pin (3) in adjusting screw (7). Install spring (4), retainer (5), run adjusting screw (7) through pin (8) and install locknut (6) on end of adjusting screw (7).
- (7) Connect governor spring (2) to end of adjusting screw (7) and into hole number seven (up from shaft end) in lever (35).
- (8) Refer to para 6-17.d. and install intake-exhaust manifold and para 6-18.e. to install carburetor. Before assembling enclosure roof and exhaust

muffler group, adjust governor setting to carburetor as outlined in following paragraph.

**d. Governor Adjustment.**

- (1) Remove cotter pin (18, fig. 7-15) and carburetor control rod (19) from lever (35). Connect control rod (19) to carburetor throttle lever.
- (2) Push the control rod (19) toward carburetor, opening the throttle wide. Move the governor lever (35) in the same direction as far as it will go. With lever (35) and rod (19) held in this position, screw control rod (19) into carburetor swivel block until bend end of rod (19) is in line with top hole in lever (35); then, screw rod (19) into swivel two more turns. Insert control rod (19) into lever (35) hole and install cotter pin (18).
- (3) Push governor lever (35) toward carburetor. There should be about 1/16 inch (1.588 mm)

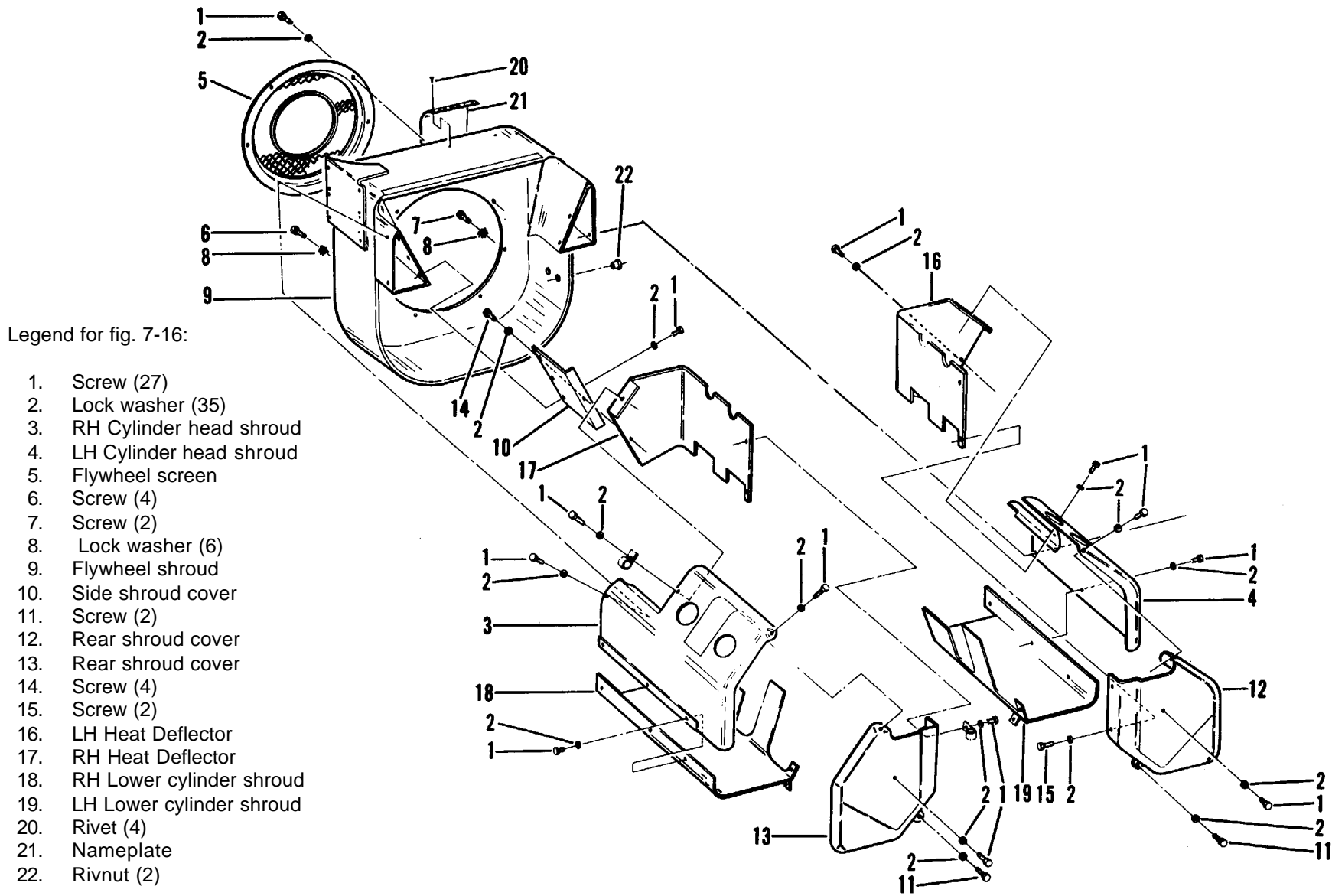
clearance between throttle lever and stop pin on carburetor.

- (4) With governor spring (2) hooked into the governor hole number seven, the load speed should be 2200 rpm and no load 2300 rpm. To further adjust speed more closely, use a suitable revolution counter to check speed and adjust as necessary with adjusting screw (7), increasing or decreasing tension on spring (2).
- (5) After engine speed is adjusted, assemble enclosure roof and exhaust muffler group.

**7-15. Maintenance of Engine Covers and Shrouds.**

**a. Removal and Disassembly.** Refer to para 7-10.a. and remove the engine assembly from the unit. Clutch housing and clutch assembly need not be removed (para 7-10.a.(12)). Refer to figure 7-16 and disassemble engine covers and shrouds as follows:





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Figure 7-16. Engine covers and shrouds

- (1) Remove six screws (1) and lock washers (2) and flywheel screen (5). Remove six screws (1) and lock washers (2) from each cylinder head shroud (3, 4). Remove right-hand shroud (3) and left-hand shroud (4).
- (2) Remove screws (1, 11, 15) and lock washers (2); remove rear shrouds (12, 13). Remove screws (1, 14) and lock washers (2); remove side shroud cover (10), left-hand heat deflector (16), right-hand heat deflector (17), right-hand lower cylinder shroud (18), and left-hand lower cylinder shroud (19).
- (3) Remove screws (6, 7), lock washers (8) and flywheel shroud (9).
- (4) Do not remove rivets (20), nameplate (21), or rivnuts (22) unless replacement is necessary.

**WARNING**

**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° F - 130° F (38° C - 59° C).**

**b. Cleaning.** Clean all parts with solvent, P-D-680, or equivalent, and dry thoroughly.

**c. Repair or Replacement.** Repair dents by straightening and weld any cracked seams. Replace all parts that cannot be repaired in this manner.

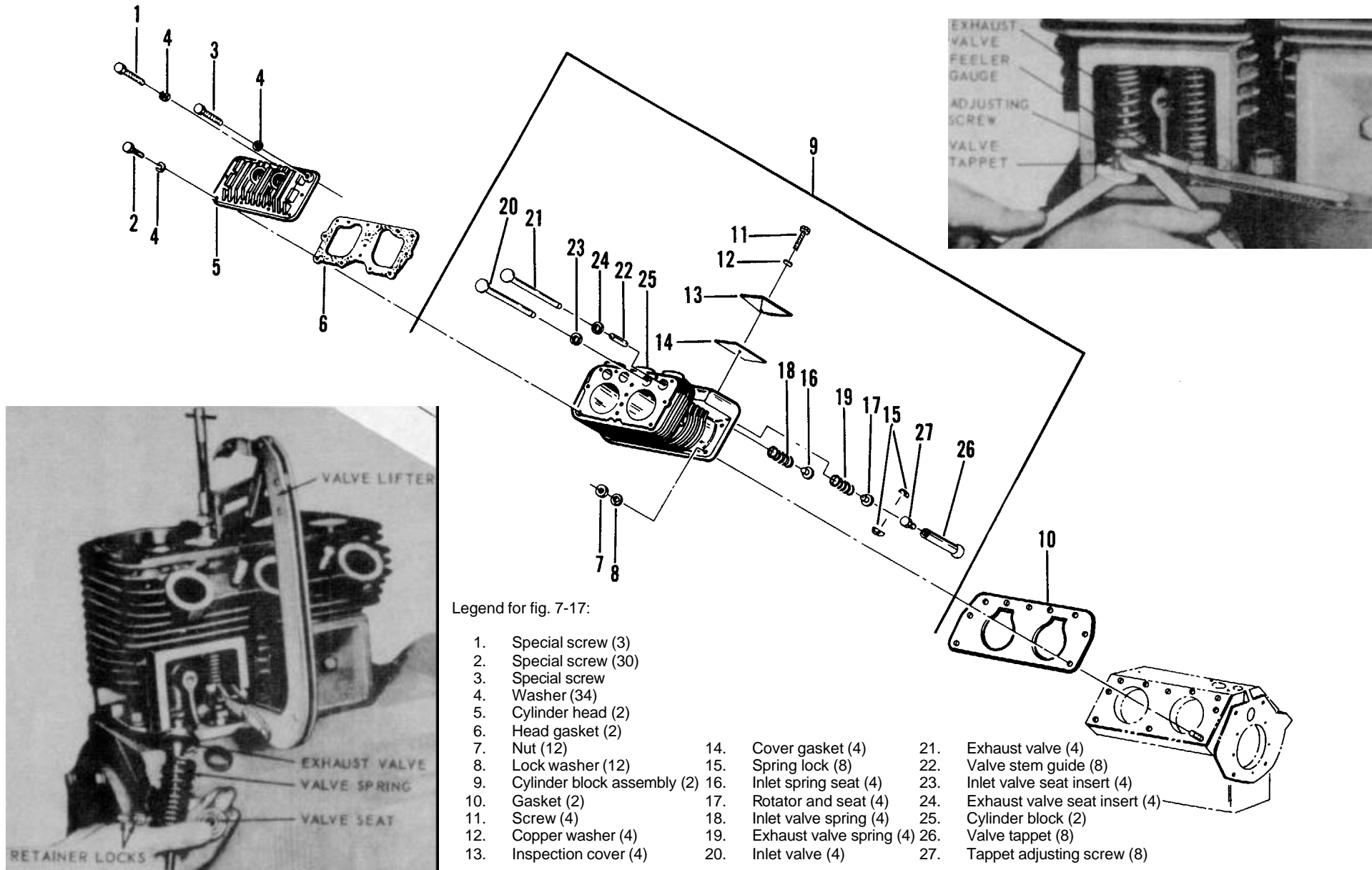
**d. Reassembly.**

- (1) If rivnuts (22, fig. 7-16), nameplate (21) and rivets (20) were removed from flywheel shroud (9), install.
- (2) Attach flywheel shroud (9) to engine gear cover with lock washers (8) and screws (7, 6).
- (3) Assemble left-hand lower cylinder shroud (19), right-hand lower cylinder shroud (18), right-hand heat deflector (17), left-hand heat deflector (16), and side shrouds (13, 12) and attach with lock washers (2) and screws (15, 11, 1) as shown.
- (4) Assemble left-hand shroud (4) and right-hand shroud (3); attach with six lock washers (2) and screws (1), each side. Attach flywheel screen (5) to flywheel shroud (9) with six lock washers (2) and screws (1).

**e. Installation.** Refer to para 7-10.b. and install the engine assembly on the unit.

**7-16. Maintenance of Cylinder Heads, Cylinder Blocks, and Valves.**

**a. Removal and Disassembly.** Refer to para 7-10.a. and remove the engine from unit. Clutch housing and clutch assembly (para 7-10.a.(12)) need not be removed. Refer to para 7-15 and remove engine covers and shrouds. Refer to figure 7-17 and remove and disassemble cylinder heads, cylinder blocks, and valves as follows:



Legend for fig. 7-17:

- |                                |                              |                                   |
|--------------------------------|------------------------------|-----------------------------------|
| 1. Special screw (3)           | 14. Cover gasket (4)         | 21. Exhaust valve (4)             |
| 2. Special screw (30)          | 15. Spring lock (8)          | 22. Valve stem guide (8)          |
| 3. Special screw               | 16. Inlet spring seat (4)    | 23. Inlet valve seat insert (4)   |
| 4. Washer (34)                 | 17. Rotator and seat (4)     | 24. Exhaust valve seat insert (4) |
| 5. Cylinder head (2)           | 18. Inlet valve spring (4)   | 25. Cylinder block (2)            |
| 6. Head gasket (2)             | 19. Exhaust valve spring (4) | 26. Valve tappet (8)              |
| 7. Nut (12)                    | 20. Inlet valve (4)          | 27. Tappet adjusting screw (8)    |
| 8. Lock washer (12)            |                              |                                   |
| 9. Cylinder block assembly (2) |                              |                                   |
| 10. Gasket (2)                 |                              |                                   |
| 11. Screw (4)                  |                              |                                   |
| 12. Copper washer (4)          |                              |                                   |
| 13. Inspection cover (4)       |                              |                                   |

Figure 7-17. Cylinder head, block, and valves

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- (1) Remove screws (1, 2, 3) and thirty-four washers (4). Tap cylinder head with a soft mallet or lead hammer and remove cylinder head (5) and gasket (6).

#### NOTE

**Quantities shown in fig. 7-17 legend are total quantities for both heads and blocks. Each of the two heads and blocks are the same except that screw (3) is used to attach the cylinder head high temperature switch (see fig. 6-11). Instructions in this paragraph apply to both banks of heads and blocks.**

- (2) Remove inspection cover screws (11), copper washers (12), covers (13) and gaskets (14). Insert a rag in opening at bottom of valve chamber so spring locks (15) do not fall into crankcase when removing
- (3) Use a standard automotive type valve lifter to compress valve springs and remove spring locks (15), inlet spring seats (16), rotators and seats (17), inlet springs (18), exhaust springs (19), inlet valves (20), and exhaust valves (21).

#### NOTE

**Tag each valve (20, 21) as they are removed to identify location so each is reassembled into same guide as removed.**

- (4) Remove nuts (7) and lock washers (8) securing cylinder blocks (25) to crankcase. Tap block loose with soft mallet or lead hammer and remove cylinder blocks (25) from crankcase. Remove gaskets (10).
- (5) Remove the inserts (23, 24) using insert puller (Wisconsin Motor DF-66-A), or equivalent. Valve tappets (26) and adjusting screws (27) are shown here for reference only. They are removed after camshaft is removed.

**b. Cleaning.** Clean cooling fins of cylinder heads (5, fig. 7-17) and cylinder blocks (25) of accumulated oil and dirt. Wash all parts thoroughly with hot solution of soap and water. Clean lead deposits and carbon off parts with approved cleaning solvent. Clean cylinder head and cylinder block seating surfaces of any gasket material that may be present.

**c. Inspection, Repair or Replacement.** Inspect valves (20, 21, fig. 7-17) and seats (23, 24) for burns and pitting. Check clearance of valve stems in guides (22). Clearance should be 0.003-0.005 inch (0.075-0.127 mm). When clearance becomes .007 inch (1.178 mm), replace valve guides (22). As necessary, grind valve faces and valve seats at 45° to vertical center-line of valve stem. After grinding lap valves until uniform seating ring shows entirely around valve face. Inspect cylinder bores for scoring, out-of-round, and wear beyond 0.005 inch (0.127 mm) oversize. When these bore conditions exist, rebore cylinder block and fit with oversize pistons and rings. Replace gaskets (6, 10) at reassembly. Replace all cracked, broken, or distorted parts.

#### d. Reassembly.

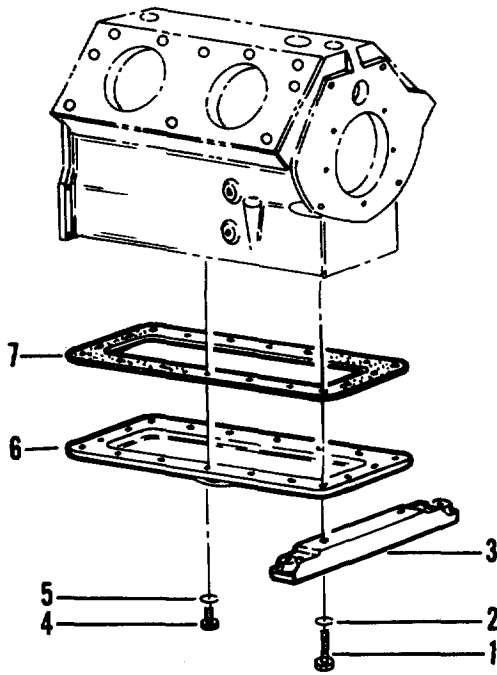
- (1) Assemble new gaskets (10, fig. 7-17) over crank-case studs. Install valve guides (22) with inside chamfer down. Install exhaust valve seat inserts (24) and inlet valve seat inserts (23). Assemble cylinder blocks (25) onto crankcase studs using ring compressors on pistons. Secure blocks to crankcase with lock washers (8) and nuts (7). Torque nuts (7) to 40-50 foot-pounds (5.53-6.92 kg-m).
- (2) Assemble exhaust valves (21) and inlet valves (20) into same guides (22) from which they were removed and tagged. Assemble exhaust valve springs (19) and rotator and seat (17) on exhaust valve (21) stem. Use automotive type valve lifter to compress valve spring and assemble spring locks (15) on exhaust valves. Assemble inlet valve springs (18) and inlet spring seats (16) on inlet valve (20) stem. Use valve lifter to compress spring and assemble spring locks (15) on inlet valves.
- (3) Adjust the valve tappets (26) in their lowest position, and engine cold, to clearance of 0.008 inch (0.203 mm) for inlet valve and .015 inch (0.406 mm) for exhaust valve. Use feeler gage between adjusting screw (27) and valve stem and turn adjusting screw until drag on feeler gage is felt.
- (4) Assemble cover gaskets (14), inspection covers (13), copper washers (12) and screws (11).
- (5) Install new gaskets (6) and install cylinder heads (5). Use a mixture of graphite and oil on cylinder head screws (1, 2, 3) to prevent rusting tight. Screw (3) and washer (4) are used to

mount cylinder head high temperature switch (fig. 6-11) on cylinder number 4. Install the remaining screws (1, 2) and washers (4) to secure heads (5) to blocks (25). Torque screws (1, 2, 3) to 22-24 foot-pounds (2.04-3.32 kg-m).

**e. Installation.** Refer to para 7-15 and install engine covers and shrouds. Refer to para 7-10.b. and install the engine on the unit.

**7-17. Maintenance of Engine Support and Crankcase Cover.**

**a. Removal and Disassembly.** Refer to para 7-10.a. and remove engine from the unit. Refer to figure 7-18 and disassemble engine support and crankcase cover as follows:



- Legend for fig. 7-18:
1. Screw (4)
  2. Lock washer (4)
  3. Engine support (2)
  4. Screw (14)
  5. Lock washer (14)
  6. Crankcase bottom cover
  7. Cover gasket

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Figure 7-18. Engine support and crankcase cover

- (1) Remove four screws (1) and lock washers (2); remove two engine supports (3).
- (2) Remove fourteen screws (4) and lock washers (5); remove crankcase bottom cover (6) and gasket (7).

**WARNING**

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° F - 130° F (38° C - 59° C).

**b. Cleaning.** Clean parts in solvent, P-D-680, or equivalent, and dry thoroughly. Clean off any gasket material that has stuck to cover or crankcase.

**c. Inspection, Repair or Replacement.** Inspect all parts for cracks and breaks. Discard and replace gasket (7, fig. 7-18). Replace all defective parts.

**d. Reassembly.**

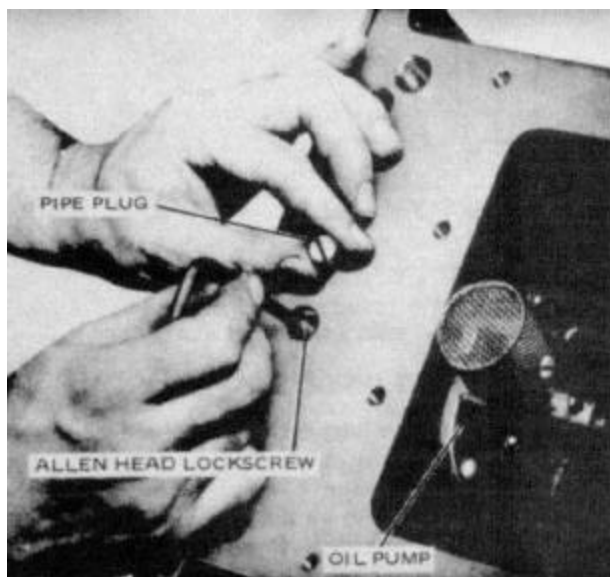
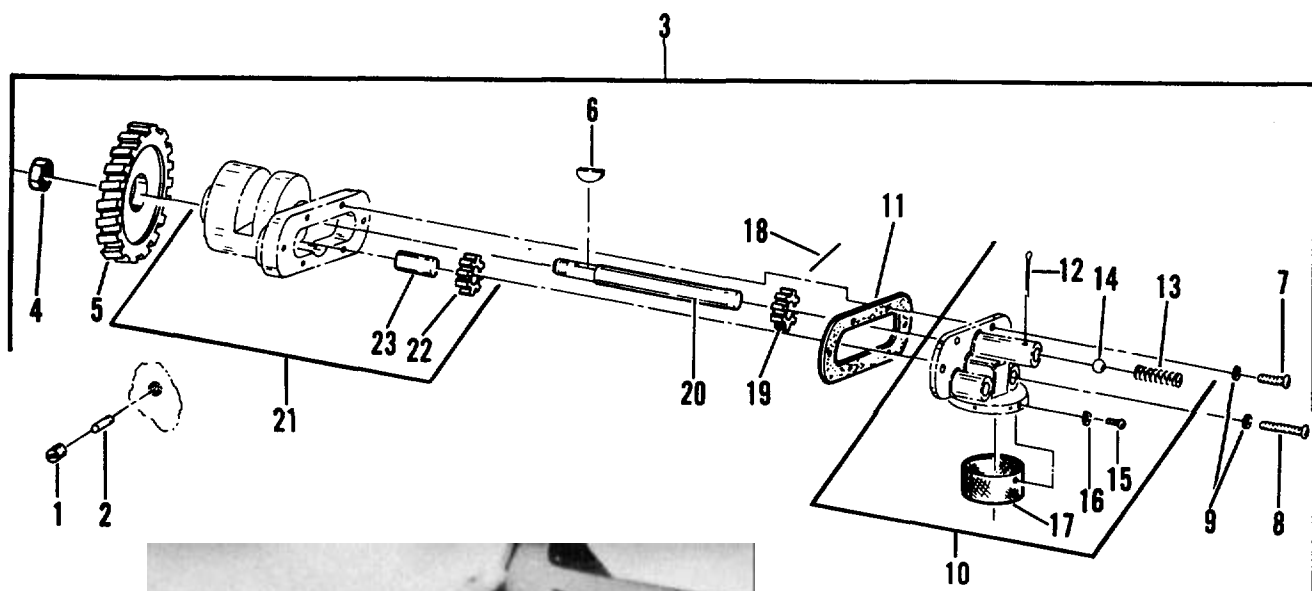
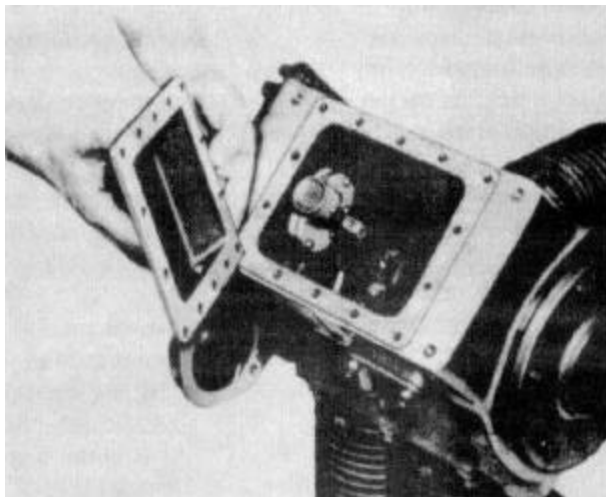
- (1) Install new gasket (7, fig 7-18) and assemble crankcase bottom cover (6) with fourteen lock washers (5) and screws (4). Tighten screws (4) to 6-9 foot-pounds (0.83-1.24 kg-m).
- (2) Assemble two engine supports (3) and attach with four lock washers (2) and screws (1).

**e. Installation.** Refer to para 7-10.b. and install the engine on the unit.

**7-18. Maintenance of Oil Pump.**

**a. Removal and Disassembly.** Refer to para 7-10.a. and remove the engine from the unit. Refer to para 7-17.a.(1) and remove engine supports and crankcase cover. Refer to para 7-20.a. and remove the gear cover. Refer to fig. 7-19 and remove and disassemble oil pump as follows:

- (1) Remove gear mounting nut (4, fig. 7-19) and oil pump drive gear (5). Use gear puller if gear (5) cannot be removed by hand. Remove key (6).



Legend for fig. 7-19:

- |                       |                         |
|-----------------------|-------------------------|
| 1. Pipe plug          | 13. Relief valve spring |
| 2. Lock screw         | 14. Steel ball          |
| 3. Oil pump assembly  | 15. Screw               |
| 4. Gear mounting unit | 16. Lock washer         |
| 5. Drive gear         | 17. Oil pump screen     |
| 6. Key                | 18. Pump gear pin       |
| 7. Screw (4)          | 19. Driver gear         |
| 8. Screw (2)          | 20. Shaft               |
| 9. Lock washer (6)    | 21. Body assembly       |
| 10. Cover assembly    | 22. Driven gear         |
| 11. Cover gasket      | 23. Stub shaft          |
| 12. Cotter pin        |                         |

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Figure 7-19. Oil pump assembly

- (2) Remove pipe plug (1) from bottom of crankcase. Use 5/32 inch Allen wrench and remove lock screw (2) from pipe plug (1) hole. Remove oil pump assembly (3) from inside of crankcase. If pump assembly is tight, tap front of pump housing, not the shaft, with soft hammer or brass rod to loosen.
- (3) To disassemble oil pump, remove four screws (7), two screws (8) and six lock washers (9). Remove cover assembly (10) and gasket (11). To disassemble cover assembly (10, remove cotter pin (12), relief valve spring (13) and steel ball (14). Remove screw (15), lock washer (16) and screen (17).
- (4) Remove shaft (20) and drive out pump gear pin (18) freeing gear (19) from shaft (20). Remove driven gear (22) and stub shaft (23) from body assembly (21) as necessary.

**b. Cleaning and Inspection.** Clean parts in a hot soap and water solution to remove oil and any collection of foreign matter. Make certain screen (17, fig. 7-19) mesh is free of all dirt. Inspect for cracks and chipping of gear teeth (5, 19, 22). Inspect screen (17) for breaks in mesh. Inspect relief spring (13) for broken coils and resiliency. Inspect all parts for cracks, breaks, and defective screw threads.

**c. Repair or Replacement.** Discard and replace gasket (11, fig. 7-19). Replace all defective parts.

**d. Reassembly and Installation.**

- (1) If removed, reassemble stub shaft (23, fig. 7-19) in cover assembly (21) and place driven gear (22) on stub shaft (23). Place driver gear (19) on shaft (10) and assemble gear pin (18) through gear and shaft. Assemble shaft into body assembly. (21).
- (2) To assemble cover assembly (10), install oil pump screen (17) and attach with lock washer (17) and screw (15). Assemble steel ball (14) and relief valve spring (13); compress spring and install cotter pin (12) past end of compressed spring (13).
- (3) Install new gasket (11); attach cover assembly (10) to body assembly (21) with six lock washers (9), two screws (8) and four screws (7).
- (4) Install the oil pump assembly (3) into crankcase, secure in position with lock screw (2) and install pipe plug (1).
- (5) Assemble key (6) into shaft (20) keyway, install oil pump drive gear (5), meshing with idler gear, and secure with mounting nut (4).
- (6) Refer to para 7-20.d. and install gear cover. Refer to para 7-10.b. and install the engine on the unit.

## 7-19. Maintenance of Flywheel Assembly.

**WARNING**

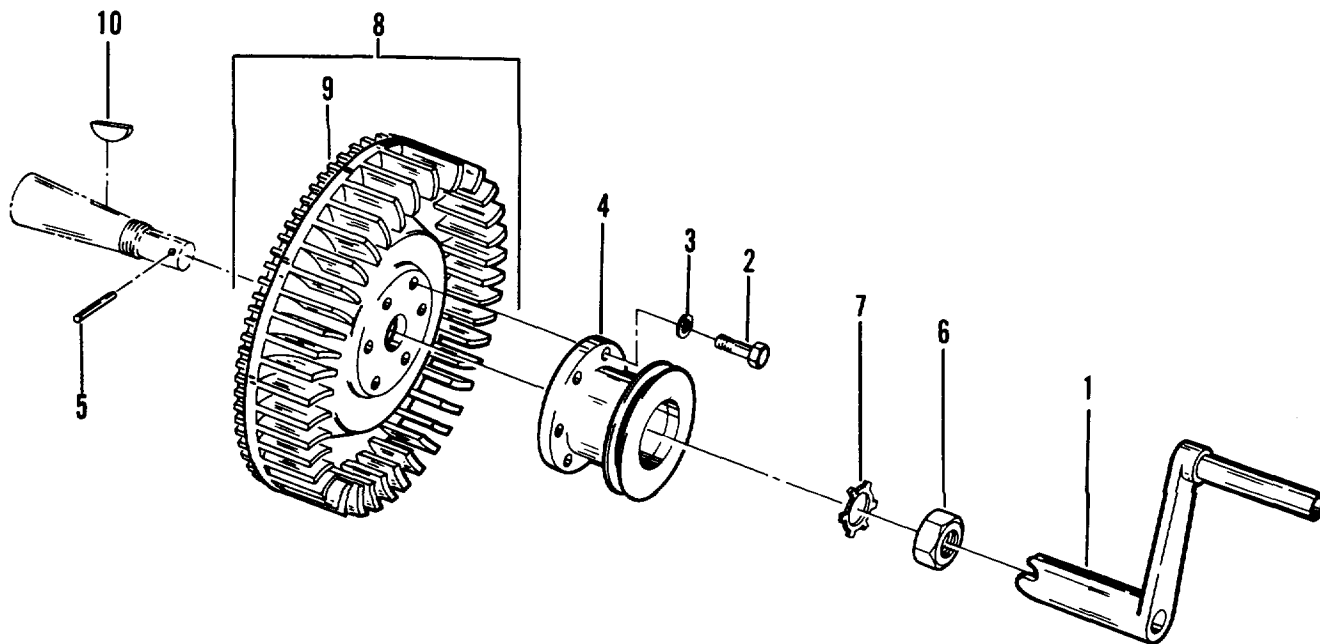
**a. Removal and Disassembly.** Refer to para 7-10.a. and remove engine from unit. Remove six screws (1, fig. 7-16) and lock washers (2); remove flywheel screen (5). Refer to figure 7-20 and remove flywheel as follows:

- (1) Remove six screws (2, fig. 7-20) and lock washers (3); remove accessory drive pulley (4). Use starting crank (1) and turn crankshaft so that crank pin (5) can be driven out of crankshaft; drive out pin (5).
- (2) Remove flywheel mounting nut (6) and lockwasher (7). Take firm hold on flywheel (8) fins, pull outward and at same time strike end of crankshaft with a babbitt hammer to break flywheel loose from taper on crankshaft. Remove flywheel assembly (8) and flywheel key (10).
- (3) Only when ring gear (9) is damaged and replacement is necessary, heat the gear (9) evenly all the way around with a torch until it can be removed from flywheel.

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° F - 130° F (38° C - 59° C).

**b. Cleaning and Inspection.** Clean all parts with solvent, P-D-680, or equivalent. Inspect flywheel assembly (8, fig. 7-20) for broken fins, nicks in tapered bore, and nicked or broken teeth on ring gear (9). Inspect accessory drive pulley (4) for cracks and breaks.

**c. Repair or Replacement.** Remove any nicks and burrs from flywheel assembly (8, fig. 7-20) bore with a metal scraper or emery cloth. If ring gear (9) was removed because replacement was necessary, heat new ring (9) with a torch evenly all the way around just enough to expand to point where it can be pressed onto flywheel. Do not overheat. Replace any part that is cracked or broken.



Legend for fig. 7-20:

- |                           |                          |
|---------------------------|--------------------------|
| 1. Starting crank         | 6. Flywheel mounting nut |
| 2. Screw (6)              | 7. Lock washer           |
| 3. Lock washer (6)        | 8. Flywheel assembly     |
| 4. Accessory drive pulley | 9. Ring gear             |
| 5. Crank pin              | 10. Flywheel key         |

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Figure 7-20. Starting crank, accessory drive, and flywheel



**d. Reassembly and Installation.**

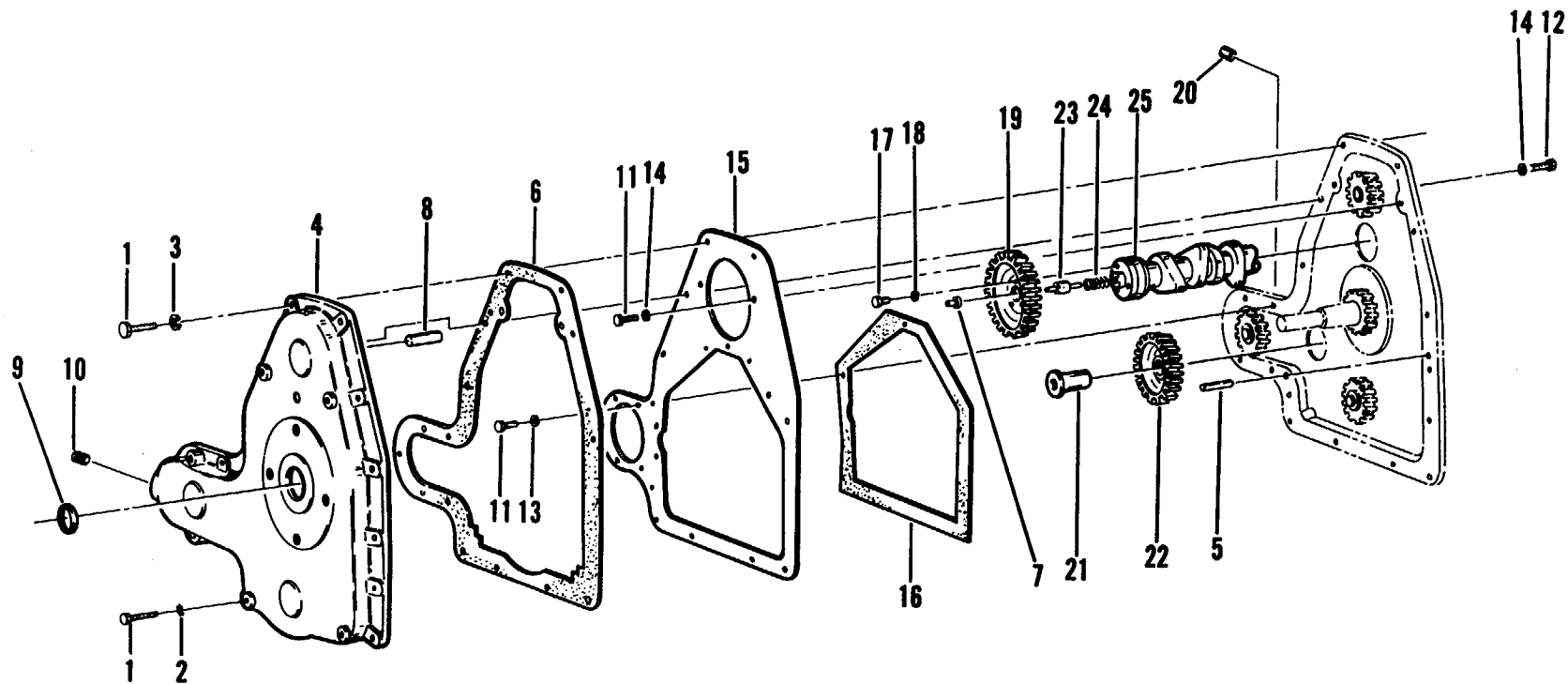
- (1) Install flywheel key (10, fig. 7-20) in crankshaft keyway. Carefully install flywheel assembly (8) onto crankshaft with keyway of flywheel aligned with key (10) in crankshaft. Install lock washer (7) and mounting nut (6). Drive crank pin (5) through crankshaft hole so that ends of pin are exposed approximately the same distance on side of crankshaft. Check that grab nut end of starting crank (1) will engage with pin on both sides.
- (2) Attach accessory drive pulley (4) to flywheel assembly (8) with six lock washers (3) and screws (2).

- (3) Assemble flywheel screen (5, fig. 7-15) and attach with six lock washers (2) and screws (1).

- (4) Refer to para 7-10.b. and install the engine.

**7-20. Maintenance of Timing Gear Cover and Gears.**

**a. Removal and Disassembly.** Refer to para 7-10.a. and remove engine from unit. Refer to para 7-14.a. and remove governor assembly from engine. Refer to para 7-15.a. and remove engine covers and shrouds. Refer to para 7-19.a. and remove accessory drive pulley and flywheel. Refer to figure 7-21 and remove timing gear cover and gears as follows:

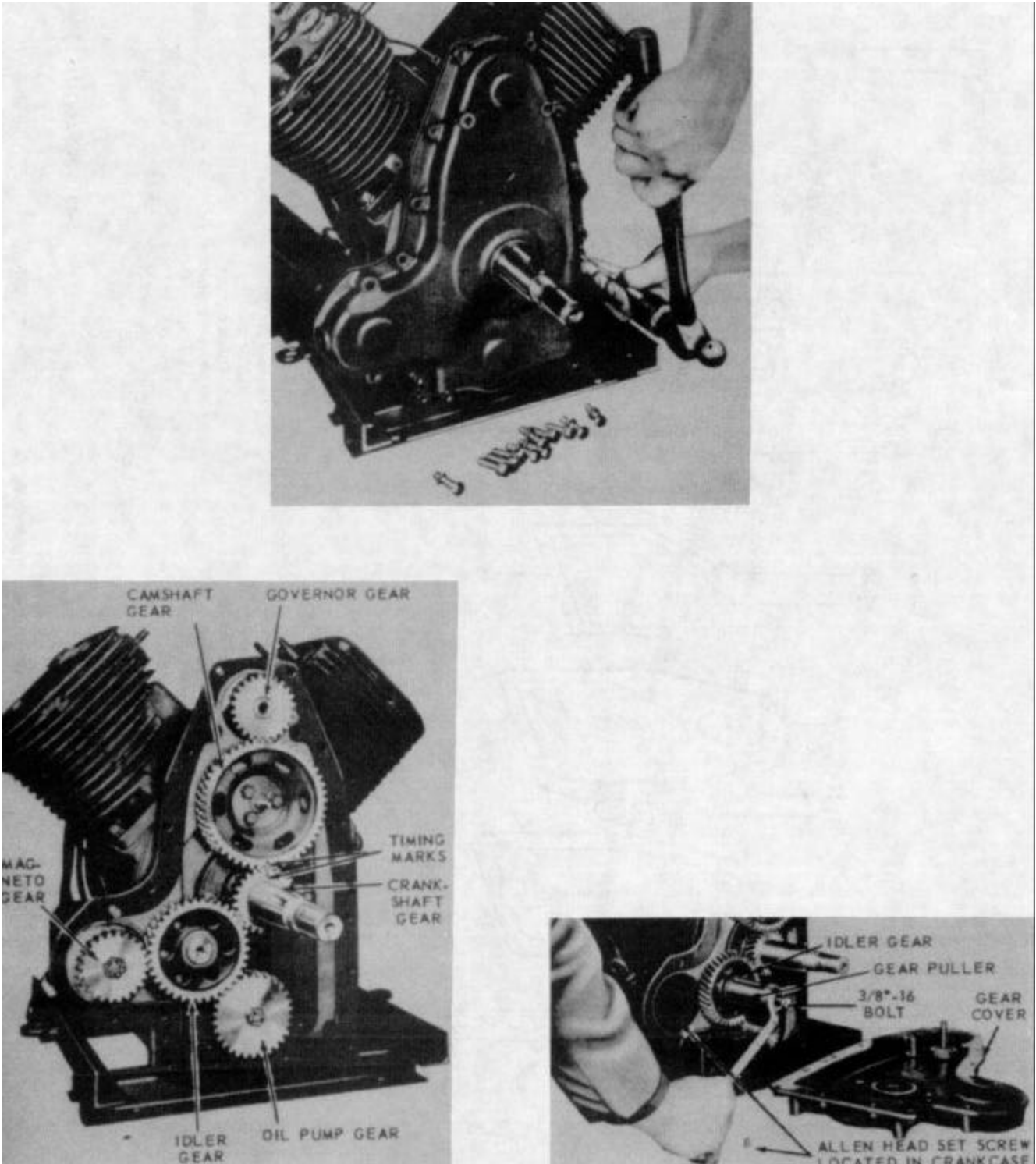


Legend for fig. 7-21:

- |                          |                       |                     |
|--------------------------|-----------------------|---------------------|
| 1. Screw (10)            | 10. Pipe plug         | 18. Lock washer (3) |
| 2. Lock washer (2)       | 11. Screw (5)         | 19. Camshaft gear   |
| 3. Lock washer (8)       | 12. Screw (2)         | 20. Setscrew        |
| 4. Gear cover            | 13. Copper washer (2) | 21. Idler gear stud |
| 5. Dowel pin (2)         | 14. Lock washer (5)   | 22. Idler gear      |
| 6. cover gasket          | 15. Gear cover spacer | 23. Thrust plunger  |
| 7. Plunger thrust button | 16. Spacer gasket     | 24. Plunger spring  |
| 8. Governor shaft        | 17. Screw (3)         | 25. Camshaft        |
| 9. Oil seal              |                       |                     |

TS5-4310-365-14/7-21(1)

Figure 7-21. Timing gear cover and gears (sheet 1 of 2)



TS5-4310-365-14/7-21(2)

Figure 7-21. Timing gear cover and gears (sheet 2 of 2)

- (1) Remove ten screws (1, fig. 7-21), eight lock washers (3), and two lock washers (2). Drive out two dowel pins (5) and remove gear cover (4). Remove cover gasket (6), plunger button (7), and only when necessary governor shaft (8), oil seal (9), and pipe plug (10).
- (2) To remove camshaft gear (19), remove three screws (17) and lock washers (18); pry camshaft gear (19) off using a wedge tool, or equivalent. When necessary remove thrust plunger (23) and plunger spring (24) from camshaft (25).
- (3) To remove idler gear (22) and stud (21), remove the setscrew (20) from magneto side of crankcase which locks idler shaft (21) in position. Use gear puller and remove idler gear (22) and stud (21) from crankcase.
- (4) Only when necessary for replacement of gear cover spacer (15), remove five screws (11), two screws (12), two copper washers (13), and five lock washers (14); remove cover spacer (15) and gasket (16).

