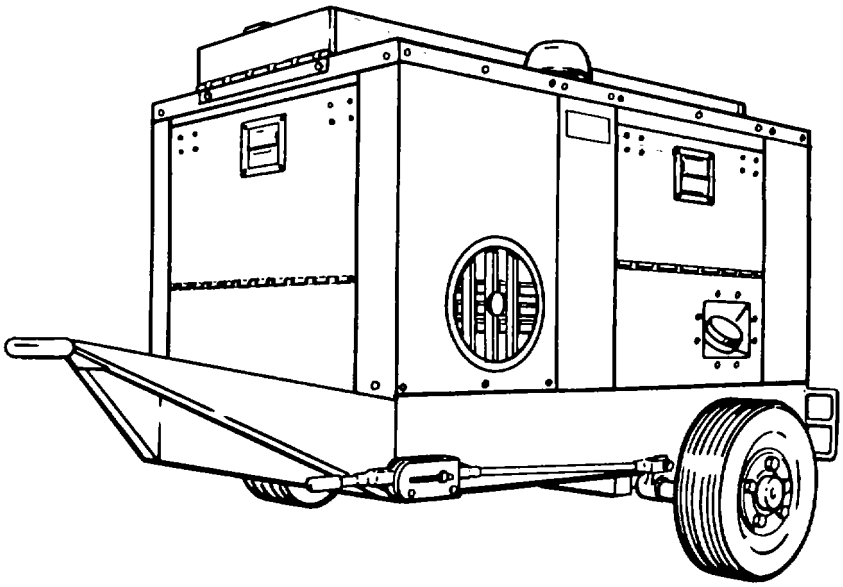
TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL



COMPRESSOR, AIR, RECIPROCATING, GASOLINE ENGINE DRIVEN,

15 SCFM, 3500 PSI, WHEEL MOUNTED, WINTERIZED

(BAUER COMPRESSOR MODEL KA15-03-PJ

NSN 4310-01-087-4317

H E A D Q U A R T E R S , D E P A R T M E N T O F T H E A R M Y

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CHANGE

NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 10 July 1990

Operator's, Organizational, Direct Support and General Support Maintenance Manual

COMPRESSOR, AIR, RECIPROCATING, GASOLINE ENGINE DRIVEN, 15 SCFM, 3500 PSI, WHEEL MOUNTED, WINTERIZED (BAUER COMPRESSOR MODEL KA15-03-P) NSN 4310-01-0874314

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By Order of the Secretary of the Army:

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General, United States Army
Chief of Staff

Official:

WILLIAM J. MEEHAN, II
Brigadier General, United States
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-25E, Operator, Unit, Direct Support and General Support Maintenance requirements for Compressor, Reciprocating, Air, Gas, Wheel Mounted, 15 CFM, 3500 PSI (KA15-3-P).

CHANGE

NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 06 June 1986

Operator's, Organizational, Direct Support and General Support Maintenance Manual

COMPRESSOR, AIR, RECIPROCATING, GASOLINE ENGINE DRIVEN, 15 SCFM, 3500 PSI, WHEEL MOUNTED, WINTERIZED (BAUER COMPRESSOR MODEL KA15-03-P) NSN 4310-01-0874314

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i and ii	i and ii
2-7 and 2-8	2-7 and 2-8
3-1 and 3-2	3-1 and 3-2
4-5 and 4-6	4-5 and 4-6
4-47 and 4-48	4-47 and 4-48
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JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-25A, Operator, Organizational, Direct Support and General Support Maintenance requirements for Compressor, Reciprocating, Air, Gas, Wheel Mounted, 15 CFM, 3500 PSI (KA15-03-P).

WARNING

High pressure air can be dangerous. Never attempt to service the air compressor unless the engine is stopped and the system is relieved of all air pressure.

Do not attempt to service separators, valves, air lines, dehydrators, gages, fittings, or service hose unless all air pressure has been relieved.

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 (38°C) - 138°F (59°C).

Compressed air can be extremely hazardous. Use 30 PSI maximum air pressure for parts cleaning.

Lead acid batteries contain a strong acid. This acid can cause severe skin burns. Handle battery only with proper lifting strap. Wear protective clothing and eye protection.

The compressed air produced by this compressor system is NOT SUITABLE for filling scuba tanks, self-contained breathing apparatus, or other such vessel with BREATHABLE AIR.

Technical Manual

No. 5-4310-368-14

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 7 December 1981

Operator's, Organizational, Direct Support and General Support Maintenance Manual
COMPRESSOR, AIR, RECIPROCATING, GASOLINE ENGINE DRIVEN, 15 SCFM, 3500 PSI, WHEEL MOUNTED, WINTERIZED
(BAUER COMPRESSOR MODEL KA15-03-P)
NSN 4310-01-087-4314

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistake 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), to: Commander, U. S. Army Troop Support Command, ATTN: AMSTR-MCTS, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. A reply will be furnished directly to you.

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LIST OF ILLUSTRATIONS

LIST OF TABLES

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE

This technical manual is intended for operator and maintenance personnel at all levels using the reciprocating air compressor Bauer Model KA15-03-P. Chapters 1 - 3 contain general information, operational instructions and maintenance for the operator. Chapter 4 provides maintenance procedures for the organizational level. Chapters 5 and 6 provide maintenance instructions for the direct support and general support levels. The purpose of the equipment is to provide mobile units with 15 cubic feet per minute of compressed air at 3500 psi for various operational uses.

1-2. MAINTENANCE FORMS AND RECORDS

Maintenance forms and records that you are required to use are as follows:

a. DA Form 2404 (Equipment Inspection and Maintenance Worksheet).

b. DA Form 2407 (Maintenance Request Used for Requesting Support Maintenance).

c. DA Form 2407-1 (Continuation Sheet Used for Requesting Support Maintenance).

d. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM738-750 the Army Maintenance Management System (TAMMS).

1-3. HAND RECEIPT

Hand receipts for Components of End Item (COEI), Basic Issue Items (Bll), and Additional Authorization List (AAL) items are published in a Hand Receipt Manual TM 5-4310-368-14-HR. This manual is published to aid in property accountability and is available through: Commander, U.S. Army Adjutant General Publication Center, Attn.: AGDL-OD, 2800 Eastern Blvd., Baltimore, MD 21220.

1-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR's)

If your air compressor needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at Commander, U.S. Army Troop Support Command, Attn.: AMSTR-QS (CFC), 4300 Goodfellow Blvd., St. Louis, MO 63120-1798.

1-5. WARRANTY INFORMATION

The air compressor Model KA15-03-P is warranted by Bauer Compressors, Inc. for 12 months. It starts on the date found in block 23, DA Form 2408-9, in the logbook. Report all defects in material or workmanship to your supervisor, who will take appropriate action through your organizational maintenance shop.

1-6. NOMENCLATURE CROSS REFERENCE

Common Name	Official Nomenclature
Fuel Gage	Liquid Level Indicator

1-7. LIST OF ABBREVIATIONS

AC	alternating current
AH	ampere/hour
AMP	ampere
BTU	British Thermal Unit
DC	direct current
GPH	gallons per hour
NM	newtons per square meter
PSI	pounds per square inch
RPM	revolutions per minute
SCFM	standard cubic feet per minute
V	volt

Section II. EQUIPMENT DESCRIPTION

1-8. EQUIPMENT PURPOSE, CAPABILITIES, AND FEATURES

The purpose of the air compressor is to provide 15 cubic feet per minute of compressed air at 3500 psi.

Major Components:

- Engine
- Compressor
- Instrument/Control Panel
- Heater
- Fuel Tank
- Air Receiver
- Running Gear
- Enclosure

Operable in temperature range of -50°F (-46°C) to 125°F (52°C)

Towable by light land vehicles, or by personnel for short distances.

U.S. Government Printing Office: 1990-754-029/20141

PIN: 050241 002

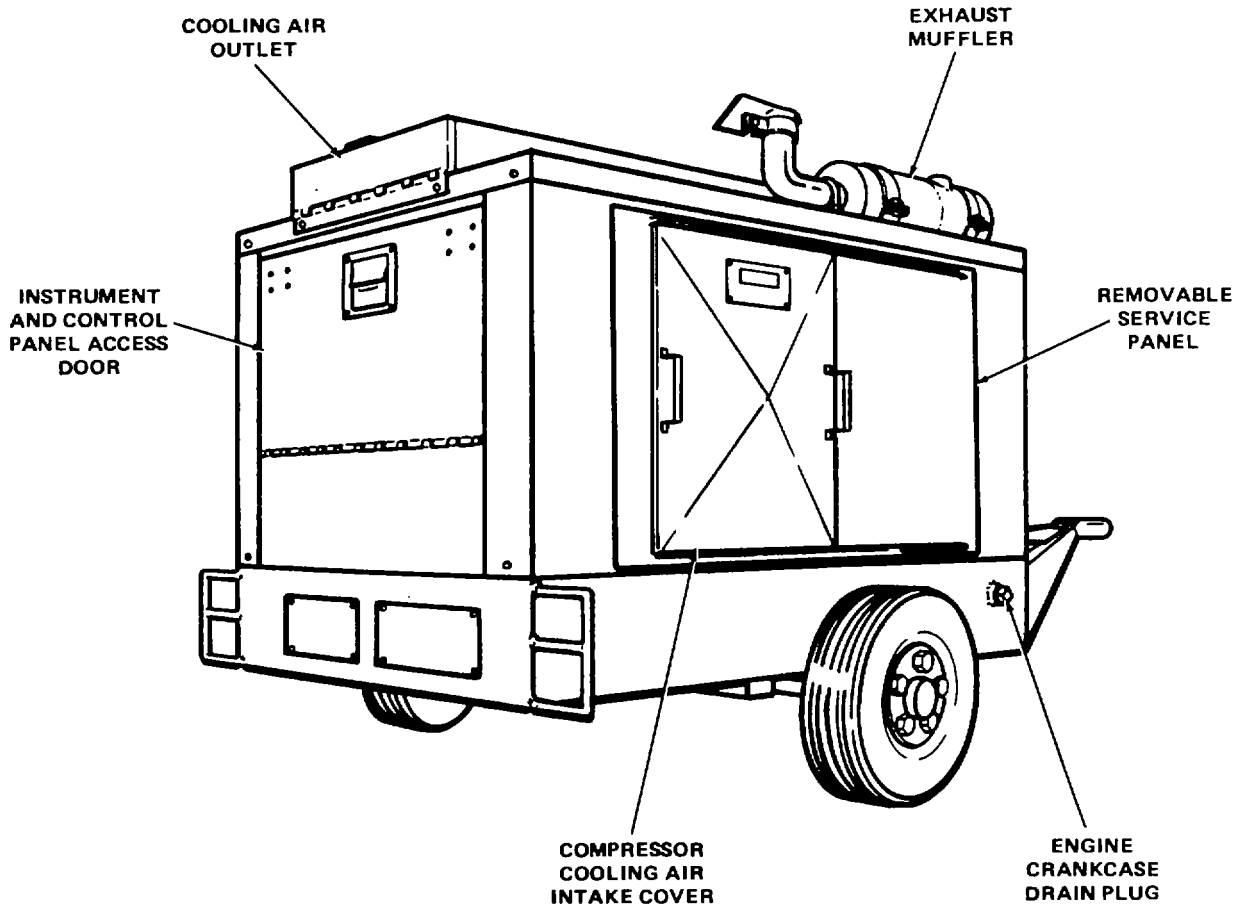


Figure 1-1. Air Compressor Model KA15-03-P, Right Rear, Three-Quarter View

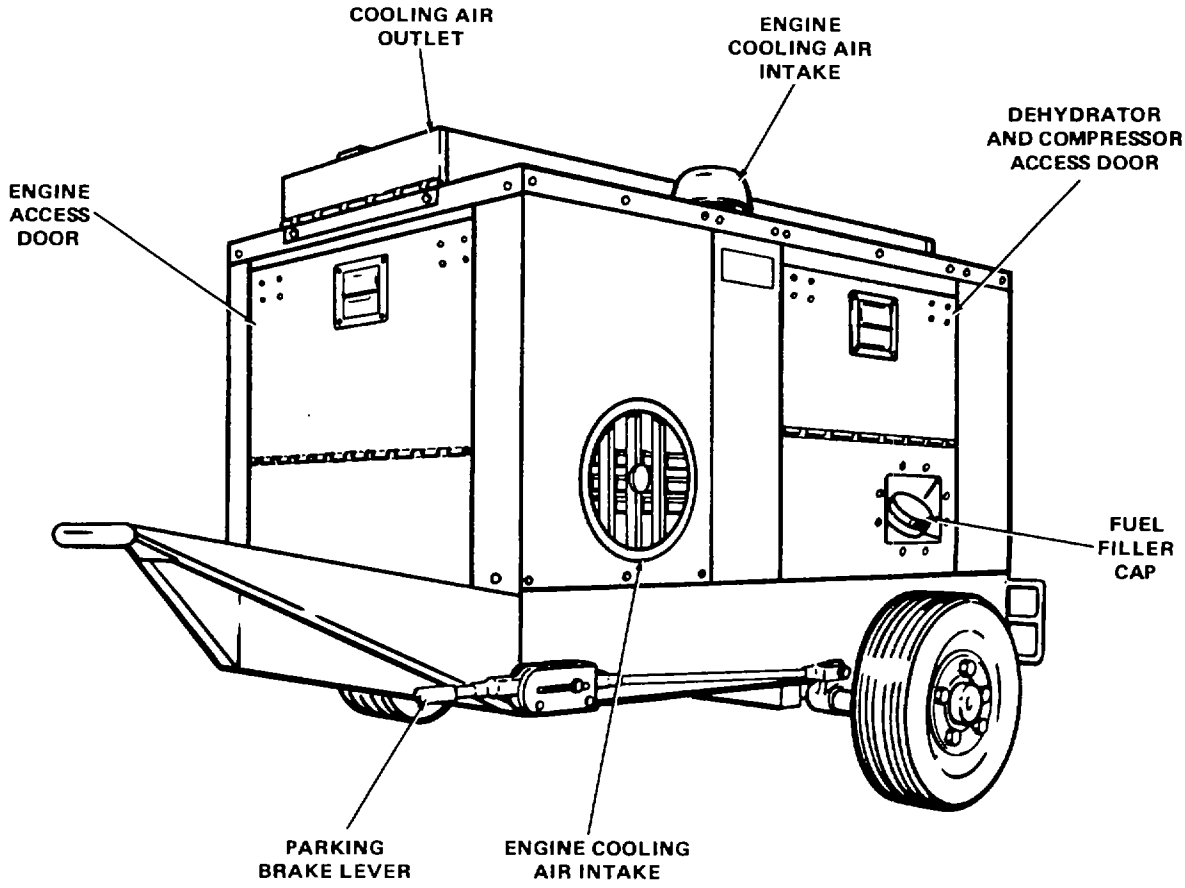


Figure 1-2. Air Compressor Model KA15-03-P, Left Front, Three-Quarter View

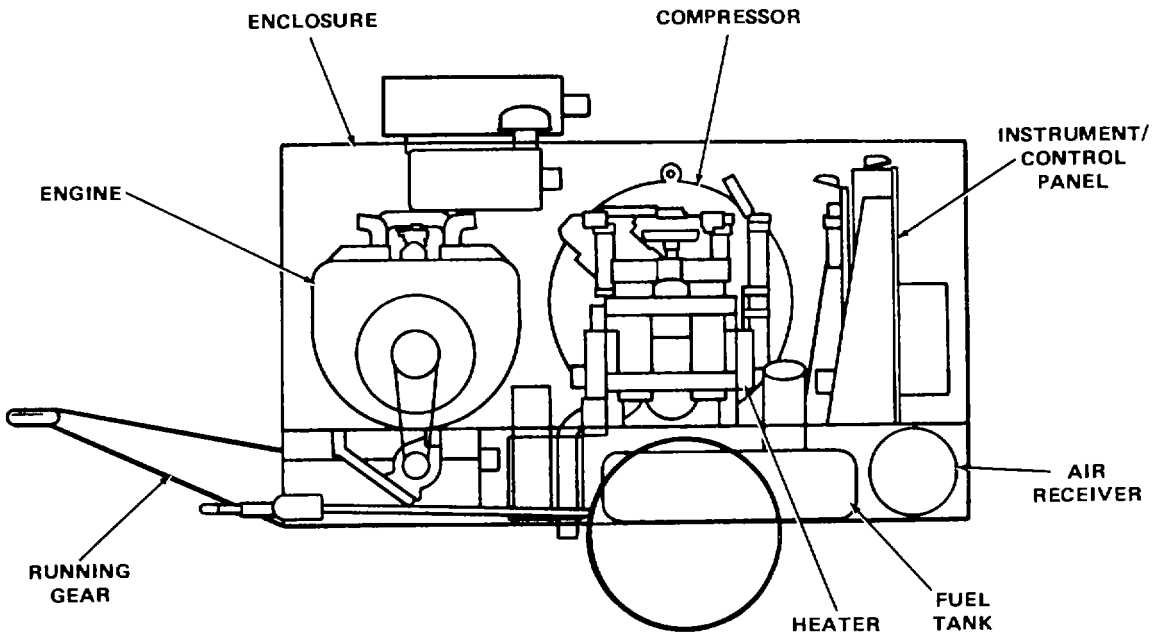


Figure 1-3. Major Compressor Components

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPRESSOR COMPONENTS

ENGINE - Consists of engine, starter motor, carburetor, magneto, and fuel pump.

COMPRESSOR - Consists of 4-stage pump, filters, dehydrators.

INSTRUMENT/CONTROL PANEL - Contains all instruments and most controls necessary for unit operation.

HEATER - Provides heat for cold weather operation. Consists of a fuel pump and gasoline-fired burner.

FUEL TANK - 25-gallon (94.6 Liter) capacity. Filled through a filler neck on the left side of the enclosure.

AIR RECEIVER - A tank for receiving compressed air from the compressor. Capacity 1300 cu. in. (21.3 Liters).

RUNNING GEAR - A two-wheeled trailer with parking brake and lunette fitting for a standard hitch.

ENCLOSURE - Protects the other components from weather and debris damage.

1-10. DIFFERENCES BETWEEN MODELS

The Bauer air compressor Model KA15-03-P is the only model covered by this technical manual.

1-11. EQUIPMENT DATA

WEIGHTS AND DIMENSIONS

Overall length	101 in (2565.4 mm)
Overall width	66 in (1676.4 mm)
Overall height	60 in (1524 mm)
Weight (dry)	1750 lb/795 KG
Volume	232 cu ft

MANUFACTURERS' DATA

Air Compressor

Manufacturer	Bauer Compressors, Inc.
Model number	KA15-03-P
Output	15SCFM, 3500 PSI
Serial number	77058-1 thru 77058-69

Compressor

Manufacturer	Bauer Kompressoren, Munich
Model	K 15-03
Type	Reciprocating, 4 cylinder, 4 stage
Speed	1300 RPM
Bore and stroke:	
1st stage	110.0 mm x 50.0 mm
2nd stage	60.0 mm x 50.0 mm
3rd stage	32.0 mm x 50.0 mm
4th stage	14.0 mm x 50.0 mm

Engine

Manufacturer	Teledyne Wisconsin Motor
Model	VH4D-1
Specification	415742
Type	Air cooled, gasoline
Number of cylinders	4
Bore	3-1/4
Stroke	3-1/4
Piston displacement	107.7 cu in
Rated horsepower	29.5 @ 3000 RPM
Compression ratio	5.5:1
Governed speed	2650 RPM
Continuous horsepower at rated speed	20 HP/14.5 KW

MANUFACTURER'S DATA (Continued)

Starter Motor

Manufacturer	Prestolite
Model	MBG4141
Operating voltage	12 VDC

Alternator

Manufacturer	Motorola
Model	RA12N451
Output voltage	12 VDC
Rated current	35 AMP

Alternator regulator

Manufacturer	Motorola
Model	8RF2011A

Battery

Manufacturer	ESB Brands, Inc.
Model	60T
Voltage	12 VDC
Amp/hour rating	90

Compartment Heater

Manufacturer	Hupp Mobile Products Div.
Model	AP3050-12
Fuel	Gasoline
Output:	
Hi-Fire	30,000 BTU/hr.
Lo-Fire	20,000 BTU/hr.
Operating voltage	12 VDC
Operating current	6 AMP
Free air delivery	150 CFM

Heater fuel pump

Manufacturer	Stewart-Warner
Model	235A
Operating voltage	12 VDC
Capacity	11 GPH @ 3 PSI

MANUFACTURER'S DATA (Continued)

Air Receiver

Units with Serial # 77058-1 through 77058-42 - National Board # 4698
Units with Serial # 7705843 through 77058-69 - National Board # 13169

Manufactured	for Bauer Compressors, Inc.
Model	20730-3-000621
Medium	Air
Capacity (Water Volume)	1300 cu. in.
Working Pressure	3500 PSI

Clutch

Manufacturer	Rockford Clutch Div.
Model	CLA-1467-AF
Type	Multi-disc, wet
Torque capacity	150 lb-ft (110 NM)

Engine Carburetor

Manufacturer	Fuel Services Div. Bendix
Model	68-7
Type	Single Venturi

Engine Magneto

Manufacturer	Fairbanks-Morse
Type	F M-XZ E4B7-4

Engine Spark Plugs

Manufacturer	Champion
Model	XMD-21
Type	Shielded
Military Standard conformity	MS 51009-1
Size	18 mm

Engine Fuel Pump

Manufacturer	Teledyne Wisconsin Motor
Model	LP-38E

Engine Oil Filter

Manufacturer	Fram Corp.
Model	F21-P
Specification (Federal)	F-F-351 Ty 1, cl. 2
Replacement cartridge part no.	C-21P

MANUFACTURERS' DATA (Continued)

Engine and Compressor Air Cleaner

Manufacturer	Donaldson
Model	FWG06-5012
Type	Dry
Replacement element	P10-1222

Compressed Air Filter

Manufacturer	FACET FILTER PRODUCTS
Model	574600
Type	Dry
Capacity	20 SCFM
Working pressure	5000 PSI
Rating	10 micron
Replacement element	AN 6235

Air Dehydrator Cartridges

Manufacturer	Multiform Dessicant Products
Model	02-800-24P-G-01 A
Specification	Ml L-C-26058
Type	MA-2

COMPRESSOR SPECIFICATIONS

Cylinder heads	18 lb-ft (13.3 NM)
Cylinder to crankcase	18 lb-ft (13.3NM)
First stage valve retainers	18 lb-ft (13.3 NM)
Drive gear cover	8 lb-ft (5.9 NM)
Crankcase upper half to lower half	18 lb-ft (13.3 NM)
Oil pump to crankcase	18 lb-ft (13.3 NM)
Oil pump drive cover	8 lb-ft (5.9 NM)
Oil pump drive cover	3 lb-ft (2.2 NM)
Crankshaft counterweight bolt	18 lb-ft (13.3 NM)

ENGINE ADJUSTMENT DATA

Spark plug gap	0.030 in (.75 mm)
Breaker point gap	0.015 in (.38 mm)
Spark advance	23°
Valve tappet clearance (cold)	
Intake	0.008 in (.2 mm)
Exhaust	0.016 in (.4 mm)

MANUFACTURERS' DATA (Continued)

CAPACITIES

Fuel tank	25 gallons (94.6 L)
Engine crankcase	4 qt + 1 qt for oil filter
Compressor crankcase	4.23 qt (4 L)
Air receiver	1300 cu in (21.3 L)

TORQUES (Engine)

Spark plugs	25-30 lb-ft (18.5-22.2 NM)
Cylinder head	22-24 lb-ft (16.3-17.7 NM)
Cylinder block	40-50 lb-ft (29.6-37 NM)
Gear cover	14-18 lb-ft (10.4-13.3 NM)
Oil pan	6-9 lb-ft (4.4-6.7 NM)
Connecting rod	22-24 lb-ft (16.3-17.7 NM)
Main bearing	25-30 lb-ft (18.5-22.2.NM)
Intake/exhaust manifolds	20-25 lb-ft (14.8-18.5 NM)

RUNNING GEAR SPECIFICATIONS

Tire size	6.90 X 9
Tire rating	Load range C (replaces 6 ply)
Tire Military Standard conformity	MS 35389-6
Tube Military Standard conformity	MS 35392-52

Section III. TECHNICAL PRINCIPLES OF OPERATION

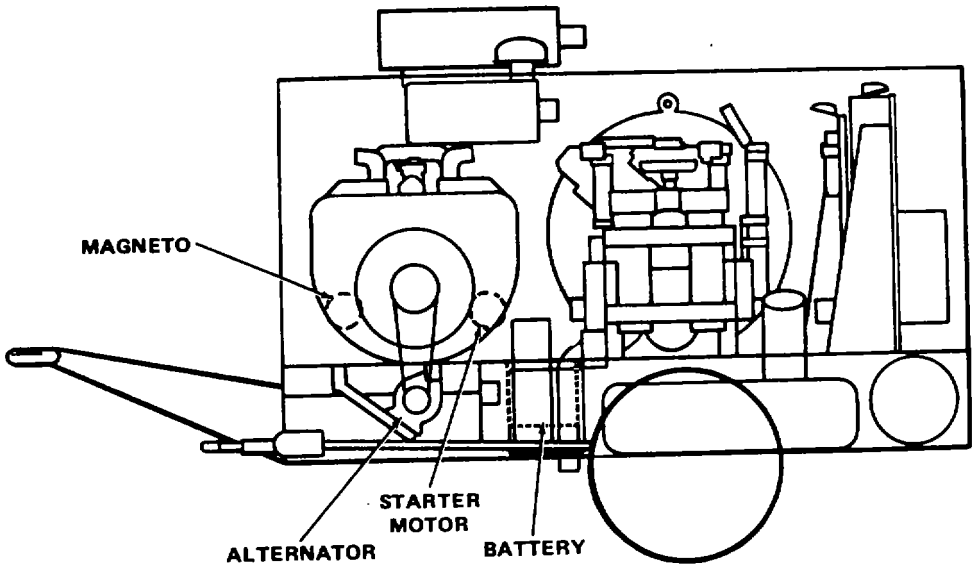


Figure 1-4. Starting/Charging System

STARTING/CHARGING SYSTEM

STARTER MOTOR - is a 12-volt motor with a Bendix type drive. It is electrically controlled by the START switch.

MAGNETO - is a rotating core type. It is mechanically driven by the engine camshaft and electrically controlled by its own grounding switch and several safety cutout switches. If any of these switches is closed, the magneto is grounded and will not generate power for the spark plugs.

ALTERNATOR - is a 12-volt 35-amp type with internal voltage regulator and rectifier diode bank. It is mechanically driven by a belt drive from the engine crankshaft.

BATTERY - is a 12-volt low-maintenance wet cell. It is charged by the alternator.

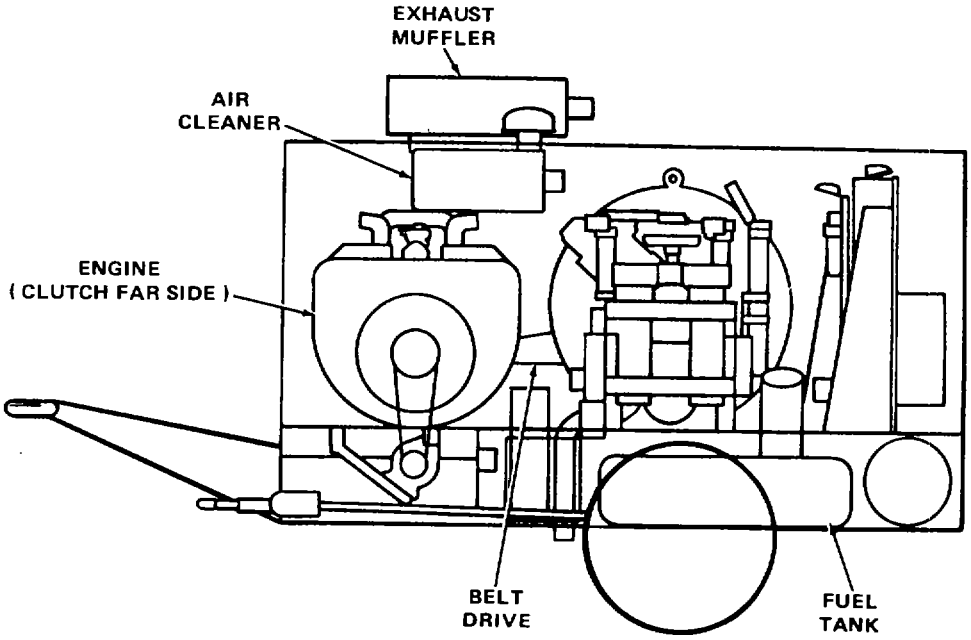


Figure 1-5. Power System

POWER SYSTEM

ENGINE - is a four-cylinder, air cooled, gasoline fueled, spark-ignition four-cycle type.

CLUTCH - is a toggle-operated multi-plate oil bath type. It is mechanically controlled by the clutch lever, allowing the engine to be started and idled without the load of the belt drive or compressor.

BELT DRIVE - consists of a drive pulley on the output shaft of the clutch, a driven pulley combined with the flywheel/fan of the air pump, and a set of two matched V belts.

FUEL TANK - has a capacity of 25 gallons (94.6 Liters).

AIR CLEANER - is a dry-element type. It cleans inlet air for the engine and the compressor.

EXHAUST MUFFLER - is an industrial type baffle muffler.

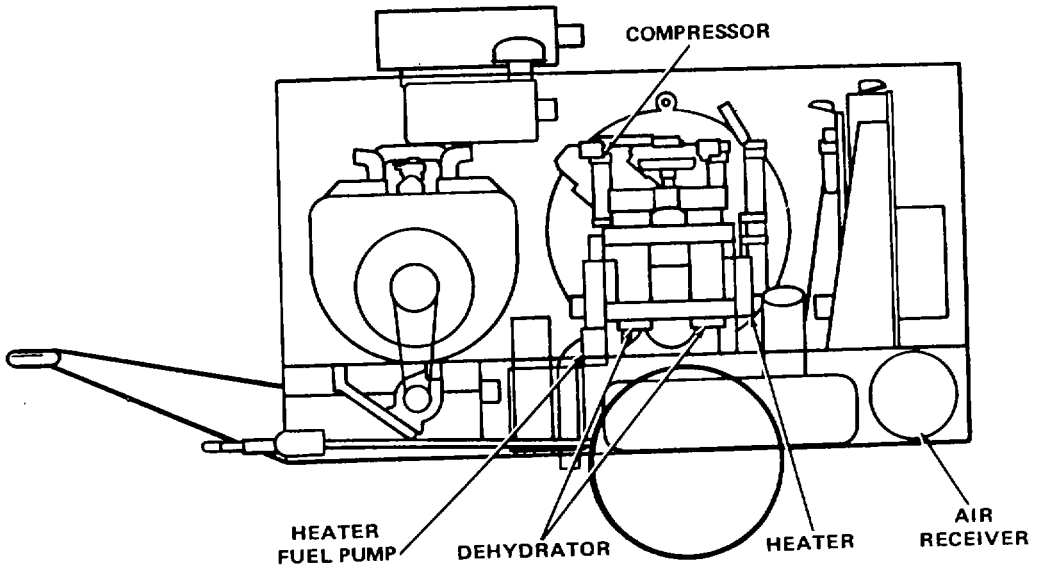


Figure 1-6. Heating System

HEATING SYSTEM

ON-BOARD HEATER -is a gasoline-burning electrically-ignited type. It is electrically controlled by its own start-off-run switch.