**Warning**

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**b. Cleaning and Inspection.** Clean all parts in solvent, P-D-680, or equivalent, and dry thoroughly. Clean off any gasket material stuck to mating surfaces. Inspect gears (19, 22) for chipped, cracked, or broken teeth. Inspect all parts for cracks and breaks.

**c. Repair or Replacement.** Discard gaskets (16, 6) and oil seal (9); replace at assembly. Replace all damaged parts.

**d. Reassembly and Installation.**

- (1) If removed, install new gasket (16, fig. 7-21) and attach gear cover spacer (15) with five lock washers (14), two copper washers (13), two screws (12), and five screws (11).
- (2) Install idler gear (22) and stud (21) allowing 0.003-0.004 inch (0.076-0.102 mm) clearance between gear and stud collar. Install setscrew (20).
- (3) Assemble plunger spring (24) and thrust plunger (23). Attach camshaft gear (19) to camshaft (25) with three lock washer (18) and screws (17). Mounting holes in camshaft gear are staggered so that gear can be assembled only one way. This will automatically times the gear to camshaft. However, timing mark on camshaft gear (19) must align with timing mark on crankshaft gear.
- (4) Install pipe plug (10), press new oil seal (9) into gear cover (4), install governor shaft (8), plunger thrust button (7), assemble new gasket (6), drive in two dowel pins (5), and attach gear cover (4) to crankcase with eight lock washers (3), two lock washers (2) and ten screws (1). Torque screws (1) to 14-18 foot pounds (1.94-2.49 kg-m).
- (5) Refer to para 7-19.**d.** and install flywheel and accessor drive pulley. Refer to para 7-15.**d.** and reassemble engine covers and shrouds. Refer to para 7-14.**c.** and install governor assembly. Refer to para 7-10.**b.** and install engine on unit.

## 7-21. Maintenance of Connecting Rods, Bearings, Pistons, and Rings.

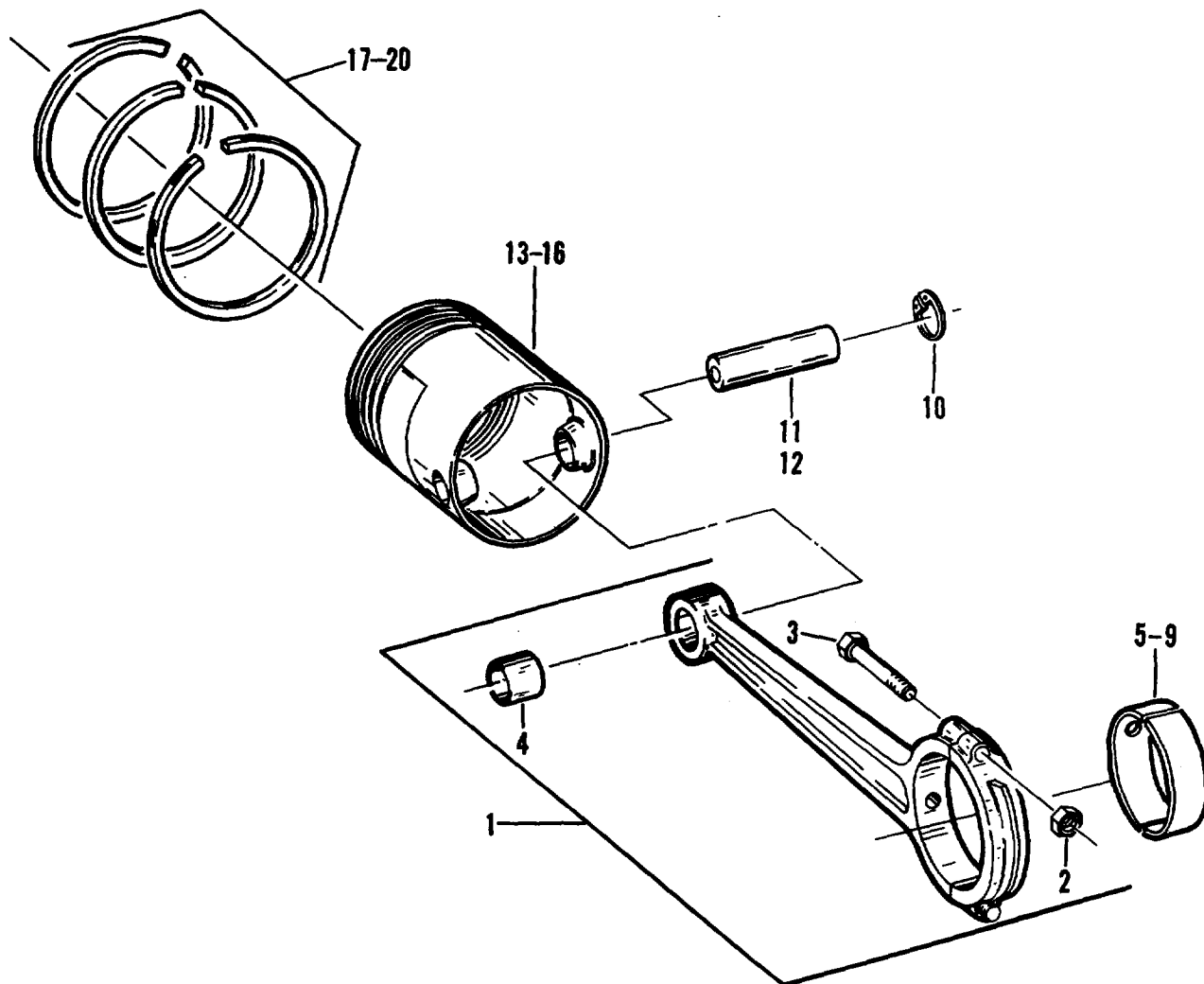
**a. Removal and Disassembly.** Refer to para 7-10.**a.** and remove the engine from unit. Refer to para 7-12.**a.** and remove carburetor. Refer to para 6-19.**b.** and remove fuel strainer and fuel pump. Refer to para 6-19.**b.** and remove fuel strainer and fuel pump. Refer to para 6-17.**b.** and remove intake and exhaust manifold. Refer to para 6-20.**b.** and remove engine oil filter. Refer to para 7-15.**a.** and remove engine covers and shrouds. Refer to para 7-16.**a.** and remove cylinder heads. Refer to para 7-17.**a.** and remove engine supports and crankcase cover. Refer to para 7-18.**a.** and remove oil pump. Refer to figure 7-22 and remove connecting rods, pistons, and rings as follows:

- (1) Scrape off all carbon deposits that might interfere with removal of pistons from upper end of cylinders.
- (2) Remove locknuts (2, fig. 7-22) from rod bolts (3). Tap ends of bolts (3) lightly to break connecting rod cap free from bolts (3).
- (3) Turn crankshaft until piston is at top of cylinder. Push connecting rod and piston assembly upward and out through top of cylinder.

### CAUTION

**Be careful to not allow rod bolts to strike or scrape across crankshaft crank pin. Tap each assembly indicating which cylinder it was removed from for reassembly reference.**

- (4) Place connecting rod caps back on rod bolts so that they will not be mismatched at reassembly



Legend for fig. 7-22

- |                                   |                               |
|-----------------------------------|-------------------------------|
| 1. Connecting rod assembly        | 11. Piston pin                |
| 2. Locknut (2)                    | 12. 0.010 Oversize piston pin |
| 3. Rod bolt (2)                   | 13. Standard piston           |
| 4. Piston pin bushing             | 14. 0.010 Oversize piston     |
| 5. Standard bearing shell         | 15. 0.020 Oversize piston     |
| 6. 0.001 Undersize shell          | 16. 0.030 Oversize piston     |
| 7. 0.002 Undersize shell          | 17. Standard piston ring set  |
| 8. 0.010 Undersize shell          | 18. 0.010 Oversize ring set   |
| 9. 0.020 Undersize shell          | 19. 0.020 Oversize ring set   |
| 10. Piston pin retaining ring (2) | 20. 0.030 Oversize ring set   |

TS5-4310-365-14/7-22 (1)

Figure 7-22. Connecting rods, bearings, pistons, and rings (sheet 1 of 2)

**Note**

Each of the four connecting rod and piston assemblies are removed in the same manner as described above.

- (5) Use a ring expander and remove piston ring set (17). Remove the two piston pin retaining rings (10) and push out piston pin (11) freeing piston (13) from connecting rod assembly (1).
- (6) As needed, press piston pin bushing (4) out of connecting rod. Remove rod cap and remove bearing shells (5).

**WARNING**

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 130°F (38°C - 59°C)

*b. Cleaning and Inspection.* Clean all parts with solvent, P-D-680, or equivalent. Dry thoroughly. If necessary, use a broken ring to clean deposits in ring grooves. The piston skirts are cam-ground to an elliptical contour.

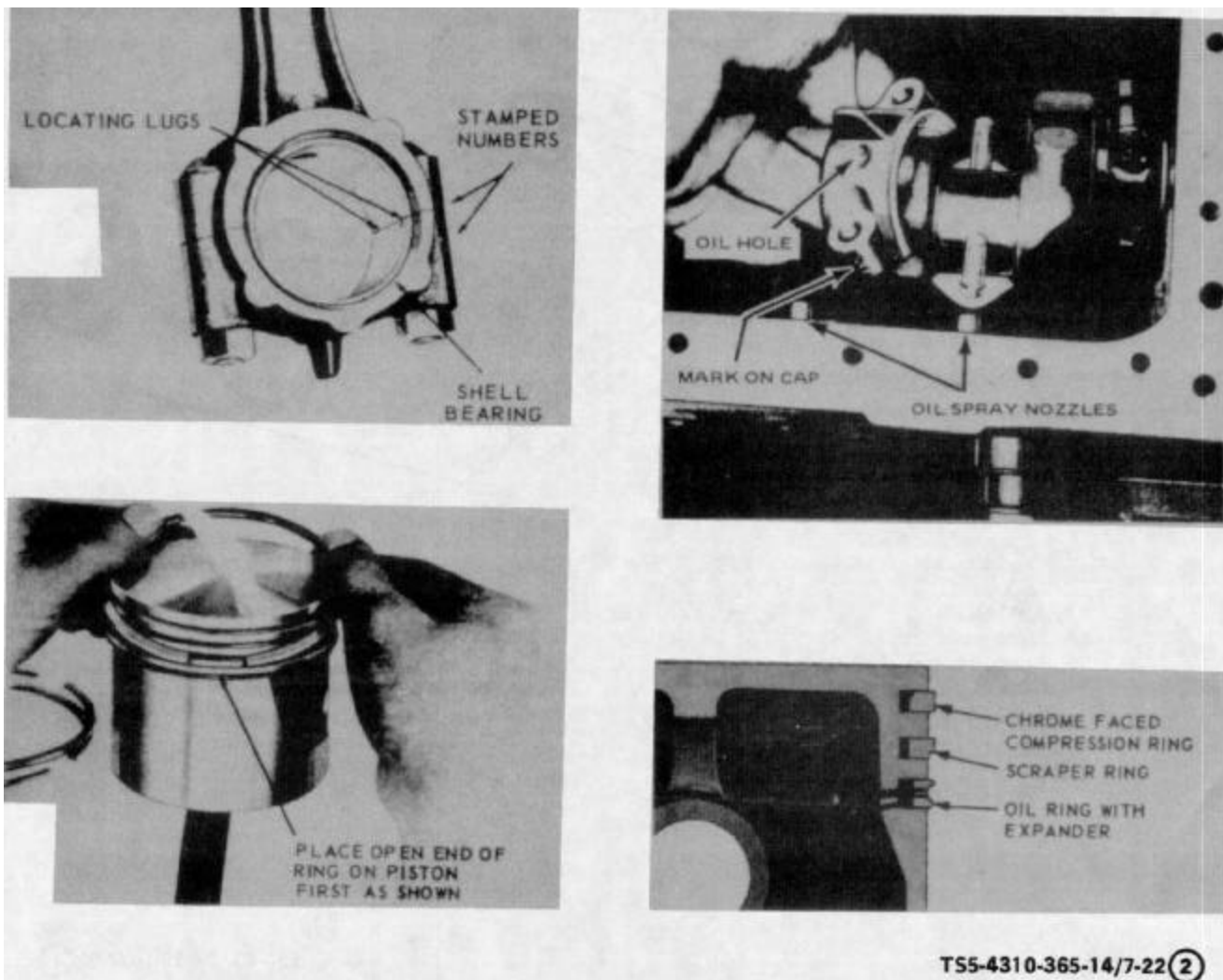


Figure 7-22. Connecting rods, bearings, pistons, and rings (sheet 2 of 2)

Clearance between piston and cylinder must be measured at the center of the thrust face at the bottom of the piston skirt. Thrust faces on piston skirt are 90° from axis of piston pin hole, with wide section of piston skirt toward maximum thrust side, opposite crankshaft rotation. Refer to table 7-2 for proper clearances. Inspect all parts for cracks, breaks and scoring.

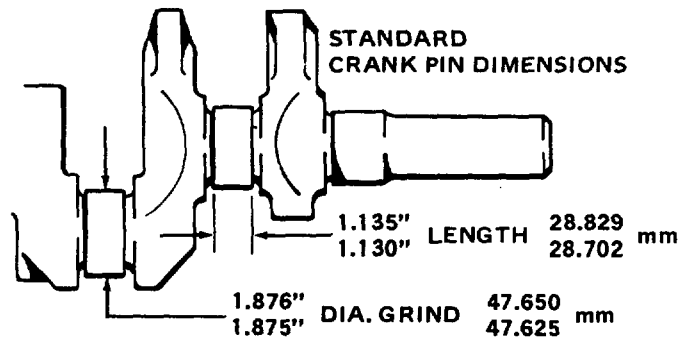
**c. Repair or Replacement.** All parts found defective shall be replaced. When proper clearances are not found (table 7-2), or when cylinders have been rebored, use undersize bearing shells (6-9, fig. 7-22), oversize piston pin (12), oversize pistons (14-16), or oversize ring sets (18-20) as needed.

**d. Reassembly and Installation.**

- (1) Mount shell bearings (5-9, fig. 7-22) in rod and cap so that locating lug of both halves are on the same side. If removed, press piston pin bushing (4) into connecting rod.
- (2) Assemble piston (13-16) to connecting rod assembly (1) with wide section of piston skirt toward maximum thrust side (opposite crankshaft rotation) when oil hole in connecting rod cap faces toward oil spray nozzles (fig. 7-22). Install piston pin (11-12) and two retaining rings (10).

Table 7-2. Piston, Ring, and Rod Clearance Chart

		INCHES	MM
PISTON TO CYLINDER AT PISTON SKIRT THRUST FACE		0.0035 - 0.004"	0.0889 - 0.1016
PISTON RING GAP		0.010 - 0.020"	0.254 - 0.508
PISTON RING SIDE CLEARANCE IN GROOVES	TOP RING	0.002 - 0.0035"	0.0508 - 0.0889
	2ND RING	0.001 - 0.0025"	0.0254 - 0.0635
	OIL RING	0.0025 - 0.004"	0.0635 - 0.1016
PISTON PIN TO CONNECTING ROD BUSHING		0.0005 - 0.0011"	0.0127 - 0.0279
PISTON PIN TO PISTON		0.0000 - 0.0008" tight	0.0000 - 0.0203
CONNECTING ROD TO CRANK PIN - SIDE CLEARANCE		0.0069 - 0.016"	0.2286 - 0.4064
CONNECTING ROD SHELL BEARING TO CRANK PIN DIA. (VERTICAL)		0.0012 - 0.0033"	0.0305 - 0.0838





- (3) Use ring expander and install ring sets (17-20) as shown in fig. 7-22. Stagger ring gaps 90° apart around the piston. Oil pistons, rings, piston pins, bearings, and cylinder walls with clean engine oil.

#### CAUTION

**Be sure piston and connecting rod assemblies are assembled into same bore from which they were removed. Identical numbers are stamped on side of rod and cap. These numbers must be on the same side when mounted in engine. Oil hole in rod cap must face oil spray nozzles.**

- (4) Use a ring compressor and install piston and connecting rod assemblies into same bores from which they were removed. Install connecting rod caps on rod bolts (3) and install new locknuts (2). Torque locknuts to 22-28 foot-pounds (3.04-3.87 kg-m).
- (5) Refer to para 7-18.d. and install oil pump. Refer to para 7-17.d. and reassemble crankcase cover and engine supports. Refer to para 7-16.d. and install cylinder heads. Refer to para 7-15.d. and install engine covers and shrouds. Refer to para 6-20.e. and install engine oil filter. Refer to para 6-17.d. and install intake and exhaust manifold. Refer to para 6-19.e. and install fuel pump and fuel strainer. Refer to para 7-12.f. and install carburetor. Refer to para 7-10.b. and install engine on unit.

### 7-22. Maintenance of Crankshaft and Main Bearings.

**a. Removal and Disassembly.** Refer to para 7-10.a. and remove the engine from unit. Refer to para 7-20.a. and remove timing gear cover. Refer to para 7-21.a. and remove pistons and connecting rods. Refer to figure 7-23 and remove and disassemble crankshaft and main bearings as follows:

- (1) Remove six screws (1, fig. 7-23) and lock washers (2). Pry off main bearing plate assembly (3).

#### CAUTION

**Keep bearing plate gaskets (5,6) and shim (7) together to provide proper and play to tapered roller main bearings.**

- (2) As necessary, press bearing cup and oil seal (4) out of main bearing plate assembly (3).
- (3) Remove crankshaft assembly (12) from crankcase from main bearing plate assembly end.
- (4) Remove bearing assembly (13) cone from crankshaft. Remove oil slinger (11) from end of crankshaft. Use a gear puller and remove gear (14); remove key (15). Remove bearing assembly (16).
- (5) As necessary, remove four screws (8), lock washers (9), and bearing retainer plate (10) from crankcase.

#### WARNING

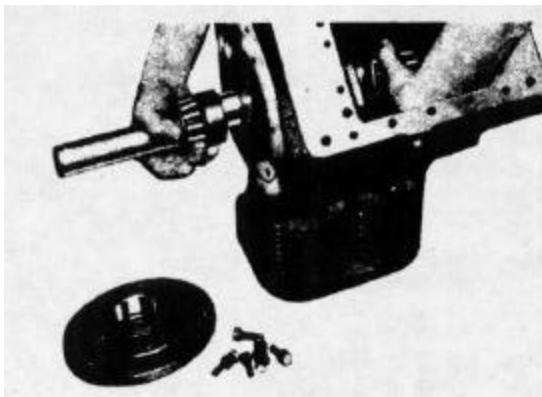
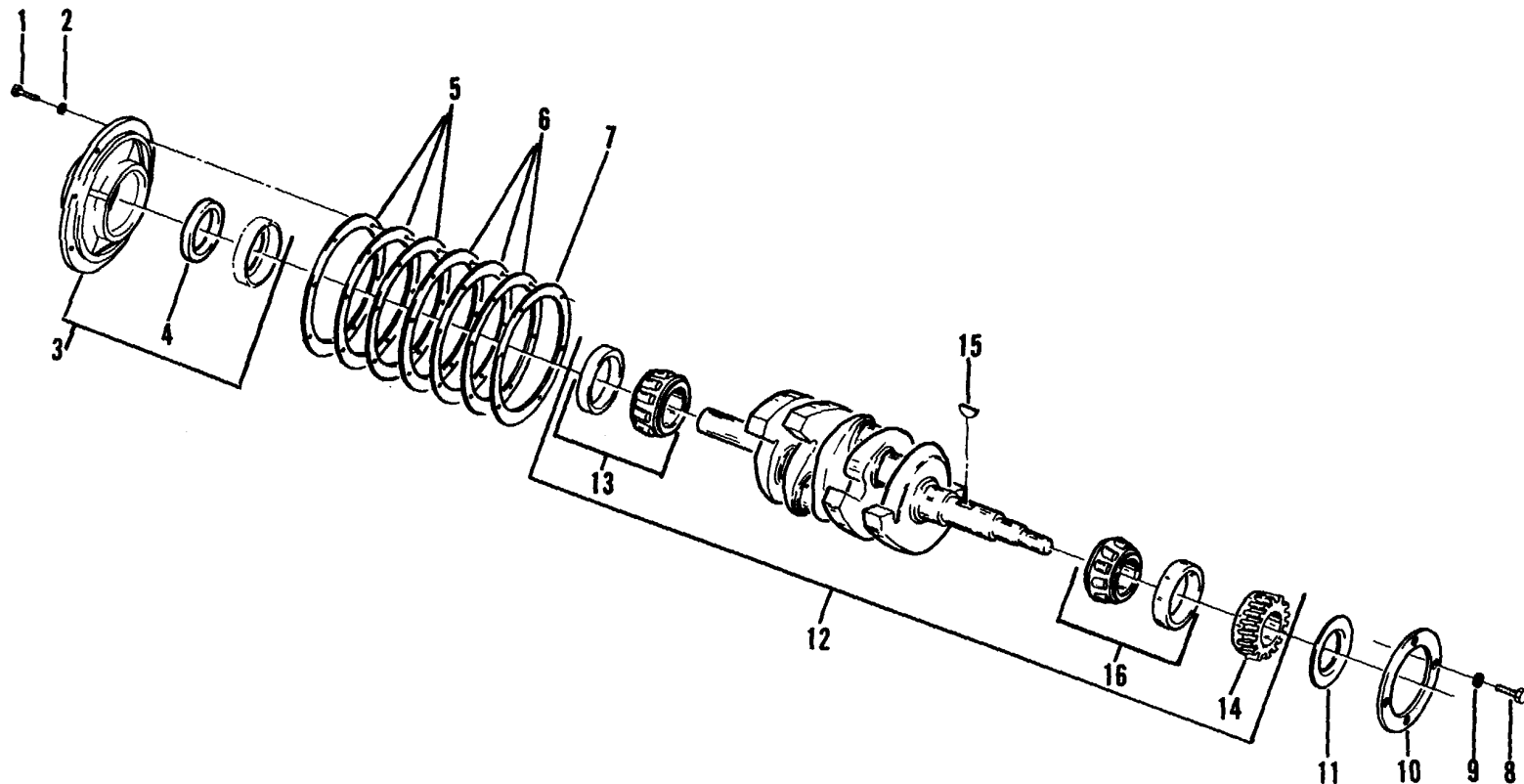
**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 130° F (38° C - 59° C).**

**b. Cleaning and Inspection.** Clean all parts insolvent, P-D-680, or equivalent. Inspect gear (14, fig. 7-23) for cracked, chipped, or broken teeth. Examine bearing assemblies (13, 16) for free rotation with no gritty action. Inspect all parts for cracks and breaks. Inspect crankshaft for scored connecting rod journals.

**c. Repair or Replacement.** Replace all damaged parts. Bearing assemblies (13, 16, fig. 7-23) shall be replaced as assemblies only.

#### **d. Reassembly and Installation.**

- (1) Install bearing retainer plate (10, fig. 7-23) on crankcase with four lock washers (9) and screws (8).
- (2) Press cones of bearing assemblies (13, 16) onto crankshaft until bottomed against shoulders on shaft extensions. Coat the cones with clean engine oil. Place cup of bearing assembly (16) on cone. Place key (15) in crankshaft keyway and press on gear (14).
- (3) Place oil slinger (11) on end of crankshaft and install crankshaft assembly (12) into crankcase from main bearing plate assembly end. Align timing mark on gear (14) with timing mark on camshaft gear.



Legend for fig. 7-23:

- |                             |                            |
|-----------------------------|----------------------------|
| 1. Screw (6)                | 9. Lock washer (4)         |
| 2. Lock Washer (6)          | 10. Bearing retainer plate |
| 3. Main bearing plate assy  | 11. Oil slinger            |
| 4. Oil seal                 | 12. Crankshaft assembly    |
| 5. Bearing plate gasket (3) | 13. Main bearing assembly  |
| 6. Bearing plate gasket (3) | 14. Crankshaft gear        |
| 7. Bearing plate shim       | 15. Key                    |
| 8. Screw (4)                | 16. Main bearing assembly  |

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Figure 7-23. Crankshaft and main bearings

- (4) Press new oil seal (4) and bearing assembly (13) cone into main bearing plate assembly (3).
- (5) Install shim (7), gaskets (6, 5), and main bearing plate assembly (3). Install six lock washers (2) and screws (1). Torque screws to 25-30 foot-pounds (3.46 - 4.15 kg-m). Check end play of crankshaft. Correct end play is 0.002 to 0.005 inch (0.051 - 0.127 mm). To maintain this end play, add or delete gaskets as necessary.
- (6) Refer to para 7-21.d. and install pistons and connecting rods. Refer to para 7-20.d. and install timing gear cover. Refer to para 7-10.b. and install engine on unit.

### 7-23. Maintenance of Crankcase and Breather.

**a. Removal and Disassembly.** Refer to para 7-10.a. and remove engine from unit. Refer to para 6-12.a. and remove starter assembly. Refer to para 6-14.b. and remove ignition leads, spark plugs, and magneto. Refer to para 6-17.b. and remove intake and exhaust manifold. Refer to para 6-18.b. and remove carburetor. Refer to para 6-19.b. and remove fuel strainer, fuel pump, and adapter. Refer to para 6-20.b. and remove oil filter group. Refer to para 7-14.a. and remove governor controls and governor. Refer to para 7-15.a. and remove engine covers and shrouds. Refer to para 7-16.a. and remove cylinder heads and cylinder blocks. Refer to para 7-18.a. and remove oil pump. Refer to para 7-19.a. and remove flywheel assembly. Refer to para 7-20.a. and remove timing gear cover and gears. Refer to para 7-21.a. and remove connecting rod and piston assemblies. Refer to para 7-22.a. and remove crankshaft and main bearings. Refer to figure 7-24 and disassemble crankcase and breather as follows:

- (1) Remove dipstick (1, fig. 7-24) and crankcase breather (2). Remove oil filler tube (4) and screen (5). Only when necessary, remove dipstick adapter tube (6).
- (2) Studs (7, 8), pipe plugs (9, 10), and expansion plugs (12, 13) should only be removed if damaged and replacement is necessary, or crankcase passages are plugged and require cleaning. Remove the four oil spray nozzles (11).

### WARNING

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 130°F (38°C - 59°C).

**b. Cleaning and Inspection.** Clean all parts in solvent, P-D-680, or equivalent. Dry thoroughly. Inspect oil filler screen (5, fig. 7-24) for damage. Examine studs (7,8) for damaged threads. Inspect crankcase assembly (3) thoroughly for cracks, breaks, damaged screw threads, scored bores and nicked or burred mounting surfaces.

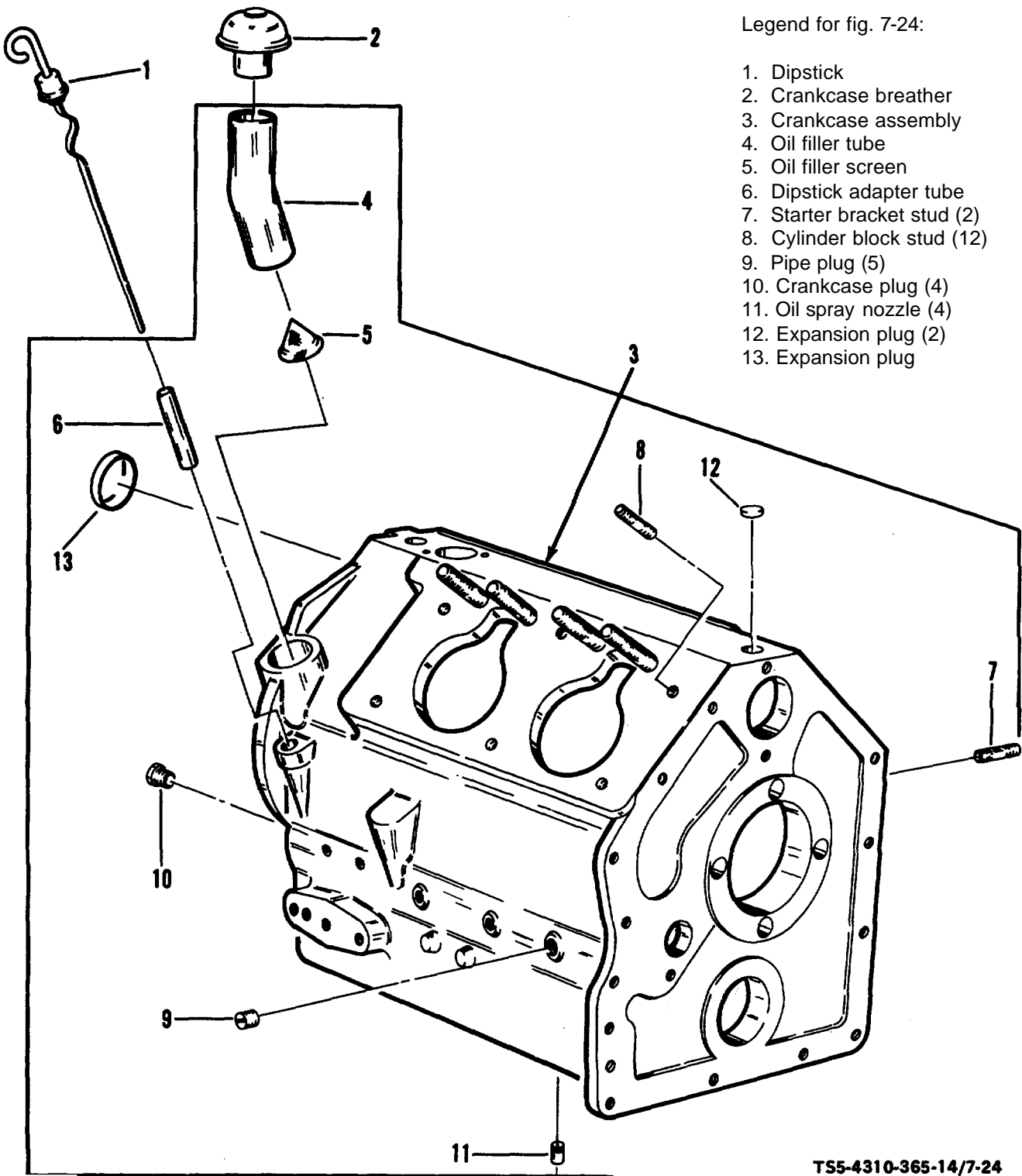
**c. Repair or Replacement.** If possible, repair damaged screw threads by chasing threads with tap. Replace damaged studs (7, 8). Remove slight nicks and burns with emery cloth, or equivalent. Replace parts damaged beyond this repair.

### d. Reassembly.

- (1) Install the four oil spray nozzles (11, fig. 7-24). If removed, install expansion plugs (12, 13), pipe plugs (9, 10), and studs (7, 8).
- (2) Install dipstick adapter tube (6). Assemble oil filler screen (5), filler tube (4), crankcase breather (2), and dipstick (1).
- (3) Refer to para 7-22.d. and install crankshaft and main bearings. Refer to para 7-12.d. and install connecting rod and piston assemblies. Refer to para 7-20.d. and install gears and timing cover. Refer to para 7-19.d. and install flywheel assembly. Refer to para 7-18.d. and install oil pump. Refer to para 7-16.d. and install cylinder blocks and cylinder heads. Refer to para 7-15.d. and install engine covers and shrouds. Refer to para 7-14.c. and install governor and controls. Refer to para 6-20.e. and install filter group. Refer to para 6-19.e. and install fuel pump adapter, fuel pump, and fuel strainer. Refer to para 6-18.e. and install carburetor.

Legend for fig. 7-24:

1. Dipstick
2. Crankcase breather
3. Crankcase assembly
4. Oil filler tube
5. Oil filler screen
6. Dipstick adapter tube
7. Starter bracket stud (2)
8. Cylinder block stud (12)
9. Pipe plug (5)
10. Crankcase plug (4)
11. Oil spray nozzle (4)
12. Expansion plug (2)
13. Expansion plug



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Figure 7-24. Crankcase and breather

Refer to para 6-17.**d.** and install intake-exhaust manifold. Refer to para 6-14.**e.** and install magnet, spark plugs, and ignition leads. Refer to para 6-12.**c.** and install starter assembly. Refer to para 7-10.**b.** and install engine on unit.

#### NOTE

**An engine that has been completely overhauled, such as having the cylinders rebored and fitted with new pistons, rings and valves, should be through a thorough "run-in" period, before any amount of load is applied to the engine. The engine should be started and allowed to run for about one-half hour, at about 1200 to 1400 R.P.M without load. The R.P.M. should then be increased to engine operating speed, still without load, for an additional three and one-half to four hours.**

### Section VI. MAINTENANCE OR PNEUMATIC SYSTEM

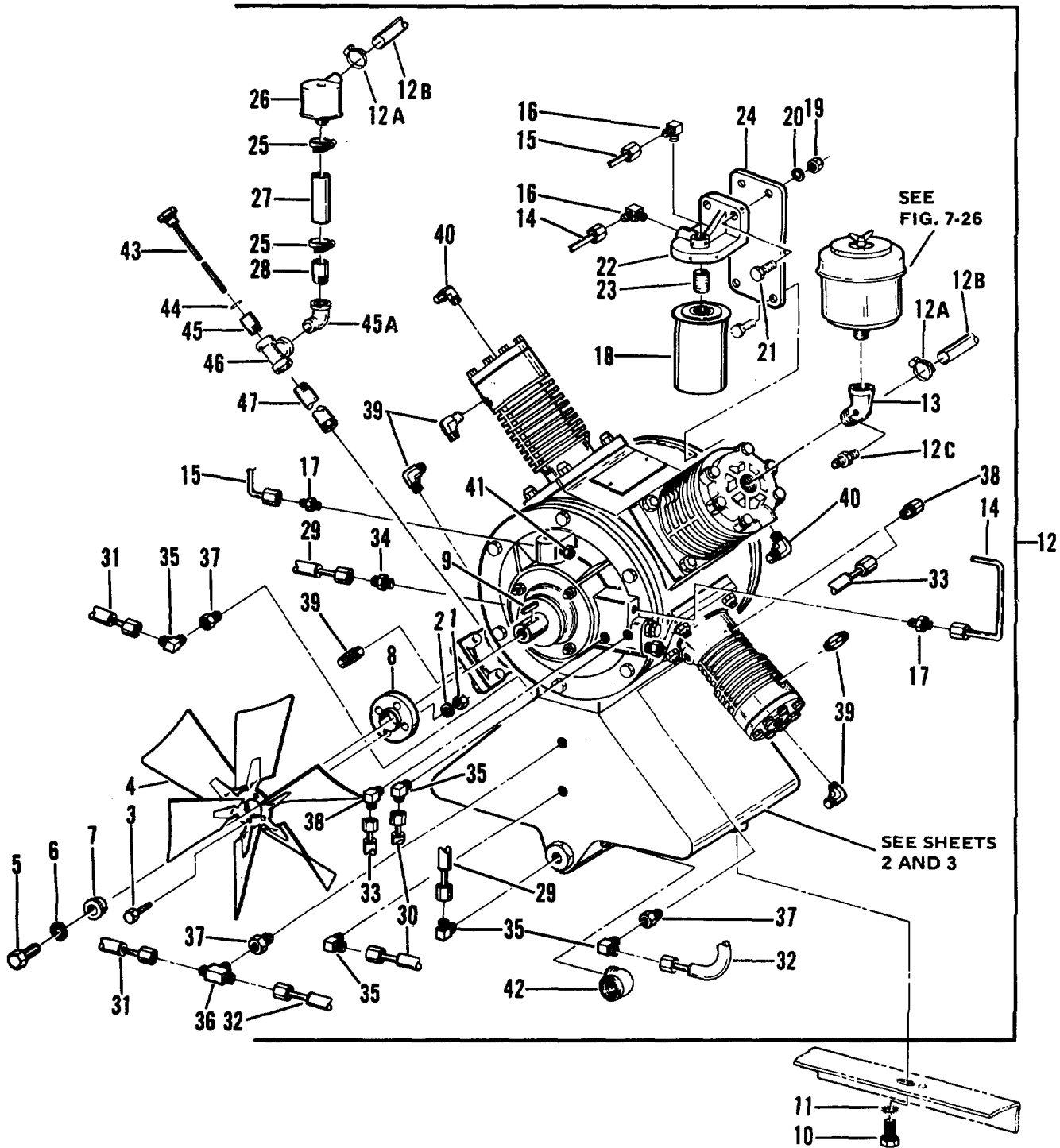
**7-24. General.** This section covers maintenance of the pneumatic system within the scope of direct support maintenance as prescribed by the MAC, Appendix E. Each component requiring maintenance at these levels is covered in a separate paragraph.

#### 7-25. Air compressor Assembly.

**a. Removal and Disassembly.** Refer to fig. 6-24 and remove drain plug (4), drain compressor oil, and disconnect compress drain hose (2) from compressor sump. Remove compressor from unit as follows:

- (1) Refer to para 6-2.**b.** and remove exhaust muffler group.
- (2) Refer to fig. 6-12 and loosen hose clamp (18), pull elbow (22) off air cleaner outlet tube. Disconnect restriction indicator hose from elbow (22). Disconnect restriction indicator hose from compressor air intake elbow. Cut and discard plastic tie and move two restriction indicator hoses out of the way of compressor.
- (3) Loosen winterization heater exhaust clamp and remove exhaust tube from heater. Unplug heater control cable from heater and heater control box. Unplug heater fuel pump wire assembly from heater. Refer to fig. 6-3 and disconnect tube assembly (4) from heater.
- (4) Unplug compressor compartment dome light lead. Refer to fig. 6-2 and remove roof (7) with engine air cleaner and heater attached.

- (5) Remove cylinder head bolt attaching choke and throttle cable clips. Move choke and throttle cable out of the way of compressor.
- (6) Refer to fig. 6-4 and remove air line tube assemblies from compressor cylinders, air cooler, and trap assemblies. Disconnect tube assembly (29) from continuous bleed valve. Disconnect hose assemblies (35, 36) from compressor end cover.
- (7) Refer to fig. 6-22 and remove four screws (97), washers (98), eight rubber washers (99), and fan guard (100). Remove four screws from each side panel that secure control panel so that panel may be moved away from compressor just far enough to remove compressor fan.
- (8) Refer to figure 7-25 and remove screw (5), lock washer (6), hub washer (7), and remove fan and hub (4, 8) and key (9) from compressor crankshaft. To remove fan (4) from hub (8), remove four nuts (1), lock washers (2), and screws (3).
- (9) Engage the clutch to secure clutch plate segments. Attach lifting straps to compressor assembly. Remove two screws (10) and lock washers (11) attaching compressor to frame. Using a hoist attached to lifting straps, take a slight strain on compressor; then, remove eight nuts (15, fig. 6-17), lock washers (16), and screws (17) that attach compressor assembly to clutch housing. Components attached to compressor flange with this hardware can be moved aside.



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Figure 7-25. Air compressor assembly (sheet 1 of 3)

Legend for fig. 7-25:

- |                             |                           |                             |
|-----------------------------|---------------------------|-----------------------------|
| 1. Nut (4)                  | 38. Elbow (2)             | 77. Crankshaft bearing (2)  |
| 2. Lock washer (4)          | 39. Elbow (5)             | 78. Lock nut (4)            |
| 3. Screw (4)                | 40. Elbow (2)             | 79. Sealing washer (4)      |
| 4. Fan                      | 41. Connector             | 80. Oil seal cover          |
| 5. Screw                    | 42. Elbow                 | 81. O-ring                  |
| 6. Lock washer              | 43. Dipstick              | 82. Oil seal                |
| 7. Hub washer               | 44. O-ring                | 83. Outer pump cover        |
| 8. Fan hub                  | 45. Dipstick guide        | 84. Oil pump blade (4)      |
| 9. Hub key                  | 45A. Street elbow         | 85. Oil pump rotor          |
| 10. Screw (2)               | 46. Pipe tee              | 86. Rotor key               |
| 11. Lock washer (2)         | 47. Pipe nipple           | 87. Screw (6)               |
| 12. Air compressor assembly | 48. Oil relief screw      | 88. Lock washer (6)         |
| 12A. Hose clamp (2)         | 49. Locknut               | 89. End cover assembly      |
| 12B. Breather hose          | 50. Nut gasket            | 90. Bushing (2)             |
| 13. Air cleaner elbow       | 51. Relief spring         | 91. O-ring                  |
| 14. Oil tube assembly       | 52. Steel ball            | 92. End cover               |
| 15. Oil tube assembly       | 53. Connector             | 93. Inner pump cover        |
| 16. Elbow (2)               | 54. Reducing bushing      | 94. Cover stud (4)          |
| 17. Connector (2)           | 55. Valve piston          | 95. Oil seal                |
| 18. Oil filter              | 56. Pipe plug             | 96. Screw (4)               |
| 19. Locknut (2)             | 57. Cylinder locknut (16) | 97. Lock washer (4)         |
| 20. Flat washer (2)         | 58. Retaining ring (2)    | 98. Balance weight (2)      |
| 21. Screw (2)               | 59. Cylinder gasket       | 99. Connecting rod assy (2) |
| 22. Oil filter bracket      | 60. Retaining ring (6)    | 100. Piston pin bearing (3) |
| 23. Filter adapter          | 61. Cylinder gasket (3)   | 101. Crankshaft bearing (4) |
| 24. Filter mounting bracket | 62. Cylinder stud (16)    | 102. Connecting rod (3)     |
| 25. Hose clamp (2)          | 63. Screw (3)             | 103. Connecting rod assy    |
| 26. Crankcase breather      | 64. Lock washer (6)       | 104. Piston pin bearing     |
| 27. Vent hose               | 65. Drive ring            | 105. Connecting rod         |
| 28. Pipe nipple             | 66. Screw (3)             | 106. Connecting rod assy    |
| 29. Oil hose assembly       | 67. Lock washer (3)       | 107. Crankshaft             |
| 30. Oil hose assembly       | 68. Compressor flywheel   | 108. Pipe plug              |
| 31. Oil hose assembly       | 69. Dowel pin (3)         | 109. Oil strainer           |
| 32. Oil hose assembly       | 70. Oil seal              | 110. Screw (3)              |
| 33. Oil hose assembly       | 71. Flywheel gasket       | 111. Lock washer (3)        |
| 34. Hose connector          | 72. Screw (5)             | 112. Oil sump               |
| 35. Elbow (5)               | 73. Screw                 | 113. O-ring                 |
| 36. Tee                     | 74. Lock washer (6)       | 114. Self-tapping screw (2) |
| 37. Reducing bushing (3)    | 75. End cover             | 115. Serial number plate    |
|                             | 76. End cover gasket (2)  | 116. Crankcase              |

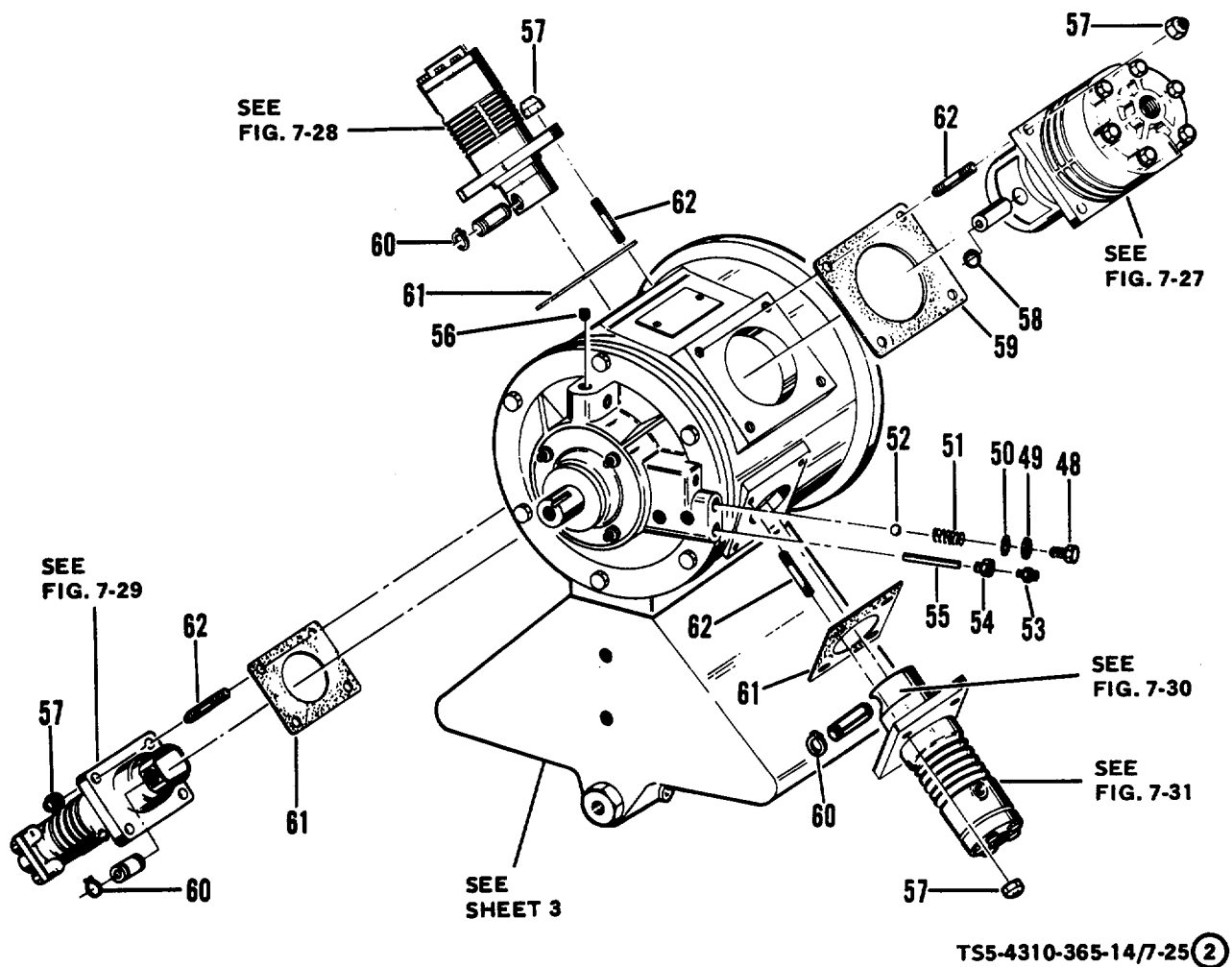
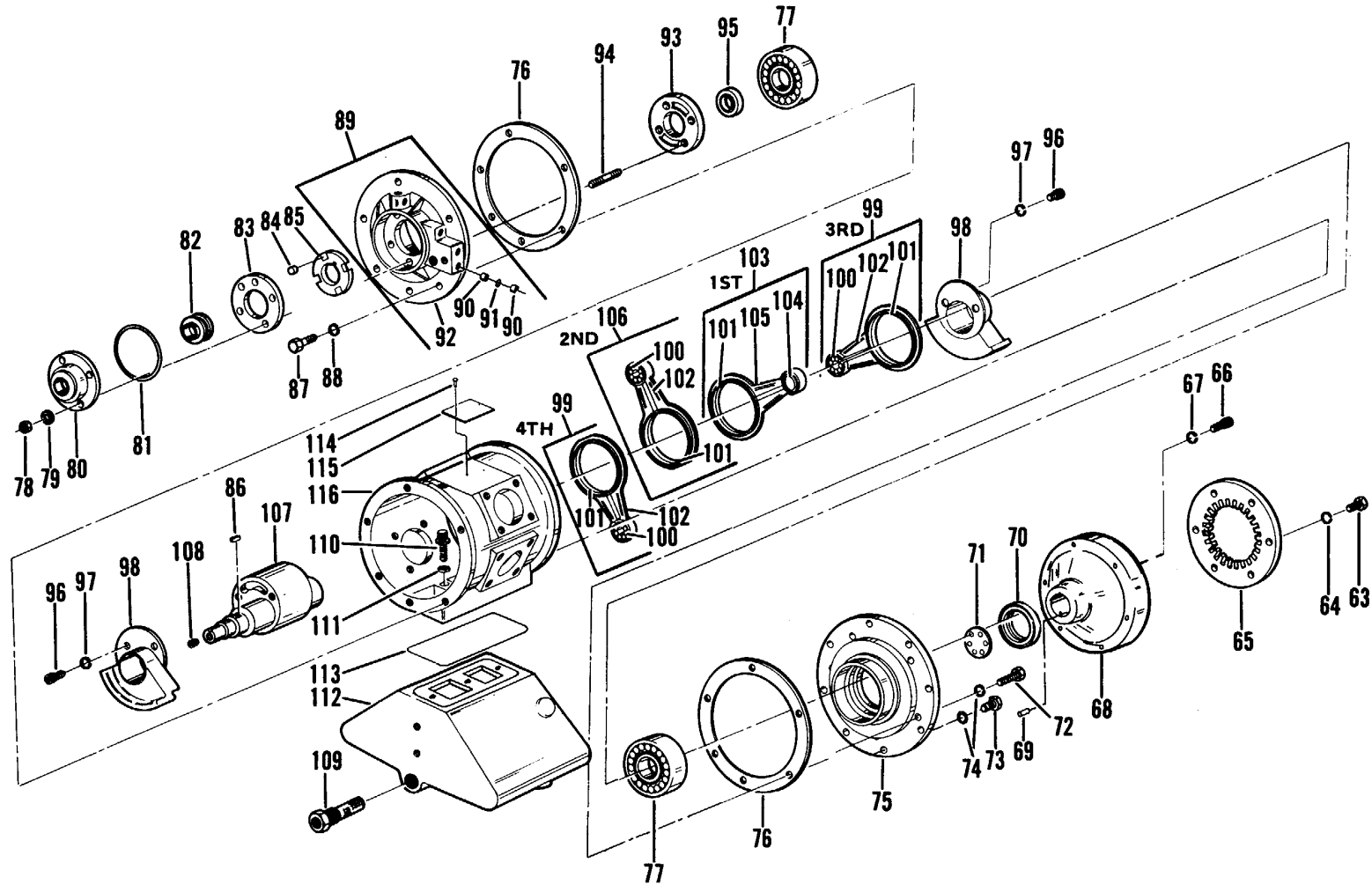


Figure 7-25. Air compressor assembly (sheet 2 of 3)





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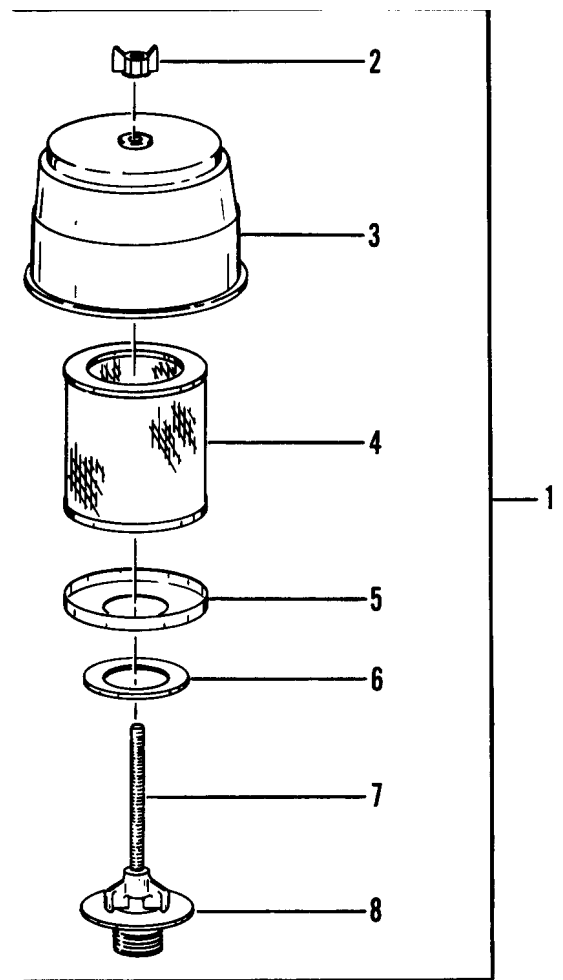
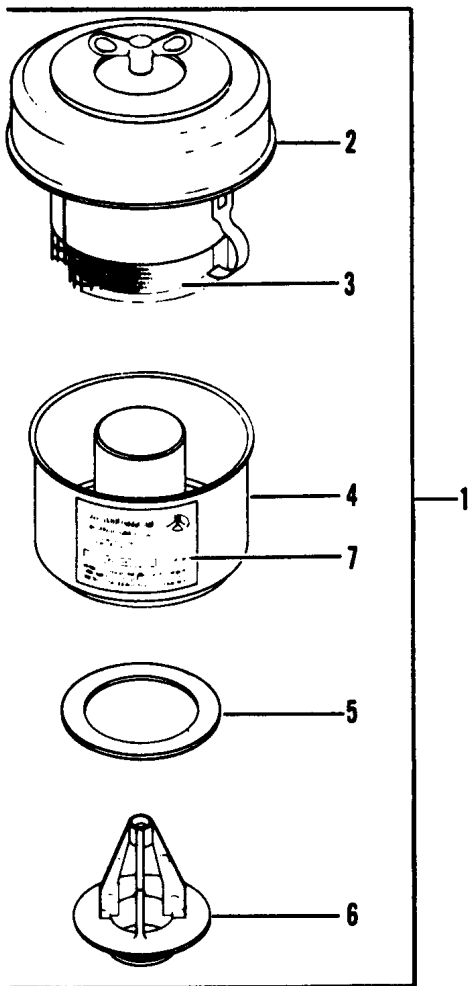
Figure 7-25. Air compressor assembly (sheet 3 of 3)

- (10) Carefully move compressor assembly toward air cooler just far enough to disengage compressor drive ring from clutch being careful not to damage cooler with compressor crankshaft fan stub. Hoist compressor out of unit and place on work bench.
- (11) Loosen two hose clamps (12A), remove breather hose (12) and the clamps (12A). Unscrew and remove the compressor oil bath type air filter (see figure 7-26) or the compressor dry type air filter (see figure 7-26.1), whichever is used on your unit.

**NOTE**

**When removing the compressor oil bath type air filter assembly (figure 7-26), be careful not to spill oil in bowl assembly (4).**

- (12) To disassemble oil bath type air filter assembly (1, fig. 7-26), unscrew the wing screw of top assembly (2) and lift out top assembly (2) and filter element (3). Pour oil out of bowl assembly (4). Separate bowl assembly (4), mounting base (6), and gasket (5). Instruction decal (7) need not be removed.



Legend for fig. 7-26:

- |  |                      |
|--|----------------------|
| 1. Compressor air filter assembly, oil bath type | 4. Bowl assembly     |
| 2. Top assembly                                  | 5. Gasket            |
| 3. Filter element                                | 6. Mounting base     |
|  | 7. Instruction decal |

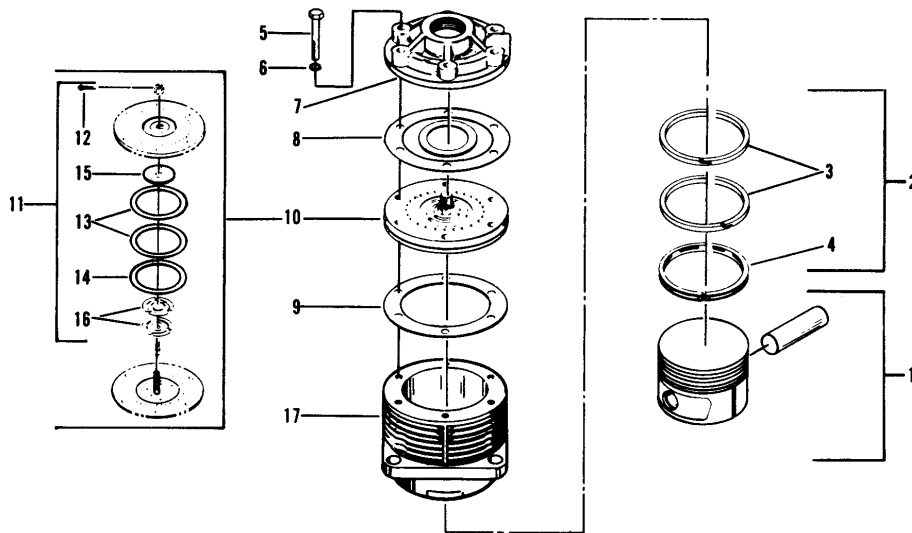
Legend for fig. 7-26.1

- |   |                   |
|---|-------------------|
| 1. Compressor air filter assembly, dry type | 5. Base tray      |
| 2. Wing nut                                 | 6. Gasket         |
| 3. Hood                                     | 7. Stem           |
| 4. Filter element                           | 8. Base connector |

- (12.1) To disassemble dry type air filter assembly (1, fig. 7-26.1), unscrew and remove wing nut (2), lift out hood (3), element (4), base tray (5), and gasket (6). The stem (7) need not be removed from base connector (8) unless replacement is necessary due to damage of threads or bending.
- (13) Unscrew and remove restriction indicator hose connector (12C, fig. 7-25) and air cleaner elbow (13). Support the oil filter assembly and remove oil tube assemblies (14, 15). Remove two elbows (16) and connectors (17). Unscrew oil filter (18). Remove two locknuts (19), flat washers (20), and screws (21). Separate oil filter bracket (22) and mounting bracket (24). Filter adapter (23) need not be removed.
- (14) Loosen hose clamps (25), remove crankcase breather (26), vent hose (27), clamps (25), and nipple (28). Remove oil hose assemblies (29 through 33).

Remove hose connector (34), five elbows (35), tee (36), three reducing bushings (37), and two elbows (38).

- (15) Remove five elbows (39), two elbows (40), connector (41), and elbow (42). Remove dipstick (43), o-ring (44), dipstick guide (45), street elbow (45A), pipe tee (46), and pipe nipple (47).
- (16) Remove oil relief screw (48), locknut (49), nut gasket (50), spring (51), and ball (52). Remove connector (53), reducing bushing (54), and piston (55). Remove pipe plug (56).
- (17) Remove four cylinder locknuts (57), separate first stage piston, head and cylinder group (figure 7-27) from crankcase, remove two retaining rings (58), and lift off first stage cylinder group. Remove gasket (59).



Legend for fig. 7-27:

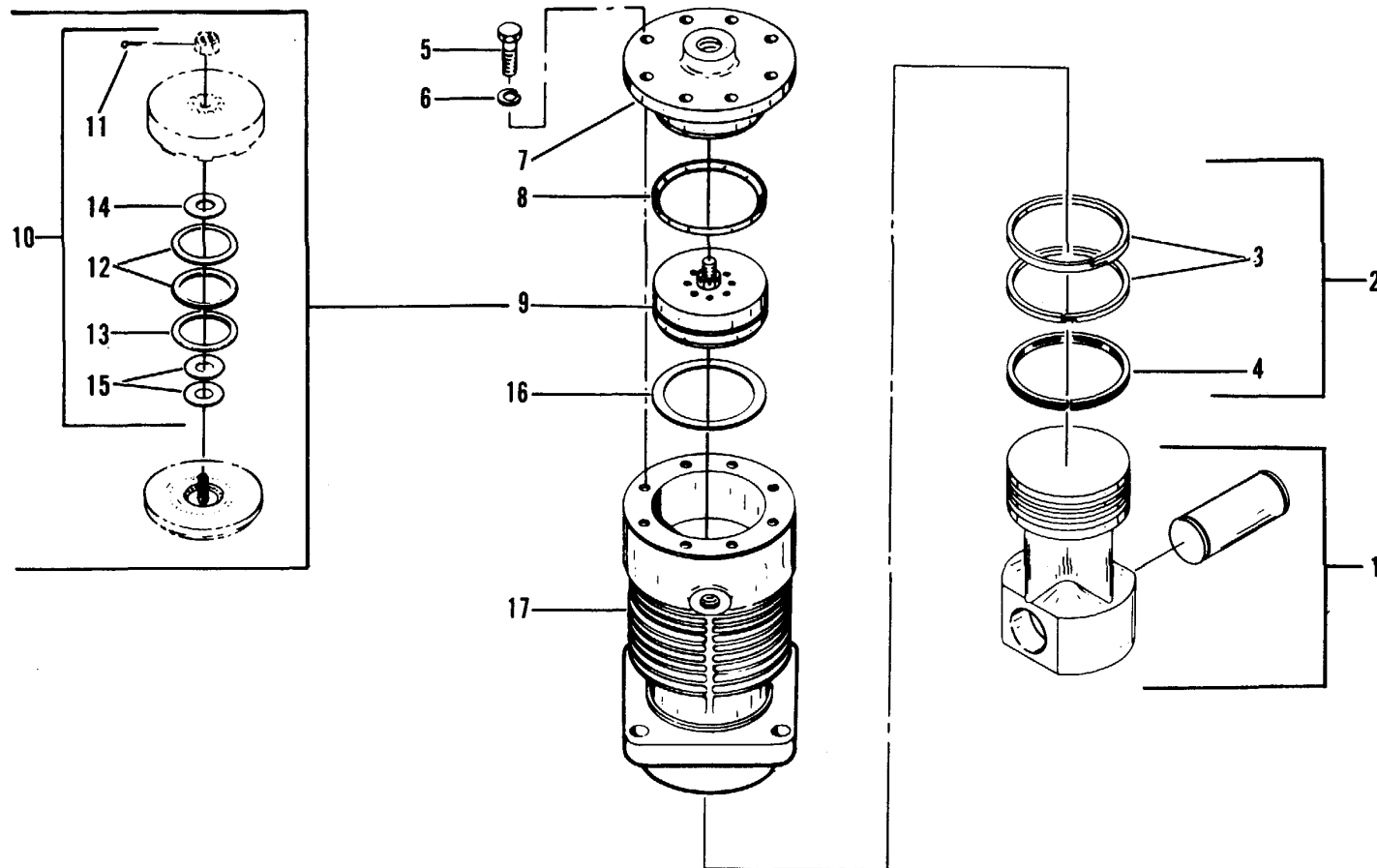
- |                            |                         |                        |
|----------------------------|-------------------------|------------------------|
| 1. Piston and pin assembly | 7. Cylinder head        | 13. Lentoid spring (2) |
| 2. Ring kit                | 8. Valve gasket         | 14. Valve ring         |
| 3. Compression ring (2)    | 9. Cylinder head gasket | 15. Valve plate        |
| 4. Oil control ring        | 10. Valve assembly      | 16. Spring plate (2)   |
| 5. Screw (6)               | 11. Repair kit          | 17. Cylinder           |
| 6. Lock washer (6)         | 12. Cotter pin          |                        |

Figure 7-27. First stage piston, head, and cylinder group

**(18)** To disassemble first stage cylinder group (fig. 7-27), remove piston and pin assembly (1) from cylinder (17) and remove ring kit (2) from piston with ring expander. Remove six screws (5), lock washers (6), and cylinder head (7). Remove valve gasket (8), lift out valve assembly (10) and remove head gasket (9). Repair kit (11) is available for valve assembly (10) and consists of items (12 through 16). It is recommended that valve

assembly (10) be disassembled only when necessary and that kit be used assembled as shown.

**(19)** Remove four cylinder locknuts (57, fig. 7-25), separate second stage piston, head, and cylinder group (figure 7-28) from crankcase, remove two retaining rings (60, fig. 7-25), lift off second stage cylinder group and remove one cylinder gasket (61).



Legend for fig. 7-28:

- 1. Piston and pin assembly
- 2. Ring kit
- 3. Compression ring (2)
- 4. Oil Control ring
- 5. Screw (8)
- 6. Lock washer (8)

- 7. Cylinder head
- 8. Cylinder head gasket
- 9. Valve assembly
- 10. Repair kit
- 11. Cotter pin
- 12. Lentoid spring (2)

- 13. Valve ring
- 14. Valve ring
- 15. Lentoid spring (2)
- 16. Valve gasket
- 17. Cylinder

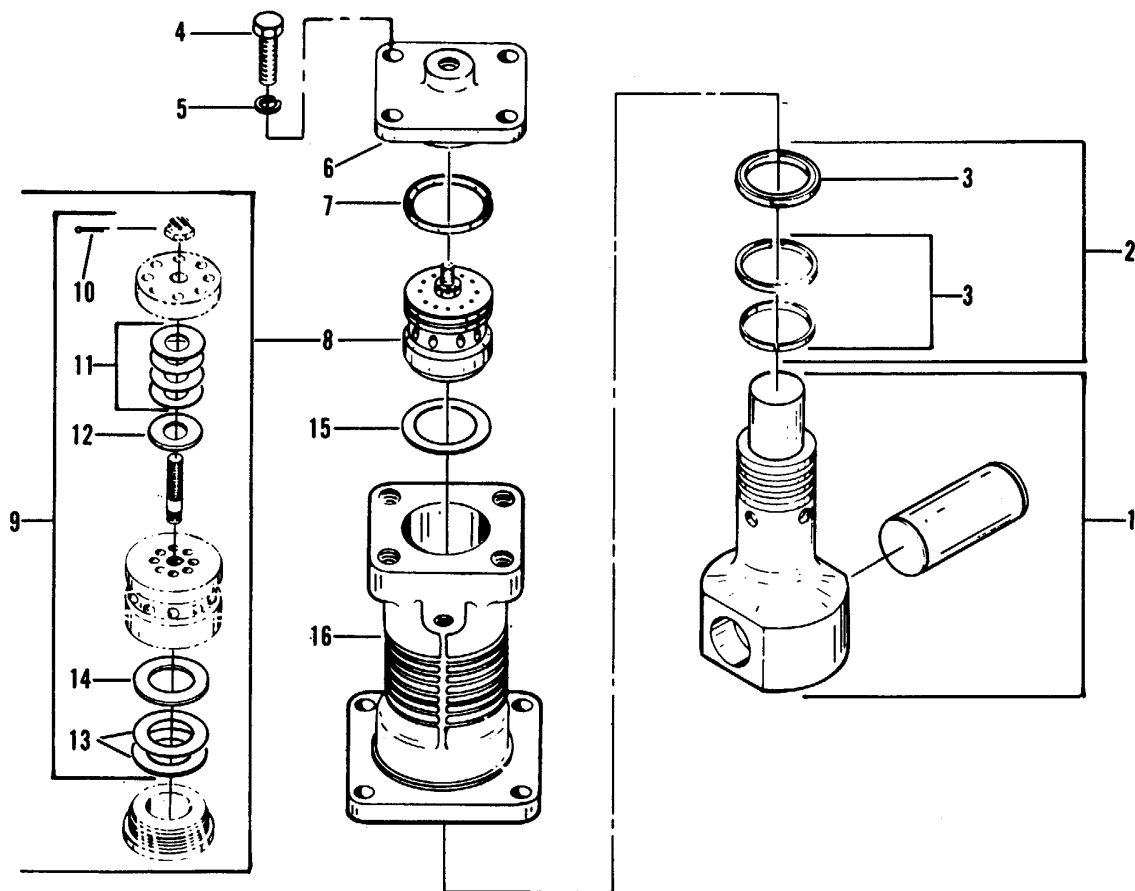
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Figure 7-28. Second stage piston, head, and cylinder group

**(20)** To disassemble second stage cylinder group, pull piston and pin assembly (1, fig. 7-28) out of cylinder (17) and remove ring kit (2) from piston using ring expander. Remove eight screws (5), lock washers (6), cylinder head (7), and head gasket (8). Lift out valve assembly (9) and remove valve gasket (16). Repair kit (10) is available for valve assembly (9) and consists of items (11 through 15). It is

recommended that valve assembly (9) be disassembled only when necessary and that kit be used assembled as shown.

**(21)** Remove four cylinder locknuts (57, fig. 7-25), separate third stage piston, head, and cylinder group (figure 7-29) from crankcase, remove two retaining rings (60, fig. 7-25), lift off third stage cylinder group and remove one cylinder gasket (61).



Legend for fig. 7-29:

- 1. Piston and pin assembly
- 2. Ring kit
- 3. Ring assembly (3)
- 4. Screw (4)
- 5. Lock washer (4)
- 6. Cylinder head

- 7. Cylinder head gasket
- 8. Valve assembly
- 9. Repair kit
- 10. Cotter pin
- 11. Lentoid spring (4)

- 12. Valve ring
- 13. Lentoid spring (2)
- 14. Valve ring
- 15. Valve gasket
- 16. Cylinder

TS5-4310-365-14/7-29

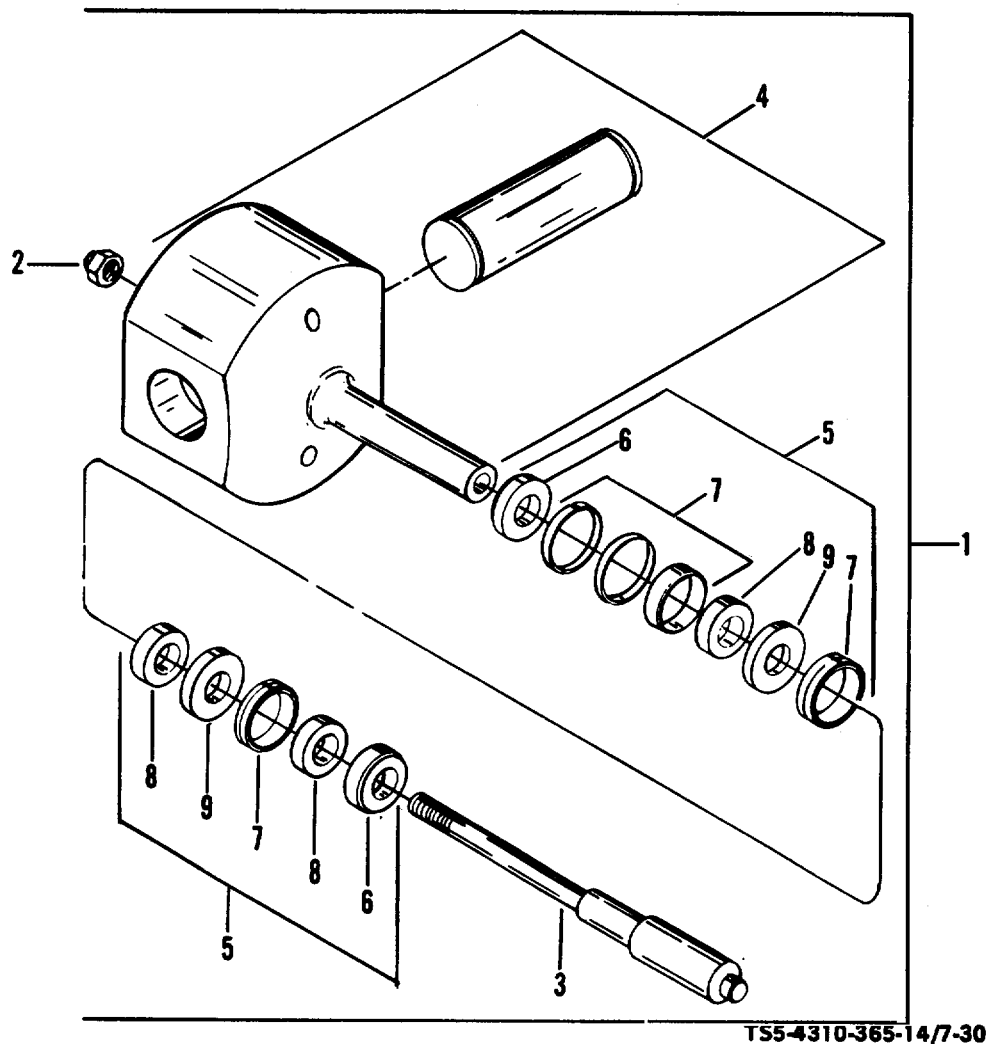
Figure 7-29. Third stage piston, head, and cylinder group

**(22)** To disassemble third stage cylinder group, pull piston and pin assembly (1, fig. 7-29) from cylinder (16) and remove ring kit (2) using ring expander. Remove four screws (4), lock washers (5), cylinder head (6), and head gasket (7). Lift out valve assembly (8) and remove valve gasket (15). Repair kit (9) is available for valve assembly (8) and consists of items (10 through 14). It is recommended that valve assembly (8) be disassembled only when necessary and that kit be used assembled as shown.

**(23)** Remove four cylinder locknuts (57, fig. 7-25), separate fourth stage piston and cylinder group from crankcase, remove two retaining rings (60), and lift off piston and cylinder group. Remove one cylinder gasket (61). Pull fourth stage piston assembly (1, fig. 7-30) out of fourth stage head and cylinder group (figure 7-31).



(24) To disassemble fourth stage piston assembly (1, fig. 7-30), remove locknut (2) and pull piston bolt (3) out of piston and pin assembly (4). Note the order of ring kit (5) components (6, 7, 8, 9). These must be assembled in proper order



TS5-4310-365-14/7-30

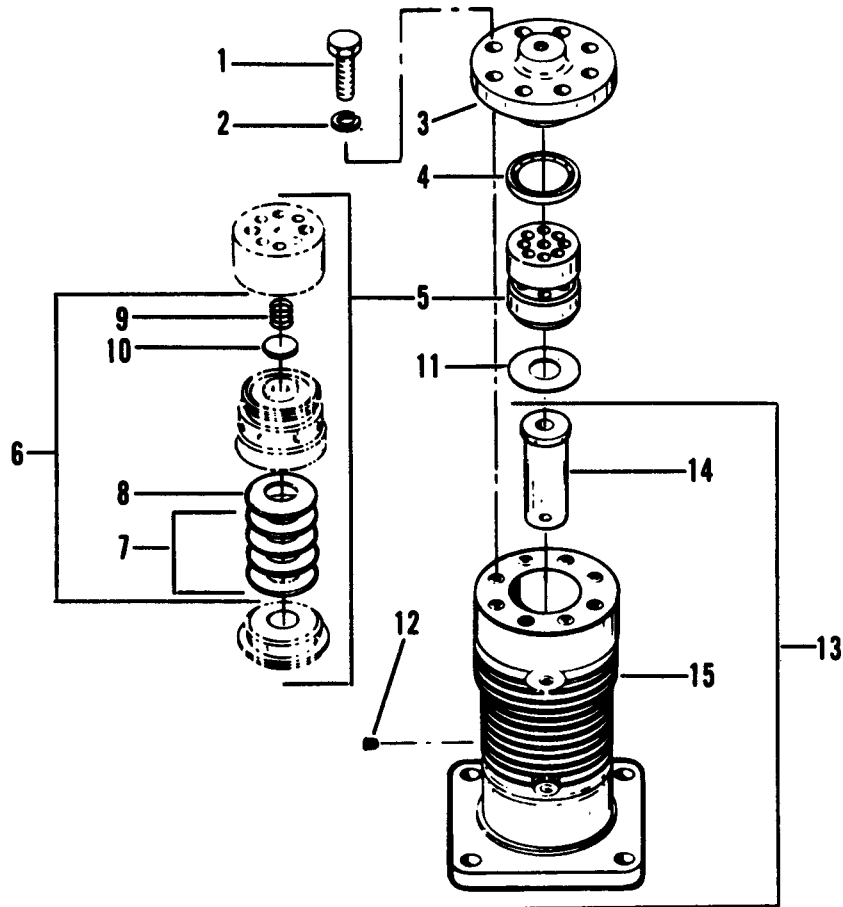
Legend for fig. 7-30:

- |                    |                            |                       |
|--------------------|----------------------------|-----------------------|
| 1. Piston assembly | 4. Piston and pin assembly | 7. Ring assembly (3)  |
| 2. Locknut         | 5. Ring kit                | 8. Ring spacer (3)    |
| 3. Piston bolt     | 6. Locator ring (2)        | 9. Ring separator (2) |

Figure 7-30. Fourth stage piston assembly

(25) To disassemble fourth stage head and cylinder group, remove eight screws (1, fig. 7-31), lock washers (2), cylinder head (3), and head gasket (4). Lift out valve assembly (5) and remove valve gasket (11). Repair kit (6) is available for valve assembly (5) consisting of items (7, 8, 9,

10). It is recommended valve assembly (5) be disassembled only when necessary and that kit be used assembled as shown. Remove pipe plug (12) only when necessary. Only if cylinder liner (14) is scored, press liner (14) out of cylinder (15).



Legend for fig. 7-31:

- |                         |                       |                       |
|-------------------------|-----------------------|-----------------------|
| 1. Screw (8)            | 6. Repair kit         | 11. Valve gasket      |
| 2. Lock washer (8)      | 7. Lentoid spring (4) | 12. Pipe plug         |
| 3. Cylinder head        | 8. Valve ring         | 13. Cylinder assembly |
| 4. Cylinder head gasket | 9. Closing spring     | 14. Cylinder liner    |
| 5. Valve assembly       | 10. Valve disc        | 15. Cylinder          |

Figure 7-31. Fourth stage head and cylinder group

- (26) The sixteen cylinder studs (62, fig. 7-25) should be removed from crankcase for replacement of damaged stud only.
- (27) Remove six screws (63, fig. 7-25), lock washers (64), and drive ring (65). Remove three screws (66), lock washers (67), and compressor flywheel (68). As necessary press out three dowel pins (69). Remove gasket (71). Remove five screws (72), one screw (73), six lock washers (74), remove end cover (75) and one end cover gasket (76). Use a puller and remove one bearing (77). Press oil seal (70) out of end cover (75).
- (28) Remove four locknuts (78), sealing washers (79), oil seal cover (80), and o-ring (81). Remove oil seal (82), outer pump cover (83), four oil pump blades (84), oil pump rotor (85), and rotor key (86).
- (29) Remove two screws (96) and lock washers (97) securing balance weight (98) on drive end of crankshaft; remove the balance weight (98). Remove six screws (87) and lock washers (88). Break end cover assembly (89) loose from crankcase (116) and carefully remove end cover assembly (89) and crankshaft (107) from crankcase while removing connecting rod assemblies (99, 103, 106) from crankshaft and from crankcase. Remove end cover gasket (76).
- (30) Pull crankshaft (107) out of end cover assembly (89). Remove two screws (96), lock washers (97), and balance weight (98) from crankshaft (107). Pipe plug (108) need not be removed. Use a puller and remove bearing (77). Remove inner pump cover (93) and four cover studs (94). Press out oil seal (95). As necessary, disassemble end cover

assembly (89) by removing the two bushings (90) and o-ring (91) from end cover (92).

- (31) When necessary, disassemble two connecting rod assemblies (99) by pressing piston pin bearings (100) and crankshaft bearings (101) from connecting rods (102). When necessary to disassemble connecting rod assemblies (103, 106), press out piston pin bearings (100, 104) and crankshaft bearings (101) from connecting rods (102, 105).
- (32) Remove oil strainer (109). Remove three screws (110) and lock washers (111). Separate oil sump (112) from crankcase (116) and remove o-ring (113). It is not necessary to remove self-tapping screws (114) and serial number plate (115).

#### WARNING

**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 130°F (38°C - 59°C).**

**b. Cleaning.** Clean parts except breather hose (12B, fig. 7-25), oil filter (18), hose (27), hose assemblies (29 through 33), o-rings (44, 81, 91, 113), oil seals (70, 82, 95) and dry type air filter (fig. 7-26.1) with solvent, P-D-680, or equivalent. Dry thoroughly. Wipe parts clean with a lint-free cloth.

**c. Inspection.** Inspect all parts for cracks, breaks, distortion, and condition of screw-threads. All damaged parts shall be replaced. Refer to table 7-3 for specific component inspection.