HEATER FUEL PUMP - is a twelve-volt motor-driven type. It is electrically controlled by the heater start-off-run switch and hi-low heat switch.

PNEUMATIC SYSTEM

COMPRESSOR - is a four-stage, four-cylinder, air cooled type with interstage coolers, aftercooler, oil/moisture separator and cooling fan.

DEHYDRATOR - consists of two casings containing replaceable MA-2 oxygen purifier cartridges.

AIR RECEIVER - is a high-pressure tank for storing compressed air, with a capacity of 1300 cubic inches (21.3 Liters).

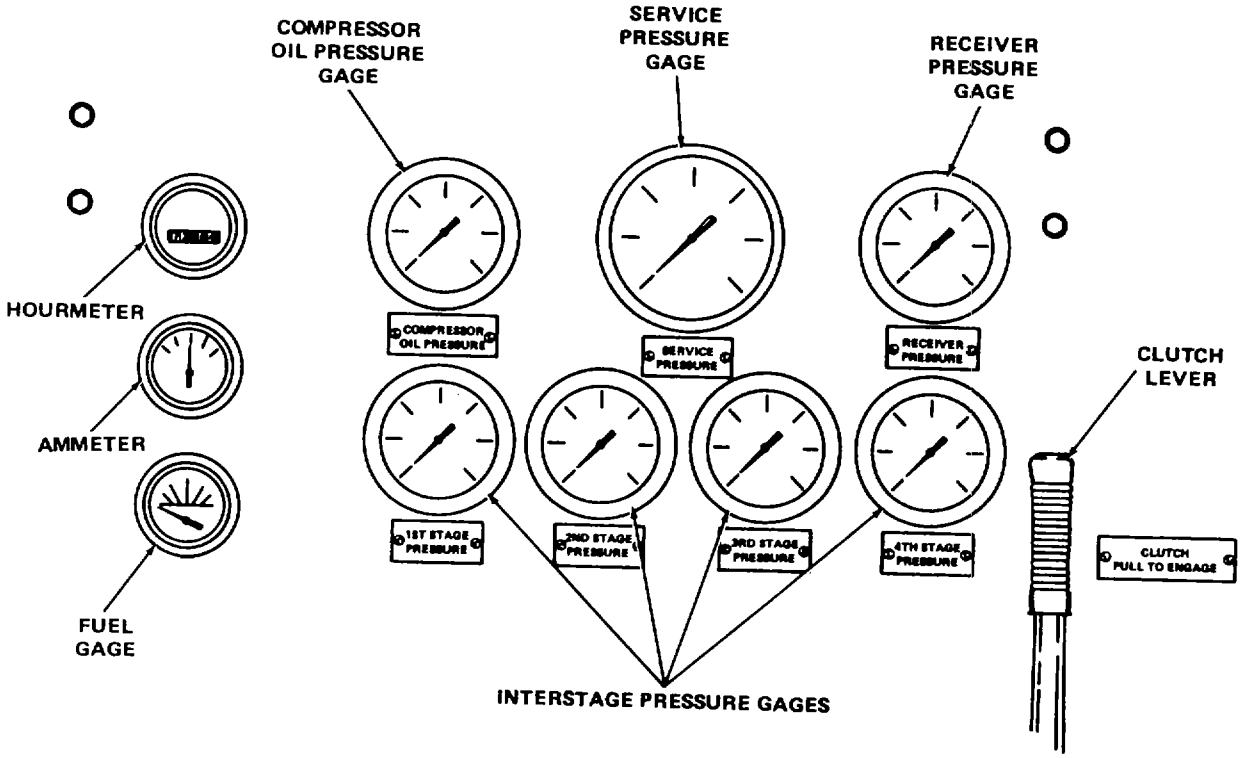


Figure 1-7. Gages and Clutch

INSTRUMENTS AND CONTROLS

INSTRUMENT AND CONTROL PANEL - is located on the back side of the unit. It is accessible by an access door which also holds the service hose.

HOURMETER - is an electric clock which runs when the engine runs. It reads in hours to the nearest tenth, maximum 9999.9.

AMMETER - indicates whether the battery is being charged or discharged.

FUEL GAGE - is controlled by a liquid level sensor unit in the fuel tank.

COMPRESSOR OIL PRESSURE GAGE - indicates pressure of lube oil in the compressor housing.

SERVICE PRESSURE GAGE - indicates pressure of air in the service hose when connected.

RECEIVER PRESSURE GAGE - indicates pressure in air receiver.

INTERSTAGE PRESSURE GAGES - indicate output pressure of each of the four compressor stages.

CLUTCH LEVER - mechanically engages the clutch linkage.

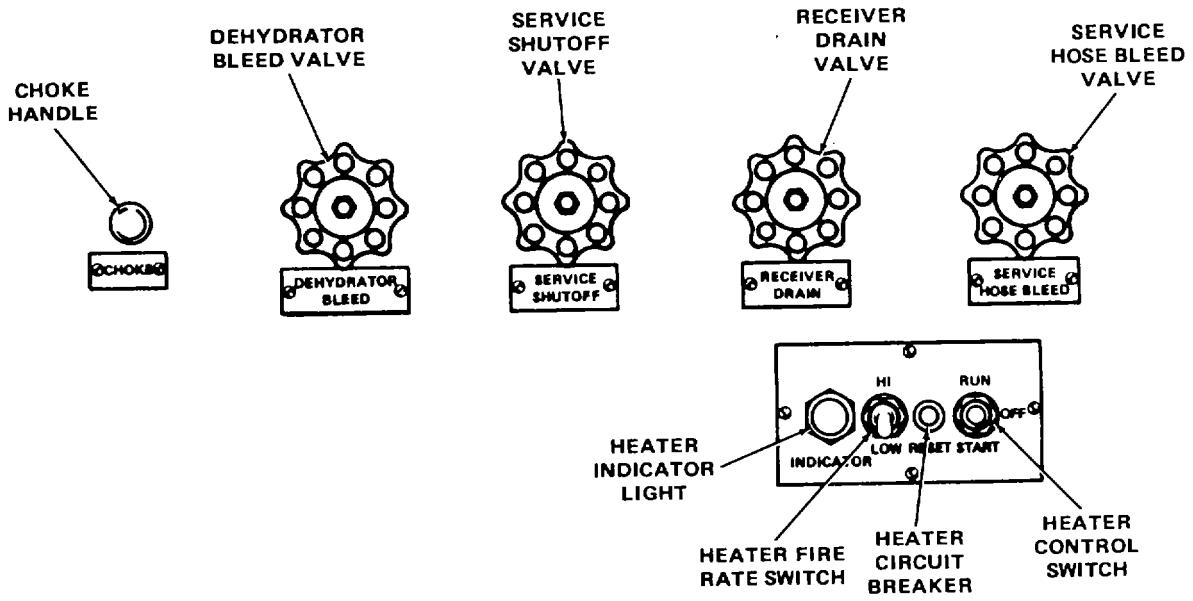


Figure 1-8. Valves and Heater Controls

CHOKE - regulates the fuel-air mixture in the carburetor for starting the engine. It is mechanically controlled by a push-pull handle on the panel.

DEHYDRATOR BLEED VALVE - releases the pressure in the air dryer cylinders to allow the cylinders to be opened to change dryer cartridges.

SERVICE SHUTOFF VALVE - controls flow of air from the air receiver to the service hose connection.

RECEIVER DRAIN VALVE - releases air stored in the air receiver.

SERVICE HOSE BLEED VALVE -- releases air pressure in air service hose to allow the hose to be safely disconnected.

HEATER INDICATOR LIGHT - indicates that the heater is running.

HEATER FIRE RATE SWITCH - controls the heater rate of heating.

HEATER CIRCUIT BREAKER - will trip in case of heater circuit overload. Reset by pressing after about 5 minutes.

HEATER CONTROL SWITCH - is a three-position switch which is spring-loaded to return to RUN position from START position.

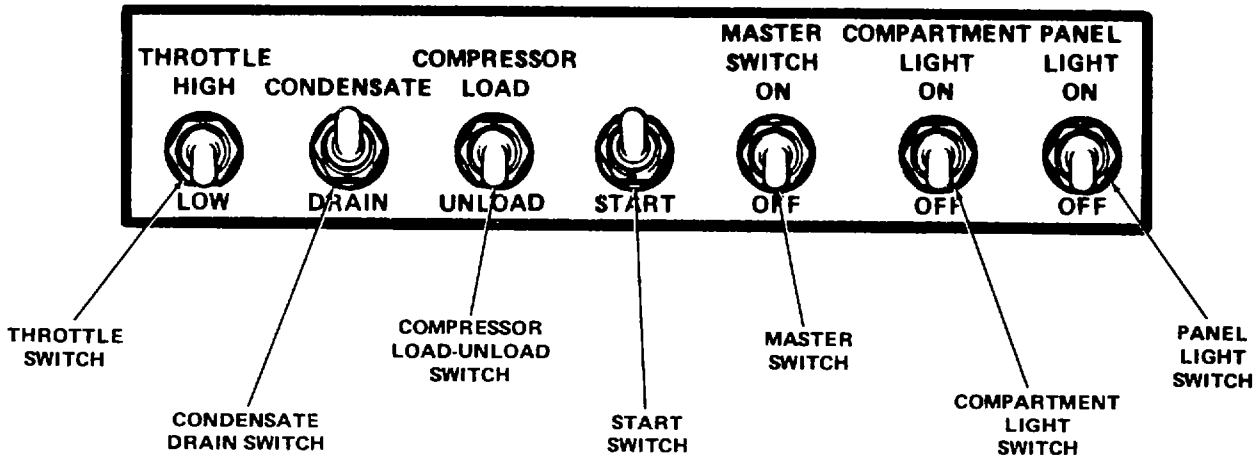


Figure 1-9. Control Switches

THROTTLE SWITCH - controls engine speed. The LOW setting runs the engine at idle speed, the HIGH setting runs it at full load speed.

CONDENSATE DRAIN SWITCH -- is a spring loaded switch. When pressed down it opens all the condensate drains to open, blowing unwanted moisture out of the compressor.

COMPRESSOR LOAD/UNLOAD SWITCH - cuts the compressor in or out. In LOAD position the compressor is operating. In UN LOAD position the compressor is not pumping air.

START SWITCH - is a spring-loaded switch. When pressed down it runs the starter motor to start the engine.

MASTER SWITCH - controls electrical power to all electrical systems except lights and heater. It is also used to stop the engine.

COMPARTMENT AND PANEL LIGHT SWITCHES - control the lights in the compressor compartment and on the control panel.

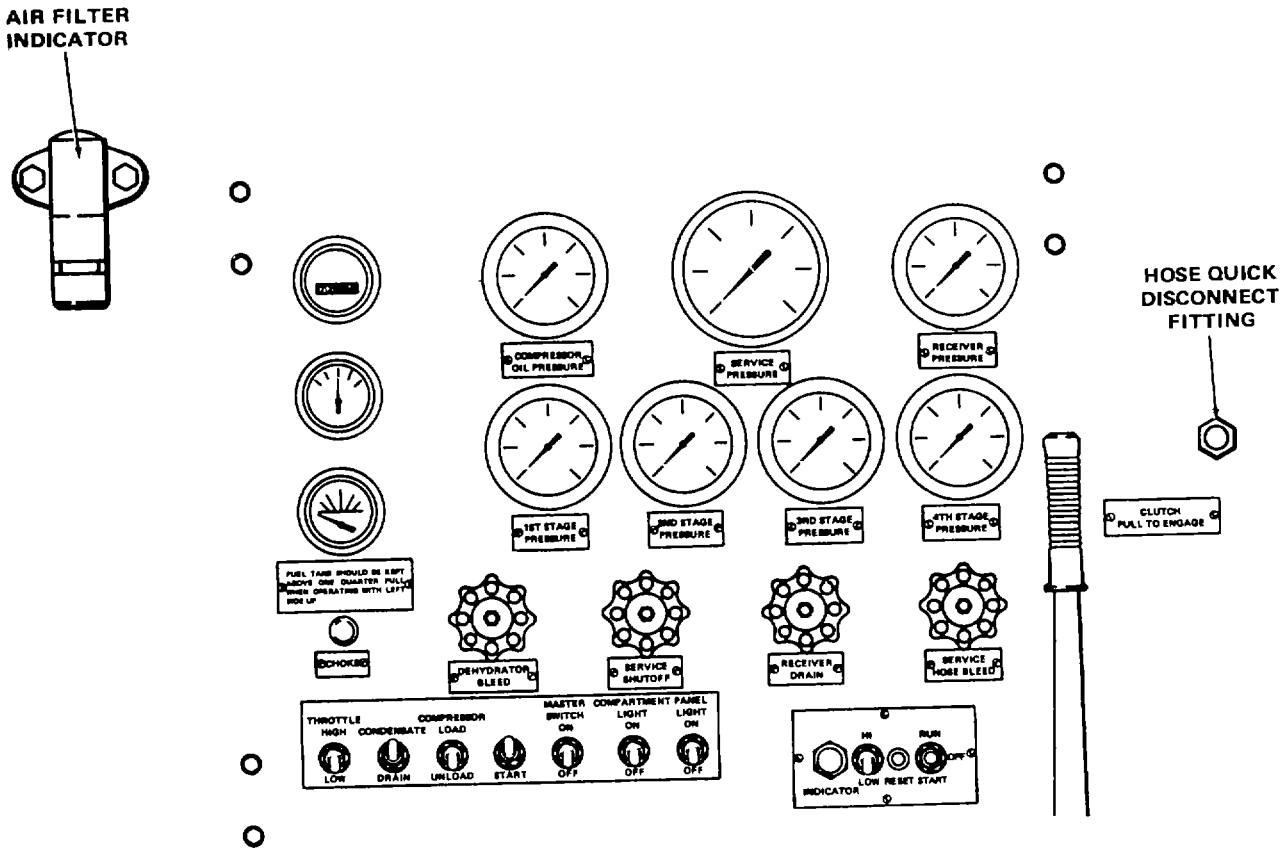


Figure 1-10. Air Filter Indicator and Hose Quick Disconnect

HOSE QUICK-DISCONNECT FITTING - permits quick and simple connection or disconnection of the service hose.

AIR CLEANER INDICATOR - shows red when the air filter is clogged badly enough to lower the efficiency of the compressor.

MISCELLANEOUS

LIGHTS - There is a light inside the compressor compartment, and two above the instrument/control panel, to provide light for nighttime operation.

SERVICE HOSE - is stowed on the inside of the panel access door. It has a quick-disconnect coupling on one end.

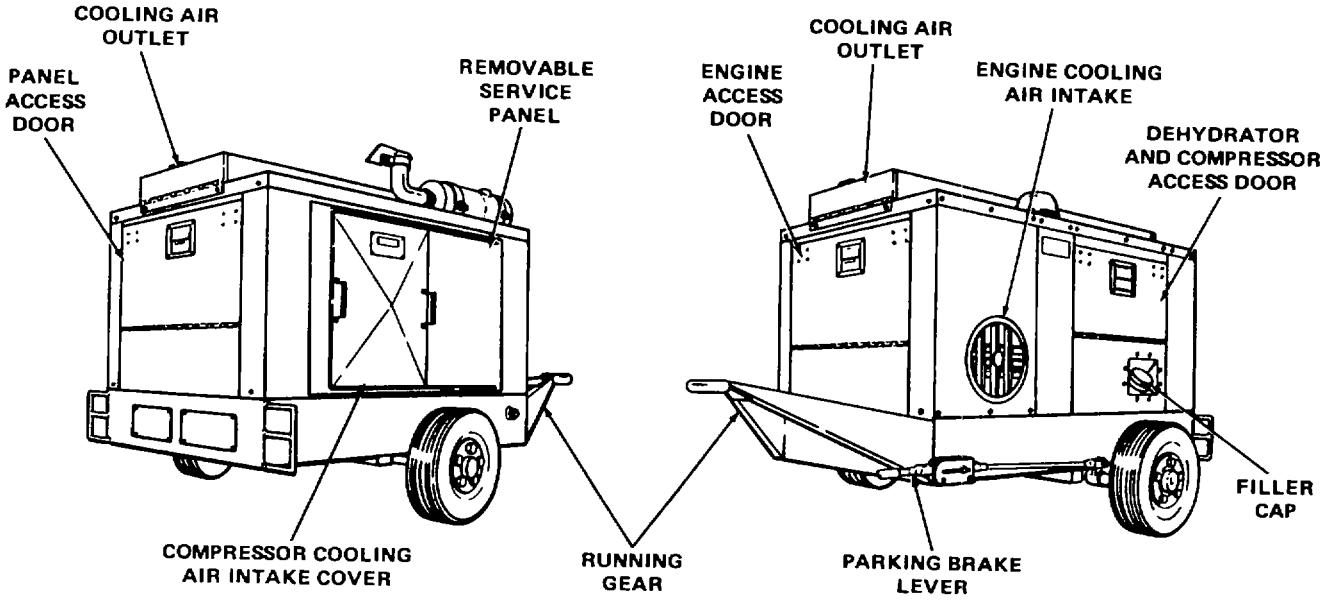


Figure 1-11. Exterior Views

RUNNING GEAR - consists of a two-wheeled trailer with a front end landing gear pedestal, a standard lunette ring hitch, and a parking brake. Figure 1-12 shows parking brake operation.

INSTRUMENT PANEL ACCESS DOOR - is located on the rear side of the enclosure.

ENGINE COOLING AIR INTAKE - is an adjustable louvered port on the front left side of the enclosure.

COMPRESSOR COOLING AIR INTAKE - is a sliding door on the rear right side of the enclosure.

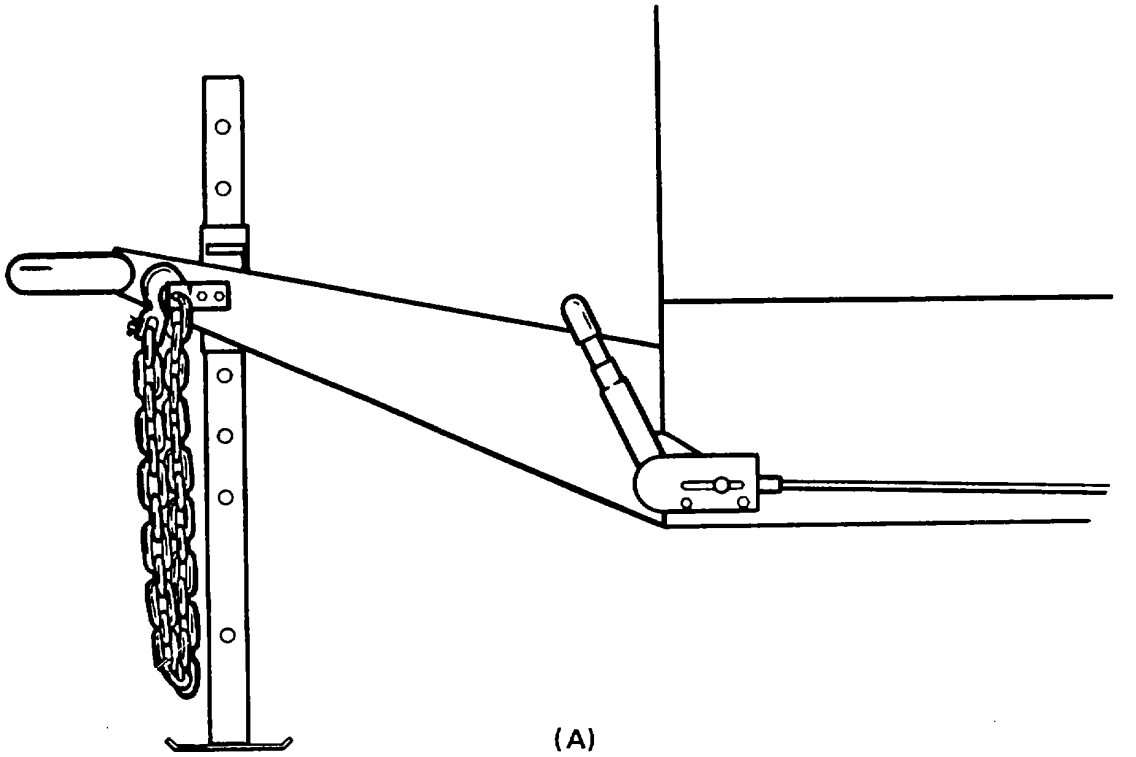
COOLING AIR OUTLETS - are located on the top of the enclosure front and rear.

REMOVEABLE ACCESS PANEL - is located on the right side of the enclosure.

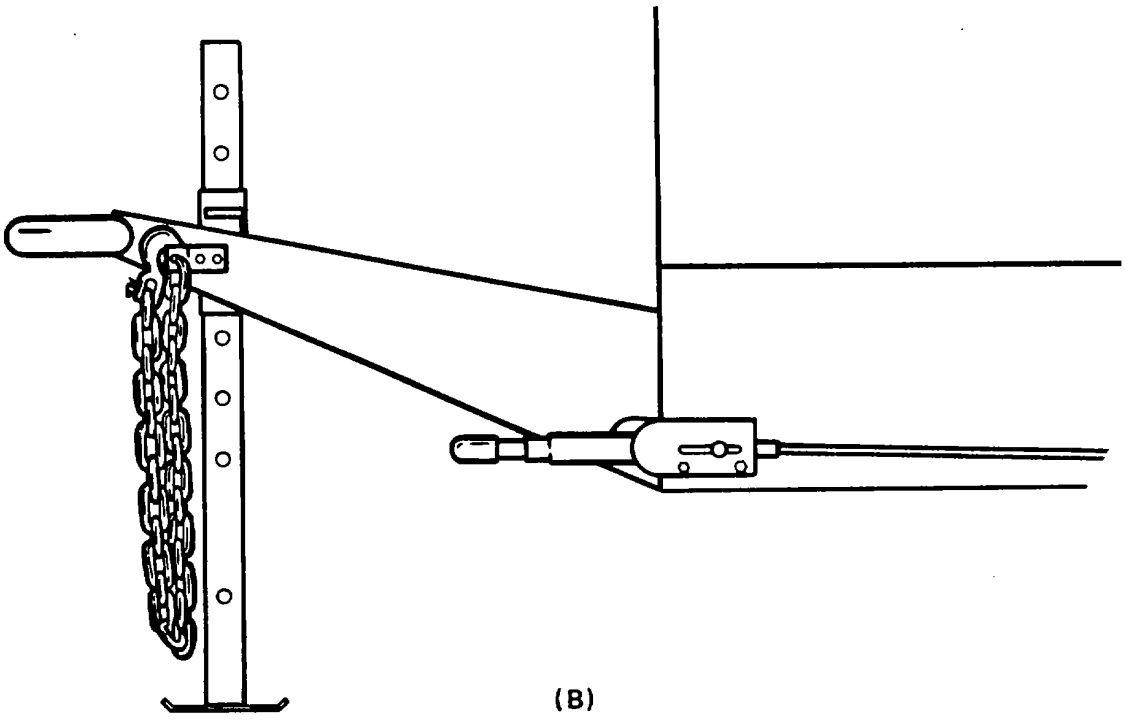
FUEL FILLER CAP - is located on the lower left rear side of the enclosure.

ENGINE ACCESS DOOR - is located on the front side of the enclosure.

DEHYDRATOR & COMPRESSOR ACCESS DOOR - is located on the rear left side of the enclosure.

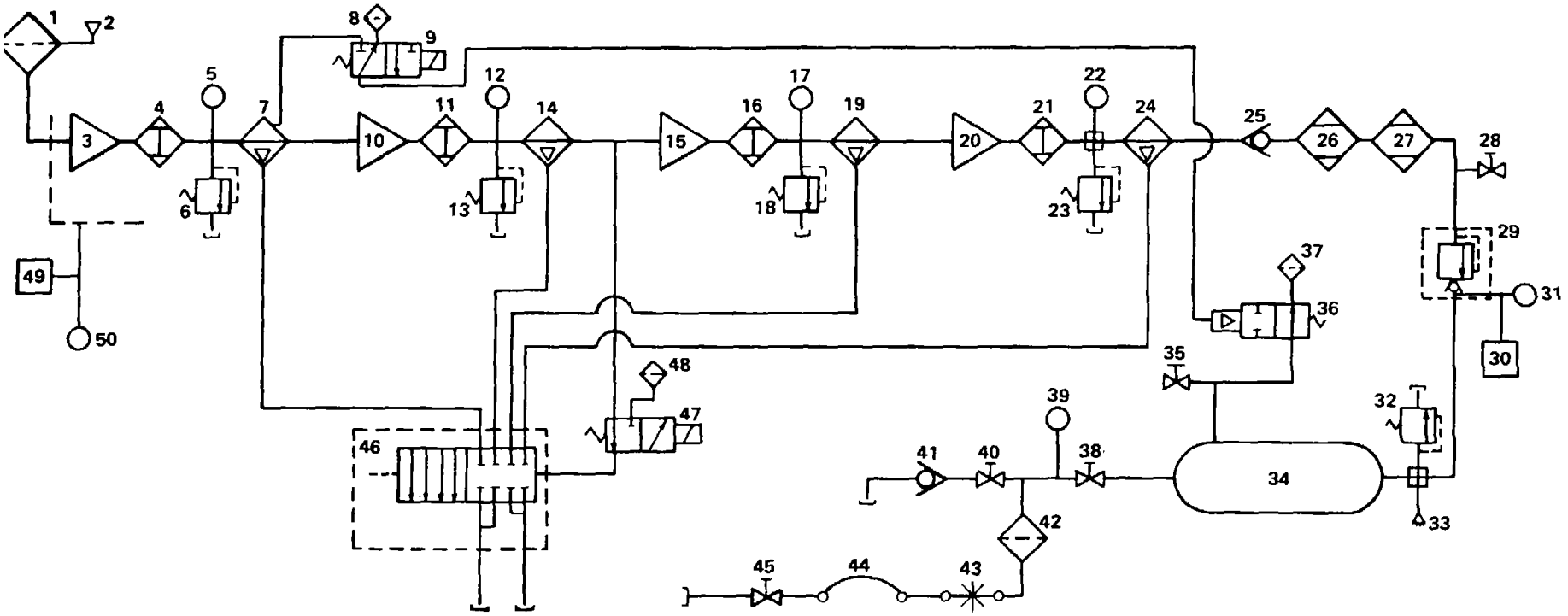


(A)



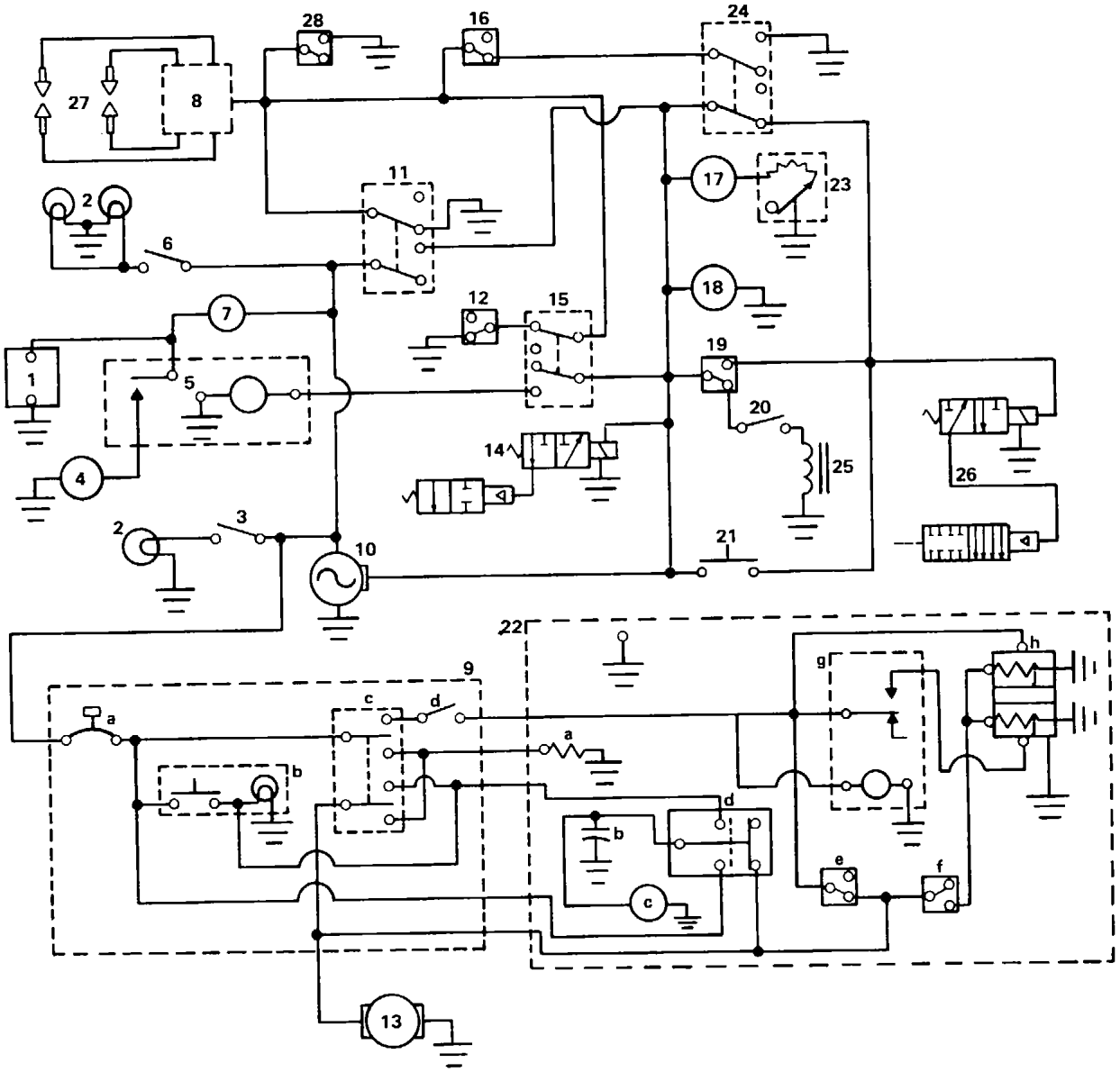
(B)

Figure 1-12. Parking Brake Operation
(A) Release Position
(B) Set Position



1 INLET FILTER
2 FILTER RESTRICTION INDICATOR
3 COMPRESSOR FIRST STAGE
4 HEAT EXCHANGER
5 FIRST STAGE PRESSURE GAUGE
6 RELIEF VALVE ONE
7 CONDENSATE SEPARATOR
8 AIR EXHAUST MUFFLER ONE
9 SOLENOID VALVE TWO
10 COMPRESSOR SECOND STAGE
11 HEAT EXCHANGER
12 SECOND STAGE PRESSURE GAUGE
13 RELIEF VALVE TWO
14 CONDENSATE SEPARATOR
15 COMPRESSOR THIRD STAGE
16 HEAT EXCHANGER
17 THIRD STAGE PRESSURE GAUGE
18 RELIEF VALVE THREE
19 CONDENSATE SEPARATOR
20 COMPRESSOR FOURTH STAGE
21 HEAT EXCHANGER
22 FOURTH STAGE PRESSURE GAUGE
23 RELIEF VALVE FOUR
24 CONDENSATE SEPARATOR
25 CHECK VALVE ONE
26 DEHYDRATOR ONE
27 DEHYDRATOR TWO
28 DEHYDRATOR BLEED VALVE
29 PRIORITY VALVE ONE
30 AIR PRESSURE SWITCH
31 RECEIVER PRESSURE GAUGE
32 RELIEF VALVE FIVE
33 RUPTURE DISC HOLDER W/DISC
34 AIR RECEIVER
35 RECEIVER DRAIN VALVE
36 RECEIVER DRAIN VALVE TWO
37 AIR EXHAUST MUFFLER TWO
38 SERVICE VALVE
39 SERVICE PRESSURE GAUGE
40 SERVICE HOSE BLEED VALVE
41 CHECK VALVE TWO
42 TEN MICRON FILTER
43 HOSE QUICK CONNECTOR
44 SERVICE HOSE
45 SERVICE HOSE SHUTOFF VALVE
46 CONDENSATE DRAIN VALVE
47 SOLENOID VALVE ONE
48 AIR EXHAUST MUFFLER THREE
49 COMPRESSOR OIL PRESSURE SWITCH
50 COMPRESSOR OIL PRESSURE GAUGE

Figure 1-13. Pneumatic Diagram



1 BATTERY
2 LIGHTS
3 INTERIOR LIGHT SWITCH
4 STARTER MOTOR
5 STARTER
6 PANEL LIGHTS SWITCH
7 AMMETER
8 MAGNETO
9 HEATER CONTROL BOX
9a CIRCUIT BREAKER
9b INDICATOR LAMP
9c START - RUN - OFF SWITCH
9d FIRE RATE SWITCH
10 ALTERNATOR
11 MASTER SWITCH
12 ENGINE OIL PRESSURE SWITCH
13 HEATER FUEL PUMP
14 RECEIVER DRAIN
15 START SWITCH
16 COMPRESSOR OIL PRESSURE SWITCH
17 FUEL GAUGE
18 HOURMETER
19 COMPRESSOR AIR PRESSURE SWITCH
20 THROTTLE SOLENOID SWITCH
21 CONDENSATE DRAIN SWITCH
22 HEATER
22a IGNITER
22b FEED THROUGH CAPACITOR
22c BLOWER MOTOR
22d FLAME SWITCH
22e LIMIT SWITCH
22f TEMPERATURE SWITCH
22g RELAY
22h FUEL CONTROL VALVE
22j FUEL VALVE HEATER
23 IN TANK TRANSMITTER
24 COMPRESSOR LOAD SWITCH
25 THROTTLE SOLENOID
26 CONDENSATE DRAIN
27 SPARK PLUGS
28 ENGINE TEMPERATURE SWITCH

Figure 1-14. Electrical Diagram

1-21/1-22 (blank)

CHAPTER 2

OPERATING INSTRUCTIONS

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

2-1. INSTRUMENT PANEL

The instrument panel, located behind the rear access panel, contains all of the operator's gages, meters, switches, controls, and valves. Figure 2-1 shows the instrument panel. Table 2-1 lists the various controls and indicators, and it briefly explains the function of each.