Table 7-3. Compressor Inspection Table of Limits

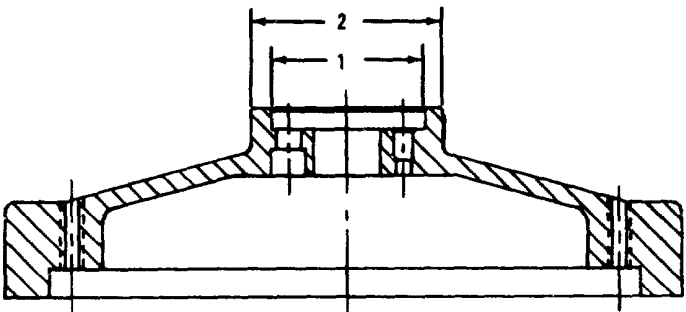
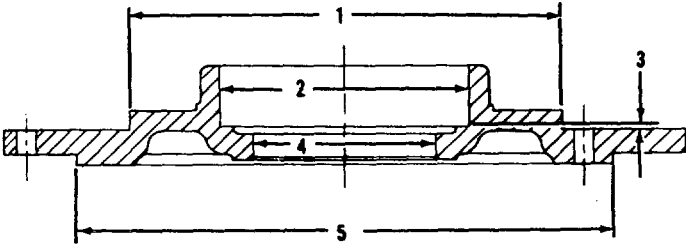
FIG. & INDEX NO.	DESCRIPTION	REF. NO.	MINIMUM INCHES (MM)	MAXIMUM INCHES (MM)	REPLACE- MENT MAXIMUM INCHES (MM)
7-25-68	<p>Flywheel</p>  <p>Crankshaft register bore.....</p> <p>Oil seal register diameter.....</p> <p>Crankshaft register bore to oil seal diameter concentric within..</p>	<p>1</p> <p>2</p> <p>1,2</p>	<p>2.166 (55.016)</p> <p>2.749 (69.825)</p>	<p>2.167 (55.042)</p> <p>2.751 (63.875)</p>	<p>0.002TIR (0.051TIR)</p>
7-25-75	<p>Drive end cover</p>  <p>Crankcase register diameter.....</p> <p>Bearing bore.....</p> <p>Bearing bore depth above mounting face surface.....</p> <p>Oil seal bore.....</p> <p>Clutch housing register diameter.....</p> <p>Crankcase register (1) and bores (2,4) concentric within.....</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p>	<p>8.248 (209.499)</p> <p>4.7242 (119.9947)</p> <p>0.070 (1.778)</p> <p>3.499 (88.875)</p> <p>10.245 (260.223)</p>	<p>8.249 (209.525)</p> <p>4.7252 (120.0201)</p> <p>0.072 (1.829)</p> <p>3.502 (88.951)</p> <p>10.248 (260.299)</p>	<p>0.002TIR (0.051TIR)</p>

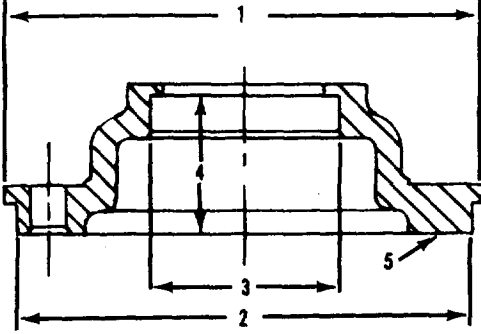
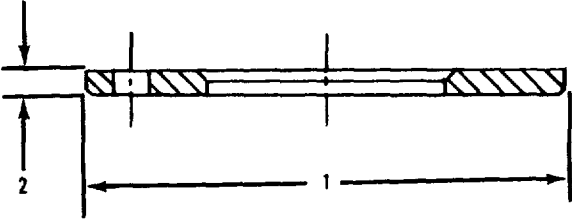
FIG. & INDEX NO.	DESCRIPTION	REF. NO.	MINIMUM INCHES (MM)	MAXIMUM INCHES (MM)	REPLACE- MENT MAXIMUM INCHES (MM)
7-25-80	<p>Oil seal cover:</p>  <p>Outside diameter.....</p> <p>O-ring seal diameter.....</p> <p>Oil seal register diameter.....</p> <p>Seal bore depth.....</p> <p>Mounting face flat within.....</p> <p>Bore (3) concentric with diameter (1) within .....</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p>	<p>4.995 (126.873)</p> <p>4.770 (121.158)</p> <p>1.998 (50.749)</p> <p>1.432 (36.373)</p>	<p>4.998 (126.949)</p> <p>4.480 (121.412)</p> <p>2.002 (50.851)</p> <p>1.442 (36.627)</p>	<p>0.002 (0.051)</p> <p>0.002TIR (0.051TIR)</p>
7-25-83	<p>Outer oil pump cover:</p>  <p>Outside .....</p> <p>Faces flat and parallel within.....</p>	<p>1</p> <p>2</p>	<p>4.993 (126.822)</p>	<p>4.998 (126.949)</p>	<p>0.002 (0.051)</p>

Table 7-3. Compressor Inspection Table of Limits - Continued

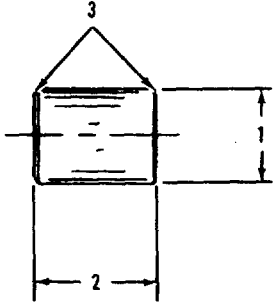
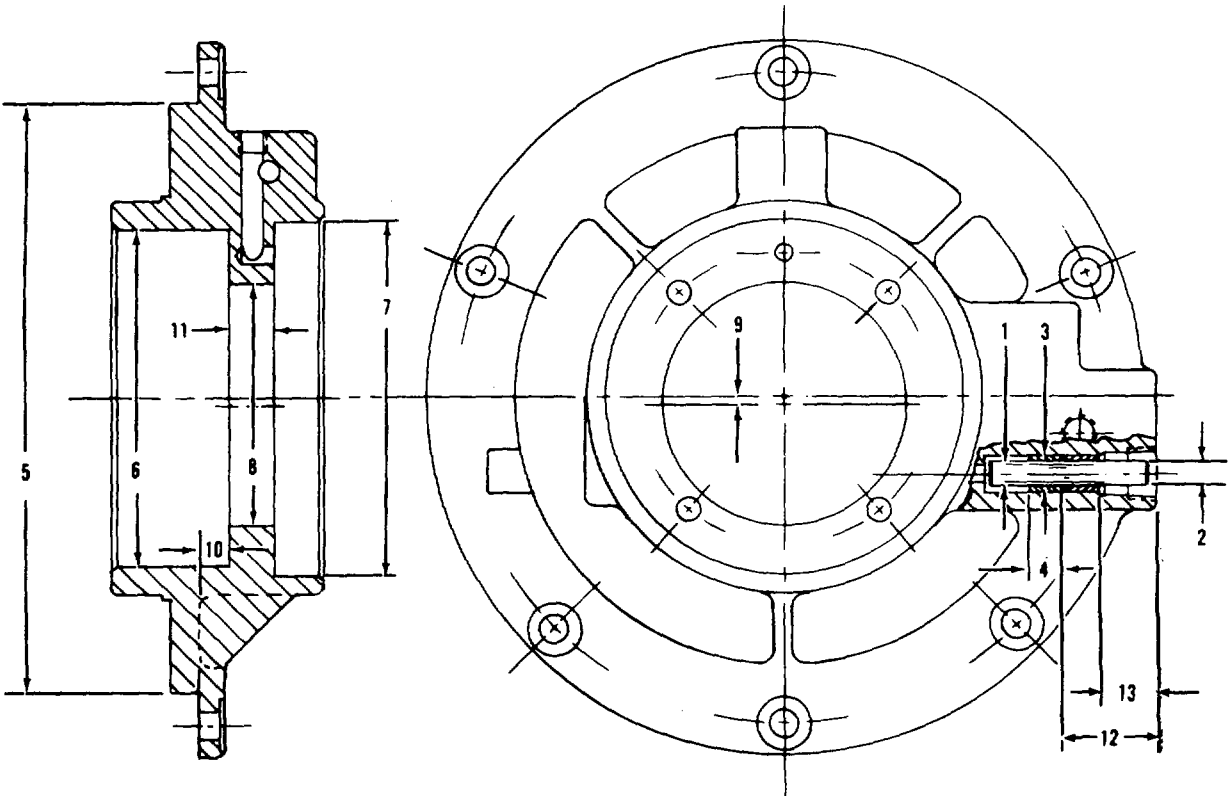
FIG. & INDEX NO.	DESCRIPTION	REF. NO.	MINIMUM INCHES (MM)	MAXIMUM INCHES (MM)	REPLACE- MENT MAXIMUM INCHES (MM)
7-25-84	Oil pump blades:    Diameter..... Length..... Ends parallel and flat.....	   1 2 3	   0.497 (12.624) 0.623 (15.824)	   0.498 (12.649) 0.624 (15.850)	   0.001TIR (0.025TIR)
7-25-89	Non drive end cover assembly:  				

Table 7-3. Compressor Inspection Table of Limits - Continued

FIG. & INDEX NO.	DESCRIPTION	REF. NO.	MINIMUM INCHES (MM)	MAXIMUM INCHES (MM)	REPLACE- MENT MAXIMUM INCHES (MM)
7-25-89	Non drive end cover assembly -(cont):				
7-25-55	Relief valve piston diameter .....	1	0.3750 (9.525)	0.3752 (9.5301)	
7-25-90	Relief valve bushing bore .....	2	0.380 (9.652)	0.382 (9.703)	
7-25-90	Relief valve bushing OD .....	3	0.501 (12.725)	0.502 (12.751)	
7-28-90	Relief valve bushing length .....	4	0.435 (11.049)	0.440 (11.176)	
7-25-90	Busing ID concentric with OD .....	2,3			0.002TIR (0.051TIR)
7-25-90	Bushing faces parallel .....				0.005TIR (0.127TIR)
7-25-90	Busing faces perpendicular to OD .....				0.005TIR (0.127TIR)
7-25-92	Register diameter.....	5	8.248 (209.499)	8.249 (209.525)	
7-25-92	Bearing bore diameter.....	6	4.7242 (119.9947)	4.7252 (120.0201)	
	Oil seal cover bore.....	7	5.00 (127.000)	5.002 (127.051)	
	Oil pump rotor bore .....	8	3.375 (85.725)	3.376 (85.750)	
	Rotor bore eccentric to horizontal centerline .....	9	0.094 (2.388)	0.095 (2.431)	
	Register (5) concentric with bore (6).....				0.002TIR (0.051TIR)
	Bore depth below flange .....	10	0.436 (11.074)	0.438 (11.125)	
	Width of oil pump rotor surface .....	11	0.625 (15.875)	0.626 (15.900)	
	Press bushing to depth of.....	12	1.320 (33.528)	1.330 (33.782)	
	Install o-ring between bushings; press outer bushing to depth of.....	13	0.780 (19.812)	0.790 (20.066)	

Table 7-3. Compressor Inspection Table of Limits - Continued

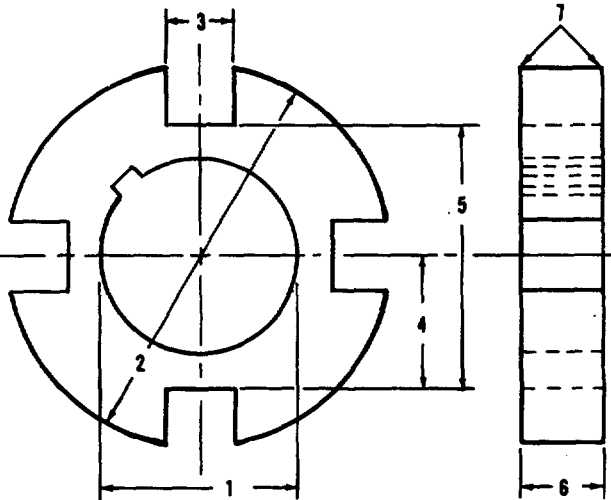
FIG. & INDEX NO.	DESCRIPTION	REF. NO.	MINIMUM INCHES (MM)	MAXIMUM INCHES (MM)	REPLACE- MENT MAXIMUM INCHES (MM)
7-25-85	Oil pump rotor: 				
	Bore diameter .....	1	1.500 (38.100)	1.501 (38.125)	
	Outside diameter .....	2	3.182 (80.823)	3.183 (80.848)	
	OD concentric with ID .....	2,1			0.002TIR (0.051TIR)
	Blade slot width .....	3	0.499 (12.675)	0.500 (12.700)	
	Blade slot root from center .....	4	1.073 (27.254)	1.083 (27.508)	
	Blade slot root-to-root.....	5	2.146 (54.508)	2.166 (55.016)	
	Rotor thickness.....	6	0.623 (15.824)	0.624 (15.850)	
	Faces flat and parallel .....	7			0.002TIR (0.051TIR)



Table 7-3. Compressor Inspection Table of Limits - Continued

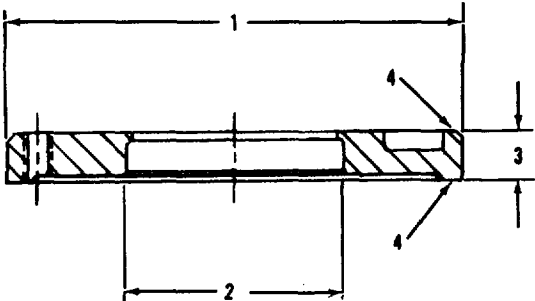
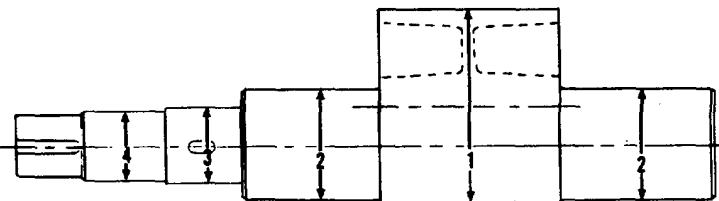
FIG. & INDEX NO.	DESCRIPTION	REF. NO.	MINIMUM INCHES (MM)	MAXIMUM INCHES (MM)	REPLACE- MENT MAXIMUM INCHES (MM)
7-25-93	<p>Oil pump inner cover:</p>  <p>Outside diameter ..... 1</p> <p>Oil seal bore ..... 2</p> <p>Thickness ..... 3</p> <p>Faces parallel and flat ..... 4</p>		<p>4.715 (119.761)</p> <p>2.250 (57.150)</p> <p>0.498 (12.675)</p>	<p>4.720 (119.888)</p> <p>2.252 (57.201)</p> <p>0.499 (12.675)</p>	<p>0.002TIR (0.051TIR)</p>
7-25-107	<p>Crankshaft:</p>  <p>Connecting rod journal ..... 1</p> <p>Bearing journals ..... 2</p> <p>Oil pump journal ..... 3</p> <p>Oil seal journal ..... 4</p> <p>Journals (2, 3) concentric within .....</p>		<p>3.746 (95.148)</p> <p>2.1653 (54.9986)</p> <p>1.499 (38.075)</p> <p>1.374 (34.900)</p>	<p>3.747 (95.174)</p> <p>2.1659 (55.0139)</p> <p>1.500 (38.100)</p> <p>1.375 (34.925)</p>	<p>3.745 (95.123)</p> <p>0.0005TIR (0.0127TIR)</p>

Table 7-3. Compressor Inspection Table of Limits - Continued

FIG. & INDEX NO.	DESCRIPTION	REF NO.	MINIMUM INCHES (MM)	MAXIMUM INCHES (MM)	REPLACE- MENT MAXIMUM INCHES (MM)
7-25-99 7-25-103 7-25-106	Connecting rod assemblies:				
	Crankshaft bearing bore .....	1	3.7518 (95.2957)	3.7557 (95.3948)	3.7567 (95.4202)
	Width-crankshaft .....	2	0.870 (22.098)	0.875 (22.225)	
	Crank to pin center.....	3	5.124 (130.150)	5.126 (130.200)	
	Piston pin bearing width, 2nd, 3rd, 4th stage .....	4	0.990 (25.146)	1.000 (25.400)	
	Piston pin rod end width, 1st stage .....	5	0.760 (19.304)	0.765 (19.431)	
	Piston pin bearing bore, 1st stage .....	6	1.0005 (25.4127)	1.0008 (25.4203)	1.0018 (25.4457)

Table 7-3. Compressor Inspection Table of Limits - Continued

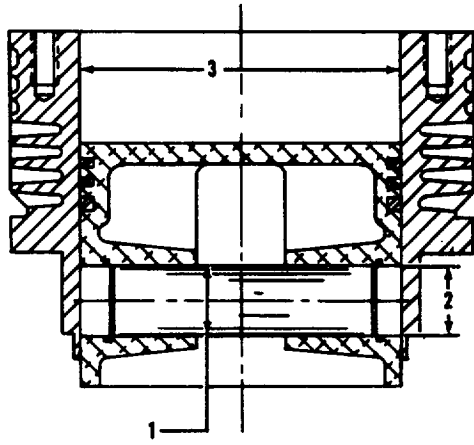
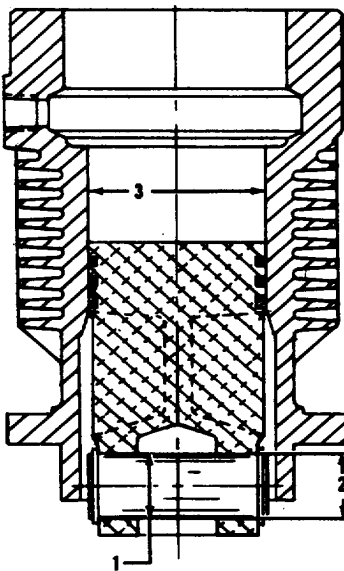
FIG. & INDEX NO.	DESCRIPTION	REF NO.	MINIMUM INCHES (MM)	MAXIMUM INCHES (MM)	REPLACE- MENT MAXIMUM INCHES (MM)
7-27-1 7-27-17	First stage piston and pin assembly. First stage cylinder. 	1  2  3	4.500 (114.300)	4.502 (114.351)	0.9988 (25.3695) 1.0018 (25.4457) 4.503 (114.376)
7-28-1 7-28-17	Second stage and pin assembly Second stage cylinder 				

Table 7-3. Compressor Inspection Table of Limits - Continued

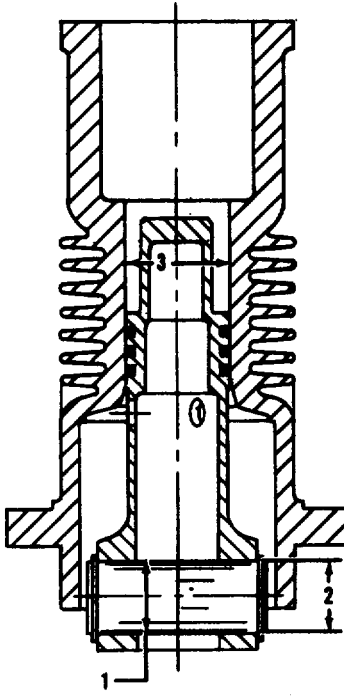
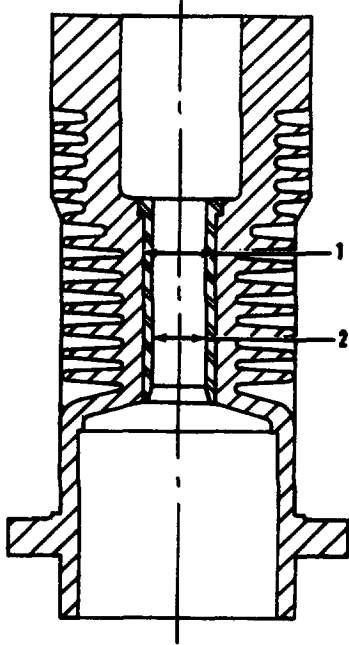
FIG. & INDEX NO.	DESCRIPTION	REF NO.	MINIMUM INCHES (MM)	MAXIMUM INCHES (MM)	REPLACE- MENT MAXIMUM INCHES (MM)
7-28-1 7-28-17	Second stage piston and pin assembly - (cont) Second stage cylinder - (cont)  Piston pin diameter ..... Piston pin bore diameter..... Cylinder ring bore diameter.....	1  2  3	2.500 (63.500)	2.501 (63.525)	0.9990 (25.3746) 1.0015 (25.4381) 2.502 (63.551)
7-29-1 7-29-16	Third stage piston and pin assembly Third stage cylinder   Piston pin diameter ..... Piston pin bore diameter..... Cylinder ring bore diameter.....	1  2  3	1.437 (36.500)	1.438 (36.525)	0.9990 (25.3746) 1.0015 (25.4381) 1.439 (36.551)

Table 7-3. Compressor Inspection Table of Limits - Continued

FIG. & INDEX NO.	DESCRIPTION	REF NO.	MINIMUM INCHES (MM)	MAXIMUM INCHES (MM)	REPLACE- MENT MAXIMUM INCHES (MM)
7-30-1	Fourth stage piston assembly				
	Piston pin diameter .....	1			0.9990 (25.3746)
	Piston pin bore diameter.....	2			1.0015 (25.4381)
	Piston bolt bore diameter.....	3	0.250 (6.350)	0.251 (6.375)	
	Piston neck extension diameter.....	4	0.405 (10.287)	0.410 (10.414)	
	Piston skirt diameter.....	5	2.246 (57.048)	2.247 (57.074)	
	Skirt (5) and bore (3) concentric within.....				0.001TIR (0.025TIR) 0°-2'
	Pin bore (2) square with bore (3) within .....				
	Bolt shank diameter .....	6	0.249 (6.325)	0.250 (6.350)	
	Ring mounting diameter .....	7	0.374 (9.500)	0.375 (9.525)	
	Bolt head diameter.....		0.495 (12.573)	0.500 (12.700)	

Table 7-3. Compressor Inspection Table of Limits - Continued

FIG. & INDEX NO.	DESCRIPTION	REF NO.	MINIMUM INCHES (MM)	MAXIMUM INCHES (MM)	REPLACE- MENT MAXIMUM INCHES (MM)
7-30-1	Forth stage piston assembly - (cont)  Shank (6), mounting dia (7), head (8) concentric within.....				0.001TIR (0.025TIR)
7-31-13	Forth stage cylinder assembly    Cylinder bore for liner..... Liner bore diameter..... Out-of-round not to exceed .....	  1 2 1,2	  0.9995 (25.3873) 0.750 (19.050)	  1.0000 (25.4000) 0.751 (19.075)	  0.0005TIR (0.012TIR)

**d. Repair or Replacement.** Repair kits are available for each of the four stage valve assemblies (6, fig. 7-31), (9, fig. 7-29), (10, fig. 7-28), and (11, fig. 7-27). An overhaul gasket and seal kit (part no. 65888) is also available for the compressor. Replace all parts found to be damaged or worn beyond limits shown in table 7-3.

**e. Reassembly and Installations.**

- (1) If removed, install serial number plate (115, fig. 7-15) on screws (114). Install o-ring (113) in groove on sump (112) and attach sump (112) to crankcase (116) with three lock washers (111) and screws (110). Install oil strainer (109) in sump (112).
- (2) If connecting rod assemblies (99, 103, 106) were disassembled, install crankcase bearings (101) in each rod (102, 105). Install piston pin bearings (100) in second, third and fourth stage rods (102) and bearing (104) in first stage rod (105). (Refer to table 7-3). If removed, installed pipe plug (108) in end of crankcase (107).
- (3) Assemble one balance weight (98) on non drive end of crankcase (107) with two lock washers (97) and screws (96). If end cover assembly (89) was disassembled, install the two bushings (90) and o-ring (91) into end cover (92) as shown in table 7-3. Press oil seal (95) into inner pump cover (93), with sealing lip toward stud side, and assemble four cover studs (94) in cover (93).
- (4) Assemble cover (93) into end cover assembly (89) and install one bearing (77) in cover assembly (89). Carefully assemble end cover assembly (89) onto end of crankshaft (107). Coat one gasket (76) with a little grease to hold in place on end of crankcase (116). Insert drive end of crankshaft (107) into crankcase while placing connecting rod assemblies (99, 106, 103, 99) through cylinder bores and onto crankcase in order shown. Use light coating of clean compressor oil on rod and piston pin bearings. Attach end cover assembly (89) to crankcase with six lock washers (88) and screws (87). (Oil relief boss located at 3 o'clock position.)
- (5) Assemble balance weight (98) on drive end of crankshaft (107) with two lock washers (97) and screws (96). Place rotor key (86) in crankshaft keyway and install oil pump rotor (85). Install the four oil pump blades (84) in

rotor (85). Assemble outer cover (83) with oil passage.  
hole aligned with oil passage in end cover (12 o'clock position).

- (6) Assemble oil seal (82) into oil cover (80), install o-ring (81), assemble cover (80) and attach on studs with four sealing washers (79) and locknuts (78).
- (7) Press oil seal (70) into end cover (75) with sealing lip facing toward bearing. Install bearing (77) in end cover (75). Coat end cover gasket (76) with light coating of grease to hold in position on crankcase (116). Assemble end cover (75) to crankcase with six lock washers (74) one shorter screw (73) (6 o'clock position) and five screws (72).
- (8) If removed, press three dowel pins (69) into compressor flywheel (68). Place gasket (71) in position and assemble flywheel (68) to end of crankshaft (107) with three lock washers (67) and screws (66). Apply a small amount of Loctite, or equivalent on screws (66) and torque screws to (26) foot-pounds (3.60 kg-m). Attach drive gear (65) to flywheel (68) with six lock washers (64) and screws (63). If removed, install sixteen studs (62) in crankcase, four each cylinder.
- (9) To assemble fourth stage head and cylinder group (fig. 7-31), apply Loctite compound No. 601, or equivalent to outside diameter of liner (14) covering area 1/2 to 3/4 inch (12,700 - 19,050 mm) below upper flange and press liner (14) into cylinder (15) until flange seats in cylinder recess. Clean off excess sealant immediately. Install pipe plug (12) in cylinder assembly (13). Place valve gasket (11) in cylinder, install valve assembly (5), head gasket (4), and cylinder head (3). Attach head (3) with eight lock washers (2) and screws (1). Torque screws (1) to 45 foot-pounds (6.22 Kg-m). Coat liner bore with clean compressor oil.
- (10) To assemble fourth stage piston assembly (fig. 7-30), assemble ring kit (5) on bolt (3) in the order shown on figure 7-30. Insert piston bolt (3) into piston and pin assembly (4), install locknut (2) and torque to 5 foot-pounds (0.69 kg-m). Coat rings with clean compressor oil and stagger ring gaps.
- (11) Rotate compressor crankshaft until fourth stage connecting rod is a top of its stroke.

Assemble fourth stage piston assembly to connecting rod and install two retaining rings (60, fig. 7-25) on piston pin. Assemble one cylinder gasket (61) on crankcase and using ring compressor on fourth stage piston, install fourth stage head and cylinder group on studs (62). Secure with four locknuts (57).

- (12) To assemble third stage piston, head, and cylinder group (fig. 7-29), place valve gasket (15) in cylinder (16) and install valve assembly (8), head gasket (7), and cylinder head (6). Attach head (6) with four lock washers (5) and screws (4); torque screws (4) to 45 foot-pounds (6.22 kg-m). Use ring expander and assemble ring kit (2) on piston and pin assembly (1). Coat rings and cylinder bore with clean compressor oil and stagger ring gap. Use ring compressor and install piston assembly in cylinder (16).
- (13) Turn compressor shaft until third stage connecting rod is at the top of its stroke. Install one cylinder gasket (61, fig. 7-25) on crankcase, install third stage cylinder and piston group, connect piston to connecting rod and install two retaining rings (60). Attach third stage cylinder on studs with four locknuts (57).
- (14) To assemble second stage piston, head, and cylinder group (fig. 7-28), place valve gasket (16) in cylinder (17), install valve assembly (9), head gasket (8), and cylinder head (7). Attach head (7) with eight lock washers (6) and screws (5). Torque screws (5) to 20 foot-pounds (2.77 kg-m). Use ring expander and install ring kit (2) on piston. Coat rings and cylinder bore with clean compressor oil and stagger ring gaps. Use ring compressor and install piston assembly into cylinder (17).
- (15) Turn compressor crankshaft until second stage connecting rod is at top of its stroke. Install one cylinder gasket (61, fig. 7-25), connecting piston to connecting rod and install two retaining rings (60). Secure cylinder on studs with four locknuts (57).
- (16) To assemble first stage piston, head, and cylinder group (fig. 7-27), place cylinder head gasket (9) on cylinder (17), place valve assembly (10) on cylinder, install valve gasket (8) removing two webs connecting outer and inner gasket; then, install cylinder head (7). Secure head (7)

with six lock washers (6) and screws (5). Use ring expander and install ring kit (2) on piston. Coat rings and cylinder bore with clean compressor oil and stagger ring gaps. Use ring compressor and install piston in cylinder.

- (17) Rotate compressor crankshaft until first stage connecting rod is at top of its stroke. Install cylinder gasket (59, fig. 7-25), connect piston to connecting rod and install two retaining rings (58). Secure cylinder on studs with four locknuts (57).
- (18) Install pipe plug (56), valve piston (55), reducing bushing (54), and connector (53). Install relief ball (52), spring (51), nut gasket (50), locknut (49), and oil relief screw (48).

### CAUTION

**When unit is started the first time after compressor overhaul, adjust screw (48) to obtain oil pressure of 25 psi (1.76 kgs/cm<sup>2</sup>) indicated on compressor oil pressure gauge on instrument panel. Tag screw (48) as a reminder to make this adjustment.**

- (19) Assemble dipstick pipe nipple (47), pipe tee (46), street elbow (45A), dipstick guide (45), install o-ring (44) on dipstick (43) and install dipstick (43). Install elbow (42) in compressor sump and install connector (41).
- (20) Install two elbows (40), five elbows (39), two elbows (38), three reducing bushings (37), tee (36), five elbows (35), and hose connector (34). Install oil hose assemblies (33 through 29). Install pipe nipple (28), place two hose clamps (25) on vent hose (27), connect vent hose (27) to nipple (28), install crankcase breather (26) and tighten hose clamps (25).
- (21) If removed, install filter adapter (23) in oil filter bracket (22). Attach bracket (22) to filter mounting bracket (24) with two screws (21), flat washers (20), and locknuts (19). Assemble oil filter (18) and two elbows (16) and two connectors (17). Support mounting bracket (24) and install tube assemblies (15, 14). Install air cleaner elbow (13), restriction indicator hose connector (12C), place hose clamps (12A) on each end of breather hose (12B), install breather hose (12B) and tighten hose clamps (12A).



- (22) To assemble oil bath type compressor air filter assembly (fig. 7-26), install mounting base (6) in intake elbow. Place gasket (5) on base (6), fill bowl assembly (4) to bead mark with oil (LO 5-4310-365-12) and set bowl (4) on base. Soak filter element (3) in oil and assemble element (3) and top assembly (2) onto bowl; tighten winged screw of top assembly to secure.
- (22.1) To assemble dry type compressor air filter assembly (fig. 7-26.1), install stem (7), if removed, in base connector (8). Install base connector (8) in intake elbow. Place gasket (6) on base connector (8) and assemble base tray (5), element (4), and hood (3). Screw wing nut (2) onto stem (7) finger tight to secure assembly.
- (23) Attach lifting straps to compressor assembly (12, fig. 7-25) and using a hoist install the assembly on unit frame making certain drive ring engages with clutch plates. Secure the assembly to frame with two lock washers (11) and screws (10). Attach components to compressor flange that were moved aside at disassembly and secure compressor to clutch housing with eight screws (17, fig. 6-17), lock washers (16) and nuts (15).
- (24) Attach fan (4, fig. 7-25) to hub (8) with four screws (3), lock washers (2) and nuts (1). Place hub key (9) in crankshaft keyway, install fan and hub (8), hub washer (7), lock washer (6), and screw (5).
- (25) Install four screws on each side panel, removed at disassembly, securing control panel assembly to the side panels. Assemble eight rubber washers (99, fig. 6-22), fan guard (100), four washers (98) and screws (97).
- (26) Refer to fig. 6-4 and connect hose assemblies (36, 35) to compressor end cover. Connect tube assembly (29) to continuous bleed valve. Connect air line tube assemblies to compressor cylinders, air cooler, and trap assemblies.
- (27) Connect choke and throttle cable clips to first stage cylinder using one of the head bolts.
- (28) Refer to figure 6-2 and install roof (7) with engine air cleaner and heater attached (as disassembled). Plug in compressor compartment dome light lead.
- (29) Refer to fig. 6-3 and connect tube assembly (4) to heater. Connect heater fuel pump wire assembly to heater. Connect heater control cable to heater and heater control box. Connect heater exhaust tube and tighten exhaust clamp.
- (30) Connect compressor restriction indicator hose to air cleaner elbow. Refer to fig. 6-12 and connect elbow (22) to air cleaner outlet tube, tighten hose clamp (18). Connect restriction indicator hose to elbow (22). Use a plastic wire tie, or equivalent, and secure hose assemblies out of the way.
- (31) Refer to para 6-2.g. and install exhaust muffler group. Connect compressor oil drain hose (2, fig. 6-24) to compressor sump. Service the compressor in accordance with LO 5-4310-365-12.
- (32) When compressor is started the first time after overhaul, adjust the oil pressure to 25 psi  $\pm$  5 psi (1.76  $\pm$  0.35 kgs/cm<sup>2</sup>) by turning oil relief screw (48, fig. 7-25). Read pressure setting on compressor oil pressure gauge on instrument panel. When pressure is set, lock screw with locknut (49, fig. 7-25).

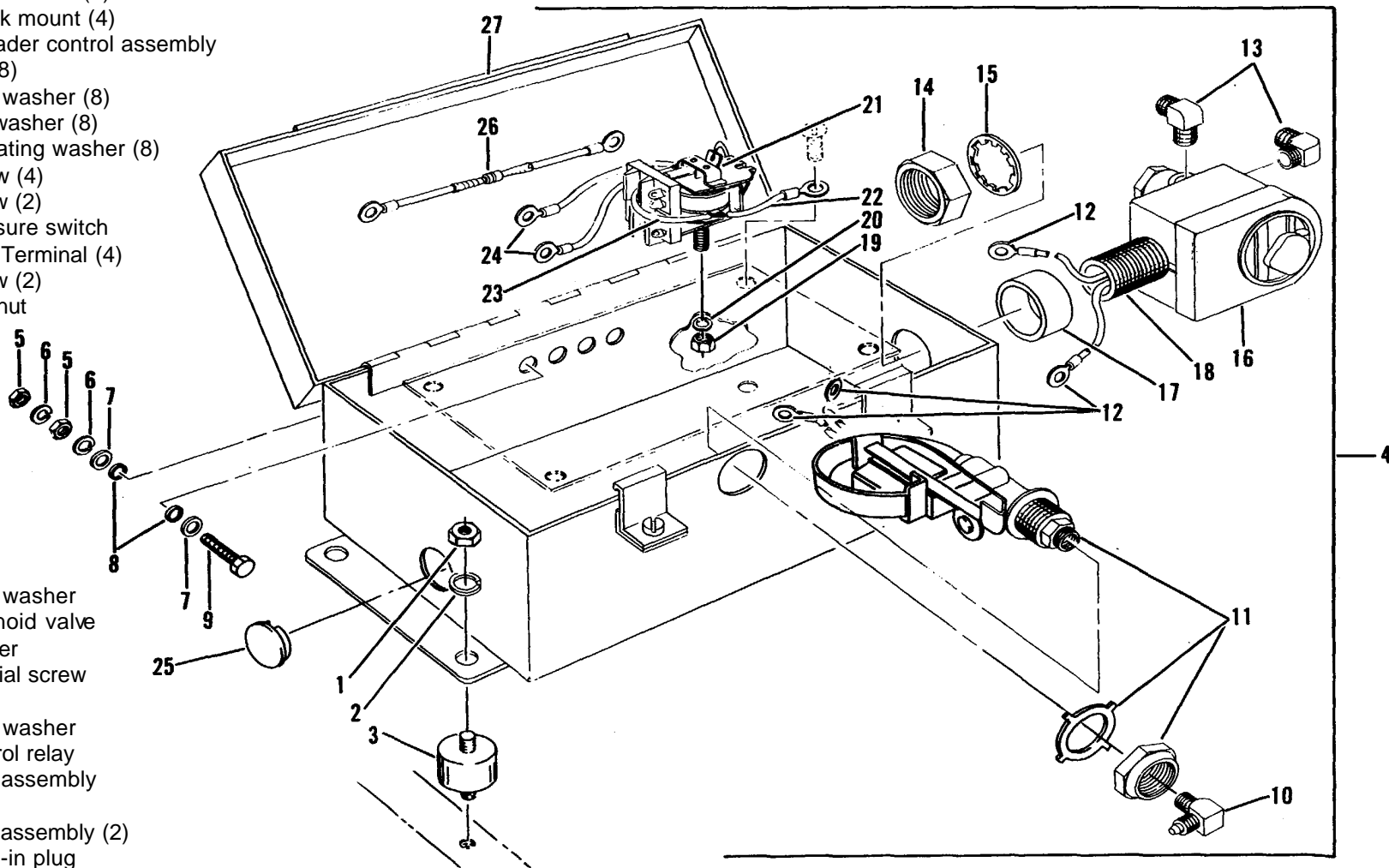
## 7-26. Maintenance of Unloader Control Box Assembly.

- a. Removal and Disassembly.** Refer to fig. 1-3 and disconnect wiring harness leads from terminals. Refer to fig. 6-4 and disconnect hose assembly (31) from pressure switch and hose assemblies (32, 40) from solenoid valve. Refer to figure 7-32 to remove and disassemble unloader control box assembly.

Legend for fig. 7-32:

- 1. Nut (6)
- 2. Lock washer (6)
- 3. Shock mount (4)
- 4. Unloader control assembly
- 5. Nut (8)
- 6. Lock washer (8)
- 7. Flat washer (8)
- 8. Insulating washer (8)
- 9. Screw (4)
- 10. Elbow (2)
- 11. Pressure switch
- 12. Ring Terminal (4)
- 13. Elbow (2)
- 14. Jam nut

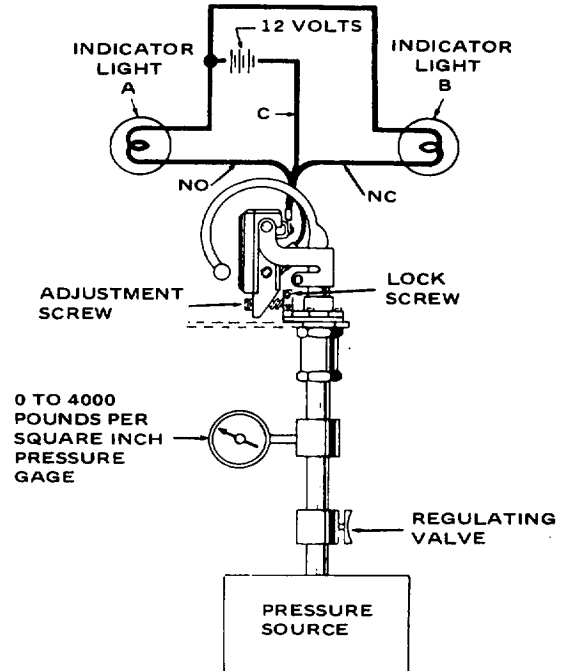
- 15. Lock washer
- 16. Solenoid valve
- 17. Spacer
- 18. Special screw
- 19. Nut
- 20. Lock washer
- 21. Control relay
- 22. Wire assembly
- 23. Wire
- 24. Wire assembly (2)
- 25. Snap-in plug
- 26. Diode assembly
- 27. Control box assembly



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Figure 7-32. Unloader control box assembly

- (1) Remove four nuts (4) and lock washers (2) and remove unloader control assembly (4) from unit. As needed, removed two nuts (1) and lock washers (2) securing two shock mounts (3) to drain valve mounting bracket and remove these two shock mounts. The other two shock mounts. The other two shock mounts (3) are mounted into tapped holes; unscrew and remove.
- (2) Remove eight units (5), lock washers (6), flat washers (7), insulating washers (8), and four terminal screws (9). Remove elbows (10,13). Remove pressure switch (11) from box. Ring terminal (12) need not be removed unless replacement is necessary. Remove mounting board corner screw that attaches solenoid ground wire, wire assembly (22) and diode assembly (26).
- (3) Remove jam nut (14) and lock washer (15). Remove solenoid valve (16) and spacer (17). When necessary to remove special screw (18), pry off solenoid valve cap and cover and remove the screw (18).
- (4) Remove remaining mounting board corner screws and lift mounting board out of box. Remove nut (19), lock washer (20), and control relay (21). When necessary, unsolder wire assemblies (22, 23, 24) from relay (21) contacts. It is not necessary to remove snap-in plug (25) from control box assembly (27).



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Figure 7-33. Pressure switch test setup

- (2) Adjust pressure source until pressure gauge indicates 3,300 psi.
- (3) Slowly increase pressure until lamp B lights. Lamp B shall light between 3,300 and 3,600 psig.

**NOTE**

**THIS OCCURS WHEN ACTUATION POINT OF SWITCH IS ADJUSTED FOR 3,500 PSI.**

- (4) Slowly increase pressure above 3,600 psig. Indicator A should light.
- (5) If lamp B or A do not light within the specified limits, adjust actuation point of pressure switch by loosening lock screw and turning adjustment screw clockwise to lower actuation point or counterclockwise to raise it.
- (6) Repeat steps (2) through (5) until indications light within the specific limits.

**c. Repair or Replacement.** Replace all defective parts. Resolder wire connections on control relay (21, fig. 7-32), as necessary. (Refer to fig. 1-3).

**NONE**

The test setup shall incorporate a master pressure gauge of known accuracy together with suitable pressure regulating and controlling apparatus. The C lead is common, NO lead is normally open, and the NC lead is normally closed.

**d. Reassembly and Installation**

- (1) If removed, install snap-in plug (25, fig. 7-32) in control box assembly (27). If removed, solder wire assemblies (24, 23, 22) to control relay (21) terminals. (See fig. 1-3, wiring diagram.) Assemble control relay (21) onto control box mounting board with lock washer (20) and nut (19). Install mounting board in box and secure three corner screws. Do not install corner next to control relay (21) until attaching ground wires and diode assembly (26).
- (2) If removed, install special screw (18) in solenoid valve (16). Run solenoid leads through screw as shown on fig. 7-32. Assemble solenoid valve (16), spacer (17) (solenoid leads into box) and secure with lock washer (15) and jam nut (14). Attach solenoid ground terminal, control relay ground terminal, and diode assembly (26) with mounting board corner screw, see fig. 1-3.
- (3) Assemble pressure switch (11, fig. 7-32) into box and install elbows (10, 13). Assemble the four terminal screws (9) making wire connection

as shown on figure 1-3, wiring diagrams; assemble terminal components (8, 7, 6, 5, fig. 7-32) in order shown.

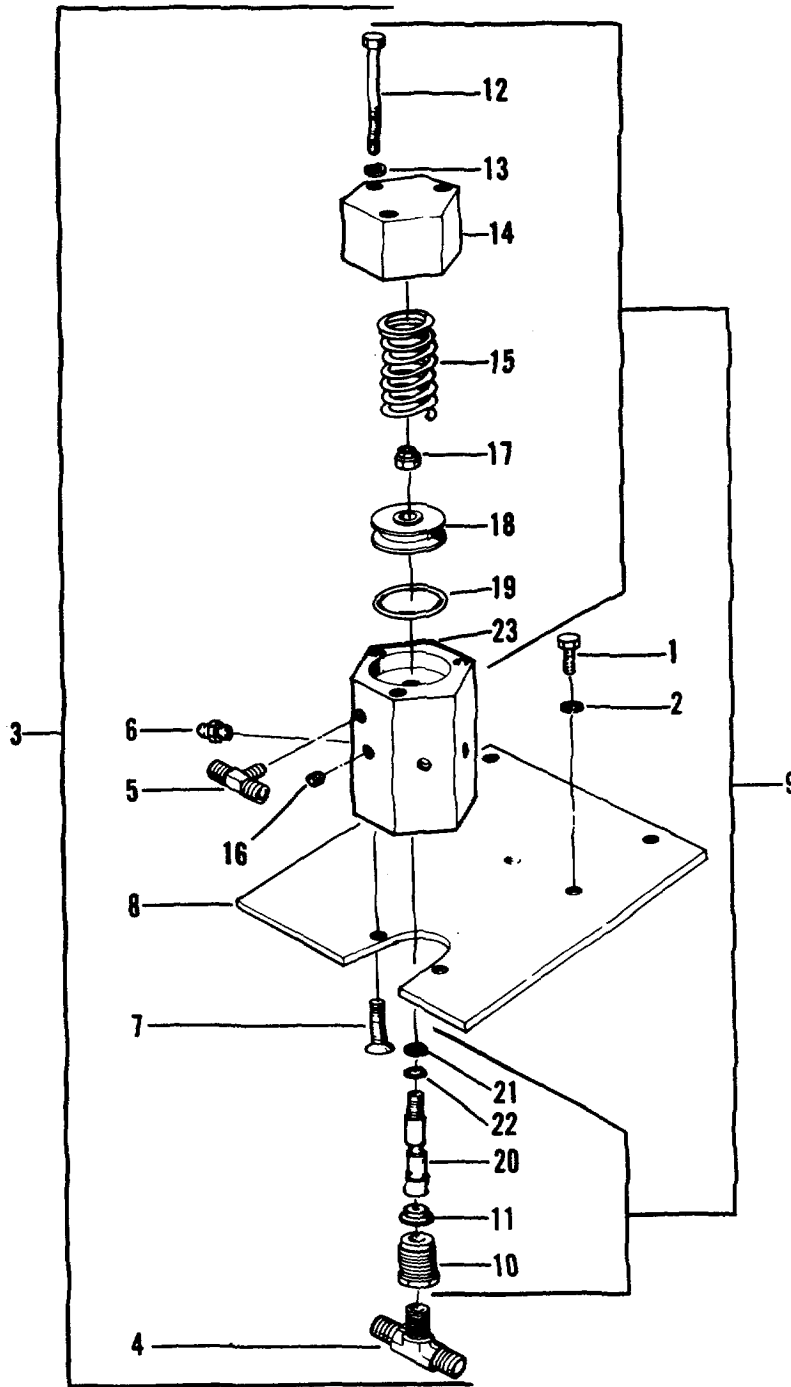
- (4) Screw two shock mounts (3) into threaded frame crossmember holes and attach the other two shock mounts (3) to drain valve mounting bracket with lock washers (2) and nuts (1). Install control box assembly (4) on shock mounts (3) and attach with four lock washers (2) and nuts (1).
- (5) Refer to figure 1-3 and make wire connections to unloader control box assembly terminals. Refer to fig. 6-4 and connect hose assemblies (31, 32, 40) to pressure switch and solenoid valve.

**7-27. Maintenance of Drain Valve Assembly.**

**a. Removal and Disassembly.** Refer to fig. 6-4 and disconnect tube assemblies (20, 26, 28) and hose assemblies (36, 40) at drain valve assembly. Remove nuts and lock washers attaching unloader control box shock mounts to mounting bracket. remove and disassemble drain valve assembly (3, fig. 7-34) as follows:

Legend for fig. 7-34

- 1. Screw (2)
- 2. Lock washer (2)
- 3. Drain valve assembly
- 4. Tee
- 5. Tee
- 6. Connector
- 7. Screw (2)
- 8. Mounting bracket
- 9. Valve assembly
- 10. Screw
- 11. Seat
- 12. Screw (3)
- 13. Lock washer (3)
- 14. Cap
- 15. Spring
- 16. Pipe plug (5)
- 17. Locknut
- 18. Piston
- 19. O-ring
- 20. Valve stem
- 21. Backup ring
- 22. O-ring
- 23. Body



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Figure 7-34. Drain valve assembly

- (1) Remove two screws (1) and lock washers (2) and remove the assembly (3) from unit. Unscrew and remove tees (4, 5), connector (6), and remove two screws (7). Separate mounting bracket (8) from valve assembly (9).
- (2) Remove screw (10) and seat (11). Remove three screws (12) and lock washers (13). Separate cap (14) from body (23) removing spring (15). Remove five pipe plugs (16).
- (3) Insert a 1/8 inch (3.175 mm) diameter rod through hole in side of body (23) and through hole in valve stem (20) to keep valve stem from turning and remove locknut (17); remove rod. Remove piston (18) and o-ring (22).
- (4) Withdraw valve stem (20) from body (23) and remove backup ring (21) and o-ring (22).

#### WARNING

**DRY CLEANING SOLVENT, p-d-680, USED TO CLEAN PARTS IS POTENTIALLY DANGEROUS TO PERSONNEL AND PROPERLY. AVOID REPEATED AND PROLONGED SKIN CONTACT. DO NOT USE NEAR OPEN FLAME OR EXCESSIVE HEAT. FLASH POINT OF SOLVENT IS 100°F - 130°F (38°C - 59°C).**

**b. Cleaning and Inspection.** Clean metallic parts with solvent, P-D-680, or equivalent. Dry thoroughly. Wipe other parts with a clean, lint-free cloth. Inspect valve stem (20, fig. 7-34) for nicks and burrs. Refer to table 7-4 for table of limits.

**c. Repair or Replacement.** A repair kit is available consisting of items (11, 17, 18, 19, 20, 21, 22). It is recommended this kit be used if damaged component parts are found. All defective parts not in repair kit shall be replaced.

#### d. Reassembly and Installation

- (1) Coat o-rings (22, 19) with light coating of clean compressor oil. Assemble o-ring (22) and backup ring (21) on valve stem (20). Carefully insert valve stem (20) into body (23). Insert a 1/8 inch (3.175 mm) diameter rod through side hole of body (23) and through hole in valve stem (20) to keep it from turning. Install o-ring (19) on piston (18), assemble piston (18) to valve stem (20) with locknut (17); remove rod.
- (2) Install five pipe plugs (16). Assemble spring (15) and cap (14) securing with three lock washers (13) and screws (12). Assemble seat (11) and screw (10).
- (3) Attach valve assembly (9) to mounting bracket (8) with two screws (7). Install connector (6) and tees (5, 4) with run of tees parallel as shown on fig. 7-34.
- (4) Attach drain valve assembly (3) to unit frame with two lock washers (2) and screws (1). Attach unloader control box shock mounts to mounting bracket (8) and secure with lock washers and nuts.
- (5) Refer to figure 6-4 and connect hose assemblies (40, 36) and tube assemblies (28, 26, 20) to drain valve assembly.

Table 7-4. Drain Valve Inspection Table of Limits

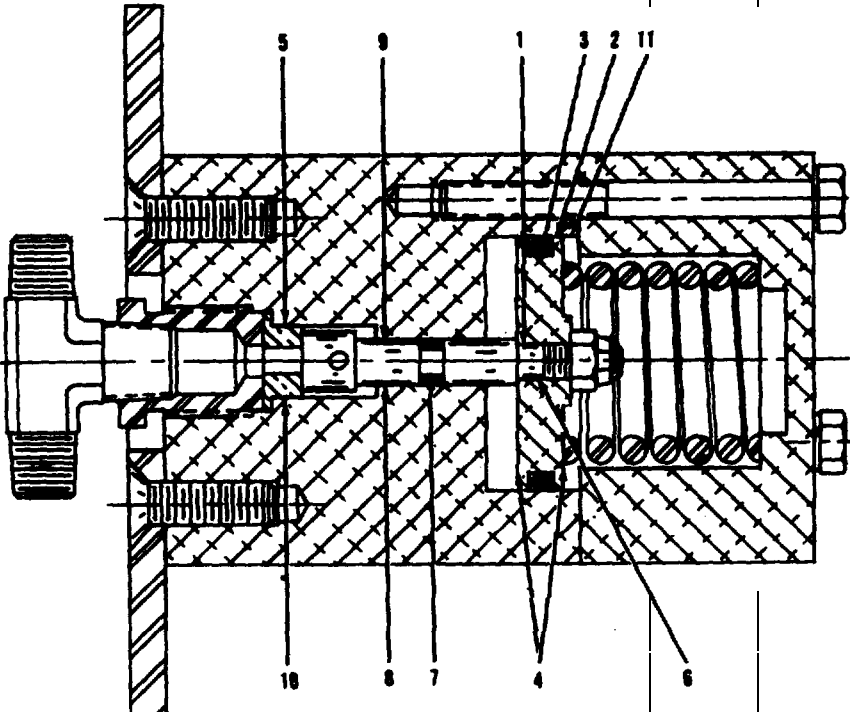
FIG. & INDEX NO.	DESCRIPTION	REF NO.	MINIMUM INCHES (MM)	MAXIMUM INCHES (MM)	REPLACE- MENT MAXIMUM INCHES (MM)
7-34-9	Drain valve assembly 				
7-34-18	Piston Bore ..... Outside diameter..... O-ring groove root diameter ..... OD (2), groove (3), bore (1) concentric within.... Faces perpendicular to bore within .....	1 2 3 4	0.250 (6.350) 1.739 (44.171) 1.504 (38.202)	0.251 (6.375) 1.743 (44.272) 1.508 (38.303)	0.002TIR (0.051TIR) 0.002TIR (0.051TIR)
7-34-11	Seat: Shoulder diameter .....	5	0.500 (12.700)	0.503 (12.776)	
7-34-20	Valve stem: Piston journal diameter ..... O-ring groove diameter .....	6 7	0.248 (6.299) 0.187 (4.750)	0.249 (6.325) 0.189 (4.801)	

Table 7-4. Drain Valve Inspection Table of Limits - Continued

FIG. & INDEX NO.	DESCRIPTION	REF NO.	MINIMUM INCHES (MM)	MAXIMUM INCHES (MM)	REPLACE- MENT MAXIMUM INCHES (MM)
7-34-20	Valve stem - cont: Stem guide journals.....	8	0.310 (7.874)	0.311 (7.899)	0.002TIR (0.051TIR)
	Piston journal (6), o-ring groove (7), stem guide (8) concentric within.....				
7-34-23	Valve body: Stem guide bore.....	9	0.313 (7.950)	0.314 (7.976)	0.005TIR (0.127.TIR)
	Stem register bore.....	10	0.500 (12.700)	0.501 (12.725)	
	Piston bore.....	11	1.750 (44.450)	1.752 (44.501)	
	Stem guide (9), seat bore (10, piston (11) concentric within.....				



**7-28. Maintenance of Dehydrators and Filter Group.**

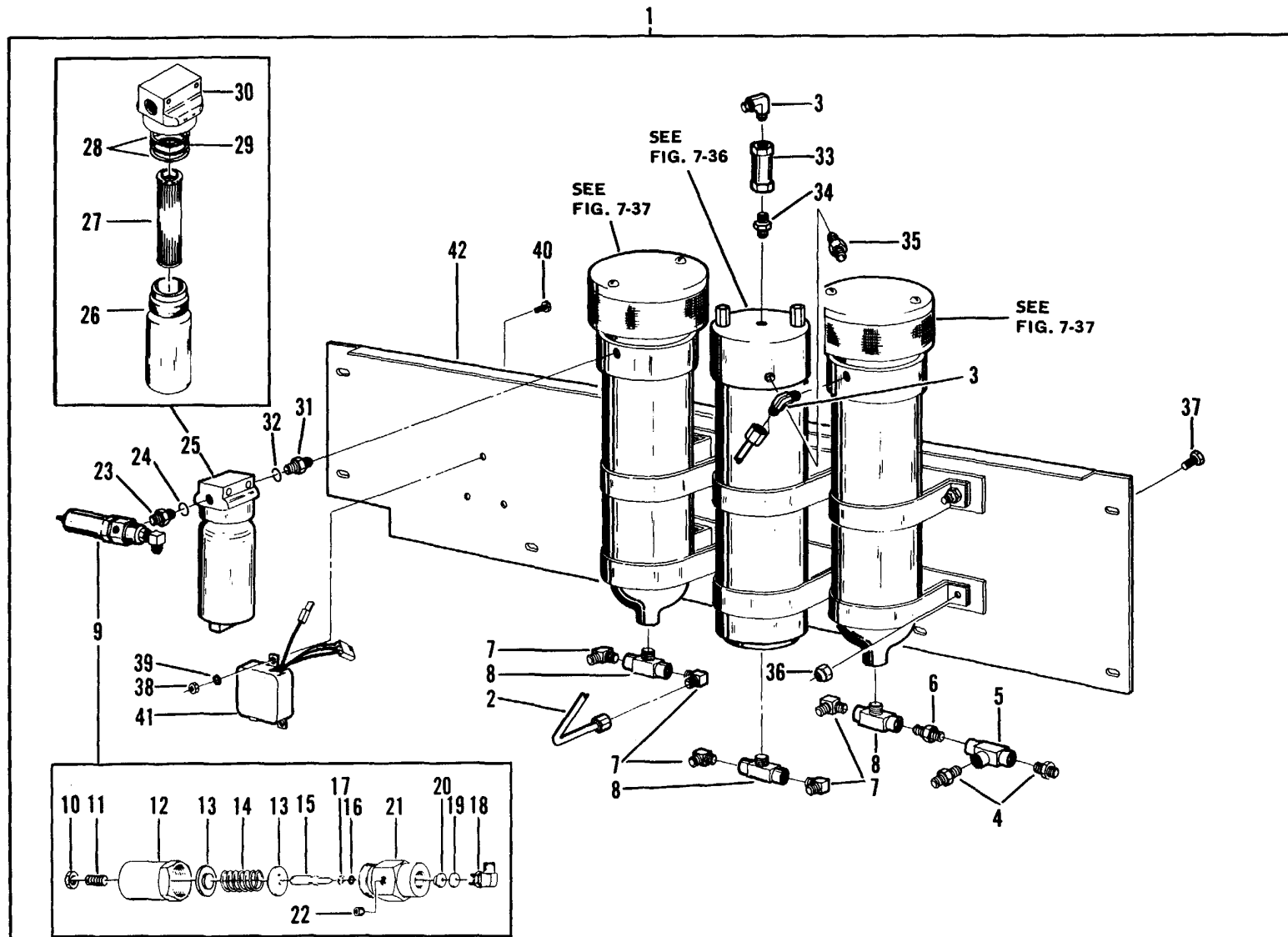
**a. Removal and Disassembly.** Refer to fig. 6-4 and disconnect tube assemblies (11, 12, 18, 19, 20, 24, 25) and hose assembly (31) from dehydrators air filter assembly. Disconnect the two voltage regulator leads at plug connections. Refer to fig. 7-35 and remove and disassemble dehydrators and filter group as follows:

- (1) Remove the seven locknuts and screws (18, 19, fig. 6-2) that secure the side panel (42, fig. 7-35) to unit; remove the dehydrator and filter group (1, fig. 7-35).
- (2) Disconnect and remove tube assembly (2), two elbows (3) and two connectors (4). Remove tee (5), hex nipple (6), five elbows (7), and three tees (8).

- (3) Unscrew and remove priority valve assembly (9). To disassemble priority valve assembly (9), remove nut (10), setscrew (11), unscrew and remove housing (12), remove two spring buttons (13), spring (14), and plunger (15). Remove backup ring (17) and o-ring (16) from plunger (15). Remove elbow (18), washer (19), and seat (20). Pipe plug (22) need not be removed from body (21).
- (4) Remove adapter (23) and o-ring (24) from filter assembly (25). Remove the filter assembly (25), unscrew filter bowl (26), remove element (27), two backup rings (28), and o-ring (29) from filter head (30). Remove adapter (31) and o-ring (32). Unscrew and remove check valve (33), hex nipple (34), and connector (35).

Legend for fig. 7-35

- |                                |                     |                       |
|--------------------------------|---------------------|-----------------------|
| 1. Dehydrator and filter group | 15. Plunger         | 29. O-ring            |
| 2. Tube assembly               | 16. O-ring          | 30. Filter head       |
| 3. Elbow (2)                   | 17. Backup ring     | 31. Adapter           |
| 4. Connector (2)               | 18. Elbow           | 32. O-ring            |
| 5. Tee                         | 19. Washer          | 33. Check valve       |
| 6. Hex nipple                  | 20. Seat            | 34. Hex nipple        |
| 7. Elbow (5)                   | 21. Body            | 35. Connector         |
| 8. Tee (3)                     | 22. Pipe plug       | 36. Locknut (8)       |
| 9. Priority valve assembly     | 23. Adapter         | 37. Screw (8)         |
| 10. Nut                        | 24. O-ring          | 38. Nut (3)           |
| 11. Setscrew                   | 25. Filter assembly | 39. Lock washer (3)   |
| 12. Housing                    | 26. Bowl            | 40. Screw (3)         |
| 13. Spring button (2)          | 27. Element         | 41. Voltage regulator |
| 14. Valve spring               | 28. Backup ring (2) | 42. Lower side panel  |



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Figure 7-35. Dehydrators and filter group

(5) Remove three nuts (38), lock washers (39), screws (40), and voltage regulator (41).

(6) Remove eight locknuts (36) and screws (37); remove two dehydrator assemblies and air filter assembly from lower side panel (42).

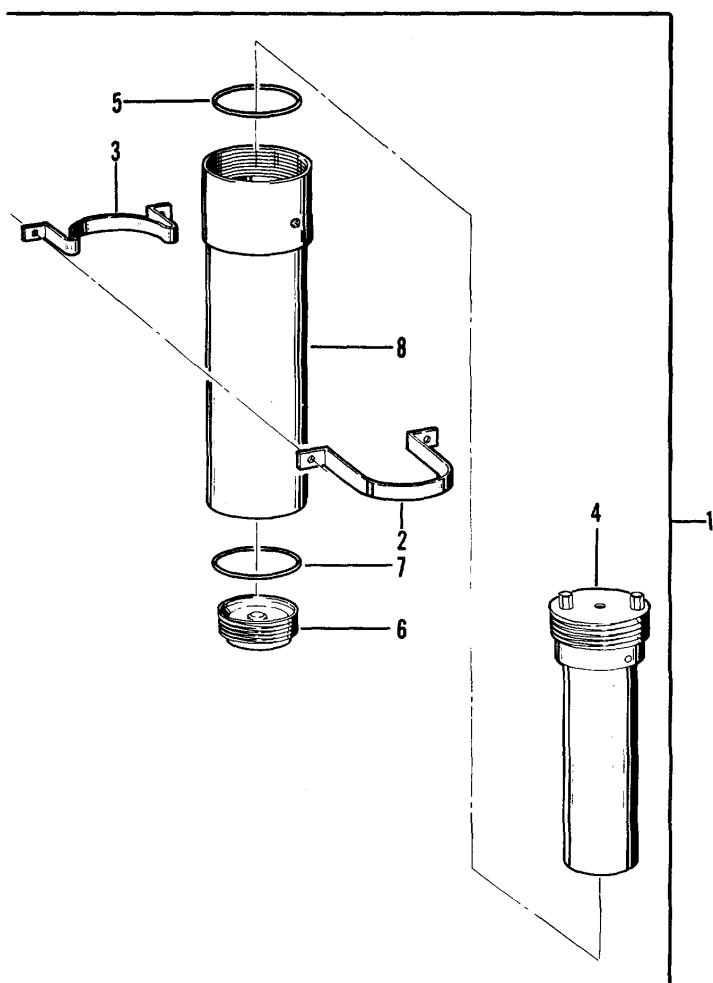
(7) Refer to fig. 7-36 and disassemble air filter assembly (1, fig. 7-36) as follows:

(a) Remove two upper mounting brackets (2) and lower mounting brackets (3) from the assembly (1).

(b) Unscrew and remove element and head assembly (4); remove o-ring (5).

(c) The cylinder tailpiece (6) and o-ring (7) should be removed from cylinder only when necessary.

(8) Refer to figure 7-37 and disassemble dehydrator assemblies (1, fig. 7-37) as follows:

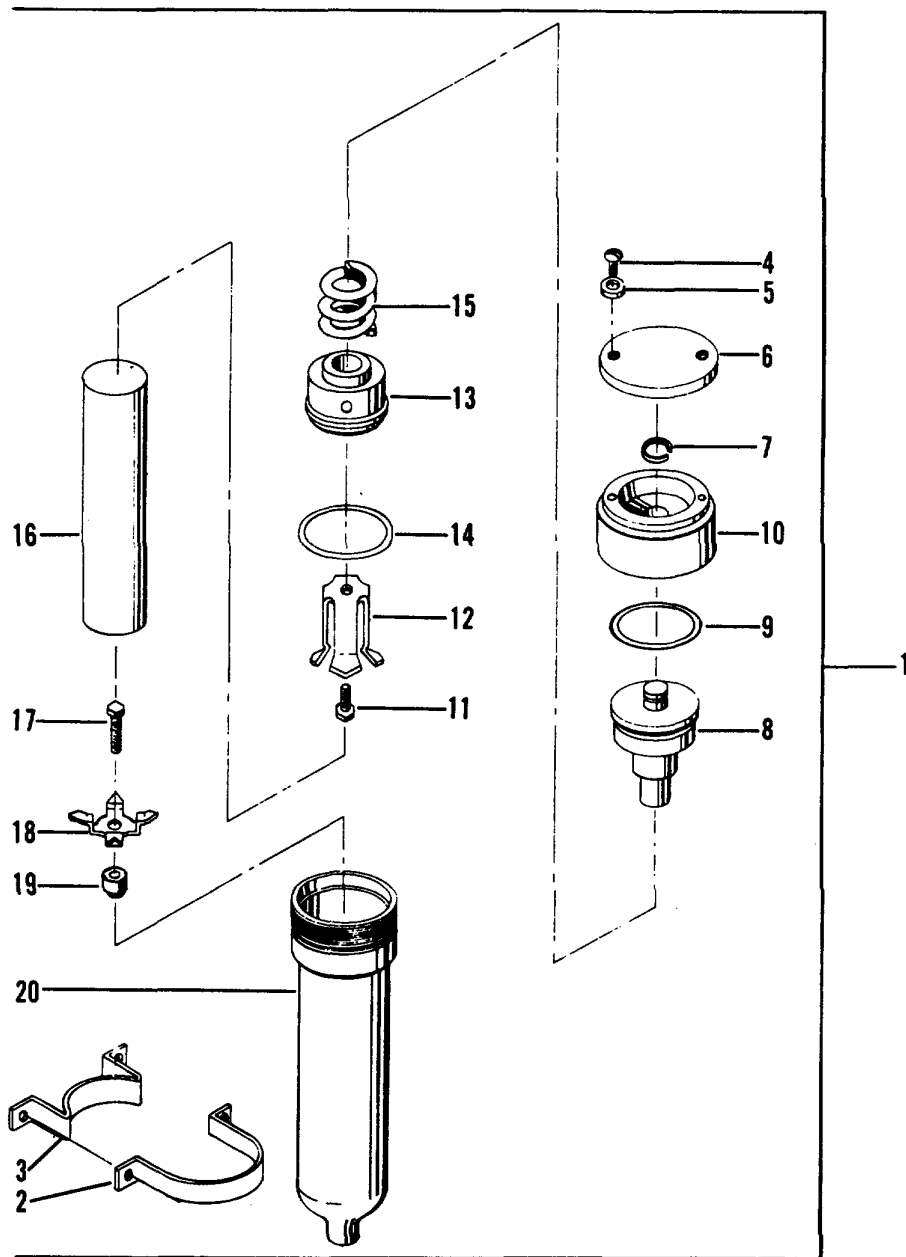


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Legend for fig. 7-36:

- 1. Air filter assembly
- 2. Upper mounting bracket (2)
- 3. Lower mounting bracket (2)
- 4. Element and head assembly
- 5. O-ring
- 6. Cylinder tailpiece
- 7. O-ring
- 8. Cylinder

Figure 7-36. Air filter assembly



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Legend for fig. 7-37:

- |                               |                      |                      |
|-------------------------------|----------------------|----------------------|
| 1. Dehydrator assembly (2)    | 8. Upper head        | 15. Head spring      |
| 2. Upper mounting bracket (2) | 9. O-ring            | 16. Cartridge        |
| 3. Lower mounting bracket (2) | 10. Cap              | 17. Screw            |
| 4. Screw (2)                  | 11. Screw            | 18. Lower perforator |
| 5. Screw gasket (2)           | 12. Upper perforator | 19. Spacer           |
| 6. Cover                      | 13. Lower head       | 20. Cylinder         |
| 7. Retaining ring             | 14. O-ring           |                      |

Figure 7-37. Dehydrator assembly

- (a) Remove the two upper mounting brackets (2) and lower mounting brackets (3) from the assembly (1).
- (b) Unscrew and remove the upper head assembly from cylinder (20). Discard cartridge (16). To disassemble head assembly, remove two screws (4) and screw gaskets (5); remove cover (6). Remove retaining ring (7) and separate upper head (8) from cap (10); remove o-ring (9). Remove screw (11), upper perforator (12), lower head (13), remove o-ring (14) and head spring (15).
- (c) Use a socket wrench with extension and remove screw (17), lower perforator (18), and spacer (19) from bottom of cylinder (20).

#### WARNING

**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 130°F (38°C - 59°C).**

**b. Cleaning and Inspection.** Clean all metallic parts with solvent, P-D-680, or equivalent, and dry thoroughly. Clean non-metallic parts by wiping with clean, lint-free cloth. Inspect all parts for damaged screw threads, cracks, breaks, distortion, nicks and burrs.

**c. Repair or Replacement.** Repair kit for priority valve assembly (9, fig. 7-35), consisting of items (14, 15, 16, 17), is available. All parts which cannot be repaired by chasing threads, removing burrs with metal scraper or emery cloth shall be replaced.

#### **d. Reassembly and Installation.**

- (1) Refer to fig. 7-37 and reassemble dehydrator assemblies as follows:
  - (a) Install spacer (19) and lower perforator (18) in bottom of cylinder (20) with screw (17). Use socket wrench with extension to tighten screw (17).
  - (b) Install o-ring (14) on lower head (13) and assemble spring (15), lower head (13) and

upper perforator (12) to upper head (8) with screw (11).

- (c) Install o-ring (9) and attach upper head (8) to cap (10) with retaining ring (7). Assemble cover (6) and secure with two screw gaskets (5) and screws (4). Lower mounting brackets (3) and upper mounting brackets (2) are used to mount the assembly (1) to lower side panel (42, fig. 7-35).
- (2) Refer to fig. 7-36 and assemble air filter assembly (1, fig. 7-36) as follows:
    - (a) If removed, assemble o-ring (7) and cylinder tailpiece (6) on cylinder (8).
    - (b) Assemble o-ring (5) and element and head assembly (4) into cylinder (8).
    - (c) Lower mounting brackets (3) and upper mounting brackets (2) are used to attach the assembly (1) to lower side panel (42, fig. 7-35).
  - (3) Mount the two dehydrators on lower side panel (42, fig. 7-35) with top of dehydrators approximately 7-3/4 inches (197 mm) above side panel top lip and the air filter assembly top approximately 6-1/4 inches (159 mm). Attach the two dehydrators and air filter assembly to side panel (42) with eight screws (37) and locknuts (36).
  - (4) Install connector (35), hex nipple (34), and check valve (33) on air filter assembly. Install o-ring (32) and adapter (31) in filter head (30). Install o-ring (24) and adapter (23) in filter head (30). Attach filter head (30) to dehydrator no. 2 by screwing adapter (31) into dehydrator outlet. Assemble filter assembly (25) by installing o-ring (29), two backup rings (28), element (27), and bowl (26).
  - (5) To assemble priority valve assembly (9), install pipe plug (22) in body (21), install seat (20), washer (19), and elbow (18). Assemble backup ring (17) and o-ring (16) on plunger (15). Install plunger (15) in body (21), place two spring buttons (13) and spring (14) in housing (12) and assemble housing (12) on body (21). Install setscrew (11) and nut (10). Connect a controlled air source capable of producing a minimum of 3,000 psi to inlet port of priority valve assembly. Adjust setscrew (11) so that valve opens at 2500 psi; then, tighten nut (10).

Remove assembly from air source and install the assembly (9) on adapter (23).

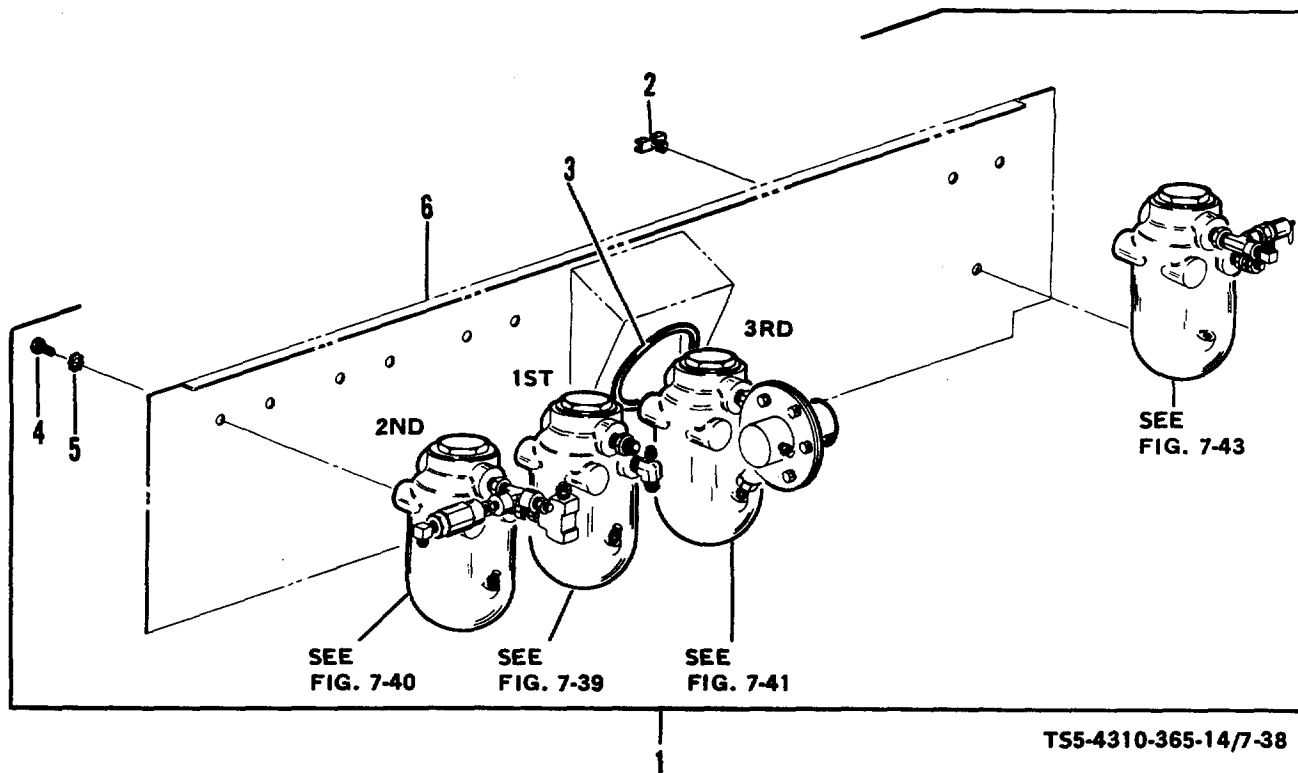
- (6) Assemble three tees (8), five elbows (7) and position as shown on fig. 7-35. Assemble hex nipple (6), tee (5) and two connectors (4). Install two elbows (3) and connect tube assembly (2).
- (7) Attach voltage regulator (41) to side panel (42) with three screws (40), lock washers (39) and nuts (38).
- (8) Attach dehydrator and filter group (2, fig. 7-35) to unit with seven screws and locknuts (19, 18, fig. 6-2).
- (9) Refer to fig. 6-4 and connect hose assembly (31) and tube assemblies (25,

24, 20, 19, 18, 14, 12, 11). Connect two voltage regulator leads at plug connections.

- (10) Refer to fig. 2-4 to install cartridges when ready to put unit into operation.

**7-29. Maintenance of Moisture Traps and Continuous Bleed Valves.**

**a. Removal and Disassembly.** Refer to fig. 6-4 and disconnect tube assemblies (2, 3, 5, 6, 8, 9, 29, 30) at trap assemblies and tube assemblies (26, 27) at condensate receiver. Disconnect hose assemblies (32, 34, 35) at trap assemblies and continuous bleed valve assemblies. Refer to figure 7-38 and remove trap assemblies and condensate receiver, as required, in following manner.



Legend for fig. 7-38:

- |                                      |                     |
|--------------------------------------|---------------------|
| 1. Moisture traps and mounting group | 4. Screw (8)        |
| 2. Drain cock                        | 5. Lock washer (8)  |
| 3. Grommet                           | 6. Lower side panel |

Figure 7-38. Moisture traps and mounting group

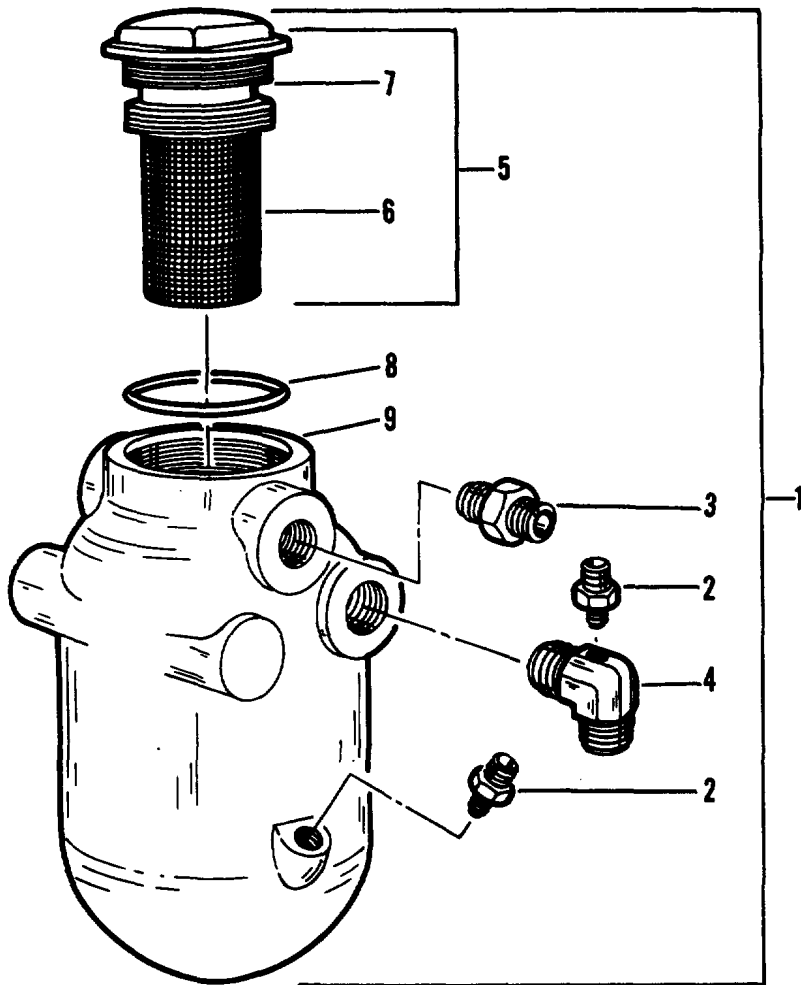
(1) Remove two screws (4) and lock washers (5) and remove the first stage trap assembly from lower side panel (6).

(2) Refer to figure 7-39 and disassemble first stage trap assembly (1) as follows:

(a) Remove the two hose connectors (2), remove tube connector (3) and elbow (4).

(b) Unscrew and remove filter assembly (5). Screen (6) is soldered to filter screw (7) and should not be disassembled except for replacement of screen. Remove o-ring (8).

(3) Refer to fig. 7-38 and remove two screws (4) and lock washers (5); remove second stage trap assembly from lower side panel (6).



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Legend for fig. 7-39:

- 1. First stage trap assembly
- 2. Hose connector (2)
- 3. Tube connector
- 4. Elbow
- 5. Filter assembly
- 6. Screen
- 7. Filter Screw
- 8. O-ring
- 9. Trap body

Figure 7-39. First stage trap assembly

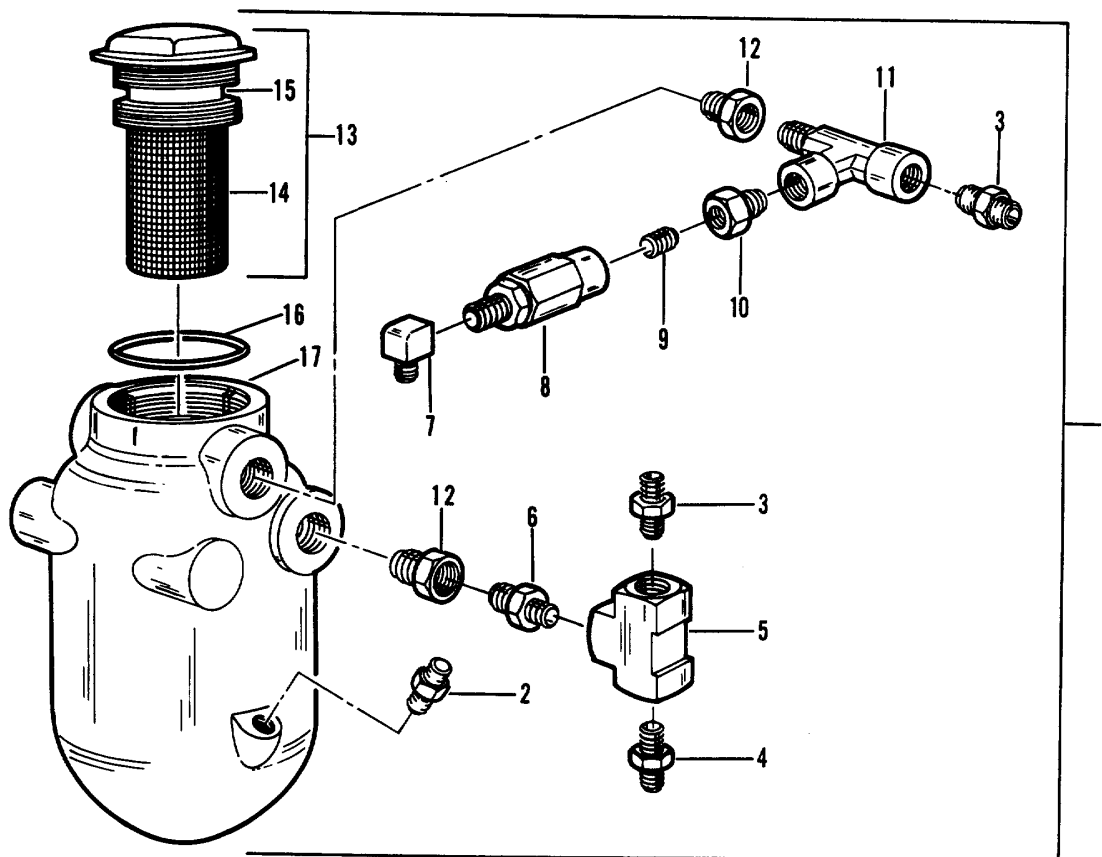
(4) Refer to fig. 7-40 and disassemble second stage trap assembly (1) as follows:

(a) Remove hose connector (3), two tube connectors (3), and tube connector (4). Remove tee (5), and hex nipple (6).

(b) Remove elbow (7), check valve (8), nipple, (9), reducing bushing (10), and tee (11). Remove two reducing bushings (12).

(c) Unscrew and remove filter assembly (13). Screen (14) is soldered to filter screw (15) and should not be disassembled except for replacement of screen (14). Remove o-ring (16).

(5) Refer to fig. 7-38 and remove two screws (4) and lock washers (5); remove third stage trap assembly from lower side panel (6).



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Legend for fig. 7-40:

- 1. Second stage trap assy
- 2. Hose connector
- 3. Tube connector (2)
- 4. Tube connector
- 5. Pipe tee
- 6. Hex nipple

- 7. Elbow
- 8. Check valve
- 9. Nipple
- 10. Reducing bushing
- 11. Tee
- 12. Reducing bushing

- 13. Filter assembly
- 14. Screen
- 15. Filter screw
- 16. O-ring
- 17. Trap body

Figure 7-40. Second stage trap assembly

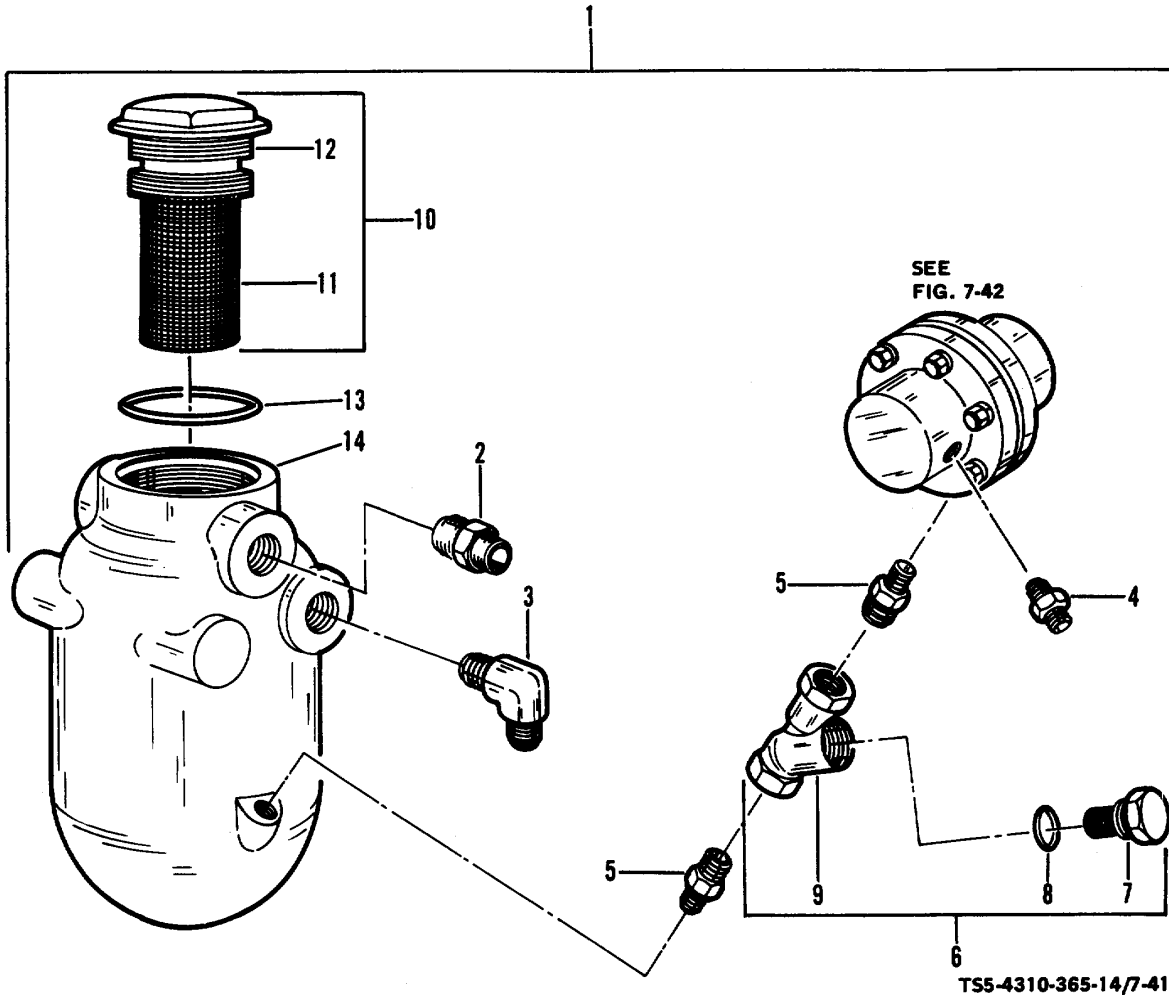


(6) Refer to fig. 7-41 and disassemble third stage trap assembly (1) as follows:

(a) Remove tube connector (2) and elbow (3); remove tube connector (4). Unscrew and remove third stage continuous bleed valve assembly and lay to one side. Disassembly is covered in para (7) below. Remove one reducing bushing (5), unscrew and remove

line strainer assembly (6) and the second reducing bushing (5). Unscrew and remove plug and screen (7) and o-ring (8) from line strainer body (9).