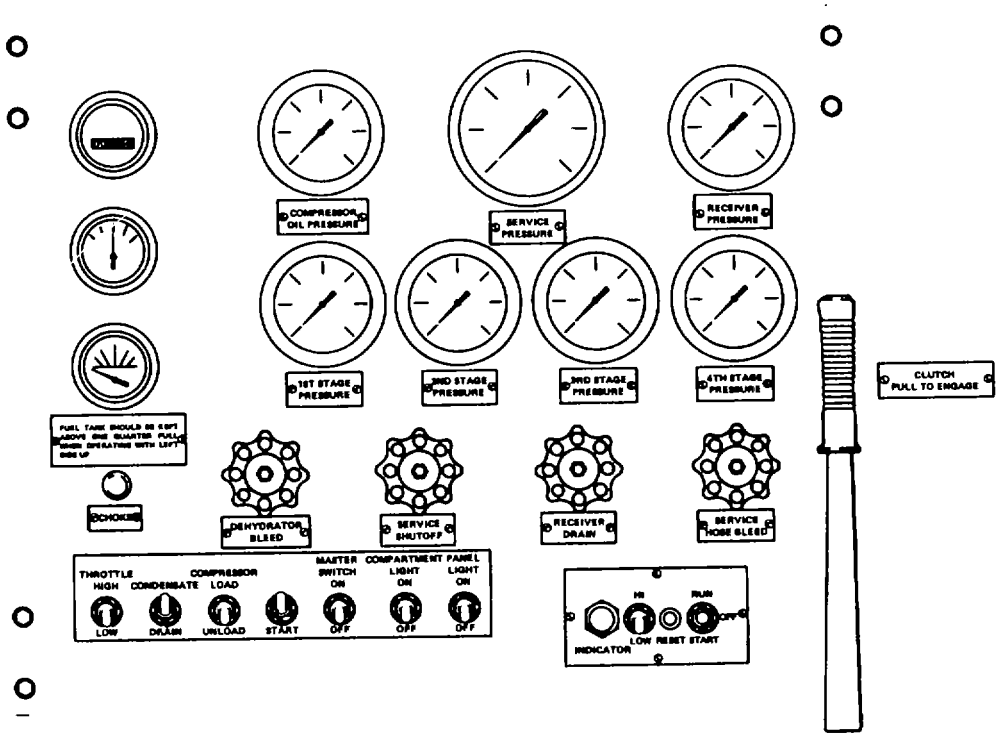


Figure 2-1. Instrument Panel

Table 2-1. Operator Controls and Indicators on the Instrument Panel

CONTROL OR INDICATOR	FUNCTION
Fuel gage	Indicates amount of gasoline in the 25 gallon tank.
Ammeter	Indicates whether electricity is from alternator (+ to indicate battery is charging) or from the battery (- for discharge).
Compressor Hourmeter	Indicates total running hours of the compressor from 000.0 to 999.9.
Compressor Oil Pressure Gage	Indicates lubricating oil pressure in the air compressor.
Service Hose Pressure Gage	Indicates delivery air pressure from the service hose shut-off valve through the service hose.
Receiver Pressure Gage	Indicates air pressure in the air receiver.
Interstage Pressure Gages	Indicate the discharge pressure for the first through the fourth stages.
Dehydrator Bleed Valve	Releases pressure inside two air dryer cylinders before air dryer cartridges are changed.
Service Hose Shut-Off Valve	Allows air flow from the air receiver to the hose disconnect fitting.
Receiver Drain Valve	Allows bleeding of the air receiver to atmosphere.
Hose Bleed Valve	Bleeds pressure in the service hose and in piping after Service Hose Shut-Off valve has been closed before disconnecting service hose.
Hose Quick Disconnect Fitting	Allows quick connection and removal of service air hose.
Heater Fire Rate Switch	Turns on on-board compartment heater to 30,000 BTU's (Hi-Fire) or to 20,000 BTU's (Low-Fire).
Heater Circuit Breaker	Protects on-board compartment heater wiring.
Heater Indicator Lamp	Indicates with amber light that compartment heater is on and delivering heat.

Table 2-1. Operator Controls and Indicators on the Instrument Panel (Continued)

CONTROL OR INDICATOR	FUNCTION
Heater Control Switch	Controls heater with 3-positions (RUN/OFF/START).
Panel Lamp Switch	Turns on lamp to light instrument panel.
Compartment Lamp Switch	Turns on lamp inside compressor and engine enclosure.
Master Switch	Turns on electrical power to all circuits except lights and on-board heater.
Start Switch	Energizes engine starter with momentary contact switch.
Condensate Drain Switch	Causes all drains to open as long as the switch is held in the DRAIN position.
Compressor Load Switch	Actuates pneumatic system to allow compressor to load the air receiver.
Throttle Switch	Controls engine speed for LOW (idle) or HIGH (normal speed at 2650 RPM) speeds.
Choke	Manually increases fuel/air mixture for cold engine starting.
Panel Lamps	Provided limited light to the instrument panel for operation at night.
Air Cleaner Restriction Indicator	Alerts operator when air cleaner is so clogged that it restricts compressor performance.

Section II. DESCRIPTION AND DATA

2-2. GENERAL

This section will present operator's preventive maintenance checks and services. Table 2-2 shows the checks and services as B (before operation), D (during operation), A (after operation), W (weekly), and M (monthly). A dot in the column indicates a maintenance action.

a. Before you operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your before (B) PMCS.

b. While you operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your during (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.

Table 2-2. Preventive Maintenance Checks and Systems

B - Before Operation D - During Operation A - After Operation
W - Weekly M - Monthly

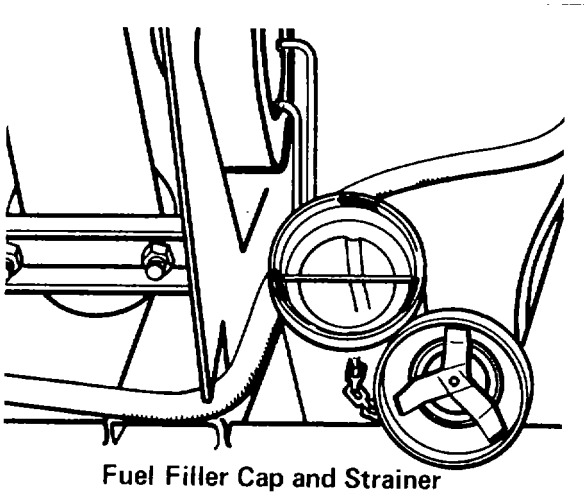
ITEM NO.	INTERVAL					ITEM TO BE INSPECTED PROCEDURE	EQUIPMENT WILL BE REPORTED NOT READY IF
	B	D	A	W	M		
						 Fuel Filler Cap and Strainer	
1	•		•			Fuel tank. Check fuel supply, add gasoline as required to keep fuel tank full. Ensure strainer is clean.	

Table 2-2. Preventive Maintenance Checks and Systems (Continued)

B - Before Operation D - During Operation A - After Operation
W - Weekly M - Monthly

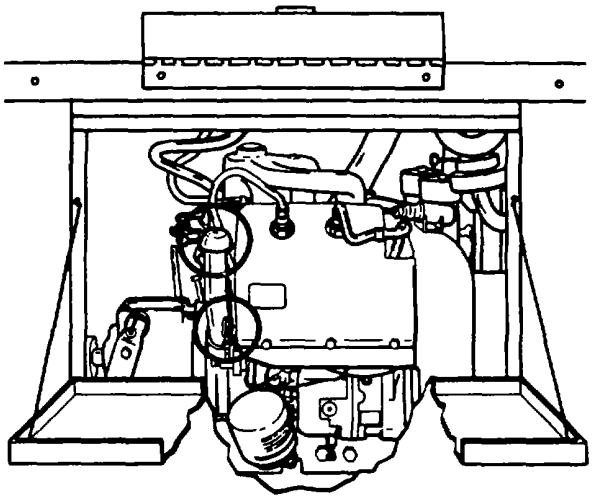
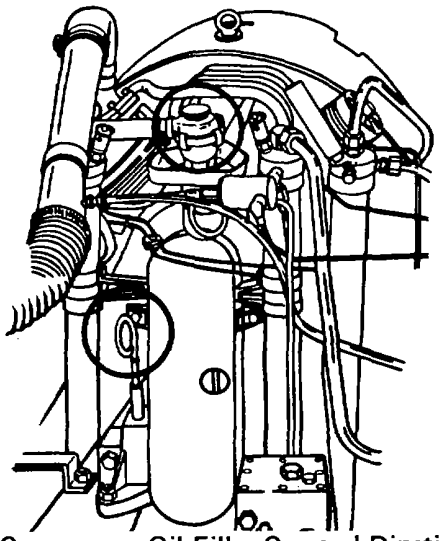
ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE	EQUIPMENT WILL BE REPORTED NOT READY IF
						 Engine Oil Filler Cap and Dipstick	
2	•		•			Engine crankcase. Check oil level. Add oil as required.	
						 Compressor Oil Filler Cap and Dipstick	
3	•		•			Compressor crankcase. Check oil level. Add oil as required.	

Table 2-2. Preventive Maintenance Checks and Systems (Continued)

B - Before Operation D - During Operation A - After Operation
W - Weekly M - Monthly

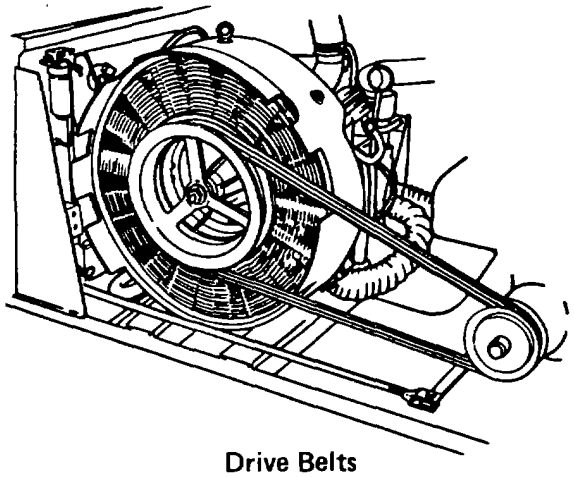
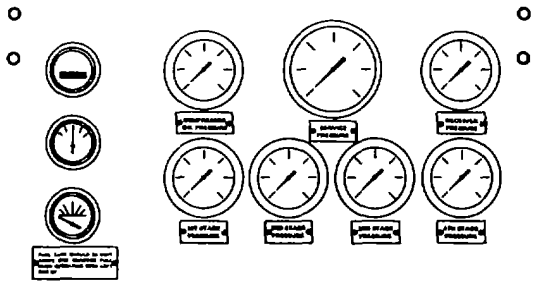
ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE	EQUIPMENT WILL BE REPORTED NOT READY IF
						 Drive Belts	
4	•		•			Engine drive belts. Inspect belts for wear, fraying, peeling and belt tension. Inspect tension by pressing down on the belts halfway between the engine pulley and the compressor flywheel. If the depression is more than 1/2 inch (13 mm), adjust the belt tension. Refer to organizational PMCS for adjustment procedures.	Belts loose or damaged. Do not operate until belts are replaced.
						 Meters and Gages	

Table 2-2. Preventive Maintenance Checks and Systems (Continued)

B - Before Operation D - During Operation A - After Operation
W - Weekly M - Monthly

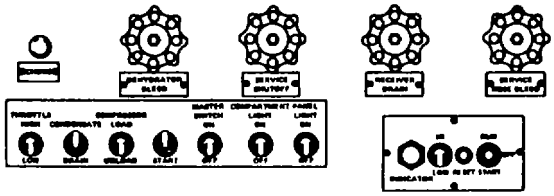
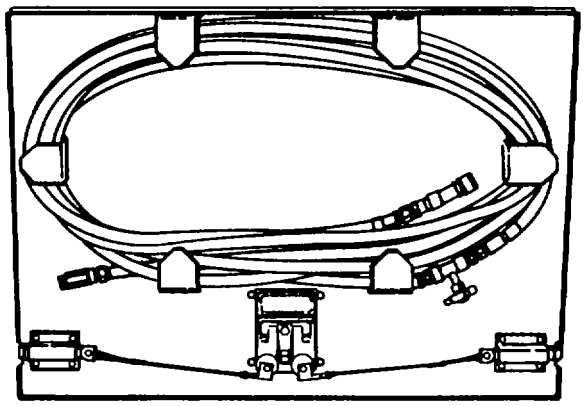
ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE	EQUIPMENT WILL BE REPORTED NOT READY IF
5	•	•	•			Meters and gages. Inspect for damaged pointers, cracked lenses, liquid fill leaks and proper operation and normal readings during operation. Liquid level should be halfway to full.	Gages damaged or inoperative. Do not operate until repaired. Liquid level is below middle of the gages.
						 Switches, Controls and Valves	
6	•		•			Switches, controls and valves. Inspect for proper operation. Check for looseness, damage and missing parts.	Switches, controls or valves damaged or inoperative.
						 Service Hose	

Table 2-2. Preventive Maintenance Checks and Systems (Continued)

B - Before Operation D - During Operation A - After Operation
W - Weekly M - Monthly

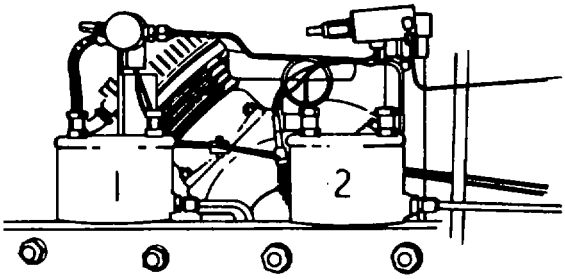
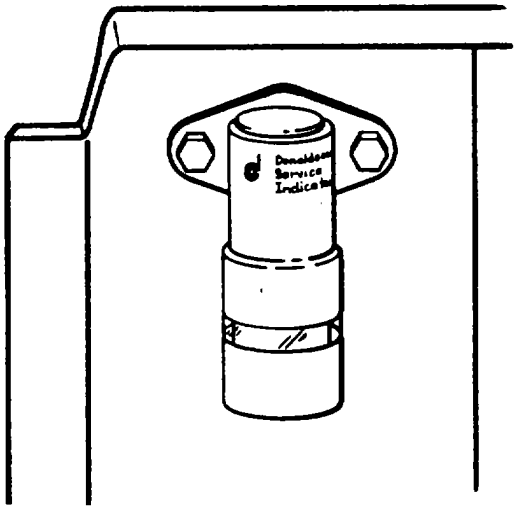
ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE	EQUIPMENT WILL BE REPORTED NOT READY IF
						WARNING Examine hoses before pressurizing. Worn or frayed hose may explode.	
7	•		•			Air hose and fittings. Inspect for wear, cracks, cuts, fraying, leaks and loose connections.	Air hose or fittings damaged. Do not operate with damaged hose or fittings.
						 Air Dehydrators	
8	•		•			Air dehydrators. Check hour meter reading and cartridge change instructions.	Dehydrator cartridges require service.

Table 2-2. Preventive Maintenance Checks and Systems (Continued)

B - Before Operation D - During Operation A - After Operation
W - Weekly M - Monthly

ITEM NO.	INTERVAL B	D	A	W	M	ITEM TO BE INSPECTED PROCEDURE	EQUIPMENT WILL BE REPORTED NOT READY IF
						 Air Filter Indicator	
						CAUTION	
						Compressor will not function properly with clogged filter.	
9		•				Air cleaner. Check air cleaner restriction indicator. If green, OK for operation. If red indication, air cleaner element requires service.	Air cleaner element requires service.

Section III. OPERATION UNDER USUAL CONDITIONS

2-3. ASSEMBLY AND PREPARATION FOR USE

No unpackaging is required. The only necessary installation is the air service hose (coiled on the inside of the instrument panel access door) which is fitted to the hose disconnect fitting beside the instrument panel. See depreservation instructions delivered with each unit.

2-4. INITIAL ADJUSTMENTS AND DAILY CHECKS

a. Perform the B (before operation) checks and services from Table 2-2.

b. Open all doors if operating in weather above freezing (32°F). These include instrument panel access door, engine access door, dehydrator access door, front cooling air exhaust door, rear cooling air exhaust door, and sliding side cooling door. Between 32°F and 0°F, close the front and rear cooling air exhaust doors. Below 0°F to -50°F, close all doors except the instrument panel access door.

c. Push the clutch operating lever in to disengage the clutch.

d. Pull the magneto ground switch down (Fig. 2-2).

e. Pull out spring tab and bend it so that the end fits in the slot in the engine oil pressure switch (Fig. 2-3).

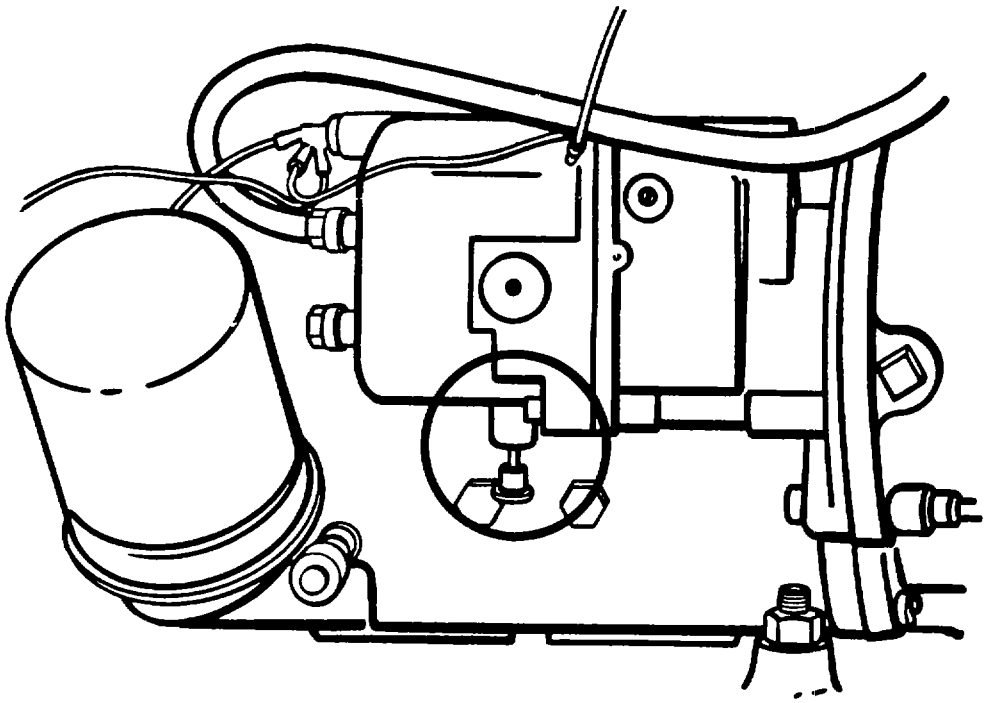


Figure 2-2. Magneto Ground Switch

2-5. OPERATING PROCEDURE

a. Starting. (See Figure 2-1)

(1) Pull out and set retainer spring on engine oil pressure switch (See Figure 2-3).

(2) Switch MASTER SWITCH to ON.

(3) Switch COMPRESSOR LOAD switch to UNLOAD.

(4) Switch THROTTLE switch to LOW.

(5) Pull out CHOKE control as required. The amount of choke depends upon the weather and whether the engine is hot or cold. A warm engine requires little or no choking.

CAUTION

Do not hold the START switch down longer than 5 seconds. It may damage the starter.

(6) Press the START switch down and hold it for five seconds. Release the switch when the engine starts. If it does not start the first time, wait 5 seconds and try again. Repeat until engine starts. Push in CHOKE.

CAUTION

Do not try to shorten warm-up time by setting the THROTTLE to HIGH and racing the engine. Failure to adequately warm the engine may result in early failure of internal parts.

(7) Allow the engine to warm by letting it idle for 5 minutes with the THROTTLE on the LOW setting.

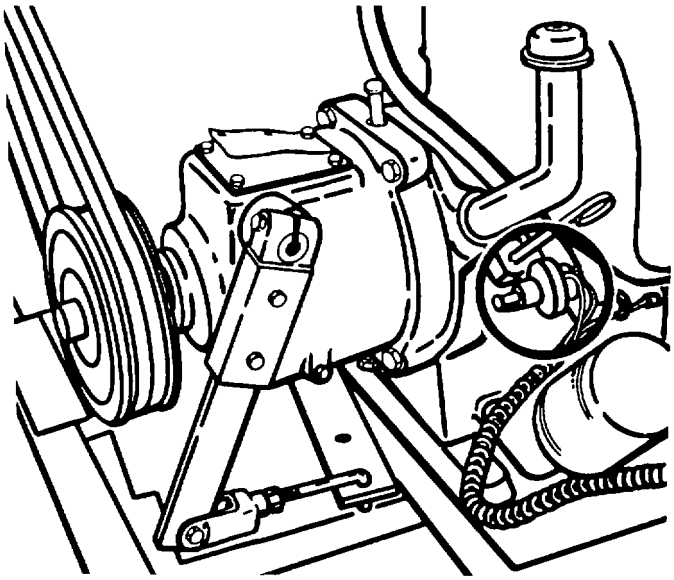


Figure 2-3. Engine Oil Pressure Switch

(8) Set the THROTTLE on HIGH.

(9) Slowly pull the CLUTCH handle to engage the clutch.

(10) When the COMPRESSOR OIL PRESSURE gage reaches at least 600 psi, move COMPRESSOR LOAD switch to LOAD.

NOTE

The compressor will unload and the engine will switch to idle automatically at a receiver pressure of 3500 (+175, -0) psi.

(11) Check all gages for proper engine and compressor operation.

b. Operation. (See Figure 2-1)

(1) Close the SERVICE SHUTOFF valve.

(2) Open the SERVICE HOSE BLEED valve.

(3) Connect the service hose to the hose quick disconnect fitting located on the instrument panel right support.

(4) Close the SERVICE HOSE BLEED valve.

(5) Connect hose to item being serviced, and open the service hose shutoff valve.

CAUTION

Be sure the hose line pressure is correct for the application. Do not leave hose connected to unprotected systems after desired pressure is reached.

(6) Slowly open SERVICE SHUTOFF valve while observing the SERVICE PRESSURE gage.

(7) When the desired pressure is reached on the SERVICE PRESSURE gage, quickly close the SERVICE SHUTOFF and the service hose shutoff valves.

(8) Open the SERVICE HOSE BLEED valve.

(9) Disconnect the hose from the item being serviced and store it on the brackets on the inside of the instrument panel access door.

c. Operation for Extended Periods. (See Figure 2-1)

When the air compressor is continuously operated for times longer than 20 minutes, drain the oil/moisture separators at 20-30 minute intervals. To drain the separators, press and hold the CONDENSATE DRAIN switch until all condensate has been discharged (10-15 seconds), then release the switch (Figure 2-16).

d. Shutdown. (See Figure 2-1)

(1) Switch the COMPRESSOR LOAD switch to UNLOAD.

(2) Switch the THROTTLE switch to LOW, and allow the engine to idle for 5 minutes.

(3) Push in the CLUTCH handle to disengage the clutch.

(4) Switch the MASTER SWITCH to OFF.

(5) Open the RECEIVER DRAIN valve until the RECEIVER PRESSURE gage reads zero.

(6) Close all valves.

2-6. PREPARATION FOR MOVEMENT

a. Follow normal shutdown procedures for the air compressor and engine.

b. Close all access doors and insure they are latched properly.

c. Hitch the unit by the standard lunette ring. Attach the two safety chains, and raise the landing gear.

d. Release the brake by pulling the brake lever up.

2-7. OPERATING INSTRUCTIONS ON INSTR UCTION PLATES

Operating instructions are located on the OPERATING INSTRUCTIONS plate located on the inside of the instrument panel access door (Fig. 2-4).

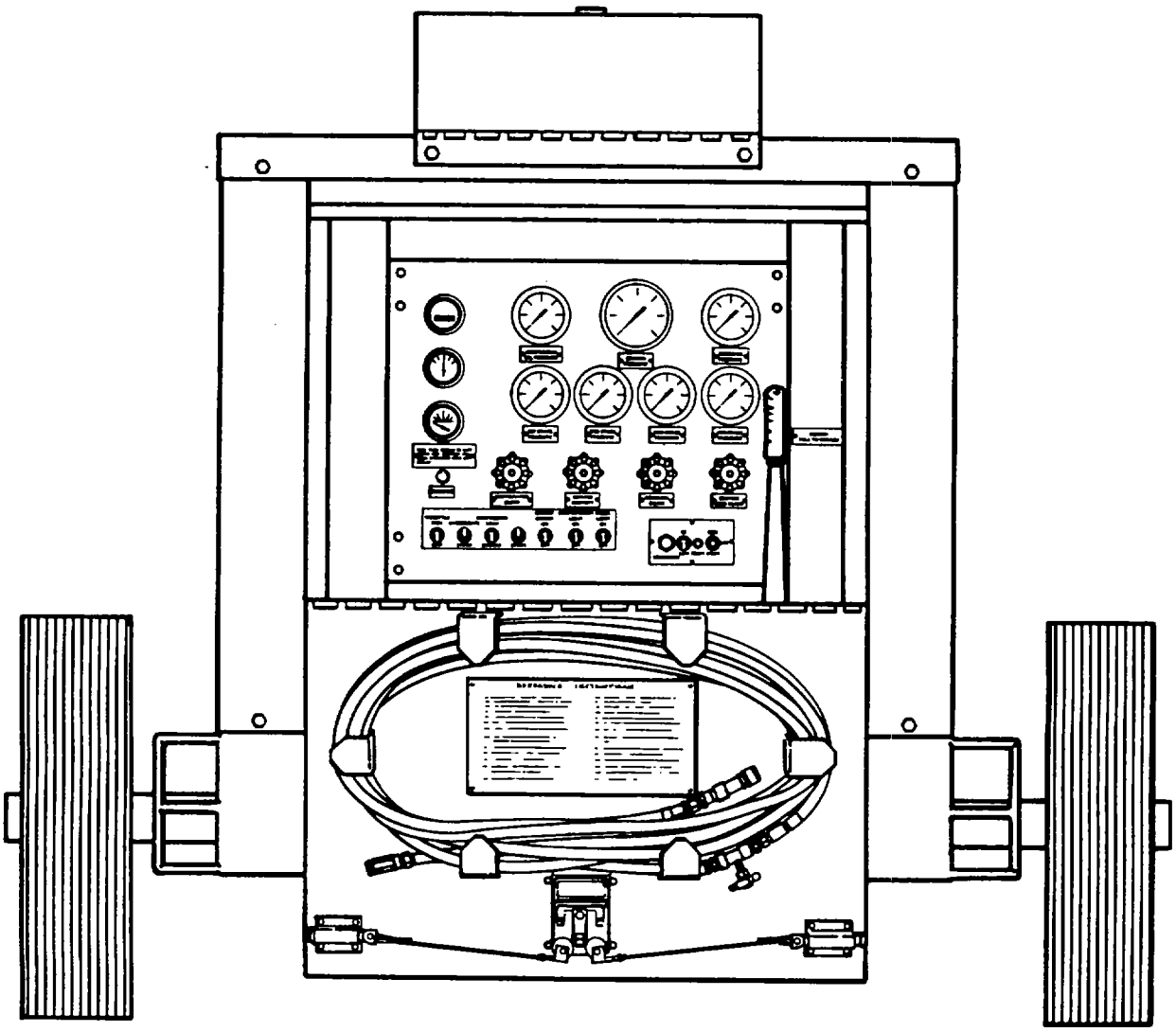


Figure 2-4. Operating Instructions Plate

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

This section contains instructions for obtaining optimum operation under unusual conditions.

2-8. OPERATING IN UNUSUAL WEATHER

a. Operations in Extreme Cold.

CAUTION

Check hoses and ducts for cracks or other cold weather damage prior to starting compressor. Keep fuel tank full to minimize moisture condensation.

(1) Service engine and clutch with cold weather oil.

(2) Service compressor with cold weather oil.

(3) Close all access doors except the instrument panel access door.

(4) Use the onboard heater for warming the engine when temperatures are below 0°F. To operate heater, turn RUN/OFF/START switch to START and hold several minutes until amber INDICATOR lamp comes on. Move the switch up to the RUN position. Select either HI (30,000 BTU's) or LO (20,000 BTU's) setting. The heater will then operate automatically. For extremely low temperatures (to -50°F), allow the heater to operate on the HI position for 30-45 minutes before starting the engine. (Figure 2-1)

NOTE

An alternate method of preheating is to connect a 12-inch diameter duct from an external heater to the engine cooling air inlet. Open the cooling air inlet door fully, and open the compressor cooling air door about 2 inches.

(5) Start the engine and operate the compressor using usual procedures.

b. **Operation in Extreme Heat.**

CAUTION

Do not operate the compressor if the ambient temperature exceeds 125°F.

(1) Open all cooling air and access doors.

(2) Keep all engine, compressor and compressor heat exchanger cooling fins clean and free of obstructions.

(3) Make sure that cooling air flow is not restricted and that cooling air comes from the coolest possible source. Avoid having heated air being drawn into the cooling fan.

(4) If possible, provide shade to protect the unit from direct sunlight.

c. Operation in Dusty or Sandy Areas.

(1) Protect the unit from dust and sand. Take advantage of all natural barriers which could protect the unit from blowing dust or sand. Install a canvas cover when the unit is not in operation.

(2) Keep fuel clean. Strain the fuel before adding it to the tank. Make sure fuel storage and transfer cans are clean.

(3) Check and service the engine/compressor air cleaner often, even though it has a dust discharge valve.

(4) Clean the engine, compressor and compressor heat exchanger cooling fans often. Wipe with clean cloth dampened with an approved cleaning solvent.

d. Operation in Rainy or High Humidity Conditions.

(1) Store unit in a sheltered area when it is not in use.

(2) Keep fuel clean and free of water. Keep fuel tank full when the unit is not in use to minimize condensation.

(3) Whenever possible protect the unit from direct rainfall when it is operating. Cover the unit with a tarpaulin suspended about 3 feet above the unit.

(4) Drain the oil/moisture separators often. Press and hold the CONDENSATE DRAIN switch for 10-15 seconds every half-hour of continuous operation.

e. Operation in Salt Water Areas.

(1) Avoid direct contact with salt water to prevent corrosion. If salt water does come in contact with the unit, rinse the unit with clean fresh water.

(2) Repair any paint damage, such as cracks and chips. Apply standard issue rustproofing material to all exposed ferrous metal (steel) surfaces. If rustproofing material is not available, apply a light film of oil or grease to all exposed metal surfaces.

f. Operation at High Altitudes.

(1) Engine power output will decrease by about 3-1/2 percent for each 1000 feet above sea level. The compressor will have a similar loss of operation efficiency.

(2) Service the engine/compressor air cleaner often to minimize this loss of efficiency.

2-9. FORDING

The air compressor should not be forded in water deeper than one foot. Deeper water would sub- merge the alternator and damage it.

CHAPTER 3

OPERATOR'S MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION INSTRUCTION

3-1. TYPE OF LUBRICANT

The engine and crankcase and clutch use one grade of oil in temperatures from -10°F to +130°F. Another is used in temperatures below 0°F. The compressor requires one grade for temperatures ranging from -10°F to +125°F. For temperatures from 0°F to -65°F, use the cold weather grade. Store the lubricants in clean containers in a clean, dry place away from external heat. Do not allow dust, dirt or foreign material to contaminate the oil. Keep all lubrication equipment clean and ready to use. Glycerin will be added to the pressure gages when liquid level falls below the middle of the gage.

3-2. CLEAN BEFORE LUBRICATION

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 (38°C) - 138°F (59°C).

Clean all external parts not requiring lubrication of oil using cleaning solvent and dry thoroughly. Before lubricating the equipment, wipe all lubrication points free of dirt and grease. Clean the lubrication points after lubrication to prevent accumulation of dirt.

3-3. LUBRICATION POINTS

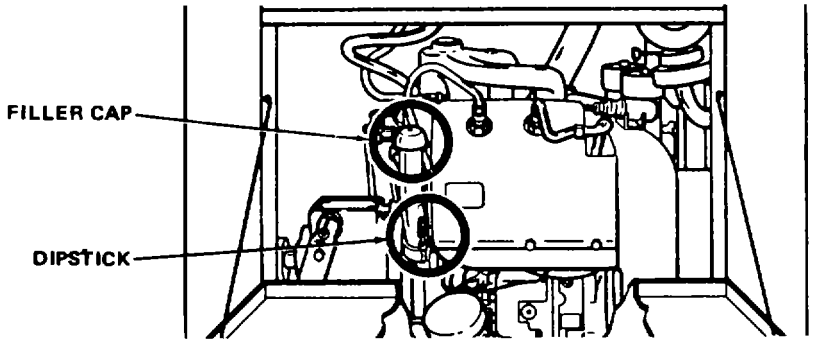
Table 3-1 shows the lubrication points for the engine, clutch and compressor.

NOTE

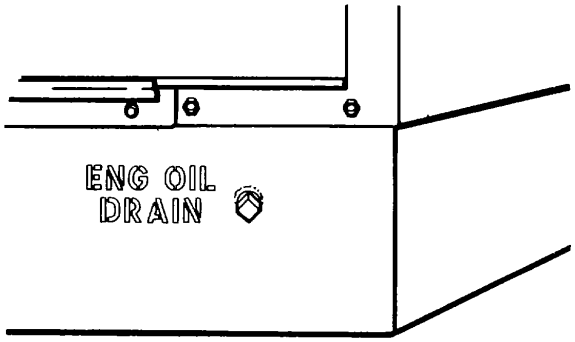
Lubrication points (dipsticks, oil filler caps, and drain plugs) are painted red for easy identification.

Table 3-1. Lubrication Points

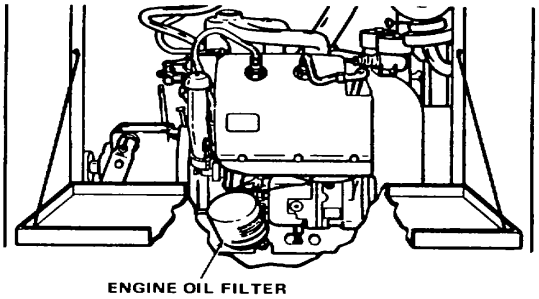
1. Check level of engine crankcase with dipstick before operation. Add oil as necessary through oil filler.



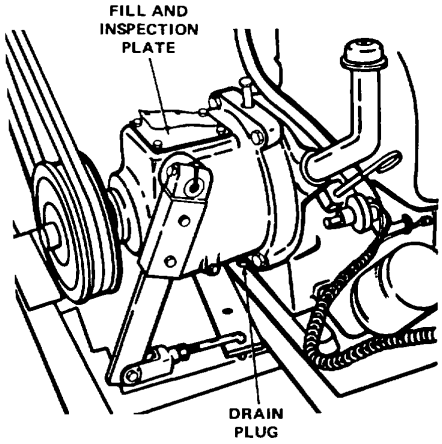
2. Drain and refill engine oil every 50 hours of operation. Drain through external drain and fill (4 quarts).



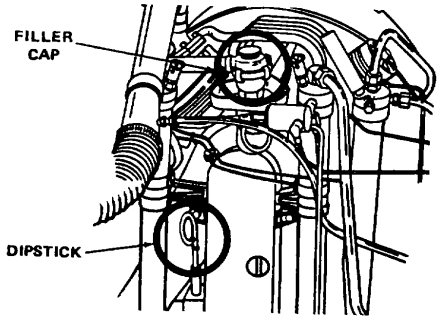
3. Change the engine oil filter every 100 hours of operation.



4. Drain clutch oil and refill (1 pint) every 250 hours of operation.

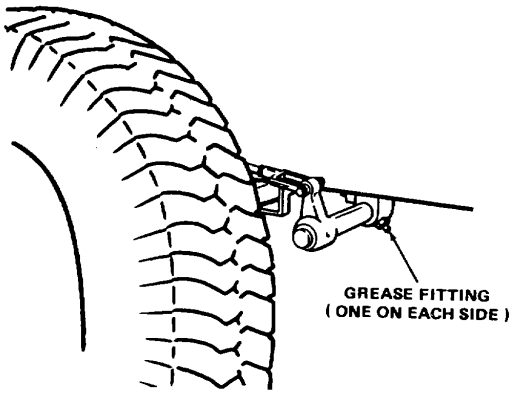


5. Check compressor oil with dipstick before operation. Add oil as necessary through oil filler.



6. Drain and refill compressor oil every 250 hours.

7. Renew grease on brake mechanism once a year.



Section II. TROUBLESHOOTING

3-4. TROUBLESHOOTING PROCEDURES

a. Table 3-2 lists the common malfunctions which you may find during the operation or maintenance of the Model KA-15-03-P Bauer Compressor, or its components. You should perform the tests/inspections and corrective actions in the 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.

Table 3-2. Troubleshooting Chart for the Operator

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. ENGINE FAILS TO START, OR HARD TO START.

Step 1. Check to see if battery is fully charged.
Notify organizational maintenance.

Step 2. Check to see if battery and starter cables are loose.
Tighten cables (page 3-18).

Step 3. Check to see if fuel tank is empty.
Add fuel as required (page 3-8).

Step 4. Check to see if fuel filter is clogged.
Clean (page 3-14).

Step 5. Check to see if spark plugs dirty or damaged.
Notify organizational maintenance.

Step 6. Check to see if magneto ground switch pushbutton is in grounded position.
Pull out on pushbutton.

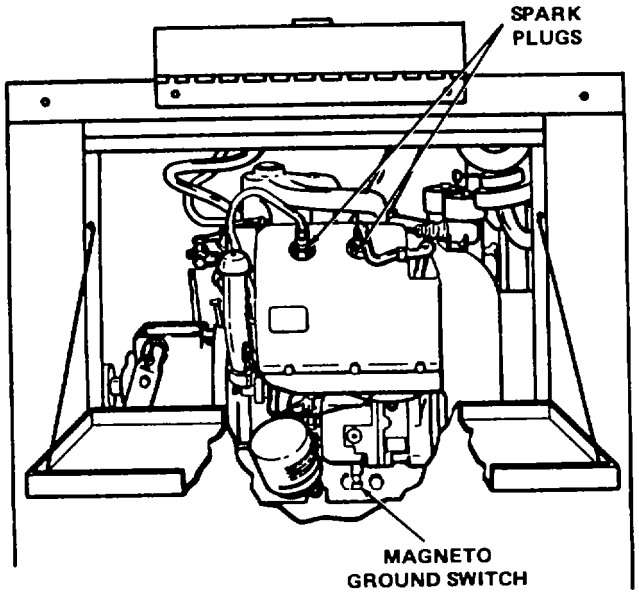


Table 3-2. Troubleshooting Chart for the Operator (Continued)

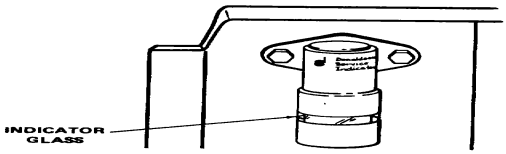
MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

2. ENGINE RUNS ROUGH OR ERRATICALLY.

Step 1. Check to see if spark plugs are dirty or damaged.
Notify organizational maintenance.

Step 2. Check to see if spark plug wires are defective.
Replace (page 4-11).

Step 3. Check to see if air cleaner restriction indicator is **RED**.
Notify organizational maintenance.



3. ENGINE OVERHEATS OR BACKFIRES

Step 1. Check to see if fuel in tank is of poor grade.
Drain (page 3-14).

Step 2. Check to see if cooling fins are dirty.
Clean.

Step 3. Check to see if crankcase oil level is low.
Add oil as required (page 3-8).

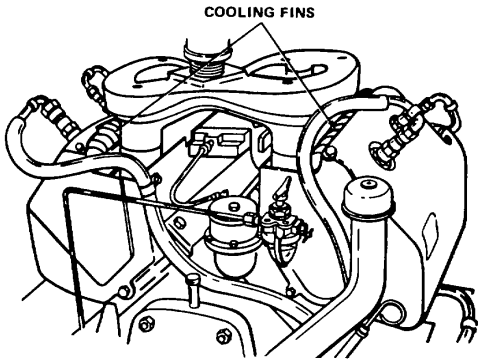


Table 3-2. Troubleshooting Chart for the Operator (Continued)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

4. ENGINE STOPS SUDDENLY.

Step 1. Check to see if fuel tank is empty.
Add fuel as required (page 3-14).

Step 2. Check cylinder head temperatures switch.
Let engine cool 10 minutes and restart (page 4-39).

Step 3. Check to see if air cleaner restriction indicator is RED.
Notify organizational maintenance.

5. ALTERNATOR OUTPUT ERRATIC.

Step 1. Check to see if drive belt has proper tension and is not worn.
Adjust or replace (para. 3-14).

6. COMPRESSOR OUTPUT LOW.

Step 1. Check to see if compressor is at rated speed.
Increase speed: minimum - 1240 RPM, maximum - 1319 RPM.

Step 2. Check to see if air cleaner restriction indicator is RED.
Notify organizational maintenance.

Step 3. Check to see if condensate drain valve is leaking.
Notify organizational maintenance.

7. COMPRESSOR SPEED LOW.

Step 1. Check to see if drive belts have proper tension and are not worn.
Adjust/Replace (page 4-31).

Step 2 Check to see if engine is running at rated speed.
Increase speed (rated speed 2650 RPM).

8. COMPRESSOR WILL NOT LOAD.

Step 1. Check to see if condensate drain valve is leaking.
Notify organizational maintenance.

9. LOW COMPRESSOR OIL PRESSURE.

Step 1. Check to see if crankcase oil level is low.
Add oil as required (page 3-12).

Step 2. Check to see if oil lines are leaking.
Repair/Replace (page 3-12).

Step 3. Check to see if oil pump drive belts are worn or slipping.
Tighten/Replace (page 3-14).

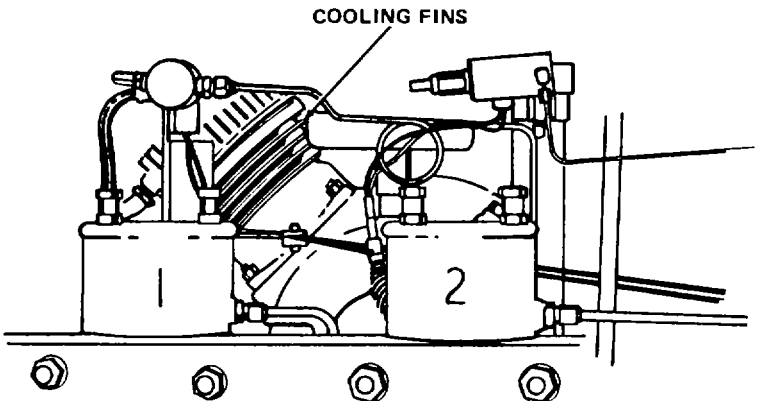
10. COMPRESSOR OVERHEATING.

Step 1. Check to see if air inlet doors are open.
Open (page 3-6).

Step 2. Check to see if cooling fins are dirty.
Clean.

Table 3-2. Troubleshooting Chart for the Operator (Continued)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION



11. LOW 1st STAGE PRESSURE.

Step 1. Check to see if pressure gage tubing fittings are leaking.
Tighten (page 3-7).

Step 2. Check to see if the air cleaner restriction indictor is RED.
Notify organizational maintenance.

Step 3. Check to see if condensate drain valve is leaking.
Notify organizational maintenance.

12. LOW 2nd STAGE PRESSURE.

Step 1. Check to see if pressure gage tubing fittings are leaking.
Tighten (page 3-7).

Step 2 Check to see if condensate drain valve is leaking.
Notify organizational maintenance.

Step 3. Check to see if tubing fittings are leaking between solenoid and condensate drain valves.
Tighten (page 3-7).

1**3. LOW 3rd STAGE PRESSURE.**

Step 1. Check to see if pressure gage tubing fittings are leaking.
Tighten (page 3-7).

Step 2. Check to see if condensate drain valve is leaking.
Notify organizational maintenance.

Table 3-2. Troubleshooting Chart for the Operator (Continued)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

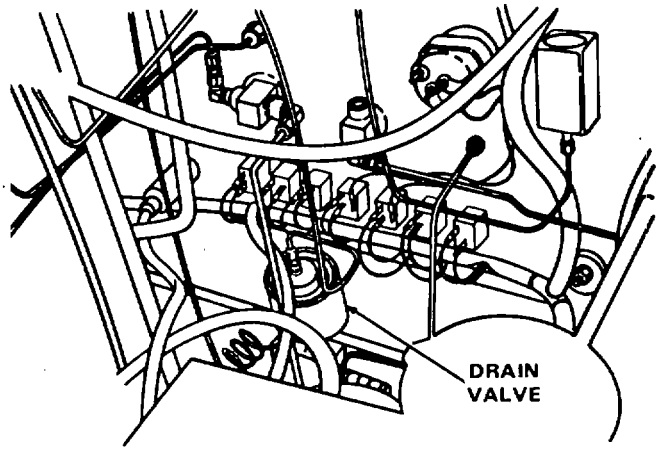
14. LOW 4th STAGE PRESSURE.

Step 1. Check to see if pressure gage tubing fittings are leaking.
Tighten (page 3-7).

Step 2. Check to see if condensate drain valve is leaking.
Notify organizational maintenance.

15. RECEIVER AIR PRESSURE WILL NOT RISE.

Step 1. Check to see if manual drain valve is leaking.
Repair/Replace.



16. HAND BRAKE DOES NOT HOLD.

Step 1. Check to see if hand brake is properly adjusted.
Adjust (page 1-27).

17. TIRE WEAR ABNORMAL.

Step 1. Check to see if tires are properly inflated.
Adjust pressure as required (page 3-22).

Section III. MAINTENANCE PROCEDURES

3-5. INTRODUCTION

This section provides maintenance procedures for the compressor operator. More detailed maintenance procedures are provided in Chapters 4 through 6 for the organizational, direct support, and general support levels.

3-6. DETAILED MAINTENANCE PROCEDURES

WARNING

Never attempt to service any air compressor component unless the engine is stopped and the system is relieved of all air pressure.

3-7. EXHAUST MUFFLER

a. Inspection.

(1) Inspect muffler for leaks, cracks or other damage.

(2) Inspect muffler mounting hardware for loose or missing fasteners.

b. Replacement. Refer to organizational maintenance.

3-8. SERVICE HOSE AND FITTINGS

a. Inspection.

(1) Inspect entire outer casing of hose for wear, fraying or other damage.

(2) Inspect fittings at each end of hose for damage.

b. Test. Refer to general support maintenance.

c. Repair. Refer to direct support maintenance.

d. Replacement. Refer to organizational maintenance.

3-9. ENCLOSURE ROOF

a. Inspection.

(1) Inspect roof panel for cracks, dents and paint damage.

(2) Inspect roof installation hardware for loose or missing fasteners.

b. Repair. Refer to organizational maintenance.

c. Replacement. Refer to organizational maintenance.

3-10. ENCLOSURE DOORS, LATCHES AND TOOL BOX

a. Inspection.

(1) Inspect each door for proper operation, dents, cracks or other defects.

(2) Inspect each hinge for proper operation.

(3) Inspect all latches and catches for proper operation.

(4) Inspect tool box and document boxes for dents, cracks and paint damage.

(5) Inspect all hardware for loose or missing fasteners.

b. Repair. Refer to organizational maintenance.

c. Replacement. Refer to organizational maintenance.

3-11. ENCLOSURE CORNER POSTS AND PANELS

a. Inspection.

(1) Inspect each panel and corner post for dents, cracks and paint damage.

(2) Inspect installation hardware for each panel and corner post for loose or missing fasteners.

b. Repair. Refer to organizational maintenance.

c. Replacement. Refer to organizational maintenance.

3-12. FUEL LINES, FITTINGS AND HOSES

a. Inspection. Inspect all lines, fittings, tubes and hoses for leaks, cracks or crimps.

b. Repair. Refer to organizational maintenance.

c. Replacement. Refer to organizational maintenance.

3-13. AIR LINES AND FITTINGS

a. Inspection. Inspect all air lines and fittings for leaks, cracks or crimps.

b. Repair. Refer to direct support maintenance.

c. Replacement. Refer to organizational maintenance.

3-14. ALTERNATOR ASSEMBLY (Fig. 3-1)

a. Inspection. Inspect alternator assembly for loose fasteners, wire and other parts.

b. Test. Refer to organizational maintenance.

c. Adjustment. Refer to organizational maintenance.

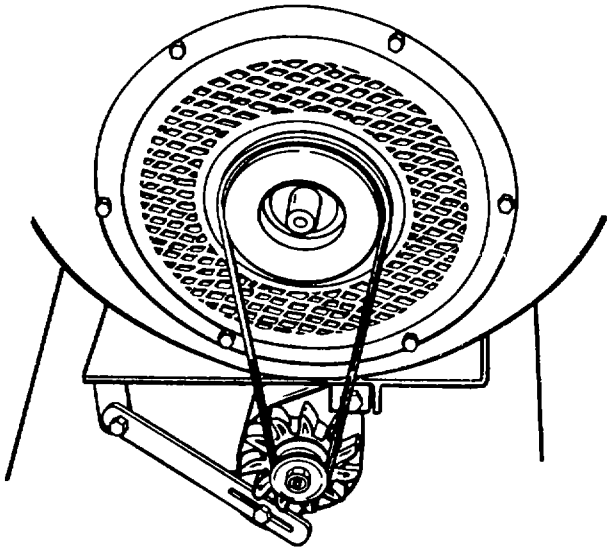


Figure 3-1. Alternator and Belt Drive

d. Repair. Refer to direct support maintenance.

e. Replacement. Refer to organizational maintenance.

3-15. ALTERNATOR DRIVE BELT (Fig. 3-1)

a. Inspection.

(1) Inspect belt for wear, fraying and cracks.

(2) Inspect for proper tension.

b. Adjustment. Refer to organizational maintenance.

c. Replacement . Refer to organizational maintenance.

3-16. STARTER ASSEMBLY (Fig. 3-2)

a. Inspection.

(1) Inspect starter for signs of overheating.

(2) Inspect starter assembly for loose fasteners.

(3) Inspect starter cable for loose attaching hardware. Tighten fastener securely.

b. Test. Refer to organizational maintenance.

c. Replacement. Refer to organizational maintenance.

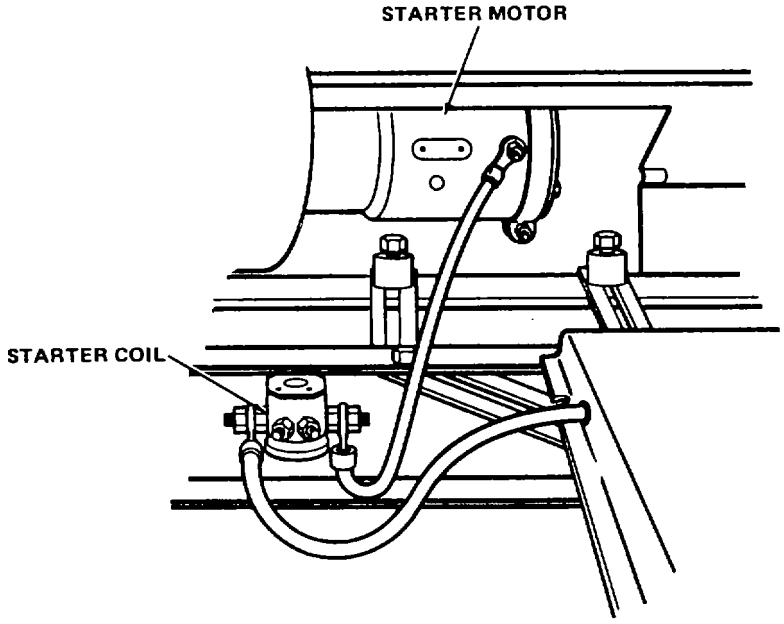


Figure 3-2. Starter Assembly

d. Repair. Refer to direct support maintenance.

e. Overhaul. Refer to general support maintenance.

3-17. ENGINE ASSEMBLY

a. Inspection.

(1) Inspect outside of engine for fuel and oil leaks.

(2) Inspect engine for loose or missing bolts.

b. Test. Refer to organizational maintenance.

c. Service.

(1) Check fuel level in fuel tank. Fill with fuel.

(2) Check crankcase oil level. Add oil as required.

d. Replacement. Refer to direct support maintenance.

e. Repair. Refer to direct support maintenance.

f. Overhaul. Refer to general support maintenance.

3-18. FUEL PUMP (Fig. 3-3)

a. Inspection.

(1) Inspect fuel pump housing for fuel or oil leaks. Tighten fasteners securely.

(2) Inspect fuel lines and fittings for leaks, cracks and crimps. Tighten fittings securely.

b. Test. Refer to organizational maintenance.

c. Replacement. Refer to organizational maintenance.

d. Repair. Refer to direct support maintenance.

e. Overhaul. Refer to direct support maintenance.

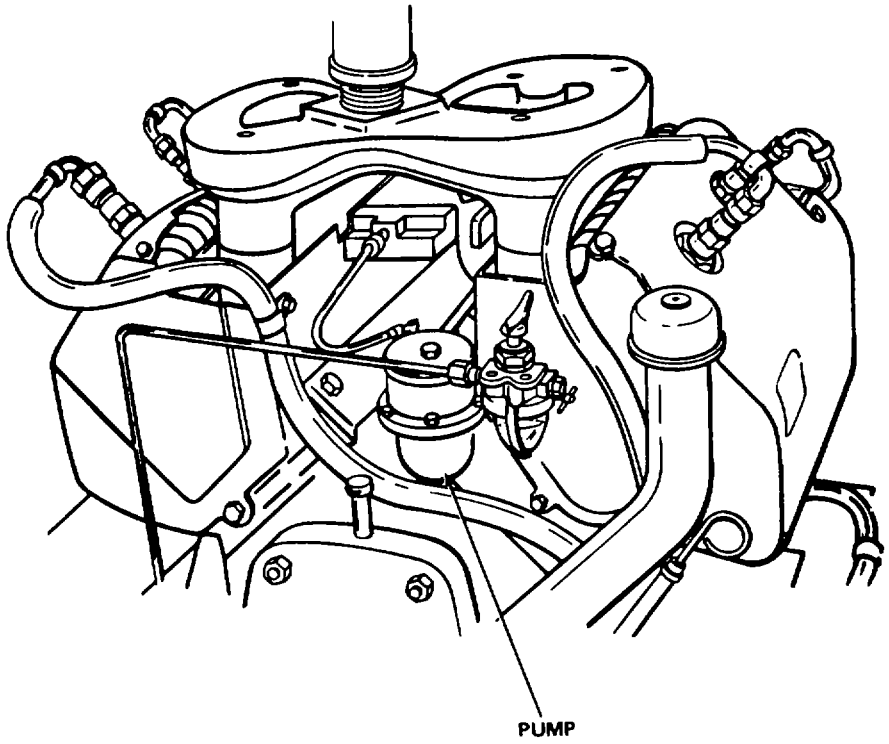


Figure 3-3. Engine Fuel Pump

3-19. ENGINE CRANKCASE BREATHER (Fig. 3-4)

a. Inspection. Inspect crankcase breather for loose retainer spring and missing filter media.

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 (38°C) - 138°F (59°C).

b. Service. Clean crankcase breather in cleaning solvent. Dry thoroughly and reinstall on engine.

c. Replacement. Refer to organizational maintenance.