(b) Unscrew and remove filter assembly (10). Screen (11) is soldered to filter screw (12)



Legend for fig. 7-41:

- |                          |                           |                  |
|--------------------------|---------------------------|------------------|
| 1. Third stage trap assy | 6. Line strainer assembly | 11. Screen       |
| 2. Tube connector        | 7. Plug and screen        | 12. Filter screw |
| 3. Elbow                 | 8. O-ring                 | 13. O-ring       |
| 4. Tube connector        | 9. Strainer body          | 14. Trap body    |
| 5. Reducing nipple       | 10. Filter assembly       |                  |

Figure 7-41. Third stage trap assembly

and should not be disassembled except for replacement of screen (11). Remove o-ring (13).

- (7) Refer to fig. 7-42 and disassemble continuous bleed valve assembly as follows:

**NOTE**

All three continuous bleed valve assemblies (1, 2, 3, fig. 7-42) are shown in this figure. Difference in the assemblies is inlet and discharge port relationship and springs (7, 8). Port relationship is found at reassembly paragraphs.

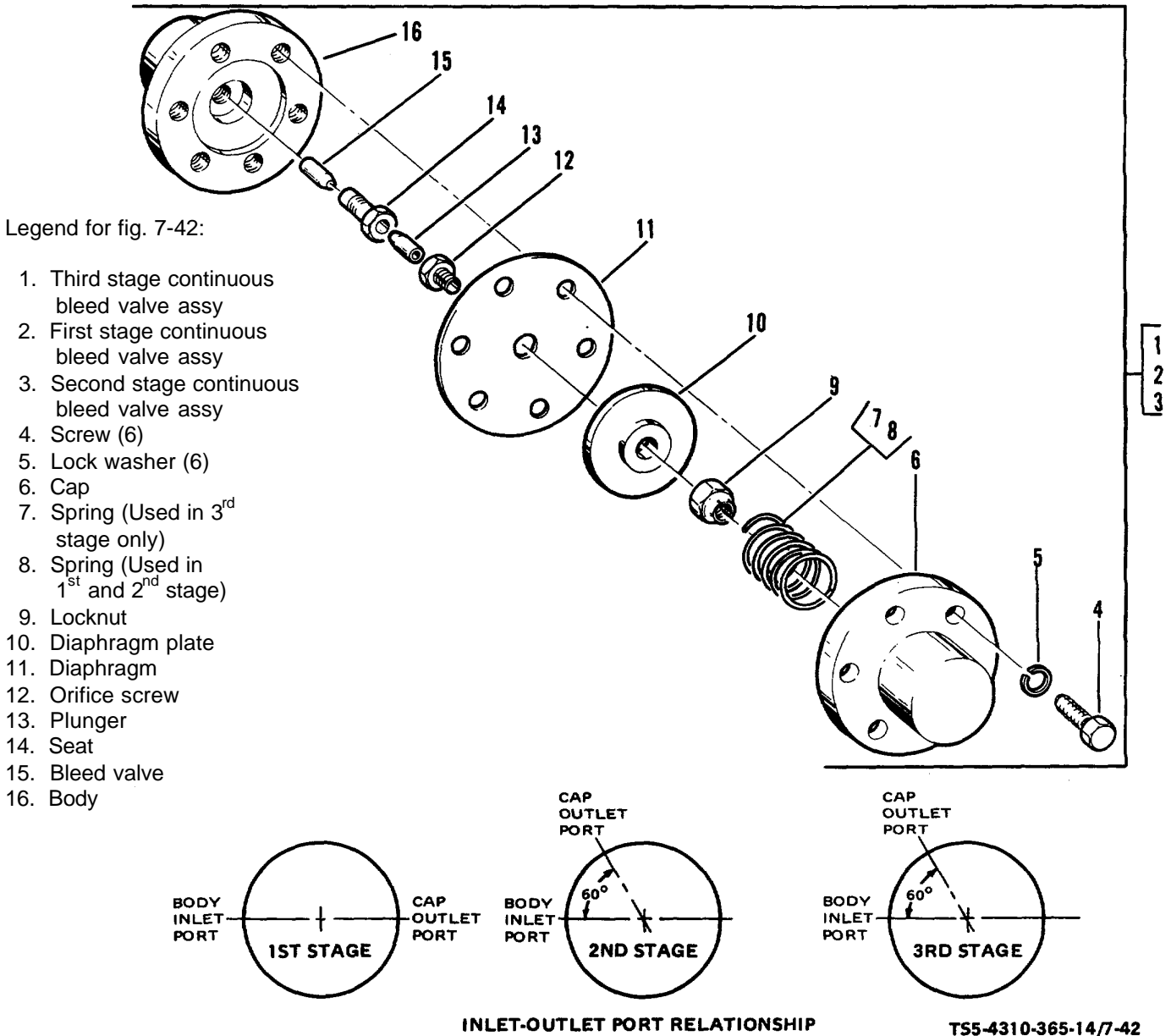
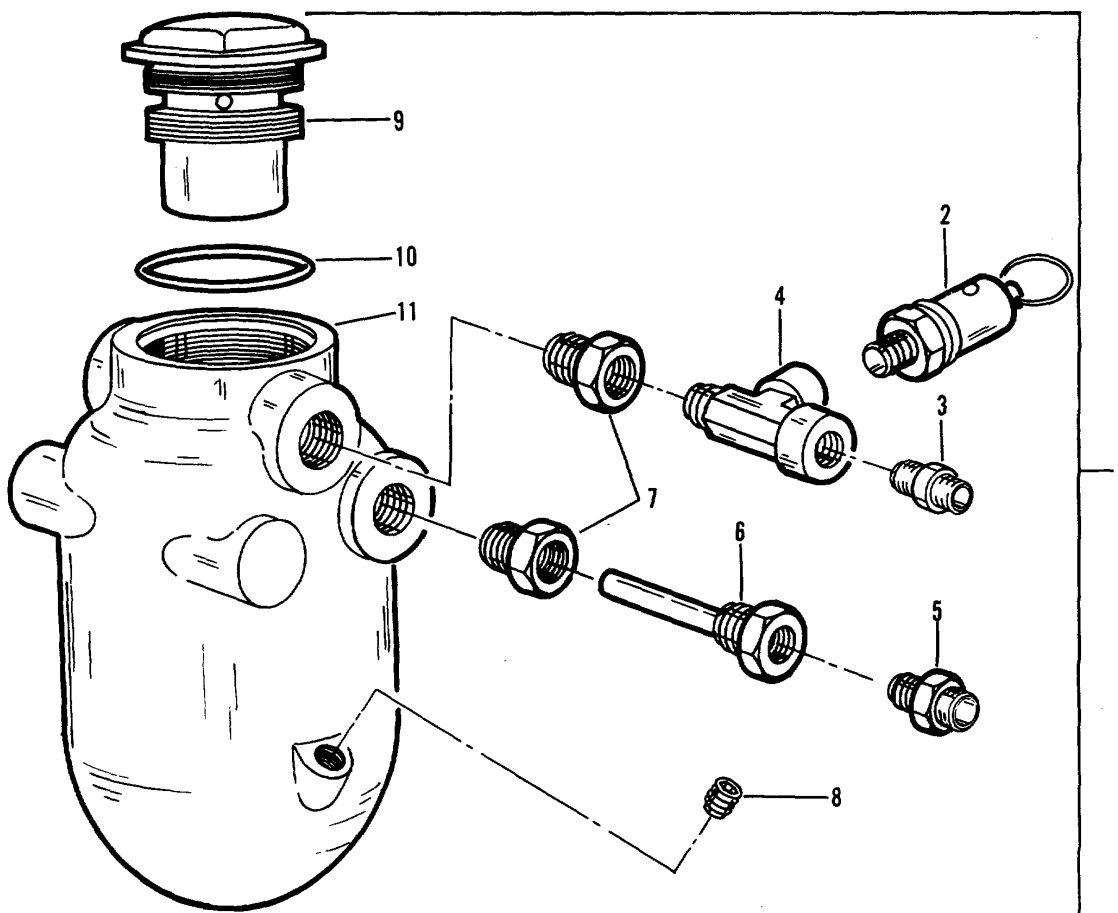


Figure 7-42. Continuous bleed valve assemblies

- (a) Remove six screws (4), lock washers (5) and cap (6). Remove third stage spring (7) or first and second stage spring (8). Lift out diaphragm group (9, 10, 11, 12); remove locknut (9) and separate diaphragm plate (10), diaphragm (11), and orifice screw (12).
- (b) Remove plunger (13). Unscrew and remove seat (14) and bleed valve (15) from body (16).

- (8) Refer to fig. 7-38 and remove condensate receiver drain cock (2). Remove two screws (4) and lock washers (5); remove condensate receiver from lower side panel (6).
- (9) Refer to fig. 7-43 and disassemble condensate receiver (1) as follows:



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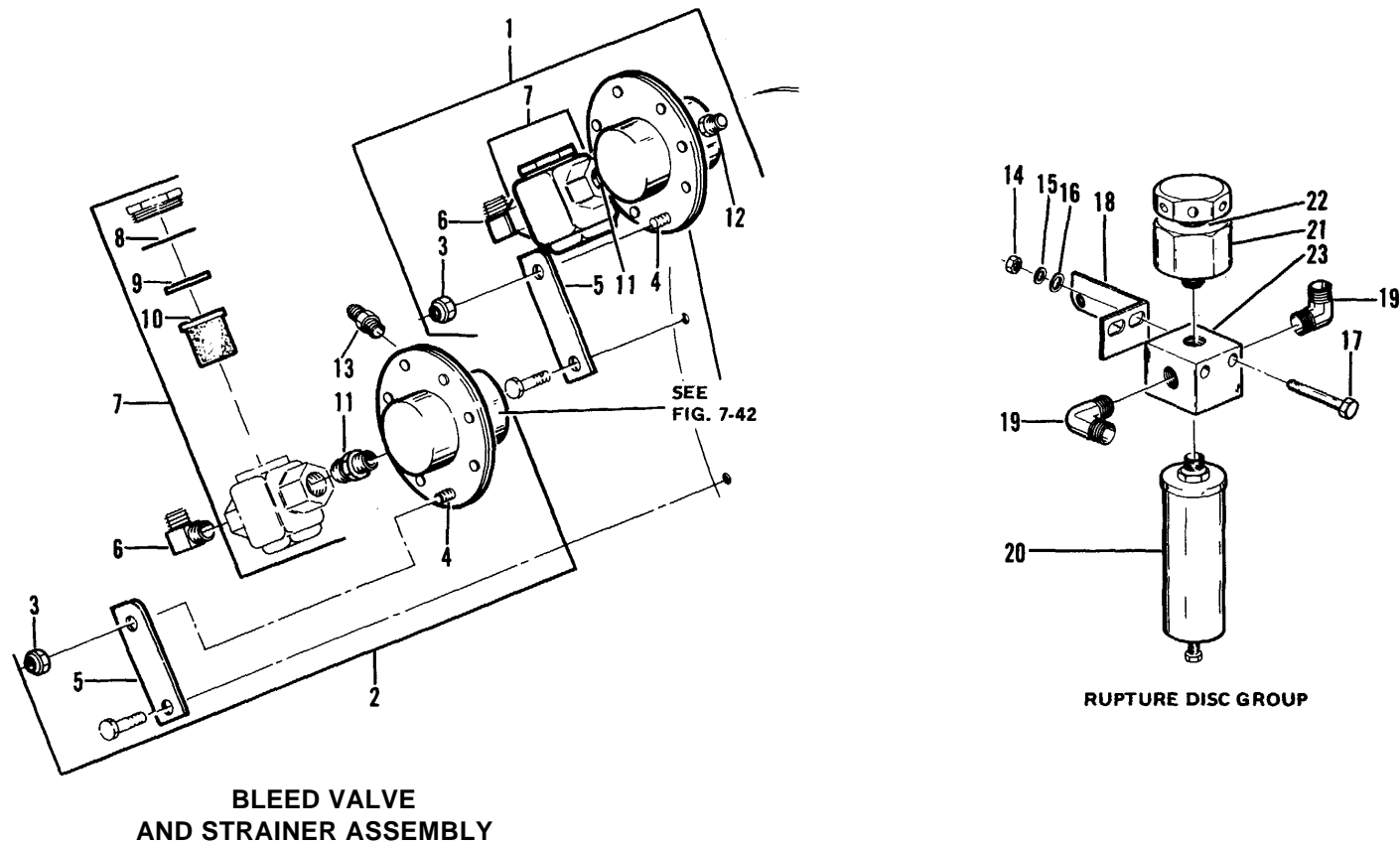
Legend for fig. 7-43:

- |                                 |                         |
|---------------------------------|-------------------------|
| 1. Condensate receiver assembly | 7. Reducing bushing (2) |
| 2. Safety valve                 | 8. Pipe plug            |
| 3. Tube connector               | 9. Receiver screw       |
| 4. Tee                          | 10. O-ring              |
| 5. Tube connector               | 11. Receiver body       |
| 6. Restricted adapter           |                         |

Figure 7-43. Condensate receiver assembly

- (a) Remove safety valve (2), tube connector (3), and tee (4). Remove tube connector (5) and restricted adapter (6). Remove two reducing bushings (7) and pipe plug (8).
- (b) Unscrew and remove receiver screw (9) and o-ring (10).

- (10) The first and second stage bleed valve and strainer assemblies are attached to compressor and clutch housing mounting flange. Refer to fig. 6-17 and remove nuts (15), lock washers (16) and screws (17) securing these assemblies. Refer to fig. 7-44 and disassemble as follows:



Legend for fig. 7-44:

- |   |                         |                        |
|---|-------------------------|------------------------|
| 1. First stage bleed valve and strainer assy  | 8. O-ring               | 17. Screw (2)          |
| 2. Second stage bleed valve and strainer assy | 9. Seal                 | 18. Mounting bracket   |
| 3. Locknut                                    | 10. Strainer element    | 19. Elbow (2)          |
| 4. Screw                                      | 11. Reducing nipple     | 20. Safety valve       |
| 5. Mounting bracket                           | 12. Tube connector      | 21. Rupture disc body  |
| 6. Elbow                                      | 13. Tube connector      | 22. Rupture disc       |
| 7. Line strainer assy                         | 14. Nut (2)             | 23. Rupture disc cross |
|   | 15. Lock washer (2)     |                        |
|   | 16. SAE flat washer (2) |                        |

Figure 7-44. Bleed valve and strainers and rupture disc group

**NOTE**

The first stage bleed valve and strainer assembly (1, fig. 7-44) and second stage assembly (2) differ only in outlet port fittings (12, 13) and inlet-outlet port relationship of continuous bleed valve assemblies. Port relationship is covered in reassembly paragraphs.

- (a) Remove locknut (3) and screw (4); remove mounting bracket (5). Remove elbow (6) and line strainer (7). Remove line strainer cap, o-ring (8), seal (9), and strainer element (10) from strainer body.
  - (b) Remove reducing nipple (11) and connectors (12, 13). Refer to para 7-29.a. (7) for continuous bleed valve disassembly.
- (11) The rupture disc group is attached to compressor and clutch housing mounting flange. Refer to fig. 6-17 and remove nut (15), lock washer (16) and screw (17) securing this group. Refer to fig. 7-44 and disassemble as follows:
- (a) Remove two nuts (14), lockwashers (15), flat washers (16), screws (17), and the mounting bracket (18). Remove two elbows (19) and safety valve (20).
  - (b) Unscrew and remove rupture disc body (21) from cross (23). Remove cap from rupture disc body (21) to replace the rupture disc (22).

**b. Cleaning and Inspection.** Clean all components of moisture traps and continuous bleed valves with soap and water solution, rinse in clean water; dry thoroughly. Inspect trap screens for puncture, o-rings for cuts and hardening, and all screw threads for damage. Inspect continuous bleed valve diaphragm (11, fig. 7-42) for cuts, tears, or any other defect. Refer to table 7-5 for continuous bleed valve inspection table of limits.

**c. Repair or Replacement.** All parts found to be defective shall be replaced. Repair kits for continuous bleed valve assemblies, fig. 7-42, consisting of items (7 or 8, 20 through 15) are available. It is recommended these kits be used at assembly.

**d. Reassembly and Installation.**

- (1) Refer to fig. 7-44 and reassemble rupture disc group as follows:
  - (a) As needed, remove cap of rupture disc body (21) and replace rupture

disc (22). Assemble cap back on body and install body (21) in cross (23).

- (b) Assemble safety valve (20) and two elbows (19) in cross (23). Attach mounting bracket (28) to cross (23) with two screws (17), flat washers (16), lock washers (15) and nuts (14).
- (c) Attach rupture disc group to compressor and clutch housing mounting flange at location removed. Secure with screw (17, fig. 6-17), lock washer (16) and nut (15).

- (2) Refer to fig. 7-44 and reassemble bleed valve and strainer assemblies as follows:

**NOTE**

Refer to para (4) below for assembly of continuous bleed valve assemblies so that inlet-outlet port relationship is maintained.

- (a) Install tube connector (13) in second stage bleed valve and connector (12) in first stage bleed valve. Install reducing nipple (11). Assemble strainer element (10), seal (9), and o-ring (8) in strainer assembly body and install cap. Assemble line strainer assembly (7) to nipple (11) and install elbow (6).
- (b) Remove one screw (4, fig. 7-42) and replace with screw (4, fig. 7-44) as shown. Tighten screw to torque of 15-17 inch pounds (0.173-0.196 kg-m). Install mounting bracket (5) and locknut (3).
- (c) Install first stage bleed valve and strainer assembly (1) and second stage assembly (2) in same location removed from compressor and clutch housing mounting flange and secure with screws (17, fig. 6-17), lock washers (16) and nuts (15).

- (3) Refer to fig. 7-43 and assemble condensate receiver as follows:

- (a) Install o-ring (10) and assemble receiver screw (9) in body (11).
- (b) Install pipe plug (8), two reducing bushing (7), restricted adapter (6) and tube

Table 7-5. Continuous Bleed Valves Inspection Table of Limits

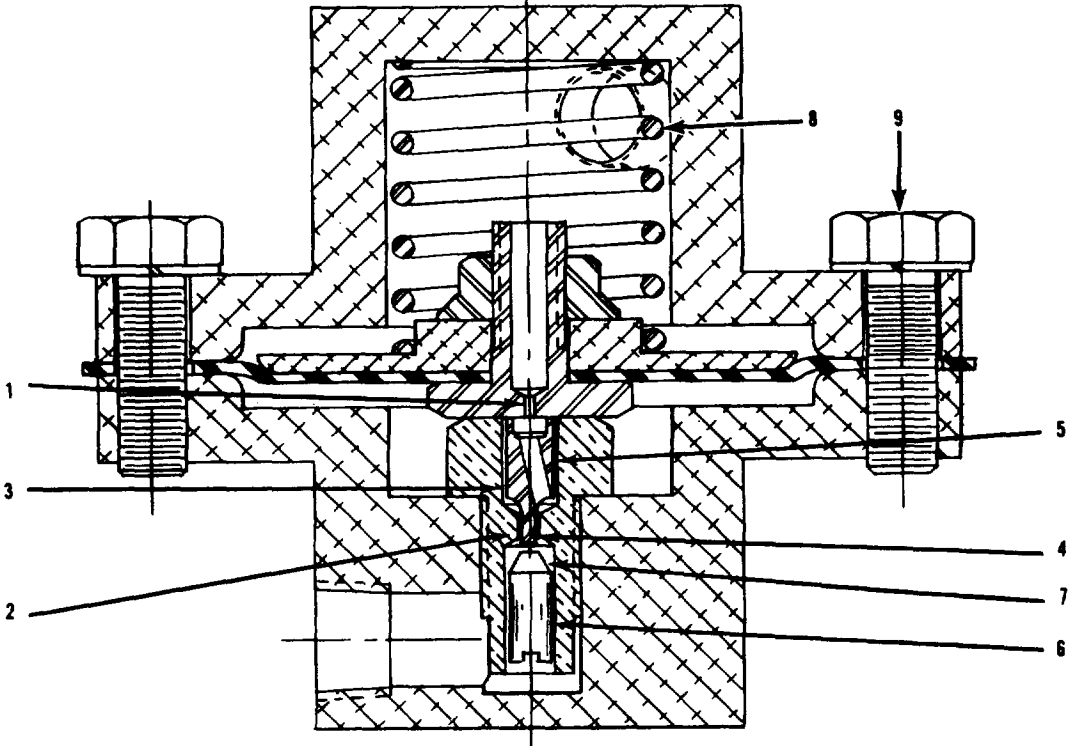
FIG. & INDEX NO.	DESCRIPTION	REF. NO.	MINIMUM INCHES (MM)	MAXIMUM INCHES (MM)	REPLACE- MENT MAXIMUM INCHES (MM)
7-42-1 7-42-2 7-42-3	Continuous bleed valve assemblies:				
					
7-42-12	Orifice diameter .....	1	0.030 (0.762)	0.033 (0.838)	0.035 (0.889)
7-42-13	Plunger: Tip diameter .....	2	0.062 (1.575)	0.067 (1.702)	
	Body diameter .....	3	0.1855 (4.7117)	0.1872 (4.7549)	
	Tip (2), body (3) concentric within.....				0.001TIR (0.025TIR)
7-42-14	Valve seat: Inside diameter (for plunger tip).....	4	0.0937 (2.3799)	0.0950 (2.4130)	
	Plunger body bore diameter.....	5	0.189 (4.801)	0.190 (4.826)	
	Bore (4) and bore (5) concentric within.....				0.0025TIR (0.0635TIR)

Table 7-5. Continuous Bleed Valves Inspection Table of Limits - Continued

FIG. & INDEX NO.	DESCRIPTION	Ref NO.	MINIMUM INCHES (MM)	MAXIMUM INCHES (MM)	REPLACE- MENT MAXIMUM INCHES (MM)
7-42-1 7-42-2 7-42-3	Continuous bleed valve assemblies - cont:				
7-42-15	Bleed valve:				
	Outside diameter .....	6	0.161 (4.089)	0.164 (4.166)	
	Tip diameter .....	7	0.063 (1.600)	0.073 (1.854)	
	OD (6), tip (7) concentric within .....				0.001TIR (0.025TIR)
7-42-7	Spring, 3rd stage: free length 2-3/4 in. (69.850 mm), ten active coils, 0.947 in. (24.054 mm) OD	8			
7-42-8	Spring, 1st and 2nd stage: free length 2 in..... (50.800 mm), ten active coils, 0.947 in. (24.054 mm) OD	8			
7-42-4	Screws: Torque 15-17 inch-pounds .....	9			
	(0.173-0.196 kg-m)				



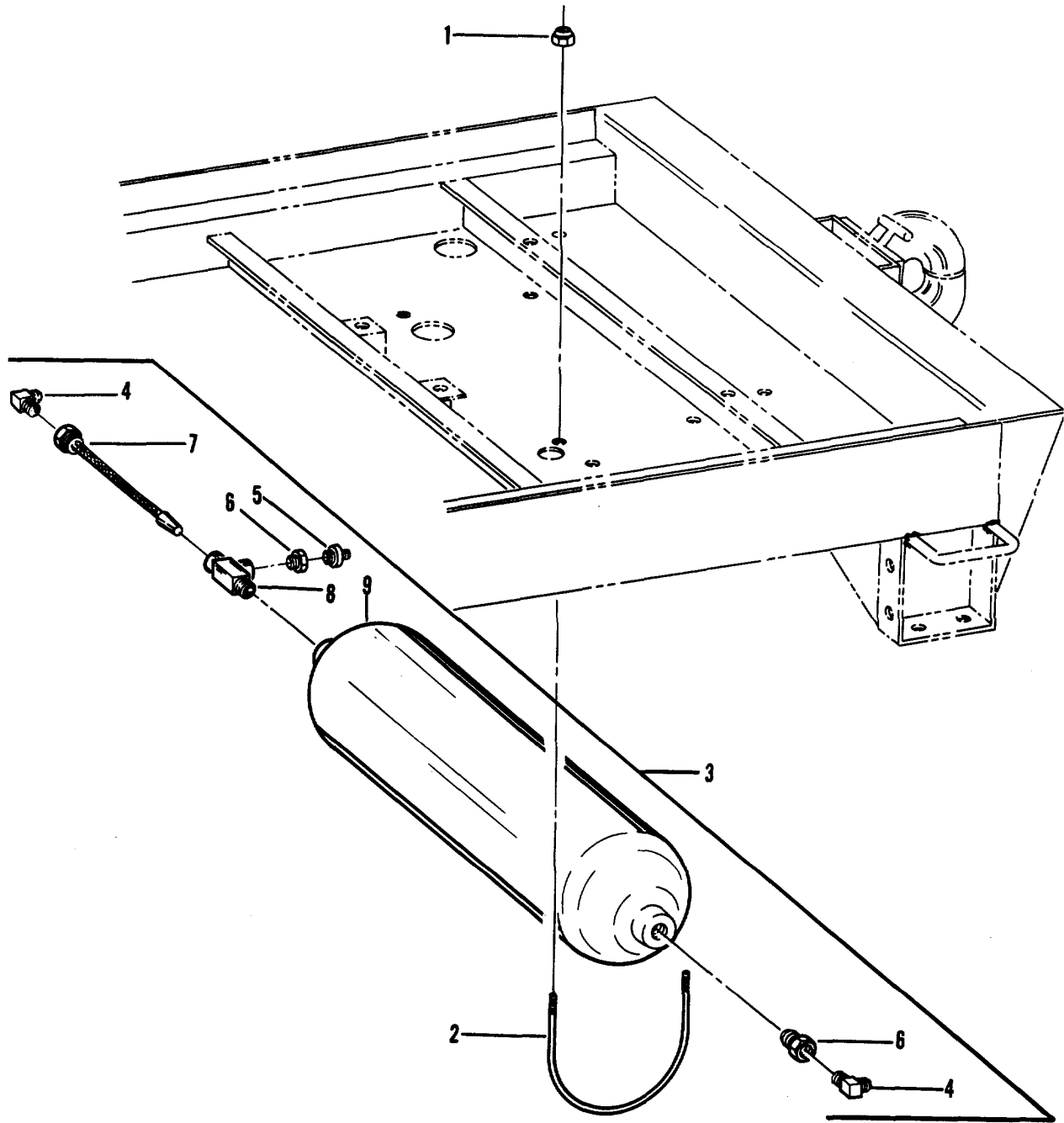
- connector (5). Install tee (4), tube connector (3) and safety valve (2). Assemble condensate receiver assembly (1) on housing lower side panel (6, fig. 7-38) and attach with two lock washers (5) and screws (4). Install drain cock (2).
- (4) Refer to fig. 7-42 and assemble first, second, and/or third stage continuous bleed valve assemblies (1,2,3) as follows:
- (a) Assemble bleed valve (15) in seat (14) and install seat (14) in body (16). Place plunger (13) in seat (14). Assemble orifice screw (12), diaphragm (11), diaphragm plate (10), and secure together with locknut (9). Place spring (8) (first and second stage) or spring (7) (third stage) on shoulder of diaphragm plate (10). Place the diaphragm group on body (16) with holes aligned.
- (b) Assemble cap (6) on body (16) with inlet-outlet port relationship as shown on figure 7-42. Secure cap (6) to body (16) with lock washers (5) and screws (4). Torque screws (4) to 15-17 inch-pounds (0.173-0.196 kg-m).
- (5) Refer to fig. 7-41 and assemble third stage trap assembly as follows:
- (a) Install o-ring (13) and assemble filter assembly (10) into trap body (14). Assemble o-ring (8) and plug and screen (7) into strainer body (9).
- (b) Install one reducing nipple (5) into body (14), assemble line strainer assembly (6), second reducing nipple (5), elbow (3), and connector (2). Install third stage continuous bleed valve assembly and connector (4).
- (c) Refer to fig. 7-38 and attach third stage trap assembly to lower side panel (6) with two lock washers (5) and screws (4).
- (6) Refer to fig. 7-40 and assemble second stage trap assembly as follows:
- (a) Install o-ring (16) and assemble filter assembly (13) into body (17). Install two reducing bushings (12).
- (b) Assemble tee (11), reducing bushing (10), nipple (9), check valve (8) and elbow (7). Assemble hex nipple (6), tee (5), connectors (3), and hose connector (2).
- (c) Refer to fig. 7-38 and attach second stage trap assembly to lower side panel (6) with two lock washers (5) and screws (4).
- (7) Refer to fig. 7-39 and assemble first stage trap assembly as follows:
- (a) Install o-ring (8) and assemble filter assembly (5) into body (9). Install elbow (4), connector (3) and two hose connectors (2).
- (b) Refer to fig. 7-38 and attach first stage trap assembly to lower side panel (6) with two lock washers (5) and screws (4).
- (8) Refer to fig. 6-4 and connect hose assemblies (35, 34, 32). Connect tube assemblies (30, 29, 9,8,6,5,3,2) to trap assemblies.

### 7-30. Maintenance of Air Receiver

**a. Removal and Disassembly.** Refer to fig. 6-4 and disconnect tube assemblies (13, 14, 16) at air receiver fittings. Use suitable blocking beneath receiver when removing. Refer to figure 7-45 and remove the air receiver.

#### WARNING

**Suitable blocking and lifting device shall be used to remove and install air receiver. The receiver tank weights approximately 145 pounds (65.77 kgs).**



Legend for fig. 7-45:

- |                          |                         |                   |
|--------------------------|-------------------------|-------------------|
| 1. Locknut (4)           | 4. Elbow (2)            | 7. Drain assembly |
| 2. U-bolt (2)            | 5. Connector            | 8. Tee            |
| 3. Air receiver assembly | 6. Reducing bushing (2) | 9. Air receiver   |

Figure 7-45. Air receiver

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- (1) Using suitable blocking and lifting device, remove four locknuts (1) and two u-bolts (2) and remove air receiver assembly (3) from unit.
- (2) Remove two elbows (4), connector (5), two reducing bushings (6), drain assembly (7) and tee (8) from air receiver (9).

**b. Cleaning and Inspection.** Clean parts thoroughly with soap and water solution, rinse with clean water and dry thoroughly. Inspect all screw threads for damage and drain assembly (7, fig. 7-45) for plugging and breaks. Inspect all parts for cracks and breaks.

**c. Repair or Replacement.** All defective parts shall be replaced.

**d. Testing.** Pressure test air receiver (9, fig. 7-45) to 5250 psi (369.075 kgs/cm<sup>2</sup>). There shall be no

evidence of leakage. If leakage does occur, air receiver shall be replaced.

**e. Reassembly and Installation.**

- (1) Reassembly tee (8, fig. 7-45), drain assembly (7), two reducing bushings (6), connector (5), and two elbows (4) into air receiver (9) positioning as shown in figure 7-45.
- (2) Use suitable lifting device and blocking, receiver weighs approximately 145 pounds (65.77 kgs), and install air receiver assembly (3) to underside of frame and secure with two u-bolts (2) and four locknuts (1).
- (3) Refer to fig. 6-4 and connect tube assemblies (16, 14, 13) at air receiver fittings.

## Section VII. MAINTENANCE OF INSTRUMENT AND CONTROL PANEL ASSEMBLY

**7-31. General.** This section covers maintenance of instrument and control panel assembly within scope of direct support and general support maintenance as prescribed by the MAC, Appendix E. Each component requiring maintenance at these levels is covered in a separate paragraph.

### 7-32. Maintenance of Pressure Switches.

**a. Testing Engine Oil Pressure Switch (12, fig. 6-23).**

- (1) Switch is normally open type. Pressure test for closing at  $2 \pm 1/2$  psi ( $0.141 \pm 0.035$  kgs/cm<sup>2</sup>).
- (2) Turn adjusting screw on back of gauge to obtain this closing pressure.
- (3) Refer to para 6-29.1. for continuity testing.

**b. Testing Compressor Oil Pressure Switch (13, fig. 6-23).**

- (1) Switch is normally open type and is not adjustable. Pressure test for closing at  $8 \pm 1$  psi ( $0.562 \pm 0.070$  kgs/cm<sup>2</sup>).
- (2) Refer to para 6.29.1. for continuity testing.

**7-33. Maintenance of Air Pressure Gauges.** Test air pressure gauges as follows:

**a.** Each of the air pressure gauges (26, 27, 28, fig. 6-23) and three gauges (29) shall be pressure tested for accuracy using a controlled air source, capable of producing minimum pressure of 4000 psi (24560 kPa), and a test gauge of known accuracy. The unit pressure gauges are designed with an accuracy of  $\pm 3\%$  of span in middle half of scale. Therefore, test gauge should have known accuracy of this or better percentage.

**b.** Test each of the gauges at least through the middle half of the scale as follows:

- (1) First stage pressure gauge (26, fig. 6-23) has scale of 0-100 psi (0-700kPa). Test in range of 25 - 75 psi (172 - 517 kPa). Shut off test pressure. Gauge pointer should drop to a point within the zero band on the dial when gauge is within prescribed accuracy. Replace faulty gauge. They are not adjustable.
- (2) Second stage pressure gauge (27) has scale of 0 - 600 psi (0-4000 kPa). Test in range of 150 - 450 psi (1033.5 - 3100.5 kPa). Shut off test pressure. Gauge pointer should drop to a point within the zero band range on the dial when gauge is within prescribed accuracy. Replace faulty gauge. They are not adjustable.
- (3) Third stage pressure gauge (28) has scale of 0-2000 psi (0-14,000 kPa). Test in range of 500 - 1500 psi (3445 - 10335 kPa). Shut off test pressure. Gauge

pointer should drop to a point within the zero band range on the dial when gauge is within prescribed accuracy. Replace faulty gauge. They are not adjustable.

- (4) The fourth stage, service, and receiver pressure gauges (29) have scale of 0-5000 psi (0-35000 kPa). Test in range of 1250-3750 psi (8612.5 - 25837.5 kPa). Shut off test pressure. Gauge pointer should drop to a point within the zero band range on the dial when gauge is within prescribed accuracy. Replace faulty gauge. They are not adjustable.

**7-34. Maintenance of Panel Light Switch.** Test the panel light switch (63, fig. 6-22) in accordance with para 6-29.e. Defective switch is not repairable. Replace a defective switch.

**7-35. Maintenance of Receiver Drain Valve Assembly.**

**a. Removal and Disassembly.** Refer to fig. 6-4 and disconnect tube assembly (17) from drain valve assembly inlet. Refer to fig. 6-22 and remove connector (23) from drain valve inlet. Remove drain valve assembly from nipple (33). Refer to figure 7-46 and disassemble drain valve assembly (1) as follows:

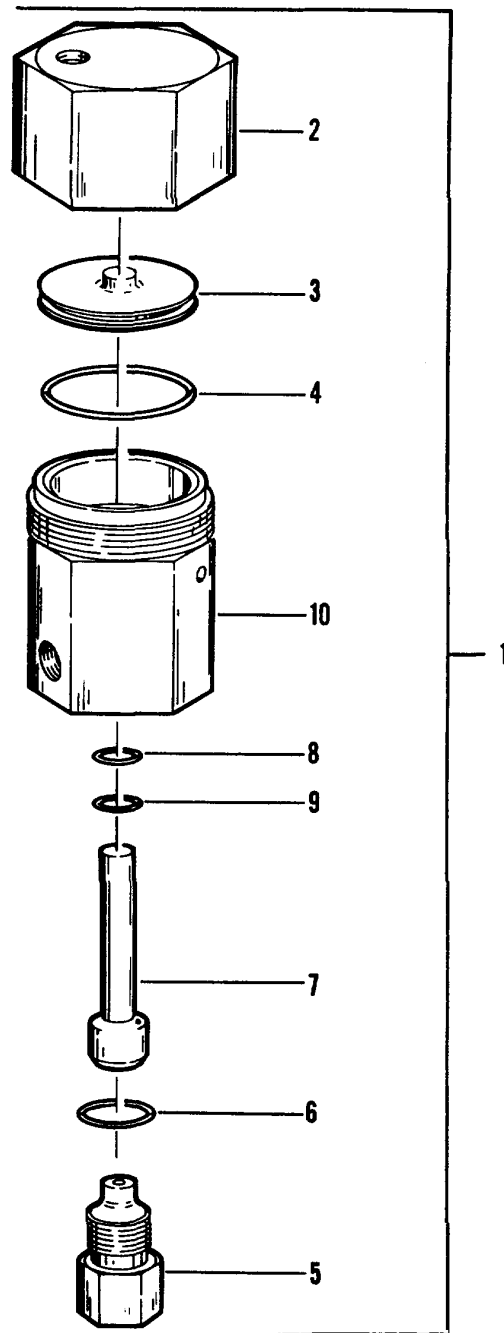
- (1) Unscrew and remove cap (2, fig. 7-46) and remove piston (3) and o-ring 94).
- (2) Unscrew and remove seat (5), o-ring (6), valve stem (7), backup ring (8), and o-ring (9) from body (10).

**b. Cleaning and Inspection.** Clean the component parts of drain valve assembly (fig. 7-46) in soap and water solution, rinse with clean water, and dry thoroughly. Inspect o-rings (4, 6, 9) for cuts and deterioration. Inspect screw threads for nicks and burrs. Inspect all parts for cracks, breaks, and burrs.

**c. Repair or Replacement.** Minor nicks and burrs may be removed using a metal scraper or emery cloth. O-rings (4, 6, 9, fig. 7-46) shall be replaced if damaged. Replace all other defective parts.

**d. Reassembly and Installation.**

- (1) Apply a light coating of clean compressor oil on o-rings (4, 6, 9, fig. 7-46) to ease assembly. Install backup ring (8) and o-ring (9) in body (10) and carefully assemble valve stem (7). Assemble o-ring (6) on seat (5) and install seat (5) in body (10).



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Legend for figure 7-46:

- |                         |                |
|-------------------------|----------------|
| 1. Drain valve assembly | 6. O-ring      |
| 2. Cap                  | 7. Valve stem  |
| 3. Piston               | 8. Backup ring |
| 4. O-ring               | 9. O-ring      |
| 5. Seat                 | 10. Valve body |

Figure 7-46. Receiver drain valve assembly

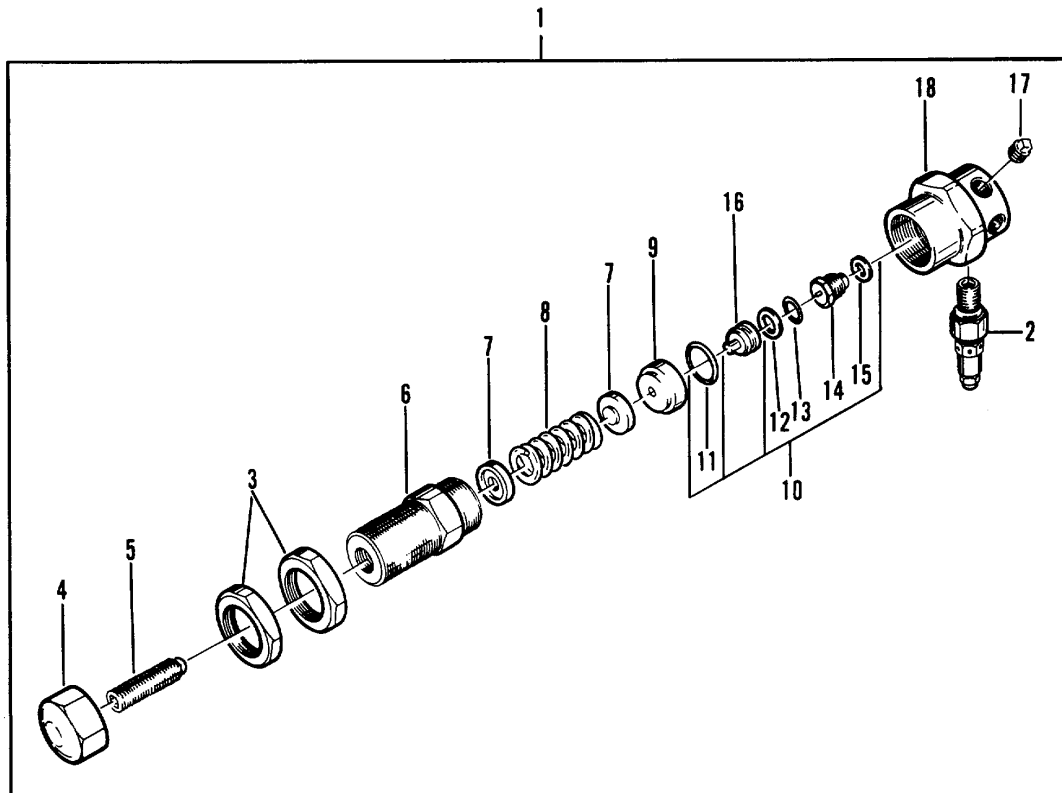
- (2) Install o-ring (4) on piston (3), assemble piston (3) into body (10) and install cap (2).
- (3) Assemble drain valve assembly (1) onto nipple (33, fig. 6-22) and install connector (23, fig. 6-22) in drain valve assembly inlet. Refer to fig. 6-4 and connect tube assembly (17) to drain valve assembly inlet connector.

and connect tube assembly (18) from regulator outlet fitting. Refer to fig. 6-22 and disconnect hose assembly (21) at regulator inlet elbow (28). Remove elbow (28) and elbow (22) from regulator. Remove one panel mounting nut (3, fig. 7-47) and remove pressure regulator assembly (1) from control panel. Disassemble pressure regulator assembly (1, fig. 7-47) as follows:

- (1) Remove safety valve (2, fig. 7-47) from body (18). Remove panel mounting nut (3), adjusting screw cap (4), and adjusting screw (5).

**7-36. Maintenance of Pressure Regulator Assembly.**

*a. Removal and Disassembly.* Refer to fig. 6-4



Legend for fig. 7-47:

- |                            |                      |                        |
|----------------------------|----------------------|------------------------|
| 1. Pressure regulator assy | 7. Spring button (2) | 13. O-ring             |
| 2. Safety valve            | 8. Spring            | 14. Cartridge assembly |
| 3. Panel mounting nut (2)  | 9. Centralizer       | 15. Gasket             |
| 4. Adjusting screw cap     | 10. Repair kit       | 16. Piston             |
| 5. Adjusting screw         | 11. O-ring           | 17. Pipe plug          |
| 6. Housing cap             | 12. Backup washer    | 18. Regulator body     |

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Figure 7-47. Pressure regulator assembly

- (2) Unscrew and remove housing cap (6), two spring buttons (7), spring (8), and centralizer (9) from body (18). Remove piston (16), o-rings (11, 13) and backup washer (12). Unscrew and remove cartridge assembly (14) and gasket (15) from body (18). Pipe plug (17) need not be removed.

### WARNING

**Provide adequate ventilation when using trichloroethylene. Avoid prolonged breathing of vapors and minimize skin contact.**

**b. Cleaning and Inspection.** Clean all metal parts using trichloroethylene. Do not allow o-rings or safety valve seat to come in contact with trichloroethylene as it will cause material to swell. Inspect all parts for cracks, breaks, nicks, burrs, and damaged threads.

**c. Repair or Replacement.** Replace all parts found to be defective. A repair kit (10, fig. 7-47), consisting of items (11, 12, 13, 14, 15) is available. It is recommended that this kit be used at reassembly.

### d. Reassembly

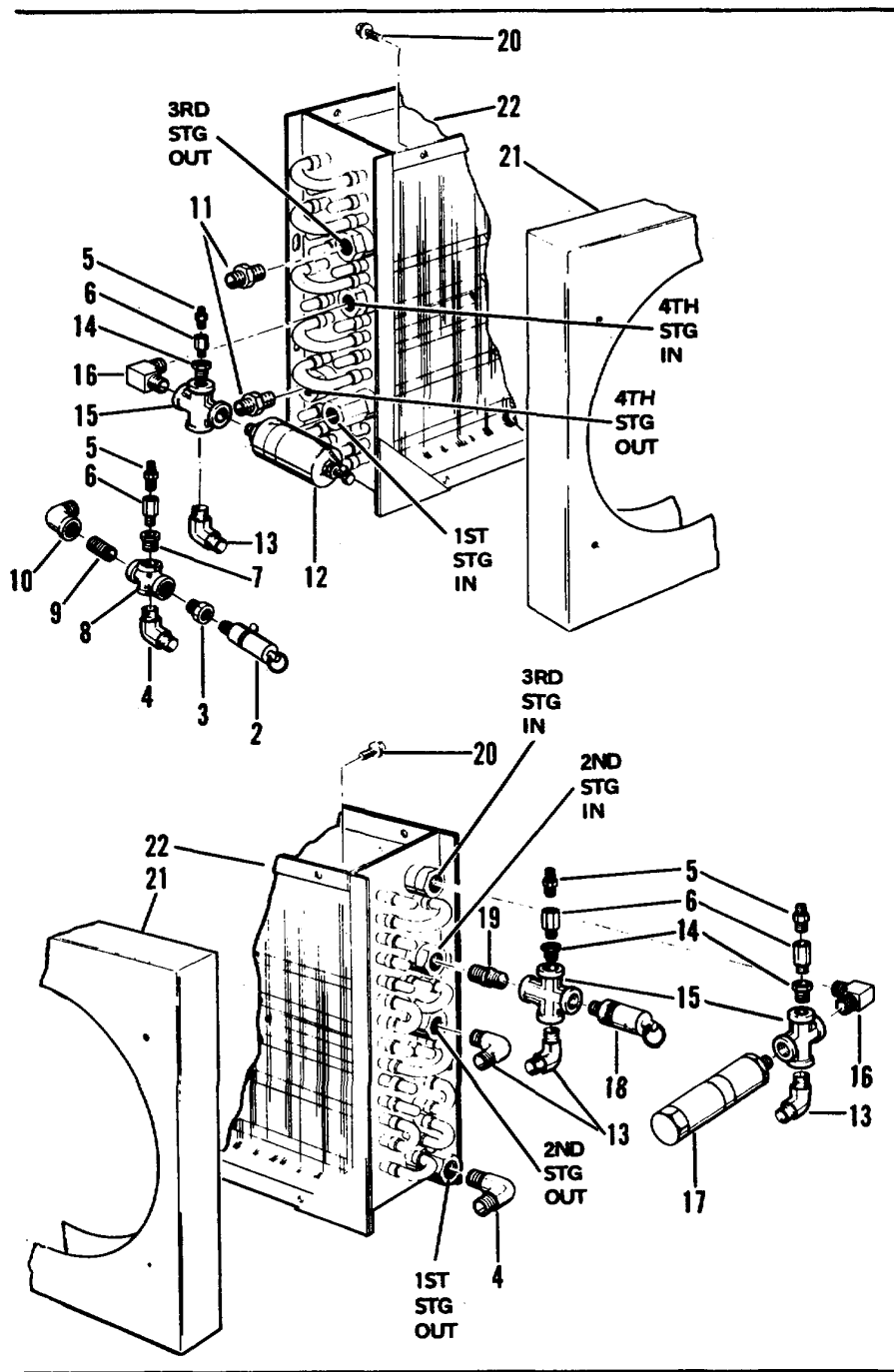
- (1) If removed, install pipe plug (17, fig. 7-47) in body (18). Install gasket (15) and cartridge assembly (14) in body (18). Assemble backup washer (12), o-rings (13, 11), and piston (16).
- (2) Assemble centralizer (9), two spring buttons (7), spring (8), and housing cap (6). Torque housing cap (6) to 50 foot-pounds (6.915 kgs-m). Assemble one panel mounting nut (3) on housing cap (6); thread to cap shoulder. Install adjusting screw (5).
- (3) Test opening pressure of safety valve (2) before installing in body (18). Connect to a controlled air source capable of supplying 5000 psi (351.5 kgs/cm<sup>2</sup>). Apply inlet pressure and observe opening pressure. Safety valve should open at approximately 4400 psi (309.32 kgs/cm<sup>2</sup>). Reduce inlet pressure. Valve should close at approximately 3200 psi (224.96 kgs/cm<sup>2</sup>). Adjust safety valve as necessary to obtain the opening and

closing pressures.

- (4) Install safety valve (2) in body (18). Before assembly of adjusting screw cap (4), adjust the pressure regulator as follows:
- (a) Connect a controlled air source capable of supplying 5000 psi (351.5 kgs/cm<sup>2</sup>) to inlet port of body (18, fig. 7-47). Connect an air line to body outlet port venting to atmosphere with pressure gauge in line that will indicate the outlet pressure.
- (b) Apply 3500 psi (246.05 kgs/cm<sup>2</sup>) to inlet and turn adjusting screw (5) until outlet pressure is between 80 - 100 psi (5.62 - 7.03 kgs/cm<sup>2</sup>). Shut off test pressure and remove pressure regulator from the test setup.
- (5) Install adjusting screw cap (4). Install air pressure regulator on instrument panel and secure with panel mounting nut (3).
- (6) Refer to fig. 6-22 and install elbow (22) in outlet of regulator and elbow (28) in inlet of regulator. Connect hose assembly (21) to inlet elbow (28). Refer to fig. 6-4 and connect tube assembly (18) to regulator outlet elbow.

### 7-37. Maintenance of Air Cooler Assembly.

**a. Removal and Disassembly.** Refer to para 7-25.a.(1) through 7-25.a.(4) and remove the exhaust muffler group and roof with engine air cleaner, heater, side doors and rear door attached to roof. Refer to para 7-25.a.(7) and (8) and remove fan guard and compressor fan and hub. Refer to fig. 6-2 and remove side panel (26) for easier access to cooler. Refer to fig. 6-4 and disconnect tube assemblies (1, 2, 4, 5, 7, 8, 10, 11) from air cooler fittings. Refer to fig. 6-22 and disconnect tube assemblies (6, 7, 8, 9) from air cooler fittings. Remove three nuts (38, fig. 6-22), lock washers (39), screws (40), six flat washers (41), and remove door slide bar (42) with door assemblies (43, 44). Lay these parts aside. Remove three locknuts (80) and screws (83). Remove the air cooler assembly (1, fig. 7-48) from unit. Disassemble as follows:



Legend for fig. 7-48:

1. Air cooler assembly
2. Safety valve, 80 psi
3. Reducing bushing
4. Elbow (2)
5. Connector (4)
6. Snubber (4)
7. Reducing bushing
8. Pipe cross
9. Pipe nipple
10. Street elbow
11. Connector (2)
12. Safety valve, 3800 psi
13. Elbow (4)
14. Reducing bushing (3)
15. Pipe cross (3)
16. Elbow (2)
17. Safety valve, 1500 psi
18. Safety valve, 240 psi
19. Hex nipple
20. Screw (6)
21. Fan shroud
22. Air cooler

Figure 7-48. Air cooler assembly

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**CAUTION**

**Before disassembly, mark each stage of the air cooler assembly for identification in testing and reassembly. Mark in a manner so that identification will not be removed during cleaning. Identification is shown on figure 7-48.**

- (1) Remove safety valve (2, fig. 7-48), reducing bushing (3), one elbow (4), one connector (5), one snubber (6), reducing bushing (7), pipe cross (8), nipple (9), and street tee (10). Remove two connectors (11).
- (2) Remove safety valve (12), one elbow (13), one connector (5), one snubber (6), one reducing bushing (14), one pipe cross (15), and one elbow (16).
- (3) Remove safety valves (17, 18), three elbows (13), one elbow (4), two connectors (5), two snubbers (6), two reducing bushings (14), two crosses (15), one elbow (16), and nipple (19).
- (4) Remove six screws (20) and fan shroud (21) from air cooler (22).

**b. Cleaning and Inspection.** Clean outside and inside of air cooler (22, fig. 7-48) and all fittings with compressed air, pressurized hot water and detergent, or stem clean; rinse and dry thoroughly. Inspect each safety valve and air cooler (22) as follows:

- (1) Test opening pressure of first stage safety valve (2, fig. 7-48). Designed to open at 80 psi (5.62 kgs/cm<sup>2</sup>). Adjust as necessary. Adjustable to plus or minus 10% of design pressure.
- (2) Test opening pressure of second stage safety valve (18). Designed to open at 240 psi (16.87 kgs/cm<sup>2</sup>). Adjust as necessary. Adjustable to plus or minus 10% of design pressure.
- (3) Test opening pressure of third stage safety valve (17). Designed to open at 1500 psi (105.45 kgs/cm<sup>2</sup>). Adjust as necessary. Adjustable to plus or minus 10% of design pressure.
- (4) Test opening pressure of fourth stage safety valve (12). Designed to open at 3800 psi (267.14 kgs/cm<sup>2</sup>). Adjust as necessary. Adjustable to plus or minus 10% of design pressure.
- (5) Plug all ports of air cooler (22) except first stage inlet. Connect controlled air source, capable of supplying minimum of 90 psi

(6.33 kgs/cm<sup>2</sup>) with pressure gauge in supply line, to first stage inlet. Apply 90 psi (6.33 kgs/cm<sup>2</sup>) pressure to air cooler first stage. Check for leaks by submerging in water, or by checking pressure gauge for pressure drop indicating leakage. Mark leakage area for possible repair (see para c. below). Relieve test pressure from first stage inlet; disconnect test line.

- (6) Plug all ports of air cooler (22) except second stage inlet. Connect controlled air source, capable of supplying minimum of 300 psi (21.09 kgs/cm<sup>2</sup>) with pressure gauge in supply line, to second stage inlet. Apply 300 psi (21.09 kgs/cm<sup>2</sup>) to air cooler second stage. Check for leaks by submerging in water, or by checking pressure gauge for pressure drop indicating leakage. Mark leakage area for possible repair (see para c. below). Relieve test pressure from second stage inlet; disconnect test line.
- (7) Plug all ports of air cooler (22) except third stage inlet port. Connect controlled air source, capable of supplying minimum of 1500 psi (105.45 kgs/cm<sup>2</sup>) with pressure gauge in supply line, to third stage inlet. Apply 1500 psi (105.45 kgs/cm<sup>2</sup>) to air cooler third stage. Check for leaks by submerging in water, or by checking pressure gauge for pressure drop indicating leakage. Mark leakage area for possible repair (see para c. below). Relieve test pressure from third stage inlet; disconnect test line.
- (8) Plug all ports of air cooler (22) except fourth stage inlet port. Connect controlled air source, capable of supplying minimum of 5250 psi (369.02 kgs/cm<sup>2</sup>) with pressure gauge in supply line, to fourth stage inlet. Apply 5250 psi (369.02 kgs/cm<sup>2</sup>) to air cooler fourth stage. Check for leaks by submerging in water, or by checking pressure gauge for pressure drop indicating leakage. Mark leakage area for possible repair (see para c. below). Relieve test pressure from fourth stage inlet; disconnect test line.

**c. Repair or Replacement.** Repair air cooler (22, fig. 7-48) core tubes on each side by silver soldering at points of leakage marked in steps (5) thru (8) above. This is the only repair recommended. Any other damage or defect of air cooler assembly (1, fig. 7-48) components is cause for replacement of defective part or parts. After repair, retest



Repaired stage in accordance with para 7-37.b.(5) thru (8), as applicable

**d. Reassembly and Installation.**

- (1) Attach fan shroud (21, fig. 7-48) to air cooler (22) with six screws (20).
- (2) Install nipple (19) in second stage inlet port, one elbow (16) in third stage inlet port, one elbow (13) in second stage outlet port, and one elbow (4) in first stage outlet port. Assemble two pipe crosses (15), two reducing bushings (14), two snubbers (6), two connectors (5), two elbows (13), second stage safety valve (18), and third stage safety valve (17).
- (3) Install two connectors (11), one each in third and fourth stage outlets. Install one elbow (16) in fourth stage inlet and street elbow (10) in first stage inlet. Assemble pipe cross (15), elbow (13), reducing bushing (14), snubber (6), connector (5), and fourth stage safety valve (12).

Assemble pipe nipple (9), pipe cross (8), elbow (4), reducing bushings (7, 3), snubber (6), connector (5), and first stage safety valve (2).

- (4) Assemble air cooler assembly (1, fig. 7-48) on unit and attach to control panel with four screws (83, fig. 6-22) and locknuts (82). Install three screws (81) and locknuts (80). Assemble door slide bar (42) with door assemblies (43, 44) to control panel with three screws (40), six flat washers (41), three lock washers (39) and nuts (38).
- (5) Refer to fig. 6-22 and connect tube assemblies (9, 8, 7, 6) to air cooler fittings.
- (6) Refer to fig. 6-4 and connect tube assemblies (11, 10, 8, 7, 5, 4, 2, 1) to air cooler fittings.
- (7) Refer to fig. 6-2 and install side panel (26). Refer to para 7-25.e.(24) and (25) and 7-25.e.(28) thru (31) and complete reassembly.

### Section VIII. MAINTENANCE OF FUEL TANK ASSEMBLY

**7-38. General.** This section covers maintenance of the fuel tank assembly within scope of direct support and general support maintenance as prescribed by the MAC, Appendix E.

**7-39. Maintenance of Filler Neck**

**a. Removal and Disassembly.** Refer to para 6-33.b.(1) and remove filler neck assembly (1, fig. 6-25).

**WARNING**

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 130°F (38°C - 59°C).

**b. Cleaning and Inspection.** Clean the filler neck (6, fig. 6-25) with solvent, P-D-680, and dry thoroughly. Inspect for cracked or broken elbow seam. Inspect for broken chain (3) and firm connection of chain (3) to cap (2) and filler neck (6).

**c. Repair and Replacement.** Repair cracked or

broken seam of filler neck (6, fig. 6-25) and make chain (3) connection to filler neck (6) by soldering. Replace rivet (4) as necessary to attach chain to cap (2). Replace parts which cannot be repaired in this manner.

**d. Reassembly and Inspection.** Refer to para 6-33.d.(4) and reassemble and install filler neck.

**7-40. Maintenance of Fuel Tank**

**a. Removal and Disassembly.** Refer to para 6-33.b. and remove fuel tank (17, fig. 6-25) from unit.

**WARNING**

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 130°F (38°C - 59°C).

**b. Cleaning and Inspection.** Clean the fuel tank (17, fig. 6-25) thoroughly with solvent, P-D-680, and dry. Inspect for leaks as follows:

- (1) Install pipe plug (16) in bottom of tank. Install a plug in opening for fuel level gauge (15).
- (2) Attach a controlled air source, with pressure gauge in supply line, to fuel tank filler opening. Apply pressure of 3 psi (0.211 kgs/cm<sup>2</sup>) in fuel tank.
- (3) Use soapy water solution applied with a brush to tank seams and check for leaks. The soapy water solution will bubble at a seam leak. Mark any leak for repair.

Relieve test pressure and dry the tank. Remove tank from test setup and remove plug from fuel level gauge hole.

**c. Repair or Replacement.** Leaking fuel tank seams may be repaired by soldering. Any other damage is cause for replacement of tank. After repair, retest as described in para 7-40.b. above.

**d. Reassembly and Installation.** Refer to para 6.33.d. and reassemble and install fuel tank group.

## Section IX. MAINTENANCE OF BRAKE ASSEMBLY AND FRAME

**7.41. General.** This section contains maintenance of the brake assembly and frame as prescribed by the MAC, Appendix E.

### 7-42. Maintenance of Brake Assembly.

**a. Removal and Disassembly.** Refer to para 6-40.b.(5) and remove brake assemblies (25, fig. 6-32) from rear axle assembly. Disassemble as follows:

- (1) Disconnect and remove shoe return spring (29) and brake shoe package (30). Loosen clamping hardware on lever assembly (26) and remove lever.
- (2) Separate dust shield (32) and support plate assembly (31); remove actuating camshaft (27) and holddown springs (28).

**b. Cleaning and Inspection.** Wipe away any accumulation of dirt with a cloth moistened with an approved solvent. Inspect for broken holddown springs (28, fig. 6-32) and shoe return springs (29). Examine brake shoes for excessive wear. Shoes are to be replaced as a package (30). Examine all other parts for cracks, breaks, and wear.

**c. Repair or Replacement.** Replace worn brake shoes with lined brake shoe package (30, fig. 6-32). Replace all other defective parts.

### d. Reassembly and Installation.

- (1) Assemble actuating camshaft (27, fig. 6-32) and hold down springs (28) on support plate assembly (31). Assemble dust shield (32) and lever assembly (26).
- (2) Assemble lined brake shoe package (30) and shoe return spring (29).
- (3) Refer to para 6-40.f.(1) and install brake assemblies (25, fig. 6-32).

**7-43. Maintenance of Chassis Frame.** Maintenance of the chassis frame is limited to straightening of bent members and rewelding of any cracked or broken welds. Disassemble components as necessary to gain access to area of maintenance.

## Section X. MAINTENANCE OF WINTERIZATION EQUIPMENT

**7-44. General.** This section covers repair and replacement of the winterization equipment as prescribed by the MAC, Appendix E. Each component of the winterization equipment group is covered in separate paragraphs.

### 7-45. Maintenance of Winterization Equipment.

**a. Removal and Disassembly.** Refer to fig. 7-49 to remove and disassemble winterization equipment.

- (1) Unplug heater control cable assembly (1, fig. 7-49) at heater control box assembly and at heater. The three cable clamps (2) are secured to underside of roof with side door mounting hardware. As necessary, remove this hardware and remove cable assembly (1) and clamps (2).
- (2) Unplug fuel pump wire assembly (3) at fuel pump and at heater; remove wire assembly (3). Loosen exhaust tube clamp (4) nuts and clamp (4A); remove exhaust tube (5), clamp (4), and clamp (4A). Only when necessary, remove one locknut (9), screw (10A), and support bracket (10B).
- (3) Remove three screws (6) and duct elbow (7). Unscrew and remove fuel filter (8), with nipple, from fuel pump. Remove two locknuts (9) and screws (10) to remove fuel pump. (Refer to para 7-46 for fuel pump maintenance.)
- (4) Remove two screws (11) and lock washers (12) to remove heater control box assembly (Refer to para 7-47 for control box maintenance.)
- (5) Remove four nuts (13), lockwashers (14), screws (15), and spacers (16); remove heater assembly from unit. (Refer to para 7-48 and 7-49 for heater assembly maintenance.)

**b. Cleaning and Inspection.** Cleaning and inspection of winterization equipment components is covered in para 7-46 thru 7-49 following. Use multimeter and check continuity of control cable assembly (1, fig. 7-49) and wire assembly (3).

**c. Repair or Replacement.** All parts found defective shall be replaced.

### **d. Reassembly and Installation.**

- (1) Place spacers (16, fig. 7-49) between heater mounting bases and unit roof. Attach heater assembly with four screws (15), lock washers (14) and nuts (13).
- (2) Attach heater control box assembly to control panel assembly with two lock washers (12) and screws (11). Plug in control box lead to master switch lead.
- (3) Attach heater fuel pump to end panel with two screws (10) and locknuts (9). Install fuel filter (8) and nipple on fuel pump. If removed, attach support bracket (10B) to lower side panel with screw (10A) and locknut (9).
- (4) Attach duct elbow (7) to end of heater with three screws (6). Place clamps (4A, 4) on exhaust tube (5). Attach exhaust tube (5) to heater exhaust and tighten clamp (4). Attach tube (5) to support bracket (10B) with clamp (4A).
- (5) Plug wire assembly (3) to fuel pump and heater receptacle. Attach three cable clamps (2) to underside of roof using side door mounting hardware. Plug control cable assembly (1) into heater receptacle and control box receptacle.

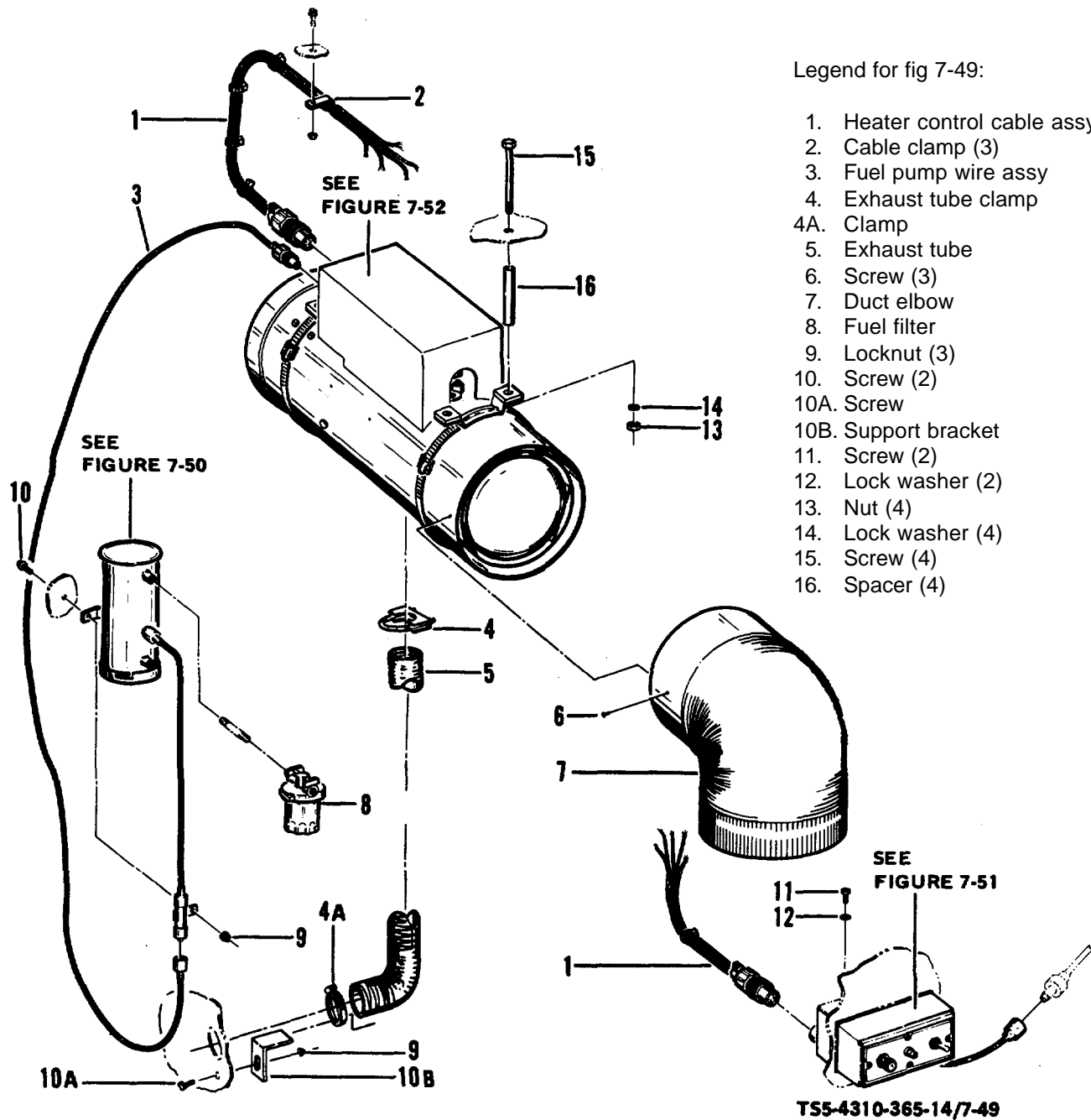


Figure 7-49. Winterization equipment mounting

**7-46. Maintenance of Heater Fuel Pump.**

**a. Disassembly.** Refer to fig. 7-50 and disassemble the heater fuel pump (1, fig. 7-50).

- (1) Turn and remove cover (2, fig. 7-50), gasket (3) and magnet (4). Remove filter (5).
- (2) Remove retainer (6), cup and valve (7), spring (8), and plunger assembly (9) from pump assembly (10).

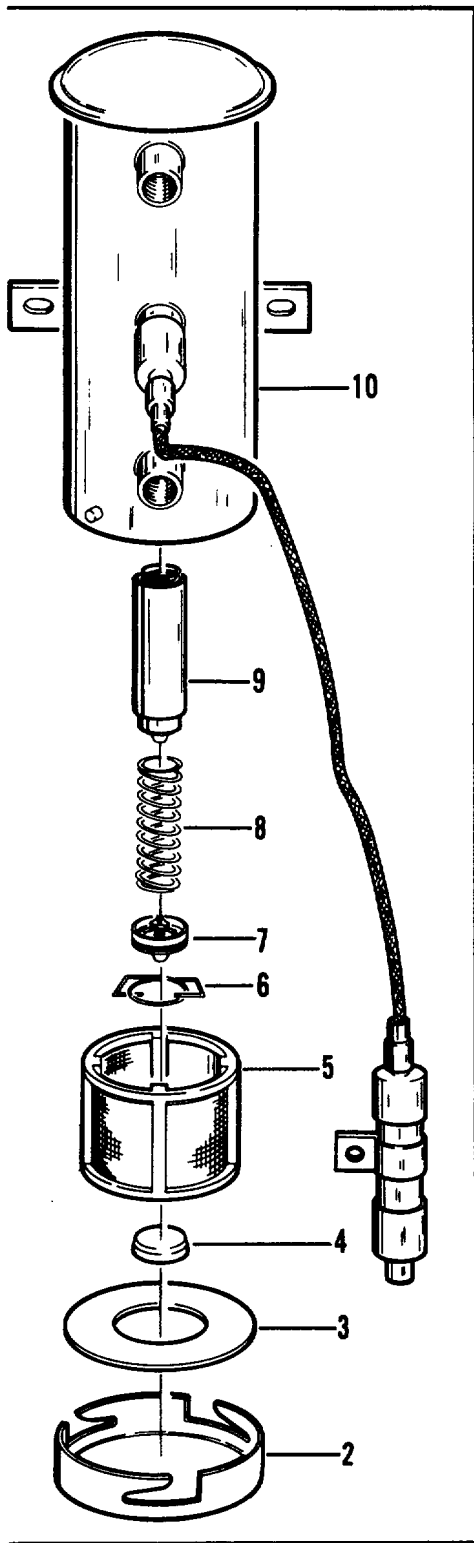
**b. Inspection.** Inspect parts for cracks, breaks, and scoring of plunger assembly (9, fig. 7-50). Use

multimeter and check continuity of pump assembly (10).

**c. Repair or Replacement.** Replace all defective parts.

**d. Reassembly.**

- (1) Assemble plunger assembly (9, fig. 7-50) into pump assembly (10), assemble spring (8), cup and valve (7), and secure with retainer (6).
- (2) Assemble filter (5), place gasket (3) in cover (2), center magnet (4) on cover and assemble cover (2) on pump assembly (10).



Legend for fig. 7-50:

- 1. Heater fuel pump assembly
- 2. Cover
- 3. Gasket
- 4. Magnet
- 5. Filter
- 6. Retainer
- 7. Cup and valve
- 8. Spring
- 9. Plunger assembly
- 10. Pump assembly

Figure 7-50. Heater fuel pump

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### 7-47. Maintenance of Heater Control Box Assembly.

**a. Disassembly.** Refer to fig. 7-51 and disassemble heater control box assembly (1, fig. 7-51).

- (1) Remove two screws (2, fig. 7-51) and pull control panel assembly (5) out of control box (3). As necessary, remove spring nuts (4).
- (2) Disconnect wire assemblies (6, 7, 8) and as necessary, jumper wire (9). As necessary, disconnect light socket (11) leads. Unscrew cap of light socket (11) to gain access to lamp (10.) To remove light socket (11), unscrew and remove one panel mounting nut and remove the assembly from panel.
- (3) Remove two screws (12) and remove circuit breaker (13). Unscrew and remove panel mounting nut securing control switch (14) and remove switch (14) and nameplate (15).
- (4) Remove two screws (16) and angle bracket (17) from panel (23). As necessary, remove four nuts (18), lock washers (19), screws (20) and cable receptacle (21). Remove grommet (22) from control box panel (23).

**b. Inspection.** Use multimeter and check continuity of the electrical components. Inspect all electrical components for evidence of shorts and burning of insulation on wire assemblies.

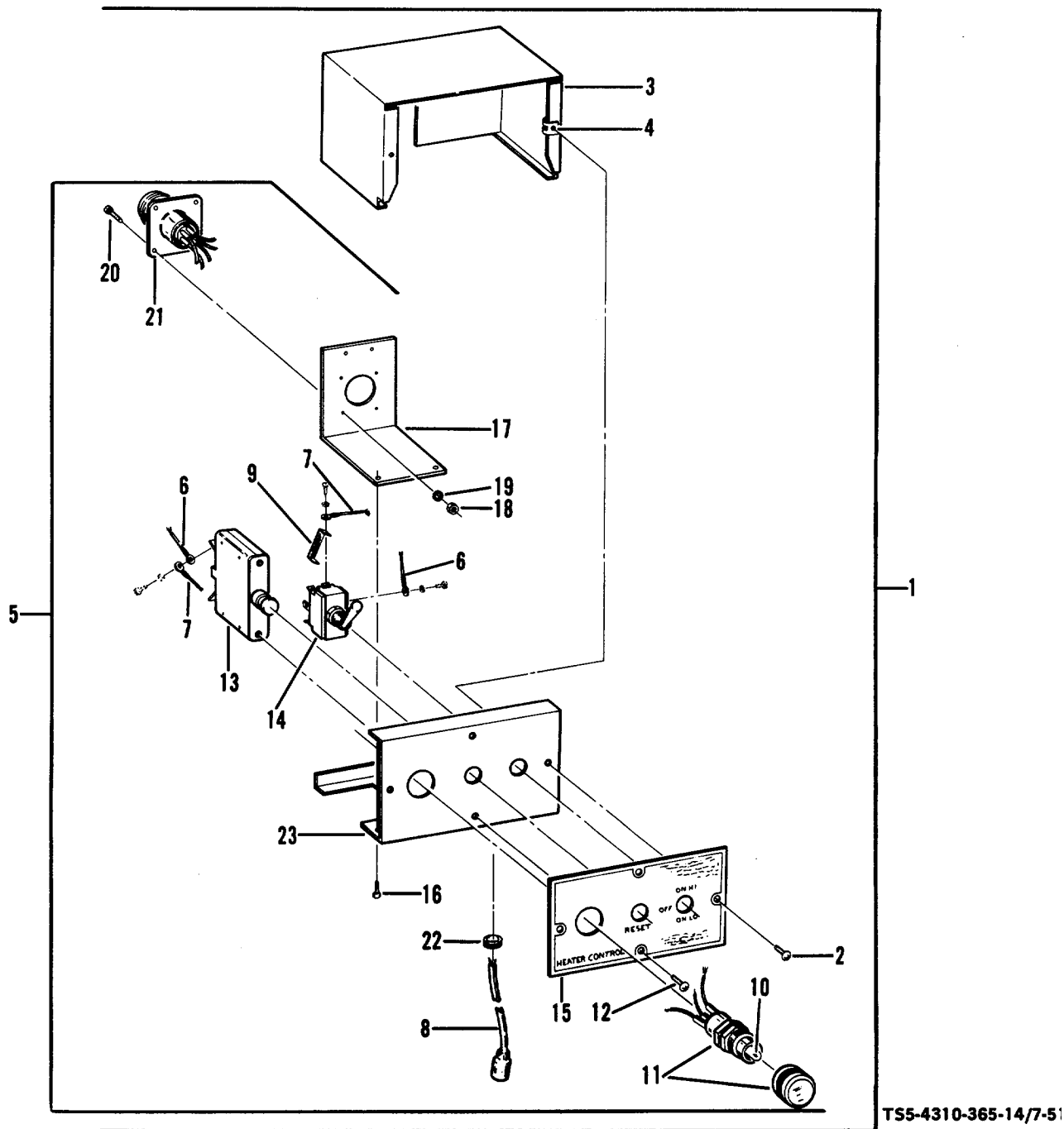
**c. Repair or Replacement.** Replace all defective parts.

**d. Reassembly**

#### CAUTION

**At reassembly, refer to figure 1-3, wiring diagram sheet 2 of 2 for connection of control box wiring.**

- (1) Assemble grommet (22, fig. 7-51) in panel (23). Assemble cable receptacle (21) to angle bracket (17) with four screws (20), lock washers (19), and nuts (18). Attach angle bracket (17) to panel (23) with two screws (16).
- (2) Place nameplate (15) in position on front of panel (23) and assemble control switch (14), securing with switch panel mounting nut. Assemble circuit breaker (13) and secure with two screws (12). Assemble light socket (11) and secure with panel mounting nut. Install lamp (10).
- (3) Assemble jumper wire (9) and wire assemblies (8, 7, 6). Make wire connections as shown on figure 1-3, sheet 2 of 2.
- (4) Assemble control panel assembly (5, fig. 7-51) into control box (3) and secure with two screws (2) threaded into nuts (4).



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- |                            |                     |                       |
|----------------------------|---------------------|-----------------------|
| 1. Heater control box assy | 9. Jumper wire      | 17. Angle bracket     |
| 2. Screw (2)               | 10. Lamp            | 18. Nut (4)           |
| 3. Control box             | 11. Light socket    | 19. Lock washer (4)   |
| 4. Nut (2)                 | 12. Screw (2)       | 20. Screw (4)         |
| 5. Control panel assy      | 13. Circuit breaker | 21. Cable receptacle  |
| 6. Wire assembly           | 14. Control switch  | 22. Grommet           |
| 7. Wire assembly           | 15. Nameplate       | 23. Control box panel |
| 8. Wire assembly           | 16. Screw (2)       |                       |

Figure 7-51. Heater control box assembly



**7-48. Maintenance of Heater Assembly**

**a. Disassembly.** Refer to fig. 7-52 and disassemble heater assembly (1, fig. 7-52).

- (1) Loosen the captive screw in center of control cover assembly (2, fig. 7-52) and remove the cover (2). Disconnect and remove tube assembly (3) and elbow (4). Disconnect wire assembly from igniter assembly (5) and reinstall lock washer (7) and locknut (6) on igniter (5) to prevent their loss. Unscrew and remove igniter assembly (5) and gasket (8).

**CAUTION**

**When removing the controls support assembly from the heater, lift the assembly straight off to prevent damage to the flame switch tube which extends into the combustion chamber.**

- (2) Disconnect motor lead from flame switch (refer to fig. 1-3, sheet 2 of 2) and two leads from limit switch (36, fig. 7-52). Loosen flame switch tube nut located under controls support assembly. Remove two screws (9) and carefully lift off heater controls support assembly (refer to para 7-49 for disassembly). Lay this assembly aside.
- (3) Remove three screws (10, fig. 7-52) and pull out blower assembly (11). Remove three screws (12) and intake cover assembly (13). Remove fan screw (14) and fan assembly (15). Remove three screws (16) and separate motor support assembly (17) from housing assembly (24). Remove four screws (18), nut (19), lock washer (20), screw (21), and separate motor assembly (22) from support assembly (17). Remove grommet (23).

Legend for fig. 7-52:

- |                           |                        |
|---------------------------|------------------------|
| 1. Heater assembly        | 15. Fan assembly       |
| 2. Control cover assembly | 16. Screw (3)          |
| 3. Tube assembly          | 17. Motor support assy |
| 4. Elbow                  | 18. Screw (4)          |
| 5. Igniter assembly       | 19. Nut                |
| 6. Locknut                | 20. Lock washer        |
| 7. Lock washer            | 21. Screw              |
| 8. Igniter gasket         | 22. Motor assembly     |
| 9. Screw (2)              | 23. Grommet            |
| 10. Screw (3)             | 24. Housing assembly   |
| 11. Blower assembly       | 25. Mounting clamp (2) |
| 12. Screw (3)             | 26. Mounting base (2)  |
| 13. Intake cover assy     | 27. Burner assembly    |
| 14. Special fan screw     |                        |

**NOTE**

**Do not disassemble blower motor (22). If inspection or test indicates any defects, the blower motor (22) should be replaced.**

- (4) Loosen two mounting clamps (25) and remove the clamps (25) and two mounting bases (26). These parts do not have to be separated. Turn burner assembly (27) counterclockwise to free burner slots from combustion chamber (33) studs and pull out burner assembly (27). Remove nut (28), lock washer (29), retainer shell assembly (30), and burner wick (31) from burner assembly (32).

**NOTE**

**Discard wick (31) each time it is disassembled. Always use a new wick at assembly.**

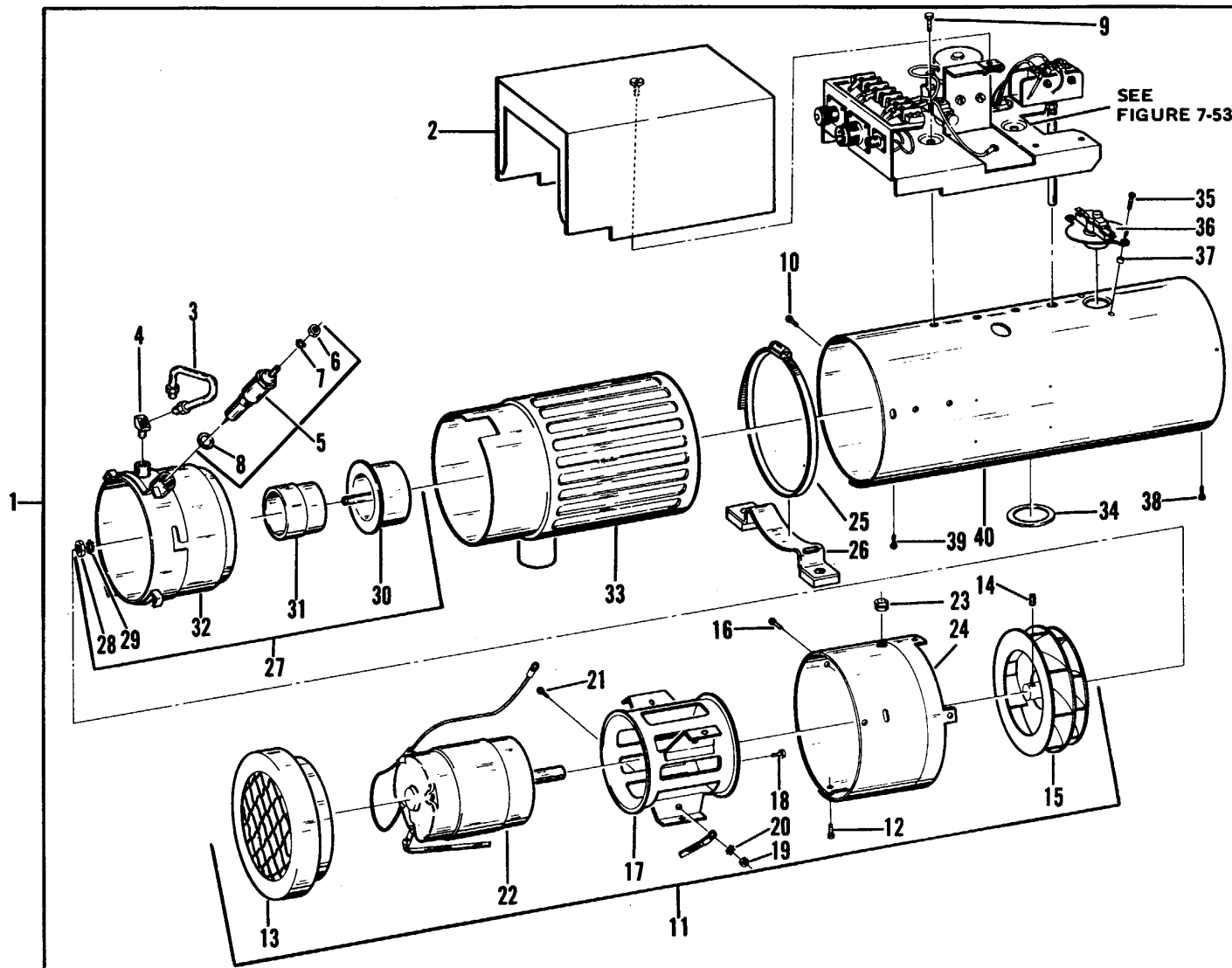
- (5) Remove combustion chamber assembly (33), exhaust tube seal (34), two screws (35), limit switch (36), and two spacers (37). As necessary, remove three screws (38) and four screws (39) from casing assembly (40).