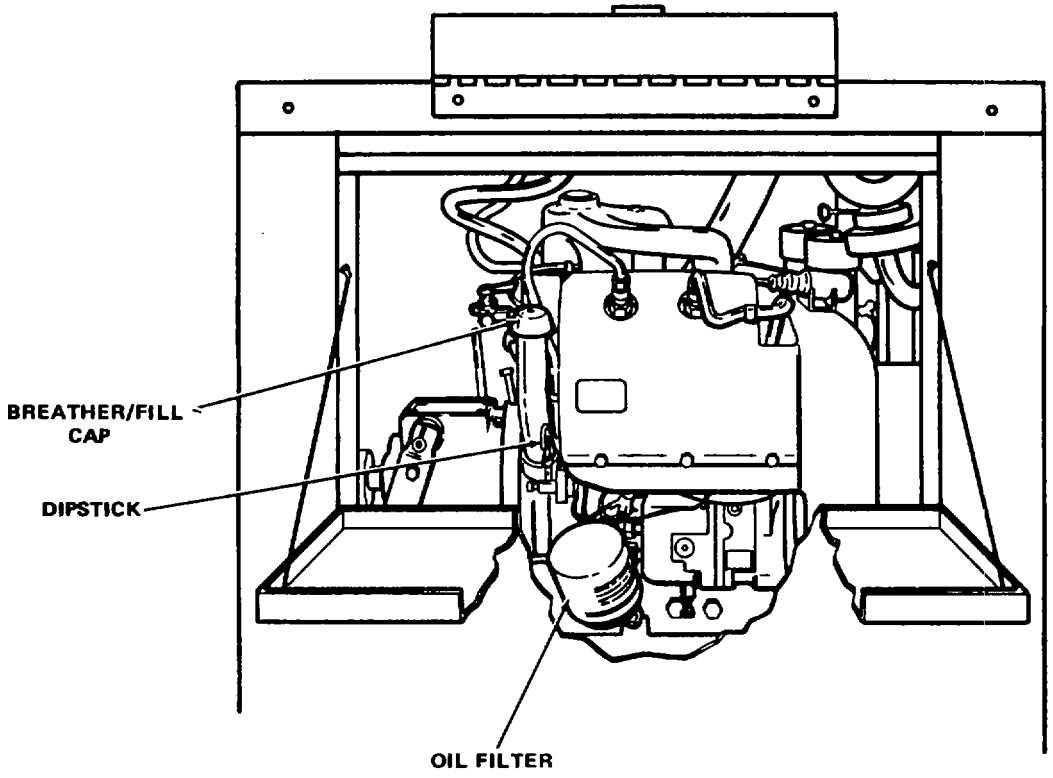


Figure 3-4. Engine Oil Components

3-20. ENGINE OIL LEVEL DIPSTICK (Fig. 3-4)

a. Inspection. Inspect oil level dipstick for any damage.

b. Replacement. Refer to organizational maintenance.

3-21. ENGINE OIL PAN ASSEMBLY

a. Inspection. Inspect engine oil pan assembly for oil leaks or missing fasteners.

b. Replacement. Refer to organizational maintenance.

c. Repair. Refer to organizational maintenance.

3-22. ENGINE OIL FILTER (Fig. 3-4)

a. Inspection. Inspect engine oil filter and filter adapter for oil leaks.

b. Replacement.

(1) Stop engine. Allow to cool 2 to 5 minutes.

(2) Turn filter element counterclockwise and unscrew filter element from filter adapter. Remove filter element.

(3) Remove seal ring from filter adapter.

(4) Install new seal ring into groove in filter adapter.

(5) Apply a light film of clean engine oil to seal ring.

(6) Position new filter element over stud on filter adapter. Screw new filter element into filter adapter.

(7) Tighten filter element handtight.

3-23. ENGINE AND COMPRESSOR AIR CLEANER (Fig. 3-5)

a. Inspection. With engine and compressor operating at full load, note color of air cleaner restriction indicator. If color is green, no further service is required. If color is red, refer to organizational maintenance.

3-24. AIR COMPRESSOR ASSEMBLY (Fig. 3-6)

a. Inspection. Check compressor crankcase oil level. Add oil as required.

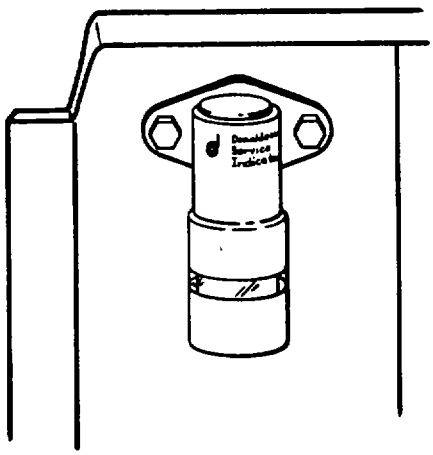


Figure 3-5. Air Cleaner Indicator

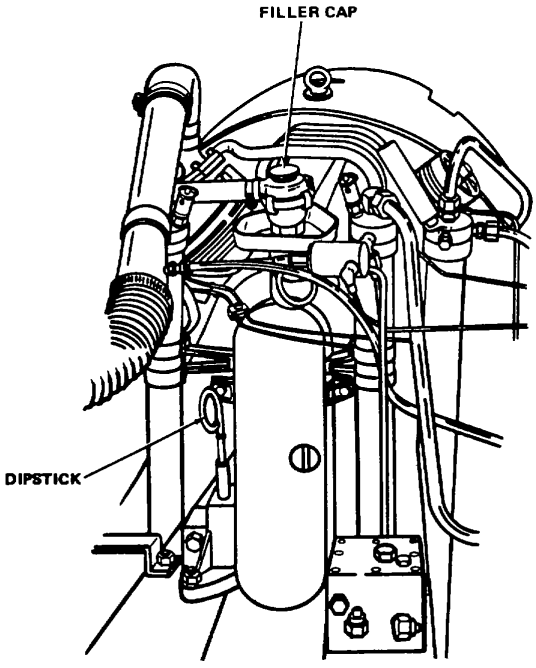


Figure 3-6. Compressor Filler Cap and Dipstick

3-25. OIL LINES AND FITTINGS

a. Inspection.

(1) Inspect oil supply line and fittings for leaks.

(2) Inspect oil return line and fittings for leaks.

b. Replacement. Refer to organizational maintenance.

3-26. AIR CLEANER CRANKCASE BREATHER TUBE

a. Inspection.

(1) Inspect breather hose for cracks and leaks.

(2) Inspect demister for cracks and missing clips.

b. Replacement. Refer to organizational maintenance.

c. Repair. Refer to organizational maintenance.

3-27. INSTRUMENT AND CONTROL PANEL (Fig. 3-7)

a. Inspection.

(1) Inspect all pressure gages for cracked lenses, oil leaks, missing or damaged pointers, or damaged faces.

(2) Operate all switches and valves.

(3) Inspect fuel gage, ammeter and hourmeter for damage.

b. Testing. Refer to direct support maintenance.

c. Service. Refer to organizational maintenance.

d. Repair and Overhaul. Refer to direct support maintenance.

e. Replacement. Refer to organizational maintenance.

3-28. MANUAL SWITCHES (Fig. 3-7)

Inspection.

(1) Operate each switch to determine proper function.

(2) Inspect for loose or missing attaching nuts.

b. Testing. Refer to organizational maintenance.

c. Replacement. Refer to organizational maintenance.

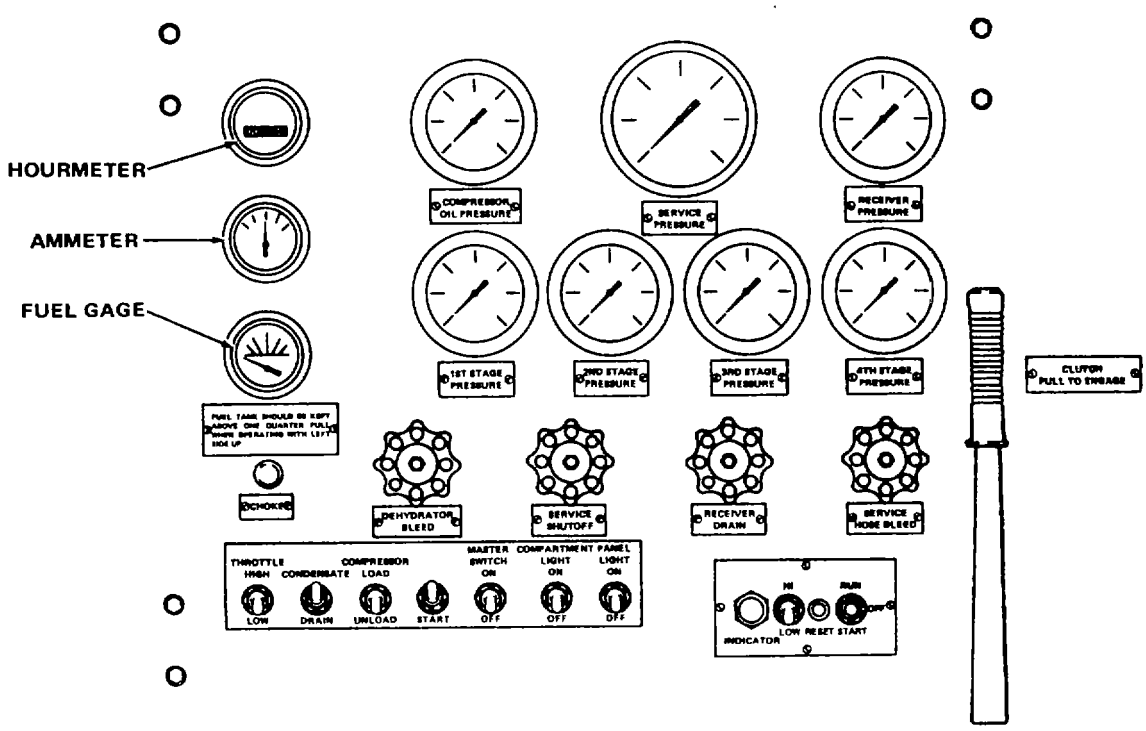


Figure 3-7. Instruments and Controls

3-29. PRESSURE SWITCHES (Fig. 3-7)

a. Inspection. Inspect each pressure switch for evidence of loose fittings, loose wiring, loose mounting and leaks.

b. Testing. Refer to direct support maintenance.

3-30. THROTTLE AND UNLOADER CONTROL (Fig. 3-7)

a. Inspection.

(1) Inspect throttle switch for damage and loose or missing parts.

(2) Inspect throttle solenoid for damage and loose or missing parts.

b. Adjustment. Refer to organizational maintenance.

c. Replacement. Refer to organizational maintenance.

3-31. ENGINE AND COMPRESSOR OIL DRAINS (Fig. 3-8)

a. Inspection.

(1) Inspect engine oil drain for damaged hose and loose or missing fittings.

(2) Inspect compressor oil drain for damaged hose and loose or missing fittings.

b. Replacement. Refer to organizational maintenance.

3-32. FUEL TANK

a. Inspection. Inspect fuel tank for leaks, loose tube fittings, loose and missing attaching bolts, dirt in strainer and loose fuel level sensor.

b. Service. Fill fuel tank with correct fuel.

c. Replacement. Refer to organizational maintenance.

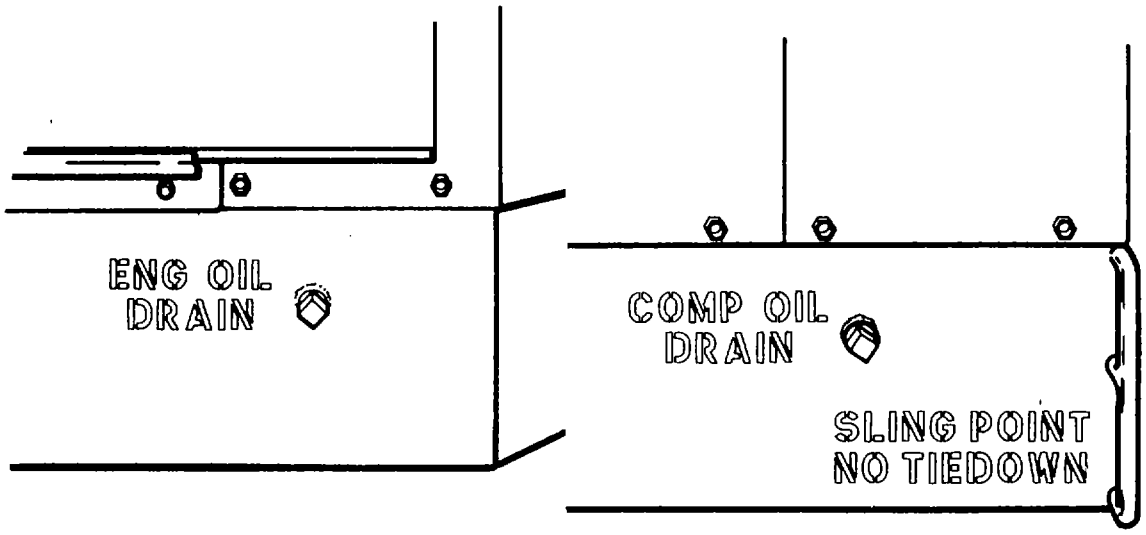


Figure 3-8. Engine and Compressor Oil Drains

3-33. AIR PRESSURE GAGES (Fig. 3-7)

a. Inspection. Inspect each air pressure gage for cracked or broken lens, oil leak, damaged or missing pointer, damaged face, loose tube connections and hoose hardware.

b. Testing. Refer to general support maintenance.

c. Replacement. Refer to direct support maintenance.

3-34. PANEL LAMP

a. Inspection.

(1) Inspect lamp bulb for operation.

(2) Inspect lamp fixture for loose or missing attaching hardware.

(3) Inspect lamp wiring for damage.

b. Testing. Turn on panel lamp switch. Insure both lamps operate.

c. Replacement of Bulb.

(1) Push lightbulb in toward base of fixture and turn bulb counterclockwise 1/3 turn. Remove bulb.

(2) Align locating pins in base of bulb with slots in lamp fixture. Push bulb in toward base of fixture and turn clockwise 1/3 turn. Release bulb.

d. Replacement of Lamp Fixture. Refer to organizational maintenance.

3-35. HOURMETER (Fig. 3-7)

a. Inspection. Inspect hourmeter for damaged lens or number wheels, loose hardware or loose or damaged wiring.

b. Testing. Use a stopwatch and verify accuracy of hourmeter.

c. Replacement. Refer to organizational maintenance.

3-36. AIR CLEANER INDICATOR (Fig. 3-5)

a. Inspection. Visually inspect air cleaner restriction indicator and sensor tube for damage and loose or missing parts.

b Replacement. Refer to organizational maintenance.

3-37. MASTER SWITCH

a. Inspection. Inspect master switch for damage and loose or missing parts.

b. Testing. Refer to organizational maintenance.

c. Replacement. Refer to organizational maintenance.

3-38. AMMETER

a. Inspection. Inspect ammeter for damage and loose or missing parts.

b. Testing. Refer to organizational maintenance.

c. Replacement. Refer to organizational maintenance.

3-39. VIBRATION MOUNT

a. Inspection. Visually inspect four vibration mounts for damage and loose or missing parts.

b. Replacement. Refer to organizational maintenance.

4-40. MAIN WIRE HARNESS

a. Inspection. Inspect main wire harness for damage and loose connections.

b. Testing. Refer to organizational maintenance.

c. Repair and Replacement. Refer to organizational maintenance.

341. COMPRESSOR OIL PRESSURE GAGE

a. Inspection. Inspect compressor oil pressure gage for cracked or broken lens, oil leaks, damaged or missing pointer, damaged face, loose tube connection, and loose hardware.

b. Testing. Refer to general support maintenance.

c. Replacement. Refer to direct support maintenance.

3-42. BATTERY AND BATTERY HOLD DOWN

NOTE

The battery installed in this unit is an extended service interval battery. The battery should be inspected and serviced only once per year. Refer to organizational maintenance for all service**.**

3-43. BATTERY CABLES

a. Inspection. Inspect battery cables for loose connections and damage.

NOTE

Inspect battery cable to battery connections only during battery service.

b. Replacement and Repair. Refer to organizational maintenance.

3-44. AXLE

a. Inspection. Inspect axle for damage and loose or missing parts.

b. Repair. Refer to organizational maintenance.

3-45. TIRES

a. Inspection.

(1) Inspect tires for damage and wear.

(2) Check air pressure in tires.

b. Service. Inflate tires to 25-35 psi.

c. Repair and Replacement. Refer to organizational maintenance.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE

Section I. GENERAL INFORMATION

4-1. SCOPE

This section covers procedures to be used by organizational maintenance personnel.

4-2. DESCRIPTION

a. General. The Model KA-15-03-P Air Compressor consists of a reciprocating high pressure compressor coupled to a gasoline engine by means of a V-belt drive; a fuel tank, instrument panel, air receiver and a compartment heater, all mounted on a wheel equipped frame and enclosed by a metal shroud.

b. Compressor. The compressor (Fig. 4-1) is a four cylinder, four stage, air cooled unit which is V-belt driven. The cylinder arrangement is in the form of an "X." The first stage is on the upper half of the compressor and has the air filter attached. The second stage is on the lower half of the compressor directly opposite the first stage. The third stage is also on the lower half of the compressor and is next to the second stage. The fourth stage is on the upper half of the compressor directly opposite the third stage. The compressor will deliver 15 SCFM (standard cubic feet

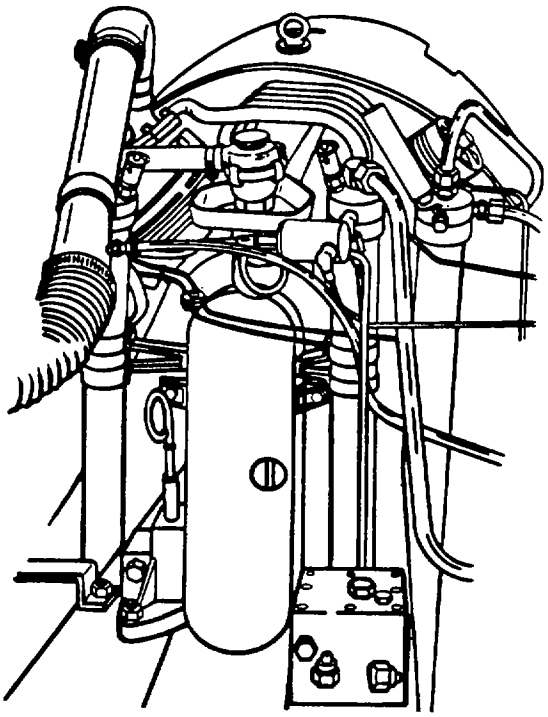


Figure 4-1. Compressor

of air per minute) at 3500 PSI (pounds per square inch pressure) when driven at 1300 RPM (revolutions per minute). Suppressed idle speed unloading allows the engine to return to idle speed at the same time the unloading system for the compression system opens to atmosphere, permitting the compressor to run free and stop delivering compressed air. This happens when the air in the air receiver reaches a pressure of 3500 PSI. When the air pressure in the air receiver is reduced to about 3200 PSI, the engine speed returns to its full load speed and the compressor pumps compressed air into the receiver.

Each stage of the compressor is connected to the next higher stage by means of an intercooler tube. The discharge of the fourth stage is connected to an aftercooler. The purpose of the intercoolers and aftercooler is to improve the efficiency of the compressor. An oil and moisture separator is installed at the cool end of each cooler to remove the condensed oil and water vapors produced by the coolers. A drain system with instrument panel control is provided to drain the accumulation of oil and water in the separators. All four separators are drained at the same time by the single instrument panel control.

Two air dehydrator cylinders are provided. These chemically reduce the moisture in the compressed air.

c. Engine. The engine is an air cooled, four cylinder, V-configuration, four stroke cycle, spark ignition, gasoline fueled, standard commercial type engine modified for military use. Those modifications include electric starting, radio noise suppression on the ignition system and automatic shutdown systems to stop the engine in case of loss of oil pressure or high cylinder head temperature. The engine develops a maximum of 29.5 BHP (brake horsepower) at 2800 RPM. The engine is equipped with an automatic, two speed, solenoid operated governor system. This ensures that the engine will be operated at only the correct speeds for proper compressor operation.

   A multi-disc, oil filled manual clutch is attached to the engine. This permits starting and operation of the engine without operating the compressor. All engine controls are located at the instrument panel.

d. Air Receiver. The air receiver for the air compressor has a capacity of approximately 1300 cubic inches (.752 cubic feet or 21.3 liters). It has a maximum working pressure of 3500 PSI. It is certified for conformance to the ASME (American Society of Mechanical Engineers) code for Unfired Pressure Vessels. The air receiver is equipped with an instrument panel mounted manual drain valve. In addition, an automatic dump system is provided which will release all compressed air from the receiver whenever the engine is shut off.

e. Fuel Tank. The frame mounted fuel tank has a capacity adequate for approximately 8 hours continuous operation. An instrumental panel mounted fuel level indicator is provided. A filter screen is installed in the fuel fill neck of the tank. A drain plug is installed in the bottom of the fuel tank to permit draining. The tank has an internal baffle to prevent excessive sloshing of fuel during filling, operation and transportation.

f. Compartment Heater. An electrically controlled, gasoline fired heater is provided. This heater is intended for use in very cold weather. The heater is equipped with ducts to direct the hot air to the engine crankcase, compressor crankcase, battery and general enclosure. A separate electric fuel pump delivers gasoline from the engine fuel tank to the heater. Operating controls for the heater are installed at the instrument panel.

g. Instrument Panel. The instrument panel (Fig. 4-2) contains all controls, valves and switches to properly start, operate and stop the engine, compressor and heater. In addition, all instrumentation necessary to operate and monitor the compressor system is provided.

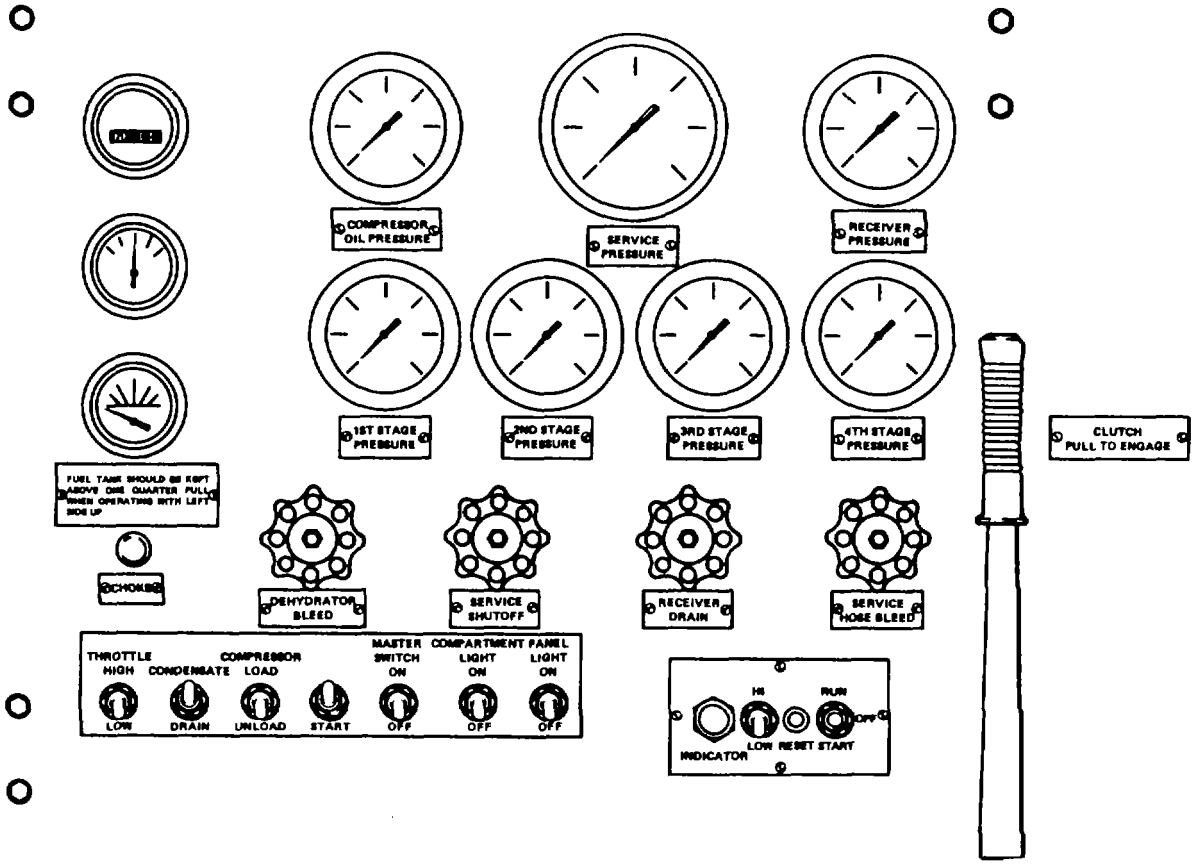


Figure 4-2. Instrument Panel

Section II. REPAIR PARTS AND TOOLS

4-3. COMMON TOOLS

For authorized common tools and equipment refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

4-4. SPECIAL TOOLS

The only special tool is a compressor valve wrench which is supplied in the tool box of the compressor (Figure 4-4A). It is a Bauer part number 10645-3-004555.

4-5. REPAIR PARTS

Repair parts are listed and illustrated in the repair parts and special tools list in TM 5-4310-36824P covering organizational maintenance for this equipment.

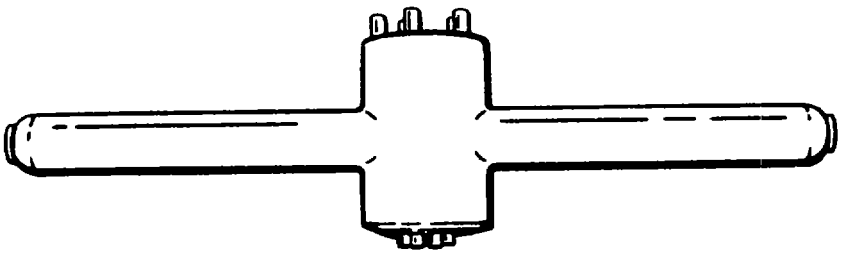


Figure 4-4A. Compressor Valve Wrench

Section III. SERVICE UPON RECEIPT OF EQUIPMENT

4-6. SCOPE

This section covers information required by organizational maintenance personnel to insure the equipment will be adequately inspected, serviced and operationally tested before it is subjected to normal use. These procedures include site and shelter requirements, service upon receipt of material, and preliminary servicing and adjustment.

4-7. SITE AND SHELTER REQUIREMENTS

The usage site for the compressor should be selected so as to avoid excessive dust, mud, rain, snow, heat or cold. The compressor must be kept as level as possible. The compressor must never be operated if it is tilted at an angle in excess of 150 in any direction. Whenever operation on a slope is necessary, position the compressor with the drawbar pointing either up or down the slope. Block the wheels, set the parking brake and level the compressor with the adjustable landing gear.

Make sure all loose trash is removed from the area of the compressor because refuse can be drawn into the cooling air inlets. Compressor should not be operated inside closed rooms or buildings. If such operation is mandatory, connect extension pipe to engine exhaust, and pipe exhaust fumes outside.

Compressor should be protected from rain, wind, snow, dust and tropical or desert sun. Temporary shelter should be provided by tarpaulins or other means. Maximum usage of natural shelter such as trees, hills, outcroppings and rock formations should be used.

4-8. UNPACKING INSTRUCTIONS

No specific unpacking instructions are required. Refer to de-preservation guide packed with each unit.

4-9. 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 DA PAM 738-750.

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

4-10. PRELIMINARY SERVICE AND ADJUSTMENT

Location	Item	Action	Remarks
1. Engine	Alternator Belt	Adjust	4-22
2. Engine	Compressor Belt	Adjust	4-25
3. Engine	Crankcase	Check oil	
4. Compressor	Crankcase	Check oil	
5. Frame	Battery	Connect cables	4-53
6. Frame	Tires	Check pressure	4-55

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-11. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

Refer to Table 4-1 for preventive maintenance checks pertaining to organizational maintenance.

Table 4-1. Organizational Preventive Checks and Services

D - Daily W - Weekly M - Monthly Q - Quarterly H - Interval in Hours

ITEM NO.	INTERVAL					Item To Be Inspected	Procedures
	H	D	W	M	Q		
1	50					Engine Oil Change	MIL-L-2104 (- 10°F to +130°F)
2	100					Engine Oil Filter Change	
3	250					Compressor Oil Change	MIL-L-26087 (- 10°F to +125°F)
4	250					Compressor Oil Filter Change	
5			X			Compressor V-Belts	Inspect belts for wear, fraying, peeling, cracking and tension. Adjust belt ten sion if deflection exceeds 1/2" (13 MM). See paragraph 4-25 for adjustment procedure.
6				X		Air Cleaner	Check air cleaner element. Replace if dirty. See paragraph 4-34 for replacement.
7		X				Dehydrator Cartridges	Check hourmeter and instruction plate. Replace cartridges as required. See paragraph 4-39 for cartridge replacement.
8		X				Meters and Gages	Inspect for damaged faces, pointers, lenses, liquid fill leaks and proper operation. Replace as required. See paragraphs 4-45 and 4-47 for replacement. Liquid level in pressure gages should be halfway to full, fill gages with glycerin if level is below middle of gage. See paragraph 4-47A for service.
9		X				Air Hose and Fittings	Inspect for wear, cracks, cuts and damage. Replace as required. See paragraph 4-14.
10					X	Switches, Controls and Valves	Inspect for operation and damage. Replace as required.

Section V. TROUBLESHOOTING

4-12. ORGANIZATIONAL MAINTENANCE TROUBLESHOOTING

a. Table 4-2 lists the common malfunctions that you may find during the operation or maintenance of the Model KA-15-03-P Bauer Compressor or its Components. You should perform the tests/ inspections and corrective actions in the 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 corrected by listed corrective actions, notify your supervisor.

Table 4-2. Troubleshooting for Organizational Maintenance Level

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
1. ENGINE FAILS TO START, OR HARD TO START
Step 1 Check to see if starter solenoid is defective. Replace (page 4-28).
Step 2. Check to see if starter is defective. Replace (page 4-28).
Step 3. Check to see if starter cable is defective. Replace (page 4-28).
Step 4. Check to see if starter switch is defective. Replace (page 4-2).
Step 5. Check to see if master switch is defective. Replace (page 4-62).
Step 6. Check to see if spark plug wires are defective. Replace (page 4-41).
Step 7. Check to see if fuel selector valve is defective. Replace (page 4-24).
Step 8. Check to see if fuel pump is defective. Replace (page 4-36).
Step 9. Check to see if compressor load switch is defective. Replace (page 4-36).
Step 10. Check to see if magneto is defective. Replace (page 4-32).
2. ENGINE RUNS ROUGH OR ERRATICALLY
Step 1. Check to see if carburetor is out-of-adjustment or defective. Adjust/replace (page 4-34).
Step 2. Check to see if governor speed spring is broken or stretched. Replace (page 4-36).

Table 4-2. Troubleshooting for Organizational Maintenance Level (Continued)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. ENGINE STOPS SUDDENLY

Step 1. Check to see if engine oil pressure switch is defective.
Replace (page 1-15).

Step 2. Check to see if compressor oil pressure switch is defective.
Replace (page 1-15).

4. ALTERNATOR OUTPUT ERRATIC

Step 1. Check to see if alternator is damaged.
Replace (page 4-26).

5. COMPRESSOR OUTPUT LOW

Step 1. Check to see if automatic unloader valve is defective.
Replace (page 4-54).

Step 2. Check to see if automatic unloader valve solenoid is defective.
Replace (page 4-54).