**WARNING**

**Provide adequate ventilation when using trichloroethane. Avoid prolonged breathing of vapors and minimize skin contact.**

**b. Cleaning and Inspection.** Clean electrical components using trichloroethane, or equivalent. Clean other metallic parts with approved solvent. Inspect all parts for cracks, breaks, dents, and electrical parts for evidence of shorts and grounds, and damaged insulation. Use multimeter and check continuity of electrical components. Check motor assembly

- 28. Nut
- 29. Lock washer
- 30. Retainer shell assy
- 31. Burner wick
- 32. Burner assembly
- 33. Chamber assembly
- 34. Exhaust tube seal
- 35. Screw (2)
- 36. Limit switch
- 37. Spacer (2)
- 38. Screw (3)
- 39. Screw (4)
- 40. Casing assembly



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Figure 7-52. Heater assembly

(22, fig. 7-52) for shorts, grounds, damaged windings. Connect the igniter assembly (5) to a 12-volt battery with an ammeter in series. The igniter should draw 12.5 to 14 amperes and will heat to a bright red within a few seconds. If amperage is not within this acceptable range, or igniter does not heat, replace igniter assembly (5). Install fan assembly (15) on blower motor (22) to 12-volt DC power source, negative ground, with ammeter connected in series. Check motor rpm with revolution counter. Minimum rpm should be 7600 with maximum current drain of 13.8 amperes. If motor does not meet these requirements, it shall be replaced. Loosen screw (14) and remove fan assembly (15).

**c. Repair or Replacement.** All parts found defective during inspection shall be replaced.

**d. Reassembly.**

- (1) If removed, reassemble three screws (38, fig. 7-52) and four screws (39) in casing assembly (40). Assemble two spacers (37), limit switch (36) and attach with two screws (35). Assemble exhaust tube seal (34) and chamber assembly into casing assembly (40).
- (2) Assemble burner wick (31) and retainer shell assembly (30) into burner assembly (32); attach with lock washer (29) and nut (28). Assemble burner assembly (27) into chamber assembly (33) and turn clockwise to engage burner slots with chamber studs. If removed, assemble two mounting clamps (25) on mounting bases (26) and assemble the clamps on each end of casing (40).
- (3) Install grommet (23) in housing assembly (24). Assemble motor assembly (22) to support assembly (17) attaching motor ground strap to support assembly with screw (21), lock washer (20) and nut (19). Attach motor assembly (22) to support assembly (17) with four screws (18). Assemble support assembly into housing assembly (24) running motor lead out through grommet (23); attach support assembly (17), with three screws (16). Install fan assembly (15) and secure with fan screw (14). Assemble intake cover assembly (13) into housing assembly (24) and secure with three screws (12). Install blower assembly (11) and attach with three screws (10).
- (4) Assemble controls support assembly (fig. 7-53) onto heater assembly, tighten flame

switch tube nut, secure to heater assembly with two screws (9, fig. 7-52) and make wiring connections in accordance with fig. 1-3, sheet 2 of 2.

- (5) Assemble igniter gasket (8, fig. 7-52), igniter assembly (5) and connect igniter lead to igniter with lock washer (7) and locknut (6). Install elbow (4) and connect tube assembly (3) elbow (4) and tee assembly on controls support assembly. Install cover assembly (2) and tighten captive screw in center of cover.

**7-49. Maintenance of Heater Controls Support Assembly.**

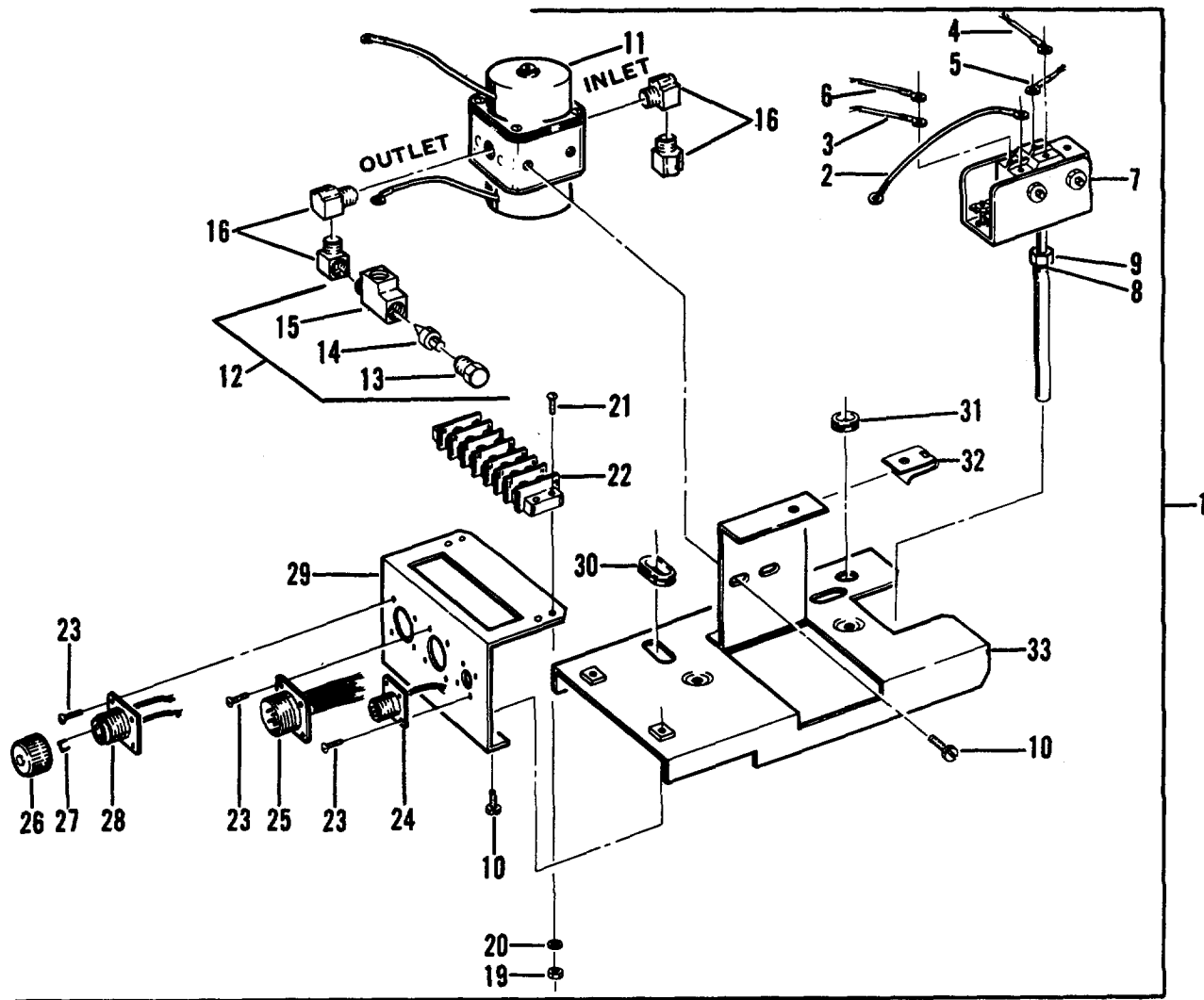
**a. Disassembly.** Refer to fig. 7-53 and disassemble heater controls support assembly (1, fig. 7-53).

- (1) Disconnect and remove wire assemblies (2 thru 6, fig. 7-53) and remove flame switch (7). Sleeve and nut (8, 9) need not be removed. Disconnect regulator valve (11) leads.
- (2) Remove two screws (10) and regulator valve assembly (11). Do not disassemble regulator valve assembly (11). To disassemble tee assembly (12), remove plug (13), nozzle assembly (14), and adapter tee (15). Remove four elbows (16).
- (3) Disconnect receptacle leads from terminal block (22). Remove four nuts (19), lock washers (20), screws (21), and remove terminal block (22). Remove four screws (23) attaching each of the receptacle assemblies (24, 25, 28) and remove the receptacle cap (26) and remove jumper wire (27) from thermostat receptacle assembly (28).
- (4) When necessary, remove two screws (10) and mounting bracket (29). Remove two grommets (30), grommet (31) and speed nut (32) from support assembly (33).

**WARNING**

**Provide adequate ventilation when using trichloroethane. Avoid prolonged breathing of vapors and minimize skin contact.**

**b. Cleaning and Inspection.** Clean electrical components using trichloroethane, or equivalent. Clean other metallic parts with approved solvent. Wipe nonmetallic parts



Legend for fig. 7-53:

- |                                 |                     |                         |
|---------------------------------|---------------------|-------------------------|
| 1. Heater controls support assy | 12. Tee assembly    | 23. Screw (12)          |
| 2. Wire assembly                | 13. Special Plug    | 24. Receptacle assembly |
| 3. Wire assembly                | 14. Nozzle assembly | 25. Receptacle assembly |
| 4. Wire assembly                | 15. Adapter tee     | 26. Receptacle cap      |
| 5. Wire assembly                | 16. Elbow (4)       | 27. Jumper wire         |
| 6. Wire assembly                | 17. Deleted         | 28. Receptacle assembly |
| 7. Flame switch                 | 18. Deleted         | 29. Mounting bracket    |
| 8. Sleeve                       | 19. Nut (4)         | 30. Grommet (2)         |
| 9. Nut                          | 20. Lock washer (4) | 31. Grommet             |
| 10. Screw (4)                   | 21. Screw (4)       | 32. Speed nut           |
| 11. Regulator valve assy        | 22. Terminal block  | 33. Support assembly    |

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Figure 7-53. Heater controls support assembly

With clean, lint-free cloth dampened with detergent and water and air dry. Inspect flame switch (7, fig. 7-53). Make certain flame switch tube is not bent or distorted. The quartz rod must be free of nicks and cracks. Switch must have positive action when button is pressed. Any defect is cause for replacement of flame switch. The switch is adjusted after installation on heater assembly. To check the fuel control system, assemble the tee assembly (12, fig. 7-53) by installing nozzle assembly (14) and plug (13) in adapter (15). Install a street tee in the regulator valve assembly (11) fuel outlet port with pressure gauge installed in the branch of the street tee. Install the fuel metering tee assembly (12) in the run of the street tee. Connect a fuel pump (12 VDC, negative ground), that is capable of supplying a steady flow of fuel under constant pressure of 3 to 4 psi (0.21 - 0.28 kgs/cm<sup>2</sup>), between the regulator valve assembly (11) and a source of fuel. Connect a clean or new fuel filter between fuel supply and fuel pump to the regulator valve assembly (11) fuel inlet port. Connect the fuel pump and the regulator valve solenoid shutoff coil to the 12 VDC power source.

#### NOTE

**The solenoid shutoff coil is located at the top of the regulator valve assembly (11). The pressure regulator coil is located at the bottom of the assembly.**

Energize the fuel pump and solenoid shutoff valve and bleed the system of air by loosening plug (13) on the fuel metering tee assembly (12). Bleed system until fuel flows freely without air bubbles; then, tighten plug.

#### NOTE

**Use a suitable graduate scaled in cubic centimeters (cc) to collect fuel from the outlet port of the tee assembly (12) and a stop watch to time fuel flow.**

After the test system is bled, the pressure gauge should read 2 psi (0.14 kgs/cm<sup>2</sup>), plus or minus 10 percent. At this pressure fuel flow rate should be 25 cc per minute, plus or minus 3 cc. De-energize the regulator shutoff Solenoid. Fuel flow should stop immediately. Connect pressure regulator lead to the power source and energize both sides of the regulator valve. The outlet

fuel pressure should now read 1 psi (0.07 kgs/cm<sup>2</sup>), plus or minus 15 percent, and fuel flow should be 17 cc per minute, plus or minus 2.5 cc per minute. De-energize the solenoid shutoff side of the regulator valve. Fuel flow should stop immediately. If fuel pressure does not conform to the values given above, or the fuel flow does not stop when shutoff solenoid is de-energized, the regulator valve assembly is defective and shall be replaced. When fuel pressure is as specified but flow rate is higher or lower than limits specified, the metering tee assembly (12) is defective and should be replaced. After the checks have been completed, remove the test components.

**c. Repair or Replacement.** Replace all parts found defective during inspection.

#### d. Reassembly

- (1) Install grommet (31, fig. 7.53), two grommets (30) and speed nut (32) on support assembly (33). If removed, attach mounting bracket (29) to support assembly (33) with two screws (10).
- (2) If removed, assemble jumper wire (27) in receptacle assembly (28) and install cap (26). Assemble the three receptacle assemblies (28, 25, 24) to mounting bracket (29) with four screws (23) each. Attach terminal block (22) with screws (21), lock washers (20) and nuts (19). Connect receptacle assembly leads as shown on wiring diagram, fig. 1-3, sheet 2 of 2.
- (3) Assemble four elbows (16, fig. 7-53) positioned as shown. Assemble nozzle assembly (14) and plug (13) in adapter tee (15). Assemble the tee assembly (12) into elbow (16). Attach regulator valve assembly (11) to support assembly (33) with two screws (10). Connect valve assembly leads as shown on wiring diagram, fig. 1-3, sheet 2 of 2.
- (4) If removed, assemble nut and sleeve (9, 8, fig. 7-53), install wire assemblies (6, 5, 4, 3, 2) and flame switch (7). Refer to wiring diagram, fig. 1-3, sheet 2 of 2.

**APPENDIX A  
REFERENCES**

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**A-1. Fire Protection:**

TB 5-4200-200-10

Hand Portable Fire Extinguisher Approved for Army Users.

**A-2. Lubrication:**

C 9100-1L

Petroleum, Petroleum-Base Products and Related Materials.

LO 5-4310-365-12

Lubrication Order.

**A-3. Painting:**

TM 43-0139

Painting Instructions for Field Use.

**A-4. Maintenance:**

TM 38-750

The Army Maintenance Management Systems (TAMMS).

TM 5-4310-365-24P

Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List. Compressor, Reciprocating, Power-driven, Air, 3500 PSI, Type II, Class 1, 15 CFM (Davey Model 1 MCAA) NSN 4310-01-070-5615.

**A-5. Radio Interference Suppression**

TM 11-483

Radio Interference Suppression

**A-6. Shipment and Limited Storage:**

TB 740-94-2

Preservation of USAMECOM Mechanical Equipment for Shipment and Storage.

**APPENDIX B  
COMPONENTS OF END ITEMS LIST**

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**Section I. INTRODUCTION**

**B-1. Scope.** This appendix lists Integral Components of and Basic Issue Items (BII) for the air compressor to help you inventory items required for safe and efficient operations.

**B-2. General.** The components of end item list are divided into the following sections:

**a. Section II.** Integral Components of the End item. These items, when assembled, comprise the air compressor and must accompany it whenever it is transferred or turned in. These illustrations will help you identify these items.

**b. Section III.** Basic Issue Items. These are minimum essential items required to place the air compressor in operation, to operate it and to perform emergency repairs. Although shipped separately packed, they must accompany the air compressor during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard- to-identify items. This manual is your authority to requisition replacement BII based on Tables(s) of Organization and Equipment (TOE)/Modification Table of Organization and Equipment (MTOE) authorization of the end item.

**B-3. Explanation of Columns.**

**a. Illustration:** This column is divided as follows:

**(1) Figure Number.** Indicates the figure number of the illustration on which the item is shown (if applicable).

**(2) Item Number.** The number used to identify item called out in the illustration.

**b. National Stock Number (NSN):** Indicates the national stock number assigned to the end item which will be used for requisitioning.

**c. Part Number (P/N):** Indicates the primary number used by the manufacturer which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards and inspection requirements to identify an item or range of items.

**d. Description:** Indicates the federal item name and, if required, a minimum description to identify the item.

**e. Location:** The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

**f. Usable on Code:** "USABLE ON" codes are included to help you identify which component items are used on the different models. Identification of the codes used in this list are:

**CODE                      USED ON**

**g. Quantity Required (Qty Reqd):** This column lists the quantity of each item required for a complete major item.

**h. Quantity:** This column is left blank for use during inventory. Under the received column, list the quantity you actually receive on your major item. The date columns are for use when you inventory the major item at a later date, such as for shipment to another site.

Section II. INTEGRAL COMPONENTS OF END ITEM

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) PART NO. & FSCM		(4) DESCRIPTION	(5) LOCATION	(6) USABLE ON CODE	(7) QTY REQ'D	(8) QUANTITY			
(a) FIGURE NO.	(b) ITEM NO.								RCV'D	DATE	DATE	DATE
7-1	1.	4440-00-606-9005	69099	16004	Service hose			1				
7-1	2.		VHC4-4EM	78357	Coupler, Quick-disconnect			1				
7-1	3.		66365	16004	Air chuck and valve assy			1				
7-37	16.		MA-2	82990	Cartridge, dehydrator			2				



Section III. BASIC ISSUE ITEMS

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) PART NO. & FSCM	(4) DESCRIPTION	(5) LOCATION	(6) USABLE ON CODE	(7) QTY REQ'D	(8) QUANTITY			
(a) FIGURE NO.	(b) ITEM NO.							RCV'D	DATE	DATE	DATE
	1			TM5-4310-365-14			1				
	2			LO5-4310-365-12			1				

**APPENDIX C  
ADDITIONAL AUTHORIZATION LIST**

**Section I. INTRODUCTION**

**C-1. Scope.** This appendix lists additional items you are authorized for the support of the air compressor.

**C-2. General.** This list identifies items that do not have to accompany the air compressor and that do not have to be turned in with it. These items are authorized to you by CTA, MTOE, TDA or JTA.

**C-3. Explanation of Listing.** National stock number, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. "USABLE ON" codes are identified as follows:

**CODE    USED ON**

**Section II. ADDITIONAL AUTHORIZATION LIST**

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION		(3)  U/M	(4)  QTY AUTH.
	PART NUMBER & FSCM	USABLE ON CODE		
4210-00-555-8837	Extinguisher, Fire		EA	1
4240-00-022-2946	Protector, Aural		EA	1
5120-01-053-3118	Installation Tool, Clutch 68247     16004		EA	1
5120-01-053-6122	Adjusting Tool, Clutch 68959     16004		EA	1
7510-00-889-3494	Log Book Binder		EA	1
7520-00-559-9618	Cotton Duck Case		EA	1

**APPENDIX D  
EXPENDABLE SUPPLIES AND MATERIALS LIST**

**Section I. INTRODUCTION**

**D-1. Scope.** This appendix lists expendable supplies and materials you will need to operate and maintain the air compressor. These items are authorized to you by CTA50-970, Expendable Items (except Medical, Class V, Repair Parts, and Heraldic Items).

F - Direct Support Maintenance  
H - General Support Maintenance

**D-2. Explanation of Columns.**

**a. Column 1 - Item Number.** This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, Item 5, App. D").

**c. Column 3 - National Stock Number.** This is the National stock number assigned to the item; use it to request or requisition the item.

**b. Column 2 - Level.** This column identifies the lowest level of maintenance that requires the listed item. (enter as applicable):

- C - Operator/Crew
- O - Organizational Maintenance

**d. Column 4 - Description.** Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parenthesis, if applicable.

**e. Column 5 - Unit of Measure (U/M).** Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation(e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

**Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST**

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION (CAGEC)	(5) U/M
1.	C	6850-00-274-5421	Dry Cleaning Solvent, P-D-680	GAL

## APPENDIX E MAINTENANCE ALLOCATION CHART

### Section I. INTRODUCTION

#### E-1. General.

**a.** This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

**b.** The maintenance Allocation Chart (MAC) in Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

**c.** Section III lists the special tools and test equipment required for each maintenance function as referenced from Section II.

**d.** Section IV contains supplemental instructions on explanatory notes for a particular maintenance function.

#### E-2. Maintenance Functions.

**a. Inspect.** To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination.

**b. Test.** To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

**c. Service.** Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

**d. Adjust.** To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

**e. Align.** To adjust specified variable elements of an item to bring about optimum or desired performance.

**f. Calibrate.** To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two

instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

**g. Install.** The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

**h. Replace.** The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

**i. Repair.** The application of maintenance services (inspect, test, service, adjust, align, calibrate, or replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), and item, or system.

**j. Overhaul.** That maintenance effort (services/actions) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

**k. Rebuild.** Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipments/components.

#### E-3. Column Entries Used in the MAC.

**a. Column 1, Group Number.** Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

**b. Column 2, Component/Assembly.** Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

**c. Column 3, Maintenance Functions.** Column 3 lists the functions to be performed on the item listed in column 2. (For detailed explanation of these functions, see paragraph E-2).

**d. Column 4, Maintenance Level.** Column 4 specifies, by the listing of a work time figure in the appropriate sub-column(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform the maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each level. The number of man-hours specified by the work time figure represents the average time required to restore an item (assembly, sub-assembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance levels are as follows:

- C .....Operator or crew
- O .....Organization maintenance
- F .....Direct support maintenance
- H .....General support maintenance
- D .....Depot maintenance

**e. Column 5, Tools and Equipment.** Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

**f. Column 6, Remarks.** This column shall contain a letter code in alphabetical order which shall be keyed to the remarks contained in Section IV.

**E-4. Column Entries Used in Tool and Test Equipment Requirements.**

**a. Column 1, Tool or Test Equipment Reference Code.** The tool and test equipment reference code correlates with a maintenance function on the identified end item or component.

**b. Column 2, Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.

**c. Column 3, Nomenclature.** Name or identification of the tool or test equipment.

**d. Column 4, National/NATO Stock Number.** The National or NATO stock number of the tool or test equipment.

**e. Column 5, Tool Number.** The manufacturer's part number.

**E-5. Explanation of Columns in Section IV.**

**a. Reference Code.** The code scheme recorded in column 6, Section II.

**b. Remarks.** This column lists information pertinent to the maintenance function being performed as indicated on the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
01	Exhaust Muffler	Inspect Replace	0.1	0.5				A-A C-B	
02	Service Hose & Fittings	Inspect Test Repair Replace	0.1		1.0	1.0		A-A AC-B D-I	
03	Com pressor Enclosure Roof	Inspect Repair Replace	0.1	1.0 1.0			3-I	A-A G-I	
	Door Assy, Latches, & Tool Box	Inspect Repair Replace	0.1	0.5 1.0				A-A G-I	
	End Panel	Inspect Repair Replace	0.1	1.0 1.0			3-I	G-I	
	End Cover	Inspect Repair Replace	0.1	1.0 1.0			3-I	A-A G-I	
	Shroud	Inspect Repair Replace	0.1	1.0 1.0			3-I	A-A G-I	
	04	Fuel Lines and Fittings	Inspect Replace Repair	0.1	0.2 0.3				A-A C-B
	05	Air Lines, Hoses & Fittings	Inspect Replace Repair	0.1	0.2	0.5			A-A C-B
06	Alternator Assy	Inspect Test Adjust Replace Repair	0.1	1.0 0.3 0.5		1.5	2-B 9-A	A-A C-B L-B K-A D-I	
	Belt	Inspect Adjust Replace	0.1	0.4 0.4			8-A	A-A R-D	

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
06	Diodes	Inspect			0.2			2-B 6-I	F-B
		Test			0.1				
		Replace			0.5				
	Rotor	Inspect			0.2			2-B	F-B
		Test			0.5				
		Replace			1.0				
Brush Assembly	Inspect			0.1			2-B	V-A	
	Test			0.1					
	Replace			0.5					
Voltage Regulator	Inspect			0.2			2-B 9-A	C-B	
	Test			0.2					
	Replace			0.4					
Stator Assembly	Inspect			0.2			2-B		
	Test			0.3					
	Replace			1.0					
Bearings	Inspect			1.0				K-A	
	Replace			1.0					
07	Starter Assembly, Engine	Inspect	0.1	0.3			2-B 11-A	C-B D-I	
		Test							
		Replace							
		Repair			1.5				
		Overhaul			2.5				
	Brushes	Inspect			0.2			V-A	
Replace				1.5					
Plunger Assembly	Test		0.1			2-B			
	Replace			0.9					
	Repair			1.4					
Armature	Test			0.5		13-A	A-A W-B		
	Replace			1.0					
	Repair			1.0					
Drive	Inspect			0.5		13-A	A-A W-B		
	Adjust			1.0					
	Replace			1.0					
	Repair								

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
07	Field Assembly	Inspect Test Replace Repair			0.1 0.2 1.0 1.0				L-B W-B
	Holder, Brush	Inspect Test			0.1 0.2			2-B	A-A
	Bearing	Inspect Replace			0.2 1.0				K-A
	Fittings	Inspect Replace Repair	0.1	0.4 0.4					A-A
08	Engine Assy	Inspect Test Service Replace Repair Overhaul	0.1 0.8	1.0	16.0 12.0	80.0		4-H 5-H 10-A 12-A	A-A Q-C C-B
	Magneto	Inspect Test Replace Repair Overhaul		0.1 0.1 1.0	2.0 3.00				A-A C-B D-I
	Carburetor	Inspect Adjust Replace Repair Overhaul		0.1 0.4	0.2 1.0 2.0				A-A P-D J-B, D
	Fuel Pump and Strainer	Inspect Test Replace Repair Overhaul	0.1	0.2 0.4	1.0 1.0				A-A A-A D-I, AC-B
	Governor Assy	Inspect Test Adjust Replace Repair Overhaul		0.1	0.5 0.2 1.0 1.5	6.0			A-A J-B, D & I P-D C-B



Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT.	(6) REMARKS	
			C	O	F	H	D			
08	Switch, Temperature	Inspect Test Replace		0.1 0.2 0.3					2-B	F-B
	Manifold, Exhaust & Intake	Inspect Replace		0.1 1.5						A-A
	Breather, Crankcase	Inspect Service Replace	0.1 0.2							A-A
	Spark Plugs & Cables	Inspect Replace		0.5 1.0						
	Cylinder Block Assy	Inspect Replace Repair Overhaul			0.1 5.0 2.0		4.0		15-A 16-A	Z-I J-B
	Valve, Intake & Exhaust	Inspect Replace Repair			0.1 0.3 1.5				17-A	C-E
	Spring, Valve	Test Replace			0.2 1.5				11-A 18-A	AA-B
	Guide, Valve	Inspect Replace			0.1		4.1		19-A	
	Dipstick, Oil Level	Replace Inspect	0.1 0.1							A-A
	Oil Pan Assy	Inspect Replace Repair	0.1		1.0 1.0					A-A
	Seal Oil Pan	Replace			1.0					A-A
	Oil Pump	Test Replace Repair					1.0 3.0 2.0			
	Flywheel Assembly	Inspect Replace			0.1 1.0					AE-H
	Ring Gear	Inspect Replace					0.1 2.0			AD-H

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT.	(6) REMARKS						
			C	O	F	H	D								
08	Housing	Inspect				0.1			AF-H						
		Replace				2.0									
	Cover, Timing	Inspect			0.1										
		Replace				2.0									
	Gears, Timing	Inspect				0.1					AH-H				
		Replace				4.0									
	Connecting Rod	Inspect				0.1					21-A 20-B	AI-H			
		Replace				10.0									
	Rod, Bearings	Inspect				0.1						20-A			
		Replace				2.0									
	Piston	Inspect				0.2							25-A		
		Replace				10.0									
	Piston Pin	Inspect				0.1								20-A	
		Replace				6.0									
	Piston Rings	Inspect				0.1									24-A
Replace					2.0										
Crankshaft	Inspect				0.2		27-A								
	Replace				6.0										
Main Bearing	Inspect				0.2			16-A 20-A							
	Replace				6.0										
Bearing, Camshaft	Inspect				0.2				20-A 22-A						
	Replace				7.0										
Crankcase Assy	Inspect				0.2						A-A				
	Replace				30.0										
	Repair				2.0										
	Overhaul				4.0										
Oil Filter, Engine	Inspect		0.1									X-C			
	Replace		0.2												
	Repair			1.0											
Air Cleaner Assy	Inspect		0.1										A-A X-C		
	Service		0.1												
	Replace			0.5											

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) GROUP NUMBER	(2) MAINTENANCE/ASSEMBLY	(3) FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
09	Clutch Assy & Housing Group	Inspect Adjust Repair Replace		0.1 0.2 1.0 3.0					A-A J-B, D, & I J-B, D, & I J-B D, & I
10	Pneumatic System								
	Air Compressor Assy	Inspect Test Adjust Service Replace Repair Overhaul	0.1   0.8	 0.5 1.0	   6.0 8.0	    15.0			A-A S-B AC-B C-B
	Crankcase Cylinder Heads	Inspect Replace			3.0	6.0			A-A
	Crankshaft, Bearing	Inspect Replace			2.0	8.0			A-A
	Pistons, Rings, Connecting Rods	Inspect Replace			2.0	8.0			A-A
	Oil Pump	Inspect Replace Repair			1.0 3.0 4.0				
	Oil Lines & Fitting	Inspect Replace	0.1	0.5					A-A
	Oil Filter Assy	Inspect Replace Repair Service	0.1  0.8	0.5	1.0				A-A J-B, D & I
	Filter, Air Intake	Inspect Service Replace	0.1 0.1 0.1						A-A X-C A-A
	Breather Assy	Inspect Replace Repair	0.1	0.5 0.5					A-A
	Unloader and Drain Valve Assy	Inspect Replace		0.1	1.0				A-A

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
10	Dehydrators and Filter Group	Inspect Service Replace Repair	1.0 1.0		1.5 2.0				A-A X-C J-B-D & I
	Moisture Traps and Mounting Group	Inspect Service Repair Replace		1.0 1.0	1.5 2.0				A-A
	Air Receiver	Inspect Test Repair Replace		0.1			1.0 1.0		AC-B D-I
11	Instrument & Control Panel Assy	Inspect Test Service Repair Overhaul Replace	0.1		1.0 2.0 3.0			2-B	A-A R-D
	Manual Switches	Inspect Test Replace	0.1	0.1 0.5				2-B	F-B
	Pressure Switches	Inspect Test Replace	0.1		0.3			2-B	F-B
	Oil Temp Gauge	Inspect Test Replace	0.1	0.3 0.5				2-B	
	Air Pressure Gauges	Inspect Test Replace	0.1		2.0	1.5			A-A
	Switch, Panel Light	Inspect Test Replace	0.1		0.3 0.5			2-B	F-B
	Lamp, Panel	Inspect Test Replace	0.1 0.1	0.1				2-B	F-B

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
11	Hourmeter	Inspect Test Replace	0.1	0.1 1.0					R-D
	Cable	Inspect Service Replace	0.1	0.3 0.5					
	Panel Fittings	Test Replace		0.5 0.5					
	Air Cleaner Indicators	Inspect Replace	0.1	0.5					
	Ignition Switch	Inspect Test Replace	0.1	0.3 0.5				2-B	F-B
	Ammeter	Inspect Test Replace	0.1	0.3 0.5					
	Vibration Mount	Inspect Replace	0.1	0.5					
	Wire Assy	Inspect Test Repair Replace	0.1	0.3 0.5 0.5					H-K
	Gauge, Oil Pressure	Inspect Test Replace	0.1	0.3 0.5					A-A
	Control, Throttle & Unloader	Inspect Adjust Replace	0.1	0.2 0.5					J-B J-B J-B
	Air Cooler Assy, Inter and After Coolers	Inspect Test Repair Replace		0.1		1.0 2.0 3.0			A-A AC-B
12	Drains, Engine and Compressor	Inspect Replace	0.5	0.5					A-A

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
13	Fuel Tank Assy	Inspect Service Replace Repair	0.1 0.1		1.0 1.5				A-A N-C
	Filler Cap	Inspect Replace		0.1 0.1					A-A
	Neck	Inspect Replace Repair		0.1	2.0 0.5				A-A
	Hose & Line	Inspect Replace		0.1 0.2					A-A
	Strap Assy	Inspect Replace Repair		0.3 0.5 0.3					
	Fuel Gauge	Inspect Test Replace	0.1		0.2 0.5				
14	Batteries & Hold-down Assy	Inspect Test Service Install Replace	0.1 0.1	0.2	0.5 0.5			1-B	A-A B-B
	Cables, Batteries	Inspect Replace Repair	0.1	0.3 0.5			2-B	A-A	
15	Chassis Assy								
	Front Axle Assy	Inspect Repair Replace	0.5	1.0 1.5					
	Rear Axle Assy	Inspect Repair	0.5	1.0			A-A		
	Wheel Assy	Replace		1.5					
	Brake Assy	Inspect Replace Repair		0.5 0.5	1.5				A-A J-B

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
15	Wheel Hub & Seal	Inspect		0.5					A-A
		Repair		0.5					
		Repair		0.5					
	Bearings	Inspect		0.5					A-A J-B
		Replace		1.0					
		Service		1.0					
	Tires & Tubes	Inspect	0.5						J-B J-B
		Service	0.5						
		Replace Repair		1.0 1.0					
	Frame	Inspect		0.5					3-I A-A G-I
Repair					1.0				
Replace				8.0					
Pintle	Inspect	0.1							
	Repair		1.0						
	Replace		1.0						
	Service	0.1							
16	Winterization Equip.	Inspect		0.5				2-B K-A D-I	
		Repair			1.0				
		Replace			4.0				

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL/NATO STOCK NUMBER	(5) TOOL NUMBER
1-B	O	Tester, Battery, Electrolyte Solution Component of tool Set L/I T13152		6630-171-5126 or Equal
2-B	O	Multimeter		6615-581-2036 or Equal
3-I	O	Torch Outfit, Cutting & Welding		3433-347-6311 or Equal
4-H	F	Hoist, Chain, 3 Ton		3950-292-9879 or Equal
5-H	F	Trestle, Hoist, Portable, 5 Ton		3950-449-7005 or Equal
6-I	O	Soldering Outfit, Electric		3439-853-8760 or Equal
8-A	O	Scale, Dial Indicating, 0-50 LB		6670-254-4634 or Equal
9-A	O	Test Set, Generator and Voltage Regulator		4910-270-3780 or Equal
10-B	F	Tachometer, stroboscopic		6680-892-1510 or Equal
11-A	O	Tester, Spring Resiliency		6635-449-3750 or Equal
12-A	F	Gage, Thickness		5120-221-1999 or Equal
13-A	F	Test Set, Armature		6625-238-1459 or Equal
15-A	F	Grinding Kit, Valve Seat		4910-473-6437 or Equal
16-A	F	Wrench, Torque		5120-542-5577 or Equal
17-A	F	Grinding Machine, Valve Face		4910-540-4679 or Equal
18-A	F	Lifter, Valve Spring		5120-239-8686 or Equal
19-A	F	Remover and Replacer, Valve Guide		5120-219-8404
20-A	H	Caliper Micrometer, Outside, 1" thru 2"		5210-243-2933 or Equal



Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS - Continued

(1) REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL/NATO STOCK NUMBER	(5) TOOL NUMBER
20-B	H	Indicator, Connecting Rod Alignment		4910-733-2487 or Equal
21-A	H	Wrench, Torque		5120-640-6364 or Equal
22-A	H	Gage Set, Telescoping		5120-473-9350 or Equal
23-A	H	Gage, Thickness		5120-517-8097 or Equal
24-A	H	Compressor, Piston Ring		5120-894-0793 or Equal
25-A	H	Expander, Piston Ring		5120-393-0549 or Equal
26-A	H	Caliper, Micrometer		5120-255-7564 or Equal
27-A	H	Caliper, Micrometer		5210-221-1934 or Equal

Section IV. REFERENCE CODES - REMARKS

REFERENCE CODES	REMARKS	REFERENCE CODES	REMARKS
A-A	Visual Inspection	S-B	Test Pressure Output
B-B	Hydrometer Test	T-D	Adjust Pressure Output
C-B	Operational Test	U-D	Overspeed Only
D-I	Repair by Replacement of Components	V-A	Inspect for Minimum Length
F-B	Continuity Test	W-B	Growler Test
G-I	Weld and Straighten	X-C	Replace Element
H-K	Fabricate New Harness	Z-I	Includes Replacing Valves and Springs
I-B	Test for known Voltage at Terminals	AA-B	Spring Tension and Length
J-B, D, & I	In Accordance with Procedures in Applicable TM or TB on Test	AC-B	Pressure Test
K-A	Visual, Audible and Physical Heat Detection	AD-H	Engine Out of Unit and Flywheel Removed
L-B	Insulation Breakdown and Continuity Tests	AE-H	Engine Out of Unit
N-C	Drain Condensation	AF-H	Engine Out of Unit - Includes Removal and Installation of Flywheel
P-D	Adjust After Replacement or Repair	AG-H	Engine Out of Unit
Q-C	Check Fluid Level	AH-H	Engine Out of Unit - Timing Gear Cover Off.
R-D	Adjust to Specification in Applicable TM	AI-H	Engine Out of Unit - Includes Removal of Head and Pan Assemblies

**APPENDIX F  
TORQUE LIMITS**

<b>COMPONENT ITEM</b>	<b>FOOT- POUNDS (ft-lbs)</b>	<b>KILOGRAM- METERS (kg-m)</b>
<b>ENGINE:</b>		
Spark plug .....	25-30	3.46-4.15
Carburetor manifold nuts .....	18	2.49
Cylinder head screws .....	22-24	3.04-3.32
Gear cover screws .....	14-18	1.94-2.49
Oil pan mounting screws .....	6-9	0.83-1.24
Connecting rod nuts .....	22-28	3.04-3.87
Cylinder block mounting nuts .....	40-50	5.53-6.92
Main bearing plate screws .....	25-30	3.46-4.15
<b>COMPRESSOR:</b>		
Cylinder head capscrews, 2nd stage.....	20	2.77
Cylinder head capscrews, 3rd stage.....	45	6.22
Cylinder head capscrews, 4th stage .....	45	6.22
Piston nut, 4th stage .....	5	0.69
Flywheel capscrews (with Loctite).....	26	3.60
<b>CLUTCH:</b>		
Engine crankshaft nut.....	80	11.06
<b>AXLES:</b>		
Rear axle U-bolt nuts .....	17	2.35
Front trunnion block U-bolt nuts .....	45	6.22
<b>CONTINUOUS BLEED VALVES:</b>		
Cap mounting screws .....	15-17 in.-lbs.	0.173-0.196
<b>ALTERNATOR:</b>		
Slip ring capscrew .....	45 in.-lbs	0.52
Pulley nut.....	35-50	4.84-6.92
Through bolts .....	50-60 in.-lbs	0.58-0.69
Brush set mounting screws .....	16-20 in.-lbs	0.18-0.23
Rear housing cover screws .....	20-30 in.-lbs	0.23-0.35
Diode mounting nuts .....	20-30 in.-lbs	0.23-0.35

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BE EXACT... PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.
----------	------------	------------	-----------

6

2-1  
a

B1

4-3

125

line 20

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

In line 6 of paragraph 2-1a the manual stated the engine has 6 Cylinders. The engine on my set only has 4 Cylinders. Change the manual to show 4 Cylinders.

Callout 16 on figure 4-3 is pointing at a bolt. In key to figure 4-3, item 16 is called a shim - Please Correct one or the other.

I ordered a gasket, item 19 on figure B-16 by NSN 2 910-05-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered, so the NSN is wrong. Please give me a good NSN

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DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.  
DRSTS-M Overprint 2, 1 Nov 80.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

REVERSE OF DA FORM 2026-2

Reverse of DRSTS-M Overprint 1,  
1 Nov 80

FILL IN YOUR  
UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

\_\_\_\_\_  
\_\_\_\_\_

OFFICIAL BUSINESS  
PENALTY FOR PRIVATE USE \$300

POSTAGE AND FEES PAID  
DEPARTMENT OF THE ARMY  
DOD 314



TEAR ALONG PERFORATED LINE

COMMANDER  
U S ARMY SUPPORT AND AVIATION MATERIEL READINESS COMMAND  
ATTN: DRSTS-MTT  
4300 GOODFELLOW BOULEVARD  
ST. LOUIS, MO 63120

### 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 = 0.35 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 milliliters = .34 fluid ounce  
 1 deciliter = 10 centiliters = 3.38 fluid ounces  
 1 liter = 10 deciliters = 33.81 fluid ounces  
 1 dekaliter = 10 liters = 2.64 gallons  
 1 hectoliter = 10 dekaliters = 27.42 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. decimeters = 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
pounds-inches	newton-meters	.11375			

#### Temperature (Exact)

°F Fahrenheit Temperature      5/9 (after subtracting 32)      Celsius Temperature      °C