6. COMPRESSOR WILL NOT LOAD

Step 1. Check to see if condensate drain valve solenoid is defective.
Replace (page 4-54).

Step 2. Check to see if air pressure switch out-of-adjustment or defective.
Notify Direct Support Maintenance.

7. COMPRESSOR DOES NOT UNLOAD

Step 1. Check to see if air pressure switch is out-of-adjustment or defective.
Notify Direct Support Maintenance.

Step 2. Check to see if condensate drain valve solenoid is defective.
Replace (page 4-54).

8. CLUTCH WILL NOT ENGAGE

Step 1. Check to see if clutch is properly adjusted.
Adjust (page 4-44).

9. LOW COMPRESSOR OIL PRESSURE

Step 1. Check to see if oil pressure gage is defective.
Notify Direct Support Maintenance.

Step 2. Check to see if oil pump is defective.
Notify Direct Support Maintenance.

10. COMPRESSOR OVERHEATING

Step 1. Check to see if compressor fan is damaged.
Notify Direct Support Maintenance.

Table 4-2. Troubleshooting for Organizational Maintenance Level (Continued)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

11. LOW 1st STAGE PRESSURE

Step 1. Check to see if 1st stage pressure gage is defective.
Notify Direct Support Maintenance.

Step 2. Check to see if 1st stage safety valve is defective.
Notify Direct Support Maintenance.

12. LOW 2nd STAGE PRESSURE

Step 1. Check to see if 2nd stage pressure gage is defective.
Notify Direct Support Maintenance.

Step 2. Check to see if 2nd stage safety valve is defective.
Notify Direct Support Maintenance

Step 3. Check to see if condensate drain solenoid valve is defective.
Replace (page 4-54).

13. LOW 3rd STAGE PRESSURE

Step 1. Check to see if 3rd stage pressure gage is defective.
Notify Direct Support Maintenance.

Step 2. Check to see if 3rd stage safety valve is defective.
Notify Direct Support Maintenance.

14. LOW 4th STAGE PRESSURE

Step 1. Check to see if 4th stage pressure gage is defective.
Notify Direct Support Maintenance.

Step 2. Check to see if 4th stage safety valve is defective.
Notify Direct Support Maintenance.

Step 3. Check to see if dehydrator cartridge holder covers are leaking.
Tighten/repair (page 4-56).

Step 4. Check to see if priority valve is defective.
Replace (page 4-51).

15. RECEIVER PRESSURE WILL NOT RISE

Step 1. Check to see if receiver safety valve is defective.
Notify Direct Support Maintenance.

Step 2. Check to see if receiver safety rupture disc is broken.
Notify Direct Support Maintenance.

Step 3. Check to see if automatic unloader solenoid valve is defective.
Replace (page 4-54).

Step 4. Check to see if automatic unloader valve is defective.
Replace (page 4-54).

Table 4-2. Troubleshooting for Organizational Maintenance Level (Continued)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
16. HAND BRAKE DOES NOT HOLD
Step 1. Check to see if brake friction linings are worn.
Replace (page 4-76).
17. TIRE WEAR ABNORMAL
Step 1. Check to see wheel bearings are damaged.
Repair (page 4-80).

Section VI. MAINTENANCE INSTRUCTIONS

4-13. EXHAUST MUFFLER (See Fig. 4-3)

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Applicable Configurations

All

---

a. Removal

(1) Loosen and remove muffler clamp. Remove exhaust extension pipe.

(2) Loosen and remove muffler clamp. Disconnect exhaust pipe.

(3) Loosen and remove two screws and nuts.

(4) Remove muffler.

b. Installation

(1) Position muffler into muffler supports. Align inlet pipe with hole in roof.

(2) Install and secure one screw and nut into each muffler support.

NOTE
Muffler inlet must be centered in hole in roof.

(3) Attach exhaust pipe to muffler inlet pipe.

(4) Install and secure muffler clamp.

(5) Install exhaust extension pipe.

NOTE
Pipe must point straight up.

(6) Install and secure muffler clamp.

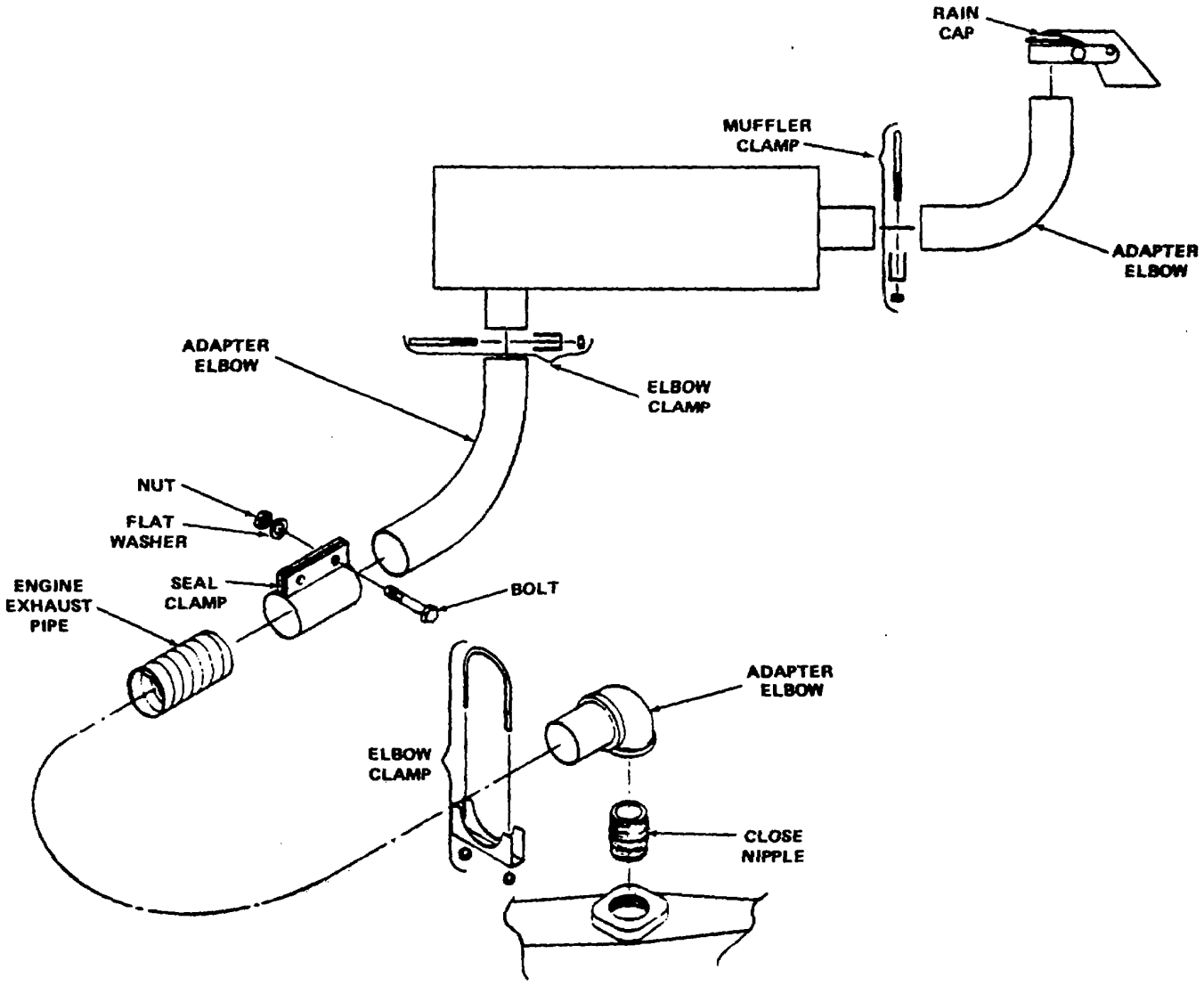


Figure 4-3. Exhaust Muffler

4-14. SERVICE HOSE

This task covers:

a. Removal

b. Disassembly, Cleaning and Repair

c. Installation

INITIAL SETUP

Applicable Configurations

All

---

a. Removal. Remove service hose from retaining clips in control panel access door.

b. Disassembly, Cleaning and Repair. Refer to direct support maintenance.

c. Installation. Wrap service hose around retaining clips in instrument panel access door.

4-15. ROOF PANEL

This task covers:

a. Removal

b. Repair

c. Installation

INITIAL SETUP

Applicable Configuration

All

Equipment Condition

Paragraph	Condition Description
4-13	Muffler Removed
4-34	Inlet Air Cleaner Removed

---

a. Removal

(1) Remove two screws and nuts from each of two cooling air discharge doors. Remove two doors.

(2) Remove 22 screws and nuts from around edge of roof panel. Remove roof panel.

b. Repair

(1) Repair damaged roof panel as required.

(2) Repaint roof panel with proper paint.

c. Installation

(1) Position roof panel over enclosure. Align roof panel with enclosure and install roof panel.

(2) Install 22 screws and nuts. Secure screws and nuts.

(3) Position cooling air discharge door over each end of enclosure.

(4) Install two screws and nuts into each door. Secure screws and nuts.

4-16. ENCLOSURE SIDE ACCESS PANEL

This task covers:

a. Removal

b. Repair

c. Installation

INITIAL SETUP

Applicable Configurations

All

---

a. Removal

(1) Use screwdriver and release ten quarter-turn fasteners. Remove side access panel.

(2) Slide sliding cover out of tracks in access panel.

b. Repair

(1) Repair side access panel as required.

(2) Repaint side access panel with proper paint.

c. Installation

(1) Install sliding cover into track in side access panel.

(2) Position access panel over opening in enclosure. Align quarter-turn fasteners with receptacles and secure ten quarter-turn fasteners.

4-17. DOORS AND LATCHES

This task covers:

a. Removal

b. Disassembly

c. Repair

d. Reassembly

e. Installation

INITIAL SETUP

Applicable Configurations

All

---

a. Removal

(1) Remove screw and nut from each of two check cables.

NOTE

Check cables not installed on control panel access door.

(2) Remove three screws and nuts from each door hinge. Remove doors.

b. Disassembly

(1) Loosen pinch bolt at rear of each latch. Remove control cable.

(2) Remove four screws and nuts from each latch. Remove latch.

(3) Remove four screws and nuts from each latch operator. Remove latch operators.

c. Repair

(1) Repair door panels as required.

(2) Repaint door panels with proper paint.

d. Reassembly

(1) Position latch operator over hole in door panel.

(2) Align bolt holes in operator with bolt holes in door panel.

(3) Install and secure four screws and nuts in latch operator.

(4) Position two latches over ends of each door panel.

(5) Align bolt holes in latch with bolt holes in door panel.

(6) Install and secure four screws and nuts in each latch.

(7) Thread end of control cable under pinch bolt on each latch.

(8) Adjust control cables so that each latch fully opens at the same time.

(9) Secure pinch bolts.

e. Installation

(1) Position door over proper opening in enclosure.

(2) Align bolt holes in door hinge with bolt holes in enclosure.

(3) Install and secure three screws and nuts in each hinge.

NOTE

Door must be centered in enclosure opening.

(4) Position screw through end of each check cable. Install and secure bolt and nut in proper hole in enclosure.

(5) Open and close door to ensure proper operation. Adjust as required.

4-18. TOOL BOX

This task covers:

a. Removal

b. Repair

c. Installation

INITIAL SETUP

Applicable Configurations

All

---

a. Removal

(1) Remove four screws and four nuts.

(2) Remove tool box and lid from enclosure.

(3) Remove two bolts and two nuts from tool box lid.

(4) Remove tool box lid from tool box.

b. Repair

(1) Repair tool box and lid as required.

(2) Paint tool box and lid with proper paint.

c. Installation

(1) Position tool box lid to tool box.

(2) Align bolt holes in tool box lid hinge with bolt holes in tool box.

(3) Install and secure two screws and nuts.

(4) Position tool box and lid into enclosure.

(5) Align bolt holes in tool box with bolt holes in enclosure panel.

(6) Install and secure screws and nuts.

4-19. END PANELS AND SIDE PANEL

This task covers:

a. Removal

b. Repair

c. Installation

INITIAL SETUP

Applicable Configurations

All

Equipment Condition Paragraph	Condition Description
4-17	Door Panel Removed

End panels and side panel are all removed in a similar manner.

a. Removal

(1) Remove four screws and four nuts from ends of panel.

(2) Remove three screws from bottom of panel.

(3) Remove panel from enclosure.

b. Repair

(1) Repair panel as required.

(2) Paint panel with proper paint.

c. Installation

(1) Position panel into enclosure opening.

(2) Align bolt holes in bottom of panel with bolt holes in frame. Loose assemble panel to frame with three screws.

(3) Align bolt holes in panel with bolt holes in adjacent panel.

(4) Install and secure two screws and two nuts at each end of panel.

(5) Secure three screws at bottom of panel.

4-20. FUEL LINES, HOSES AND FITTINGS

This task covers:

a. Removal

b. Inspection

c. Installation

INITIAL SETUP

Applicable Configurations

All

---

a. Removal

(1) Disconnect fuel line at top of fuel tank.

(2) Disconnect fuel line at fuel selector valve or at fuel pump as applicable. Remove fuel line.

(3) Disconnect fuel hose at fuel pump and at heater. Remove fuel hose.

(4) Remove fuel fittings from fuel tank, fuel selector valve, fuel pump and heater.

b. Inspection

(1) Inspect all threaded parts and tapped holes for damaged threads. Replace defective parts.

(2) Examine compression rings on fuel lines for cracks, damage or signs of leaks. Replace defective fuel lines.

(3) Examine fuel lines and hoses for cracks, splits and signs of leakage. Replace defective parts.

c. Installation

(1) Install fittings into fuel tank, fuel selector valve, fuel pump and heater.

(2) Install fuel line between fuel tank and fuel pump. Secure tube nuts.

(3) Install fuel line between fuel tank and fuel selector valve. Secure tube nuts.

4-21. FRAME UNDERPANEL

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Applicable Configurations

All

---

a. Removal

(1) Set parking brake.

(2) Raise drawbar and extend landing gear to maximum extension.

(3) Remove eight screws from frame; remove underpanel.

b. Installation

(1) Position underpanel against underside of frame.

(2) Align bolt holes in underpanel with bolt holes in frame.

(3) Secure underpanel to frame with eight screws.

4-22. ALTERNATOR ASSEMBLY

This task covers:

a. Testing

b. Removal

c. Installation

INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-21	Frame Underpanel Removed

---

a. Testing

(1) Start engine. Refer to operating instructions.

(2) Observe ammeter. Ammeter pointer should be on the charge side of "0." If not, use multimeter to check voltage between one ammeter post and ground. Voltage should be 12.5 - 14.5 VDC. If voltage is below this value, replace alternator.

b. Removal

(1) Remove adjusting bolt and washers.

(2) Remove nut and lock washer from pivot bolt. Do not remove pivot bolt.

(3) Remove drive belt.

(4) Disconnect wire harness at two places.

(5) Remove pivot bolt and alternator.

c. Repair. Refer to direct support maintenance.

d. Installation

(1) Align alternator pivot bolt hole with bolt hole in alternator support plate.

(2) Install pivot bolt through alternator and alternator support plate.

(3) Loose assemble lock washer and nut onto pivot bolt.

(4) Connect wire harness to alternator at two places.

(5) Install drive belt.

(6) Loose assemble adjusting bolt and lock washer to alternator adjusting link and alternator.

(7) Pull down on alternator to obtain correct drive belt tension. Secure adjusting link bolt and lock washer.

(8) Secure pivot bolt, lock washer and nut.

4-23. STARTER ASSEMBLY

This task covers:

a. Testing
b. Removal
c. Repair and Overhaul
d. Installation

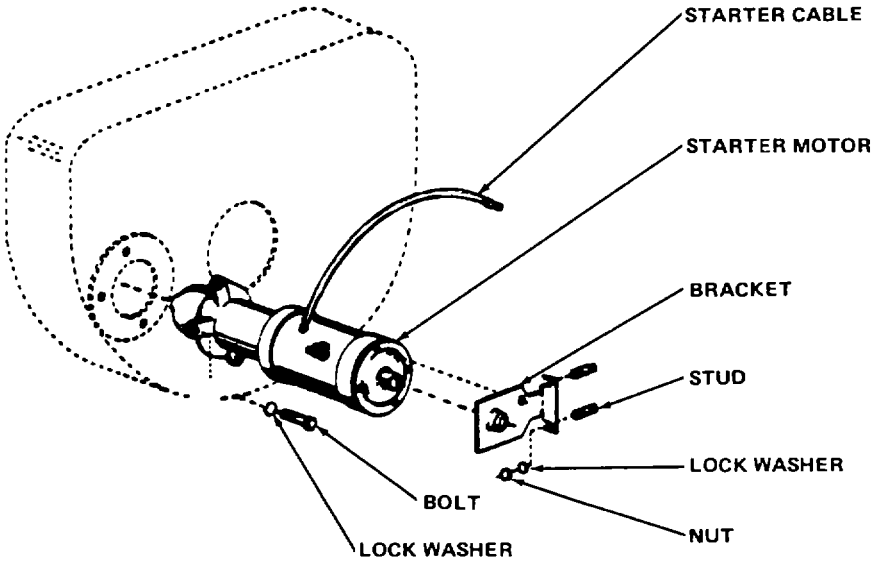


Figure 4-4. Starter Assembly

INITIAL SETUP

Applicable Configurations

All

Equipment Condition Paragraph	Condition Description
4-16	Side Access Panel Removed

a. Testing

(1) Turn on master switch.

(2) Press starter switch.

(3) If starter does not turn, check battery condition (paragraph 4-53), battery cables (paragraph 4-53) and starter relay. If all of these components check out as being good, replace the starter.

b. Removal

(1) Disconnect starter cable at the starter.

(2) Remove two nuts and lock washers.

(3) Remove starter support bracket.

(4) Remove three bolts and lock washers. Remove the starter.

c. Repair and Overhaul. Refer to direct support and general support maintenance.

d. Installation

(1) Position starter into opening in engine shroud.

(2) Align bolt holes in starter flange with bolt holes in engine shroud.

(3) Install three bolts and lock washers into starter and engine shroud.

(4) Position starter support bracket over mounting studs and end of starter.

(5) Install and secure two nuts and lock washers.

(6) Connect and secure starter cable at starter.

4-24. ENGINE ASSEMBLY, OPERATIONAL TEST

This task covers:

a. Testing

INITIAL SETUP

Applicable Configurations

All

---

a. Testing

(1) Start engine and compressor, using normal operating instructions.

(2) Allow compressor to run 10-15 minutes.

(3) While operating at full load and about 3300 - 3500 PSI receiver pressure, check compressor speed and engine speed with tachometer.

(4) Adjust engine speed as required. Refer to direct support maintenance.

(5) Using tachometer, check for drive belt slippage.

(6) Adjust drive belt tension as required (paragraph 4-25).

4-25. COMPRESSOR DRIVE BELT

This task covers:

a. Inspection

b. Removal

c. Installation

INITIAL SETUP

Applicable Configurations

All

Equipment Condition Paragraph	Condition Description
4-16	Side Access Panel Removed
4-21	Frame Underpanel Removed

---

a. Inspection. Refer to operator maintenance.

b. Removal

(1) Loosen four engine bolts, lock nuts and flat washers.

(2) Turn engine adjusting screw counterclockwise to loosen drive belts.

(3) Remove drive belts.

c. Installation

(1) Install matched pair of drive belts onto compressor and engine pulleys.

(2) Turn engine adjusting screw clockwise to obtain correct drive belt tension. Refer to PMCS.

(3) Secure four engine bolts, flat washers and lock nuts.

4-26. MAGNETO

This task covers:

a. Inspection
b. Removal
c. Repair and Overhaul
d. Installation

INITIAL SETUP

Applicable Configurations

All

Equipment Condition Paragraph	Condition Description
4-19	Front Enclosure Panel Removed
4-22	Alternator Belt Removed
	Flywheel Screen Removed

a. Inspection

(1) Remove one spark plug wire and hold about 1/4 inch from block. Crank engine over and watch for spark. If no spark appears, repair or replace magneto.

b. Removal

(1) Disconnect four spark plug wires.

(2) Disconnect ground strap.

(3) Disconnect main wire harness at one place.

(4) Remove nut.

(5) Remove bolt and lock washers and nut.

(6) Remove magneto.

c. Repair and Overhaul. Refer to direct support maintenance.

d. Installation. Refer to Fig. 4-5 for angle relationships for magneto timing.

(1) Remove # 1 spark plug.

(2) Rotate engine while holding finger over # 1 spark plug hole.

(3) Locate the letters "DC" near one of the blower vanes on the flywheel.

(4) Slowly turn engine until air blows out of # 1 spark plug hole.

(5) Continue turning engine until the letters "DC" are aligned with mark on shroud (Fig. 4-8).

(6) Remove inspection port plug from timing cover.

(7) Rotate magneto drive gear until # 1 spark plug terminal fires.

(8) Position magneto and magneto gasket over timing cover.

(9) Mesh gears. Verify location of marked tooth on magneto gear. Mark should be visible at the bottom of inspection port in timing cover.

(10) Loose assemble bolt, nut and two lock washers.

(11) Start engine.

(12) Check timing with neon timing light. Timing should be 23°The "X" marked blower vane should be visible through the timing hole in the engine air shroud. Adjust as required.

(13) Secure bolt and nut.

4-27. CARBURETOR

This task covers:

a. Inspection

b. Adjustment, Repair and Replacement

INITIAL SETUP

Applicable Configurations

All

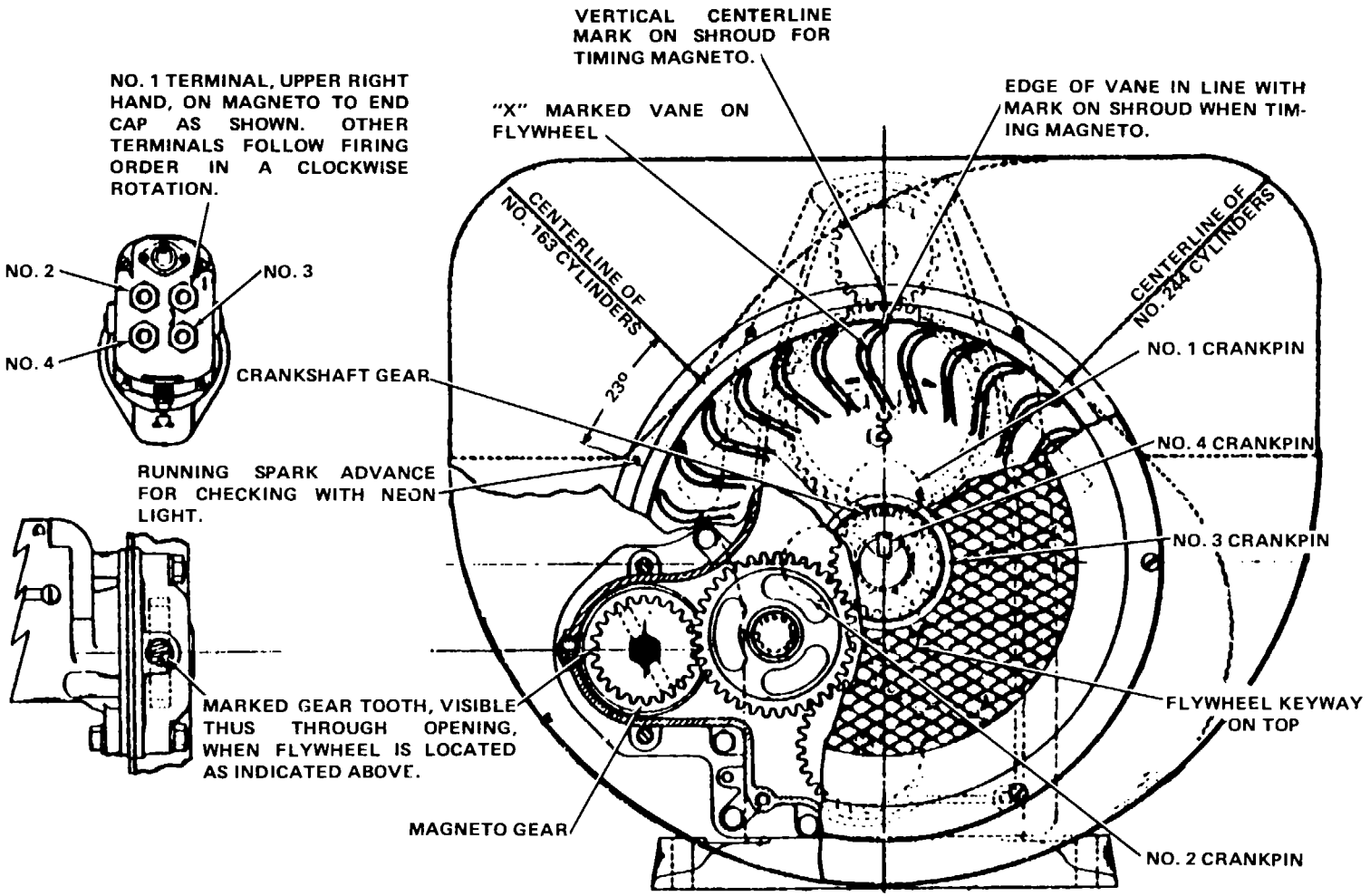


Figure 4-5. Magneto Timing

a. Inspection

(1) Inspect carburetor for leaks.

(2) Inspect carburetor fittings for leaks, cracks or damage.

(3) Inspect carburetor linkage for wear, binding or damage.

b. Adjustment, Repair and Replacement. Refer to direct support maintenance.

4-28. FUEL PUMP

This task covers:

a. Testing

b. Repair, Overhaul and Replacement

INITIAL SETUP

Applicable Configurations

All

Equipment Condition Paragraph	Condition Description
4-16	Side Access Panel Removed

---

a. Testing

(1) Disconnect fuel line between fuel pump and carburetor.

(2) Connect fuel pump pressure gage to fuel pump discharge port.

(3) Crank engine with starter. Read pressure gage. Correct pressure is 2 - 5 PSI.

(4) Disconnect fuel pump pressure gage.

(5) Connect hose to fuel pump discharge port. Run hose to clean, empty can.

(6) Crank engine with starter. Observe fuel pump delivery. Fuel pump should pump strong steam of fuel.

(7) If fuel pressure or flow rate is not correct, repair or replace fuel pump.

b. Repair. Overhaul and Replacement. Refer to direct support maintenance.

4-29. GOVERNOR

This task covers:

a. Inspection

b. Testing, Adjustment, Repair and Replacement

INITIAL SETUP

Applicable Configurations

All

---

a. Inspection

(1) Inspect governor assembly for loose, worn, damaged or missing linkage components.

(2) Inspect oil line to governor for leaks or damage.

(3) Inspect governor body and seals for leaks.

(4) Repair or replace damaged or defective components.

b. Testing, Adjustment, Repair and Replacement. Refer to direct support maintenance.

4-30. TEMPERATURE SWITCH

This task covers:

a. Removal

b. Inspection and Testing

c. Installation

INITIAL SETUP

Applicable Configurations

All

---

a. Removal

(1) Disconnect wire between magneto and temperature switch at the temperature switch.

(2) Remove one cylinder head bolt and temperature switch.

b. Inspection and Testing

(1) Inspect temperature switch for cracks, loose wire terminal and signs of damage.

(2) Use multimeter to check temperature switch for continuity. Switch should be closed below 195°F.

(3) Replace defective switch.

(4) Inspect cylinder head bolt for damaged threads. Replace defective bolt.

c. Installation

(1) Slide temperature switch onto cylinder head bolt.

(2) Assemble cylinder head bolt and temperature switch into cylinder head. Tighten to 24 lb-ft torque.

(3) Connect wire from magneto to temperature switch.

4-31. INTAKE AND EXHAUST MANIFOLD

This task covers:

a. Removal

b. Cleaning and Inspection

c. Installation

INITIAL SETUP

Applicable Configurations

All

Equipment Condition Paragraph	Condition Description
4-27	Carburetor Removed
4-13	Exhaust Pipe Removed

General Safety Precautions

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 (38°C) - 138°F (59°C).

a. Removal

(1) Remove carburetor. Refer to direct support maintenance.

(2) Remove two bolts, two nuts and four washers. Remove seal clamp.

(3) Disconnect exhaust pipe from exhaust manifold elbow.

(4) Remove four nuts and four washers.

(5) Remove intake and exhaust manifold assembly.

b. Cleaning and Inspection

(1) Clean all parts in cleaning solvent. Dry thoroughly.

(2) Inspect all threaded parts and tapped holes for thread damage. Repair or replace defective components.

(3) Inspect sealing surfaces for damage. Repair damaged surfaces.

(4) Inspect castings for cracks, breaks and leakage. Replace defective castings.

c. Installation

(1) Install four new manifold seals into cylinder block.

(2) Position intake and exhaust manifold assembly over studs in cylinder block.

(3) Carefully lower intake and exhaust manifold assembly over studs. Seat manifold onto seals.

(4) Install four nuts and four washers. Tighten to 18 lb-ft torque.

(5) Install carburetor. Refer to direct support maintenance.

(6) Connect exhaust pipe to exhaust manifold elbow.

(7) Install seal clamp.

(8) Install and secure two bolts, two nuts and four washers.

(9) Start engine and check for leaks.

(10) Stop engine.

(11) Repair any leaks.

4-32. CRANKCASE BREATHER

This task covers:

a. Inspection

b. Removal

c. Installation

INITIAL SETUP

Applicable Configurations

All

---

a. Inspection. Inspect crankcase breather for cracks, leaks or damage. Replace defective breather.

b. Removal

(1) Hold base of crankcase breather tube with a pair of vice grip type pliers.

(2) Work the tube back and forth and pull the breather out of the crankcase.

c. Installation

(1) Position end of crankcase breather over the breather hole in the crankcase.

(2) Seat the crankcase breather into the crankcase with a soft mallet.

4-33. SPARK PLUGS AND CABLES

This task covers:

a. Removal

b. Cleaning and Inspection

c. Installation

INITIAL SETUP

Applicable Configurations

All

General Safety Precautions

WARNING

Compressed air can be extremely hazardous. Use 30 PSI maximum air pressure for parts cleaning.

---

a. Removal

(1) Disconnect spark plug cables from spark plugs.

(2) Remove spark plugs from cylinder head.

b. Cleaning and Inspection

(1) Clean spark plugs with a wire brush and ignition point file. Blow dirt off of spark plugs with dry compressed air.

(2) Inspect spark plugs for cracked or broken insulators, excessive wear or other damage. Replace defective spark plugs.

(3) Adjust spark plug gap with a wire gap gage. Correct gap is 0.030 inch.

c. Installation

(1) Install spark plugs into cylinder heads. Tighten to 25 - 30 lb-ft torque.

(2) Connect spark plug wires to spark plugs.

4-34. AIR CLEANER ASSEMBLY

This task covers:

a. Replacement of Element

b. Removal of Air Cleaner Assembly

c. Installation

INITIAL SETUP

Applicable Configurations

All

---

a. Replacement of Element

(1) Loosen thumb screw and remove dust cap and retainer band.

(2) Remove wing nut and filter element.

(3) Wipe out interior of air cleaner housing and dust bowl.

(4) Install new filter element. Secure with wing nut.

(5) Install dust bowl and retainer band. Tighten thumb screw.

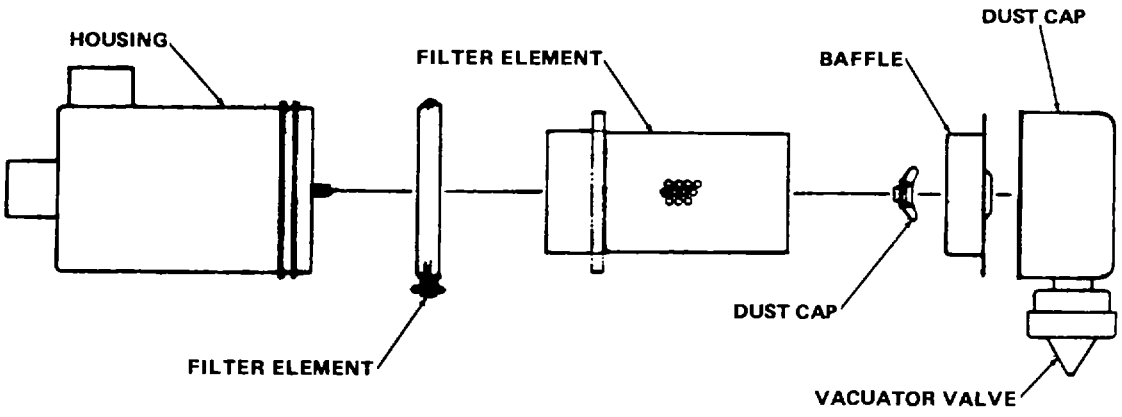


Figure 4-6. Air Cleaner Assembly

b. Removal of Air Cleaner Assembly

(1) Disconnect air duct from air cleaner housing.

(2) Remove air inlet hood.

(3) Loosen and remove four bolts and nuts. Remove air cleaner assembly.

(4) Loosen and remove one screw and nut from each strap. Remove two straps.

c. Installation

(1) Loose assemble two straps to air cleaner assembly with one screw and one nut.

(2) Position air cleaner assembly against underside of roof panel. Align air inlet of air cleaner with hole in roof panel.

(3) Align bolt holes in air cleaner straps with bolt holes in roof panel.

(4) Secure air cleaner straps to roof panel with four bolts and four nuts.

(5) Adjust air cleaner assembly within the straps so that the air cleaner air inlet is centered in the hole in the roof panel. Secure two straps.

(6) Install air inlet hood.

(7) Connect air duct to air cleaner.

4-35. CLUTCH AND HOUSING

This task covers:

a. Inspection
b. Adjustment
c. Removal
d. Disassembly
e. Cleaning and Inspection
f. Reassembly
g. Installation

INITIAL SETUP

Applicable Configurations

All

Equipment Condition Paragraph	Condition Description
4-16	Side Access Panel Removed
4-25	Drive Belts Removed

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 (38°C) - 138°F (59°C).

a. Inspection

(1) Inspect clutch housing for oil leaks and cracked or damaged housing. Repair or replace defective components.

(2) Inspect clutch linkage for wear, damage or missing or loose parts. Repair or replace defective items.

(3) Operate clutch lever. Lever should have a positive engagement and disengagement. If not, adjust as required.

b. Adjustment

(1) Remove four bolts and washers.

(2) Remove inspection cover plate.

(3) Release clutch.

(4) Rotate engine until adjustment lock is accessible.

(5) Loosen adjustment lock screw.

(6) Hold engine crankshaft to prevent turning.

(7) Turn clutch adjustment ring one notch at a time. Check clutch operation after each movement. Operating force should be about 50 lbs at end of clutch lever.

(8) Tighten adjustment lock screw.

(9) Position new cover gasket and inspection cover over opening in clutch housing.

(10) Align bolt holes in cover with bolt holes in clutch housing.

(11) Secure inspection cover to clutch housing with four bolts and lock washers.

c. Removal

(1) Remove three bolts and lock washers from drive sheave bushing.

(2) Insert two bolts into threaded holes in bushing. Tighten bolts to push drive sheave off bushing.

(3) Remove bushing, drive sheave and shaft key from output shaft.

(4) Drain oil from clutch housing.

(5) Push clutch operating lever in to disengage clutch.

(6) Remove four bolts, lock washers, inspection cover and gasket.

(7) Use a drift pin and hammer to drive out two roll pins.

(8) Remove pinch bolt from clutch operating lever. Remove lever from clutch yoke shaft.

(9) Slide yoke shaft out of clutch housing. Lift clutch yoke out of clutch housing.

(10) Loosen and remove four nuts and lock washers. Remove clutch housing and gasket.

(11) Remove setscrew and lock washer.

(12) Loosen and remove pinch bolt, lock washers and nut.

(13) Remove clutch assembly and shaft key from engine crankshaft.

d. Disassembly

(1) Remove snap ring from PTO shaft.

(2) Use brass mallet and drive PTO shaft out of shaft bearing.

(3) Remove second snap ring, bearing retainer and bearing.

(4) Loosen and remove bolt, lock washer and adjustment lock.

(5) Loosen and remove two bolts and nuts from release collar. Remove collar.

(6) Unscrew and remove adjusting ring.

(7) Remove clutch pressure plate assembly, driven member and bearing from clutch housing.

e. Cleaning and Inspection

(1) Clean all parts in cleaning solvent. Dry thoroughly.

(2) Inspect all threaded parts and tapped holes for damaged threads. Repair or replace defective parts.

(3) Inspect wear members for damage or excessive wear. Replace defective parts.

f. Reassembly

(1) Install bearing into clutch housing.

(2) Install three return springs into clutch housing.

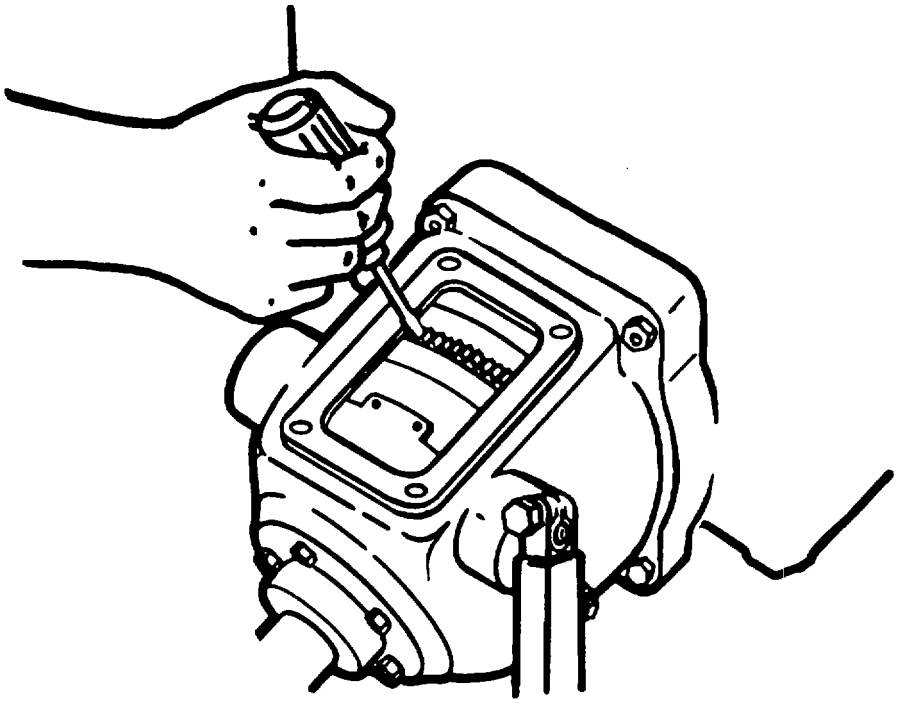


Figure 4-7. Clutch Adjustment

(3) Position and install clutch facing over return springs.

(4) Install pressure plate assembly.

(5) Install and tighten adjusting ring.

(6) Assemble release collar over release sleeve. Secure with two bolts and nuts.

(7) Install snap ring onto PTO shaft.

(8) Install bearing and retainer into clutch housing.

(9) Install outer snap ring.

g. Installation

(1) Install shaft key into crankshaft.

(2) Slide clutch assembly onto crankshaft. Secure with pinch bolt, washers and nut.

(3) Install and secure setscrew and washer.

(4) Position gasket and clutch housing over four studs in engine. Secure with four nuts and washers.

(5) Insert clutch yoke into inspection opening. Position ends of clutch yoke over lugs on release collar.

(6) Install yoke shaft into clutch housing and through yoke.

(7) Align holes in yoke with holes in yoke shaft. Secure with two roll pins.

(8) Install clutch operating lever over end of yoke shaft. Secure with pinch bolt.

(9) Adjust clutch. Secure with adjustment lock, bolt and washer.

(10) Slide drive sheave onto PTO shaft.

NOTE

Large diameter of tapered bore must be away from clutch housing.

(11) Install shaft key into keyway in PTO shaft. Slide bushing onto PTO shaft.

(12) Install and secure three bolts and lock washers into drive sheave.

(13) Fill with oil. Install and secure inspection cover, gasket, bolts and washers.

4-36. AIR COMPRESSOR ASSEMBLY

This task covers:

a. Testing

b. Adjustment

c. Repair, Replacement and Overhaul

INITIAL SETUP

Applicable Configurations

All

---

a. Testing

(1) Start compressor. Refer to operating instructions.

(2) Run compressor up to full pressure.

(3) Observe 4th stage pressure gage and receiver pressure gages. Fourth stage pressure must be greater than 2000 PSI before receiver pressure gage starts to rise from 0 PSI. Adjust priority valve as required to obtain the 2000 PSI pressure.

b. Adjustment

(1) Adjust priority. valve as required. Loosen setscrew, turn adjusting screw in to raise pressure or out to reduce pressure. Secure setscrew.

(2) Adjust oil pressure as required. Remove acorn nut. Turn adjusting screw in to raise pressure or out to reduce pressure. Install acorn nut.

c. Repair, Replacement and Overhaul. Refer to direct and general support maintenance.

4-37. OIL LINES AND FITTINGS

This task covers:

a. Inspection

b. Replacement

INITIAL SETUP

Applicable Configurations

All

---

a. Inspection

(1) Inspect oil line between compressor and panel mounted pressure gage for leaks. Replace leaking line or fittings.

(2) Inspect oil filter for leaks. Replace leaking filter or fittings.

b. Replacement. Refer to direct support maintenance.

4-38. CONDENSATE DRAIN/UNLOADER VALVE

This task covers:

a. Testing
b. Inspection
c. Replacement
d. Adjustment

INITIAL SETUP

Applicable Configurations

All

---

a. Testing

(1) Start compressor. Refer to operating instructions.

(2) After compressor reaches 3500 PSI in the 4th stage, switch throttle switch to low and compressor load switch to unload.

(3) Observe 3rd and 4th stage pressure gages. The 3rd stage pressure should remain above 200 PSI. The 4th stage pressure gage should remain above 500 PSI. Adjust valve as required.

(4) Stop compressor. Refer to operating instructions.

b. Inspection. Inspect condensate drain valve, all tubing and fittings for signs of leaks or damage. Repair or replace as required.

c. Replacement. Refer to direct support maintenance.

d. Adjustment

(1) Loosen jam nuts.

(2) Adjust screws as required to obtain proper 3rd and 4th stage pressure during unload sequence. Turn screws in to raise pressure, out to reduce pressure.

(3) Secure jam nuts.

4-39. DEHYDRATORS

This task covers:

a. Inspection

b. Service

INITIAL SETUP

Applicable Configurations

All

General Safety Precautions

WARNING

Do not attempt to open or service dehydrators until all pressure has been released. Make sure dehydrator bleed valve is fully open before servicing dehydrators.

---

a. Inspection. Refer to direct support maintenance.

b. Service

(1) Open dehydrator bleed valve.

(2) Remove top plug from each dehydrator.

(3) Examine O-rings. Replace as required.

(4) Remove and discard dehydrator cartridge from dehydrator # 1.

(5) Transfer dehydrator cartridge from dehydrator # 2 to dehydrator # 1.

(6) Install new dehydrator cartridge into dehydrator # 2.

(7) Spray silicone lubricant onto O-rings and anti-freeze compound onto plug threads.

(8) Install and secure top plugs.

(9) Close dehydrator bleed valve.

4-40. 4TH STAGE SEPARATOR

This task covers:

a. Inspection

b. Service

c. Repair and Replacement

INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-17	Side Access Panel Removed

General Safety Precautions

WARNING

Do not attempt to open or service 4th stage separator until all pressure has been released. Compressor must be shut down and all pressure released by the condensate drain valve. Note 4th stage pressure gage reading. Gage reading must be "0."

---

a. Inspection. Inspect 4th stage separator and all tubing for leaks, loose fittings or damage. Repair or replace defective components.

b. Service. Replace filter element every 1000 hours of operation. Refer to direct support maintenance for procedure.

c. Repair and Replacement. Refer to direct support maintenance.

4-41. AIR RECEIVER

This task covers:

a. Inspection

b. Repair and Replacement

INITIAL SETUP

Applicable Configurations

All

Equipment Condition Paragraph	Condition Description
4-16	Side Access Panel Removed

---

a. Inspection

(1) Inspect air receiver and all tubing and fittings for leaks. Repair or replace as required.

(2) Inspect air receiver straps for loose or missing hardware or damage. Replace or repair as required.

b. Repair and Replacement. Refer to direct support maintenance.

4-42. INTERCOOLERS AND AFTERCOOLER

This task covers:

a. Inspection

b. Repair and Replacement

INITIAL SETUP

Applicable Configurations

All

Equipment Condition Paragraph	Condition Description
4-16	Side Access Panel Removed

---

a. Inspection. Inspect aftercooler and intercoolers for leaks, loose fittings and loose attaching hardware. Repair or replace as required.

b. Repair and Replacement. Refer to general support maintenance.

4-43. INSTRUMENT PANEL

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-15	Enclosure Roof Panel Removed
4-52	Battery Disconnected

General Safety Precautions

WARNING

Make sure compressor is shut down and all pressure relieved before disconnecting gage tubing.

---

a. Removal

(1) Disconnect all pressure tubing at rear of instrument panel.

(2) Disconnect main wire assembly at 25 places. Make a note of location of wiring connections.

(3) Disconnect panel lamp wire from switch.

(4) Loosen and remove four bolts, four nuts and four lock washers. Remove instrument panel.

b. Installation

(1) Position instrument panel assembly against frame uprights.

(2) Align bolt holes in panel mounts with bolt holes in frame uprights.

(3) Install and secure panel to frame uperights with four bolts, four nuts and four lock washers.

(4) Connect all pressure tubing to rear of instrument panel.

(5) Connect main wire assembly at 25 places.

(6) Connect panel light wire to switch.

4-44. MANUAL SWITCHES

This task covers:

a. Removal

b. Testing

c. Installation

INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-52	Battery Disconnected

---

a. Removal

(1) Disconnect main wire assembly. Mark wire location for reassembly.

(2) Loosen and remove nut and washer. Remove switch from instrument panel.

b. Testing. Check continuity of switch with multimeter NSN 6615-00-581-2036 or equal.

c. Installation

(1) Position switch into hole in instrument panel.

(2) Secure switch to panel with nut and washer.

(3) Connect wire harness.

4-45. HOURMETER

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Applicable Configurations

All

a. Removal

(1) Disconnect wire harness at two places.

(2) Loosen and remove nut, washer and saddle clamp.

(3) Remove hourmeter from instrument panel.

b. Installation

(1) Position hourmeter into hole in instrument panel.

(2) Position saddle clamp over stud on back of hourmeter. Secure with nut and washer.

(3) Connect wire harness to hourmeter at two places.

4-46. AIR CLEANER RESTRICTION INDICATOR

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Applicable Configurations

All

a. Removal

(1) Disconnect signal tube at rear or indicator.

(2) Loosen and remove two bolts, two nuts and two lock washers. Remove indicator.

(3) Remove mounting flange from indicator.

b. Installation

(1) Install mounting flange onto indicator.

(2) Position indicator assembly against top of frame upright.

(3) Align bolt holes in indicator assembly with bolt holes in frame upright.

(4) Secure indicator to frame upright with two bolts, two nuts and two lock washers.

(5) Connect and secure signal tube to rear of indicator.

4-47. AMMETER

This task covers:

a. Removal

b. Testing

c. Installation

INITIAL SETUP

Applicable Configurations

All

Equipment Condition Paragraph	Condition Description
4-52	Battery Disconnected

---

a. Removal

(1) Disconnect wire harness at two places. Mark wire for reassembly.

(2) Remove two nuts, two washers and saddle clamp. Remove ammeter.

b. Testing. Apply known current to ammeter. Observe reading on ammeter. Ammeter reading should be within 5% of known current. Replace defective ammeter.

c. Installation

(1) Position ammeter into hole in instrument panel.

(2) Assemble saddle clamp, two washers and two nuts to studs on back of ammeter. Secure nuts.

(3) Connect wire harness at two places.

4-47A. GAGES

This task covers:

a. Removal

(1) Disconnect pressure tube.

(2) Disconnect 2 each mounting screws.

(3) Remove gage from panel.

b. Service

(1) Lay gage face down.

(2) Remove rubber blow out plug from back of gage.

(3) Fill gage with glycerin.

(4) Replace rubber blow out plug.

c. Installation

(1) Reinstall gage to panel.

(2) Connect 2 each mounting screws.

(3) Connect pressure tube to gage.

4-48. VIBRATION MOUNTS

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Applicable Configurations

All

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a. Removal

(1) Loosen and remove bolt, nut and lock washer.

(2) Loosen and remove four bolts, nuts and lock washers. Remove vibration mounts.

b. Installation

(1) Position vibration mount over hole in instrument panel.

(2) Align bolt holes in vibrations mount with bolt holes in instrument panel. Secure vibration mount to instrument panel with four bolts, four nuts and four lock washers.

(3) Secure vibration mount to frame with one bolt, nut and lock washer.

449. WIRE HARNESS

This task covers:

a. Removal
b. Testing
c. Repair
d. Installation

INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-52	Battery Disconnected

---

a. Removal

(1) Disconnect wire harness from rear of instrument panel at 25 places.

(2) Disconnect wire harness from air pressure switch.

(3) Disconnect wire harness from starter relay at two places.

(4) Disconnect wire harness from throttle solenoid at one place.

(5) Disconnect wire harness from alternator at two places.

(6) Disconnect wire harness at starter at two places.

(7) Disconnect wire harness at magneto at two places.

(8) Remove wire harness.

b. Testing. Use multimeter NSN 6615-00-581-2036 or equal and check continuity of each circuit of the wire harness.

NOTE

The wire harness is fully color coded. Each size and color must be fully checked.

c. Repair. No repair is recommended. Replace defective wire harness with a new harness.

d. Installation

(1) Install wire harness onto frame. Position wire harness so that wire harness will reach the air pressure switch and the magneto.

(2) Connect wire harness as follows: engine oil pressure switch - one place; magneto - one place; alternator - two places; throttle solenoid - one place; starter solenoid - two places; instrument panel - 25 places; air pressure switch - three places.

4-50. ENGINE AND COMPRESSOR OIL DRAINS

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Applicable Configurations

All

---

a. Removal

(1) Remove drain plug and drain oil.

(2) Disconnect oil drain hose from frame fitting.

(3) Remove support clamps (two for compressor, one for engine).

(4) Disconnect oil drain hose from engine or compressor.

b. Installation

(1) Connect oil drain hose at engine or compressor.

(2) Secure hose with support clamps (one for engine hose, two for compressor hose).

(3) Connect hose to frame.

(4) Install drain plug.

(5) Fill with oil.

4-51. FUEL FILLER CAP

This task covers:

a. Removal

b. Inspection

c. Installation

INITIAL SETUP

Applicable Configurations

All

---

a. Removal

(1) Remove filler cap from fuel tank.

(2) Bend cotter pin and remove filler cap from chain.

b. Inspection. Inspect filler cap for damage. Replace defective filler cap.

c. Installation

(1) Insert cotter pin through hole in center of filler cap.

(2) Bend cotter pin to secure.

(3) Install filler cap onto fuel tank.

4-52. FUEL GAGE

This task covers:

a. Testing

b. Removal

c. Installation

INITIAL SETUP

Applicable Configurations

All

a. Testing

(1) Turn master switch on. Fuel gage should register.

(2) If fuel gage does not move, verify fuel level in tank.

(3) If fuel is in tank and gage does not register, short center terminal of fuel level sender to ground. Fuel gage should go to "full."

(4) If fuel gage does not go to "full," check voltage at gage with multimeter.

(5) If proper voltage is at gage, replace gage.

b. Removal

(1) Disconnect wire harness at three places. Mark wire for reassembly.

(2) Remove nut, washer and saddle clamp from rear of fuel gage. Remove fuel gage.

c. Installation

(1) Position fuel gage into hole in instrument panel.

(2) Position saddle clamp over stud in back of fuel gage.

(3) Secure saddle clamp with nut and washer.

(4) Connect wire harness in three places.

4-53. BATTERY, BATTERY HOLD-DOWN AND BATTERY CABLES

This task covers:

a. Removal
b. Inspection
c. Remove Battery Cables
d. Install Battery Cables
e. Test Battery
f. Install Battery and Hold-Down

INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-16	Side Access Panel Removed

General Safety Precautions

WARNING

Lead-acid batteries contain a strong acid. This acid can cause severe skin burns. Handle battery only with proper lifting strap. Wear protective clothing and eye protection.

a. Removal

(1) Remove four bolts.

(2) Remove two bolts.

(3) Remove battery box cover.

(4) Disconnect two battery cables.

NOTE

Disconnect ground cable first.

(5) Loosen two nuts.

(6) Remove battery hold-down and hold-down bolts.

(7) Use battery strap and lift battery out of battery box.

(8) Lift battery between drive belts and out of compressor.

NOTE

As an alternate method, remove drive belts.

b. Inspection

(1) Inspect battery hold-down, bolts and nuts for damaged threads, corrosion and other damage. Replace damaged components.

(2) Inspect battery cables for wear, damage, cut insulation or other defects. Replace defective components.

c. Remove Battery Cables

(1) Disconnect positive battery cable at starter solenoid. Remove cable.

(2) Disconnect ground cable at side of battery box by removing one bolt, nut and two lock washers.

d. Install Battery Cables

(1) Position eyelet of positive battery cable over stud on starter relay. Secure with one nut.

(2) Position eyelet of ground cable over bolt hole in side of battery box. Secure to battery box with one bolt, one nut and two lock washers.

NOTE

Ground cable between engine and battery box also secures to the battery box with this same bolt.

e. Test Battery. Check electrolyte gravity of battery with hydrometer. Recharge if gravity is below 1.230. Replace battery if gravity difference between cells is greater than .020.

f. Install Battery and Hold-Down

(1) Position battery through drive belts.

(2) Lower battery into battery box. Negative terminal should be closest to outside of frame.

(3) Install and secure battery hold-down.

(4) Connect and secure positive battery cable.

(5) Connect and secure negative cable.

(6) Position battery box cover over battery box.

(7) Align bolt holes in cover with bolt holes in frame.

(8) Secure battery box cover to frame with two existing and four loose bolts.

(9) Install drive belts if removed.

4-54. AXLE

This task covers:

a. Removal

b. Repair

c. Installation

INITIAL SETUP

Applicable Configurations

All

---

a. Removal. Refer to direct support maintenance.

b. Repair. Repair damaged axle as required. Replace axle if damage to bearing or sealing surfaces is noted.

c. Installation. Refer to direct support maintenance.

4-55. WHEEL AND TIRE ASSEMBLY

This task covers:

a. Removal

b. Disassembly

c. Repair

d. Assembly

e. Installation

INITIAL SETUP

Applicable Configurations

All

---

a. Removal

(1) Raise compressor with jack. Support with safety stands.

(2) Remove five nuts and lock washers. Remove wheel and tire assembly from brake hub.

b. Disassembly

(1) Remove valve core from inner tube.

(2) Remove five bolts, nuts and lock washers.

(3) Separate wheel into two halves.

(4) Remove tire and inner tube.

c. Repair

(1) Repair inner tube as required. Replace inner tube if not repairable.

(2) Repair tire as required. Replace tire as required.

(3) Repair wheel halves as required.

d. Assembly

(1) Install valve core into inner tube.

(2) Add a small amount of air to inner tube.

(3) Install inner tube into tire.

(4) Install wheel halves onto tire and inner tube assembly.

(5) Extend inner tube valve stem through hole in outer wheel half.

(6) Align bolt holes in wheel halves. Secure with five bolts, five nuts and five lock washers.

(7) Inflate to 25 - 35 PSI.

e. Installation

(1) Align bolt holes in wheel with studs in brake hub.

(2) Slide wheel onto studs. Secure with five nuts and five lock washers.

(3) Raise compressor off safety stands.

(4) Remove safety stands and lower compressor. Remove jack.

4-56. BRAKE ASSEMBLY

This task covers:

a. Inspection

b. Disassembly

c. Reassembly

INITIAL SETUP

Applicable Configurations

All

Equipment Condition Paragraph	Condition Description
4-55	Wheel and Tire Removed

a. Inspection

(1) Inspect brake operating lever, extension rod, cross shaft and links for wear, thread damage and missing parts. Replace as required.

(2) Remove brake drum (paragraph 4-57).

(3) Inspect brake cam and brake linings. Replace worn or damaged components.

b. Disassembly

(1) Remove two nuts and lock washers. Remove brake lever.

(2) Remove four bolts and lock washers. Remove brake cross shaft.

(3) Remove cotter pin from two brake links.

(4) Remove tire and wheel assembly (paragraph 4-55).

(5) Remove hub cap and brake drum (paragraph 4-57).

(6) Remove one pinch bolt and one nut from each brake arm. Remove two brake arms.

(7) Remove retractor spring.

(8) Remove brake shoes.

c. Reassembly

(1) Position brake shoes against brake backing plate. Secure with spring.

(2) Position brake arm over serrated end of operating cam. Note proper angle.

(3) Install and secure one pinch bolt, one nut and one lock washer.

(4) Install brake drum (paragraph 4-57).

(5) Align brake cross shaft supports with bolt holes in frame. Secure to frame with four bolts and four lock washers.

(6) Install two brake links. Secure with two cotter pins.

(7) Align bolts in brake lever with holes in frame. Secure to frame with two nuts and two lock washers.

4-57. WHEEL HUB AND BRAKE DRUM, WHEEL BEARINGS AND SEALS

This task covers:

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

INITIAL SETUP

Applicable Configurations
All

Equipment Condition

Paragraph	Condition Description
4-54	Wheel and Tire Removed

General Safety Precautions

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 (38°C) - 138°F (59°C).

---

a. Removal

(1) Remove tire and wheel assembly (paragraph 4-55).

(2) Remove hub cap.

(3) Remove cotter pin.

(4) Remove wheel bearing nut and washer.

(5) Remove wheel hub from axle.

(6) Remove seal from inside of hub.

(7) Remove inner and outer wheel bearings.

(8) Drive inner and outer bearing races out of wheel hub.

b. Cleaning and Inspection

(1) Clean all parts in cleaning solvent, Federal Specification P-D-680. Dry thoroughly.

(2) Inspect all threaded parts for damage. Replace damaged parts.

(3) Inspect wheel bearings and races for scoring, pitting, discoloration and signs of damage. Replace as required.

(4) Inspect seal for damage. Replace as required.

c. Repair

(1) Use press to remove and replace damaged wheel hub studs.

(2) Use press to install bearing races into wheel hub.

(3) Thoroughly work wheel bearing grease into wheel bearings.

(4) Apply a liberal coating of grease to the bearing races and in the wheel hub.

(5) Fill grease pocket in wheel hub with wheel bearing grease.

(6) Install inner wheel bearing into wheel hub.

(7) Use press to install new seal into wheel hub.

d. Installation

(1) Position wheel hub over end of axle.

(2) Carefully slide wheel hub onto axle.

NOTE

Do not slide grease seal across axle shaft.

(3) Position outer wheel bearing onto end of axle.

(4) Install wheel bearing washer and nut.

(5) Tighten bearing nut while turning hub counterclockwise. Nut should be tightened until all bearing play disappears.

(6) Back off bearing nut only enough to install cotter pin.

(7) Install cotter pin and bend over.

(8) Install hub cap.

(9) Install wheel and tire assembly (paragraph 4-55).

4-58 FRAME ASSEMBLY

This task covers:

a. Inspection

b. Repair

INITIAL SETUP

Applicable Configurations

All

---

a. Inspection

(1) Steam clean frame.

(2) Inspect frame for damage. Repair bent, cracked, warped and damaged frame as required.

b. Repair. Refer to general support maintenance.

Section VII. PREPARATION FOR STORAGE OR SHIPMENT

4-59. SCOPE

This section covers the requirements for special preservation, packaging, packing, marking and ship-ping instructions. Included are those specific requirements for short term and long term storage. Also included are specific instructions for loading and tiedown procedures for transportation of the equipment via rail.

4-60. SHORT TERM (1 TO 45 DAY) STORAGE

Perform the next scheduled preventive maintenance checks and services. Correct all known deficiencies. Apply all current modification work orders. Store the compressor in a location which will protect the compressor from the direct effects of the weather. This location should allow access for periodic visual inspection. All enclosure doors must be closed and secured. Drain fuel tank.

4-61. LONG TERM (NO TIME LIMIT) STORAGE

Perform all work required for short term storage. In addition perform the following preservation operations:

a. Drain engine crankcase and fill with preservative P-10, grade 10.

b. Drain compressor crankcase and fill with preservative P-10, grade 10.

c. Start and operate the compressor for five minutes and shut the compressor down. Immediately before shutdown, spray two to three fluid ounces of preservative P-10, grade 10, into the compressor 1st stage inlet (after the air cleaner).

d. Install new dehydrator cartridges.

e. Drain fuel tank. Spray inside of fuel tank with preservative P-10, grade 30.

f. Connect a two-chamber fuel source to the auxiliary fuel connection - one chamber to be filled with gasoline, the other to be filled with preservative P-9. Start the engine (only). Run on gasoline for two minutes. Switch to P-9. Run the engine until white smoke starts to come from the engine exhaust. Stop engine.

g. After engine cools, remove each spark plug and add 1 oz. of preservative P-9 to each cylinder. Replace spark plugs.

h. Loosen all drive belts.

i. Apply preservative primer to all drive sheave belt surfaces.

j. Apply preservative P-9 to the engine exhaust manifolds, pipes and muffler.

k. Close and secure all enclosure doors.

I. Disconnect and remove battery.

m. Close air cleaner inlet with tape.

n. Store in fully protected storage site.

4-62. RAIL TIEDOWN

For rail flat car transportation use four wheel chocks (pattern 16 or 87), placing one in front and one behind each wheel. Fully raise the landing gear. Lean the compressor front end down, and rest the forward edge on a 16-inch length of 4"x 4" wood. Tie the compressor down with four 1-1/4" x .035" high tensile banding with anchor plate (form 84) at the stenciled tie down points.

CHAPTER 5

DIRECT SUPPORT MAINTENANCE

Section I. GENERAL

5-1. SCOPE

This section covers maintenance procedures to be used by direct support maintenance personnel. It also covers instructions for removal and installation of major components such as engine, compressor, axle, and so forth.

Section II. REMOVAL OF MAJOR COMPONENTS

5-2. ENGINE ASSEMBLY

a. Removal

(1) Remove enclosure roof. (Figure 5-1)

(2) Drain engine oil. (Figure 5-2)

(3) Disconnect fuel line at fuel pump. (Figure 5-3)

(4) Disconnect starter cable and ground cable. (Figure 5-4)

(5) Disconnect main wire harness at throttle solenoid, magneto and oil pressure switch.

(6) Remove four engine mounting bolts and nuts.

(7) Remove drive belts for compressor and alternator. (Figure 5-5)

(8) Disconnect clutch linkage at clutch.

(9) Attach lifting device beneath exhaust manifold.

(10) Disconnect oil drain line at engine.

(11) Disconnect air cleaner tube at carburetor. (Figure 5-6)

(12) Remove engine from frame.

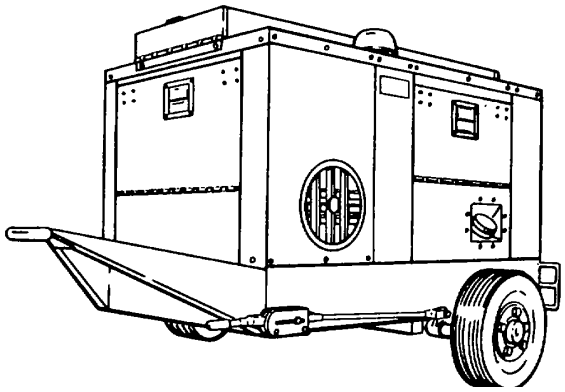


Figure 5-1. Enclosure Roof

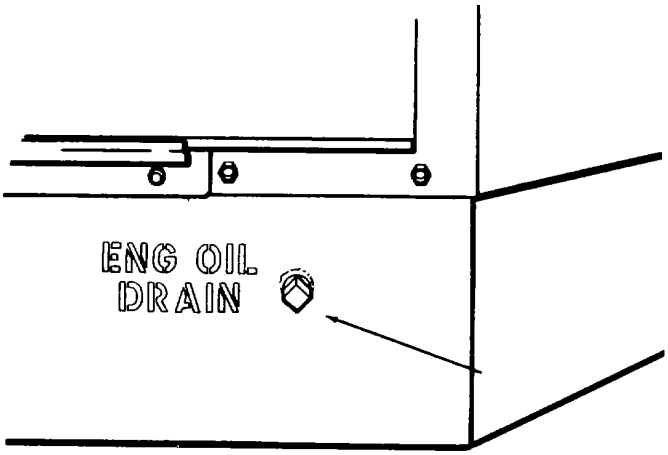


Figure 5-2. Engine Oil Drain

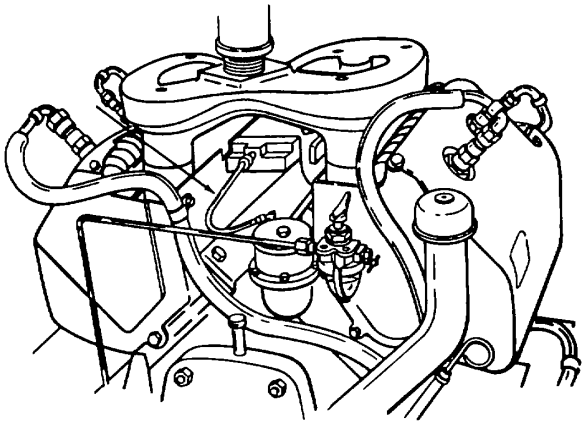


Figure 5-3. Fuel Line to Fuel Pump

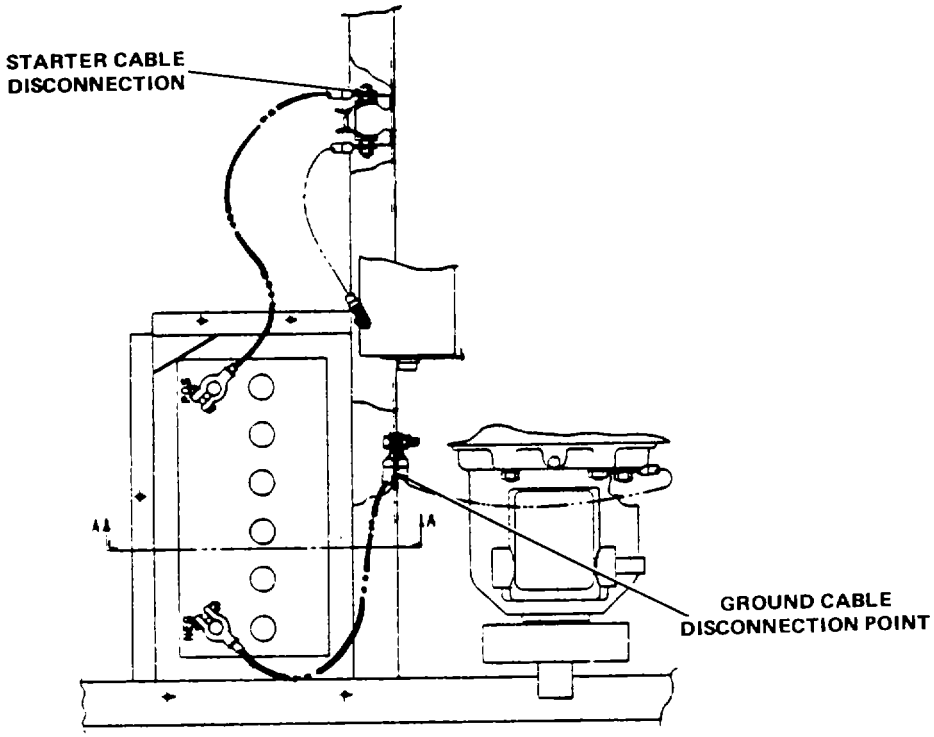


Figure 5-4. Cable Disconnect Points

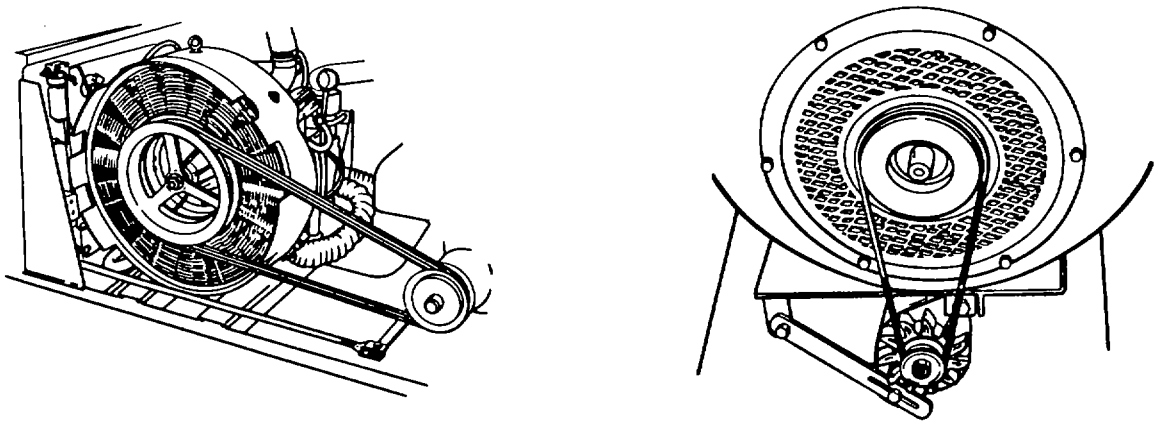


Figure 5-5. Drive Belts

b. Installation

(1) Turn belt tensioner screw counterclockwise until engine base plate is at full travel toward compressor.

(2) Lift engine onto base plate. Align holes in engine, base plate and frame. Loose assemble four bolts and nuts.

(3) Attach and secure starter cable and ground cable. (Figure 5-4)

(4) Attach and secure fuel line at fuel pump. (Figure 5-3)

(5) Attach and secure main wire harness at throttle solenoid, magneto and oil pressure switch.

(6) Install drive belts for compressor and alternator. Refer to organizational maintenance for belt adjustment. (Figure 5-5)

(7) Attach clutch linkage at clutch. Secure with cotter pin.

(8) Attach and secure oil drain line at engine.

(9) Fill with proper oil. (Figure 5-7)

(10) Install roof panel. (Figure 5-1)

(11) Connect air cleaner at carburetor. (Figure 5-6)

(12) Start engine and check for leaks and proper operation of clutch and throttle.

(13) Stop engine.

5-3. COMPRESSOR ASSEMBLY

a. Removal

(1) Drain compressor oil. (Figure 5-8)

(2) Remove enclosure roof. (Figure 5-9)

(3) Remove side access panel. (Figure 5-9)

(4) Disconnect air cleaner at compressor.

(5) Remove drive belts. (Figure 5-10)

(6) Disconnect oil drain hose at compressor.

(7) Remove four nuts and washers.

(8) Disconnect all gage tubing at compressor.

(9) Disconnect air line at aftercooler.

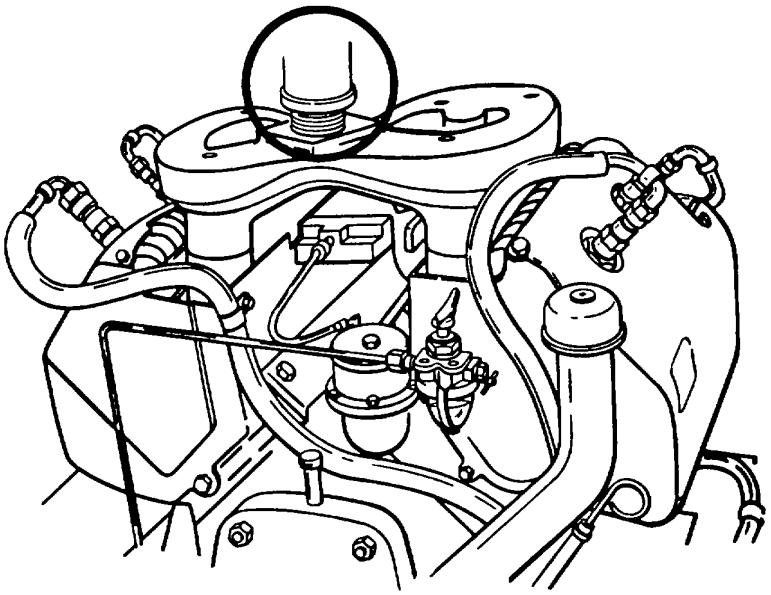


Figure 5-6. Air Cleaner Tube

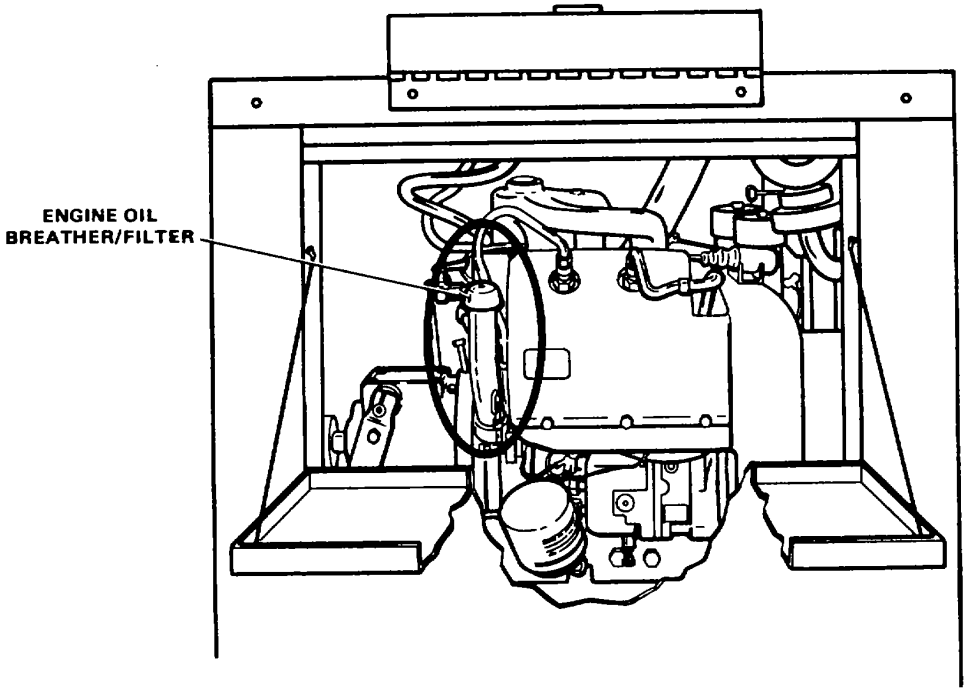


Figure 5-7. Oil Breather

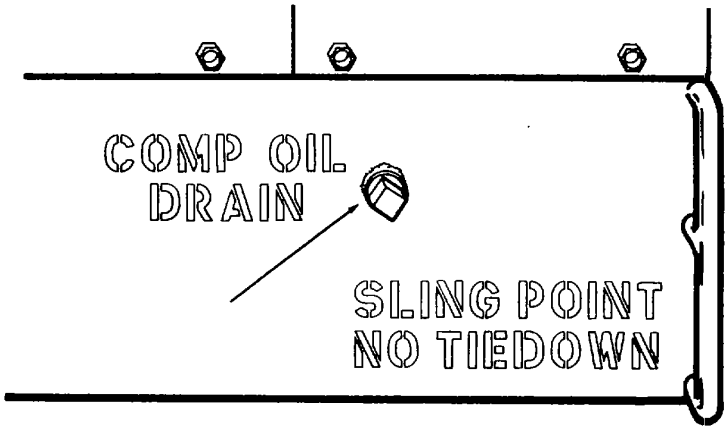


Figure 5-8. Compressor Oil Drain

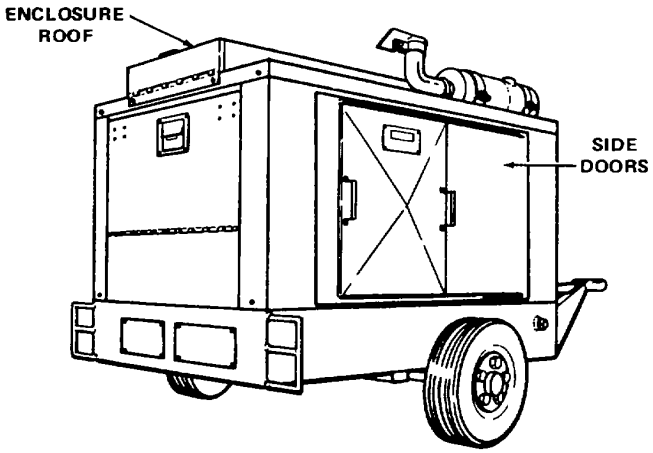


Figure 5-9. Access Panels

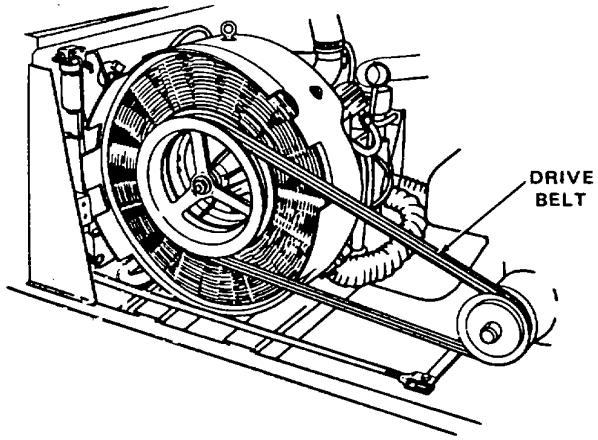


Figure 5-10. Drive Belts

(10) Disconnect condensate drain tubes.

(11) Disconnect main wiring at two solenoid valves.

(12) Attach lifting device and remove compressor. (Figure 5-11)

b. Installation

(1) Attach lifting device and lift compressor over frame. (Figure 5-11)

(2) Align four bolts holes in base of compressor with four studs in frame. Lower compressor over studs onto frame.

(3) Loose assemble four washers and four nuts onto four studs.

(4) Use a straight edge and align face of compressor flywheel with engine drive sheave. Tighten four nuts. (Figure 5-12)

(5) Attach engine oil drain line at compressor.

(6) Fill compressor with proper oil. (Figure 5-13)

(7) Install and secure three condensate drain tubes.

(8) Connect and secure all gage tubing at compressor.

(9) Connect air tube at aftercooler.

(10) Install and tighten drive belts. (Figure 5-10)

(11) Connect air cleaner at compressor.

(12) Start engine and compressor. Carefully check for leaks. Repair all leaks.

(13) Stop engine and compressor.

(14) Install enclosure roof. (Figure 5-9)

(15) Install side access panel. (Figure 5-9)

5-4. AXLE ASSEMBLY

a. Removal

(1) Raise compressor off of ground. Support with blocks or jack stands.

(2) Disconnect brake rods at axle. (Figure 5-14)

(3) Remove four bolts and washers. (Figure 5-14)

(4) Remove axle. (Figure 5-14)

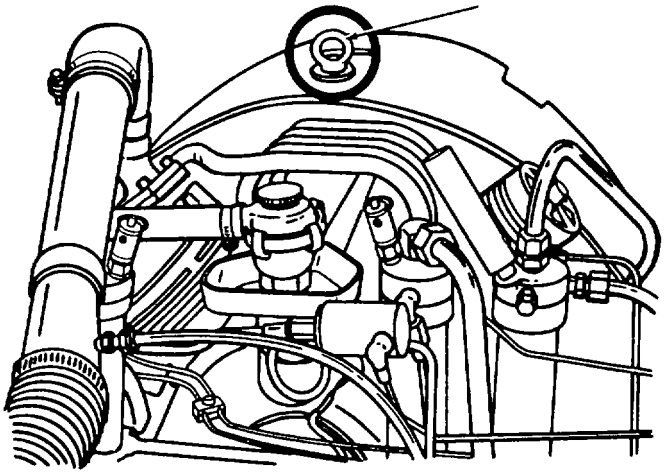


Figure 5-11. Lifting Ring

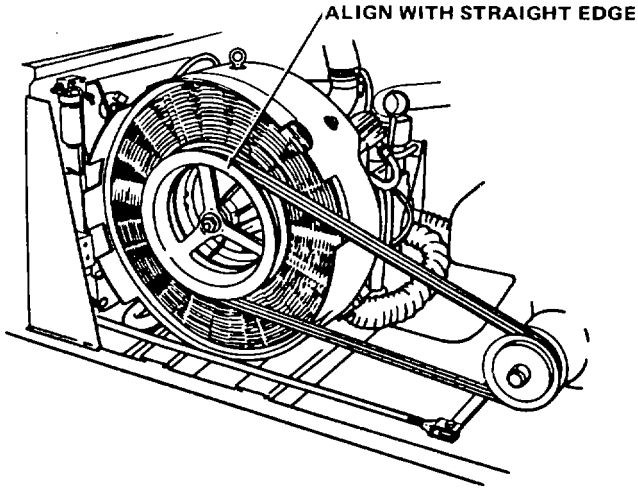


Figure 5-12. Aligning Flywheel W/Drive Sheave

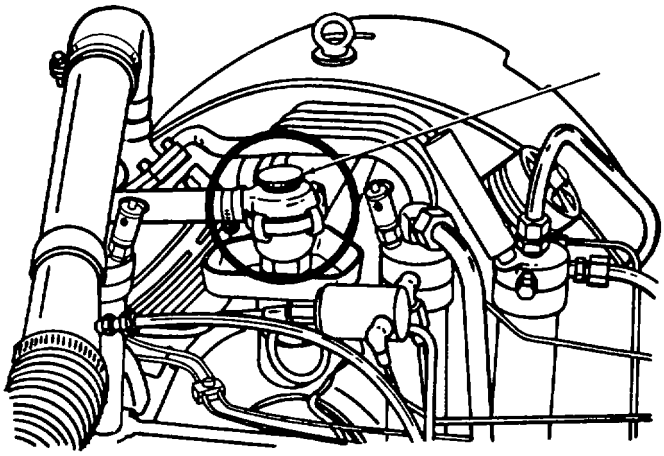


Figure 5-13. Oil Fill Cap

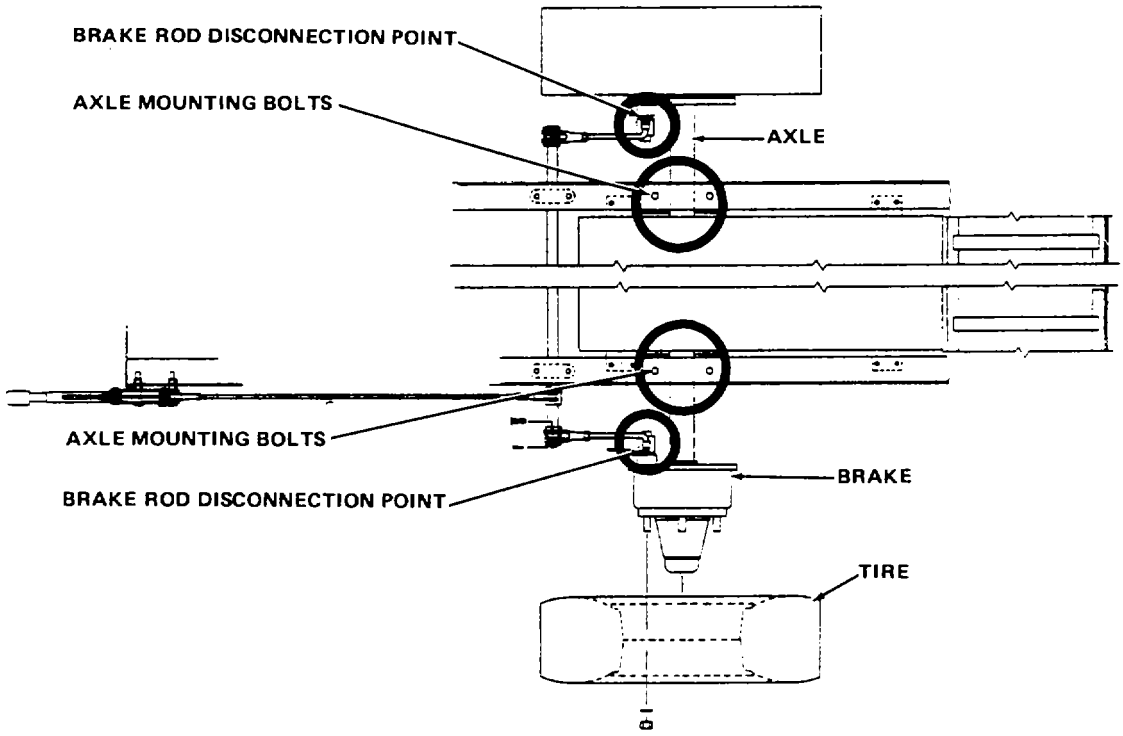


Figure 5-14. Axle Assembly

b. Installation

(1) Position axle assembly under compressor.

(2) Align bolt holes in axle pods with bolt holes in frame.

(3) Install and secure four bolts and washers.

(4) Install brake rods at axle. Secure with cotter pins.

5-5. FUEL TANK

a. Removal

(1) Remove axle (paragraph 5-4). (Figure 5-14)

(2) Drain fuel.

(3) Disconnect two fuel lines at top of tank.

(4) Disconnect wire at fuel level sensor.

(5) Remove eight bolts and eight washers.

(6) Remove tank.

b. Installation

(1) Position fuel tank under frame. Raise tank up to the underside of the frame.

(2) Align the eight bolt holes in the fuel tank with the eight bolt holes in the frame.

(3) Secure the tank to the frame with eight bolts and eight nuts.

(4) Attach wire assembly at fuel level sensor.

(5) Attach and secure two fuel lines at top of tank.

(6) Install axle assembly (paragraph 5-4). (Figure 5-14)

(7) Fill tank with fuel. Verify operation of fuel gage.

(8) Start engine and check for fuel leaks. Repair any leaks.

(9) Stop engine.

Section III. MAINTENANCE INSTRUCTIONS

5-6. SERVICE HOSE (Figure 5-15)

This task covers:

a. Disassembly

b. Repair

c. Reassembly

INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-14	Hose Removed

---

a. Disassembly

(1) Remove service valve and fitting from service hose.

(2) Remove quick disconnect chuck and fitting from service hose.

b. Repair. Replace all damaged or defective components.

c. Reassembly

(1) Apply teflon tape to quick disconnect chuck fitting. Screw fitting into chuck. Tighten fitting.

(2) Install quick disconnect chuck and fitting onto service hose. Tighten connection.

(3) Install service valve onto service hose. Tighten connection.

5-7. AIR LINES, HOSES AND FITTINGS (GENERAL) (Figure 5-15)

This task covers:

a. Disassembly

b. Repair

c. Reassembly

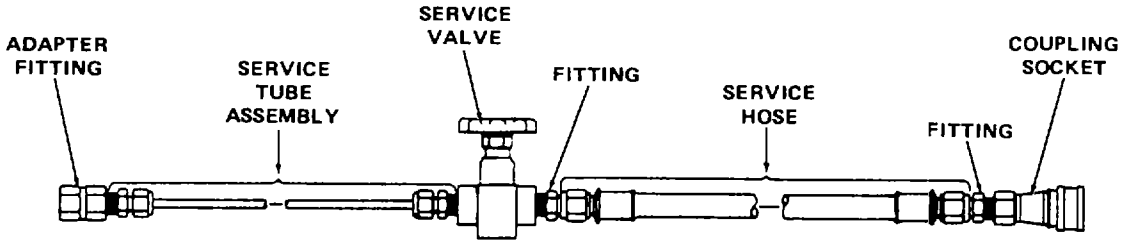


Figure 5-15. Air Lines, Hoses and Fittings

INITIAL SETUP

Applicable Configurations

All

General Safety Precautions

WARNING

Before working on any air hose, fitting or line, make sure all air pressure has been released.

---

a. Disassembly

(1) Disconnect air line from fitting.

(2) Remove fitting body.

b. Repair. No repair is recommended. Defective parts must be replaced.

c. Reassembly

(1) Apply teflon tape to pipe thread joints.

(2) Install and secure fitting body.

(3) Reinstall air lines.

5-8. ALTERNATOR (Figure 5-16)

This task covers:

a. Disassembly
b. Cleaning
c. Inspection
d. Reassembly

INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-22	Alternator Removed from Engine

General Safety Precautions

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 (38°C) - 138°F (59°C).

WARNING

Compressed air can be extremely hazardous. Use 30 PSI maximum air pressure for parts cleaning.

---

a. Disassembly

(1) Remove two nuts, one washer and nylon sleeve from isolation diode assembly. Remove isolation diode assembly.

(2) Remove two screws. Lift voltage regulator away from rear of alternator. Disconnect brush lead from voltage regulator and remove voltage regulator from alternator.

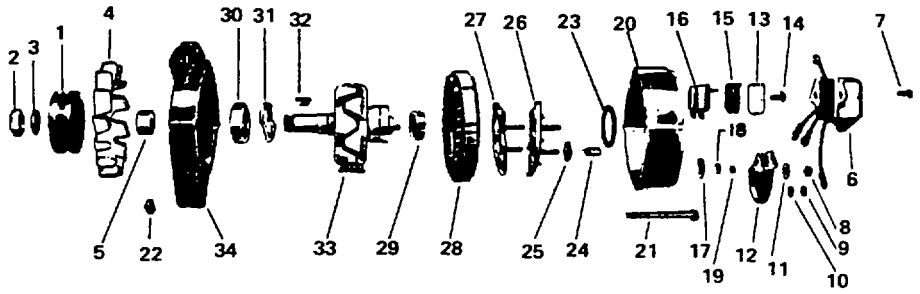
(3) Remove two screws from brush holder. Remove brush holder.

(4) Remove four bolts and nuts.

(5) Insert two flat blade screwdrivers into sides of alternator housing. Pry the rear alternator housing away from the stator assembly and remove the rear housing.

NOTE

Do not insert screwdriver blade more than 1/16". Stator windings can be damaged.



1. Drive Pulley
2. Pulley Mounting Nut
3. Lock Washer
4. Rotating Fan
5. Spacer
6. Regulator
7. Tap Screw
8. Hex Lock Nut
9. Terminal Nut
10. Washer
11. Insulating Washer
12. Isolating Diode Assembly
13. Brush Holder Cover
14. Tapscrew
15. Dust Shield
16. Brush Assembly
17. Insulating Washer
18. Hex Nut
19. Insulating Sleeve
20. Rear Housing
21. Bolt
22. Square Nut
23. Bearing Retainer
24. Insulating Sleeve
25. Insulating Washer
26. Diode Assembly
27. Diode Assembly
28. Stator Assembly
29. Sealed Bearing
30. Front Bearing
31. Front Retainer
32. Woodruff Key
33. Rotor Assembly
34. Front Housing

Figure 5-16. Alternator Assembly

(6) Wrap a section of old drive belt around the drive pulley. Clamp the pulley in a vise. Loosen and remove the pulley nut, lock washer, pulley, fan and spacer.

(7) Using snap ring pliers, remove the front bearing retainer snap ring.

(8) Remove front housing from rotor bearing.

(9) Remove front and rear bearings from rotor shaft.

b. Cleaning

(1) Clean all parts except sealed bearings, electrical wiring, field coil and stator wingings in cleaning solvent. Dry thoroughly.

(2) Clean windings and wiring with dry compressed air.

c. Inspection

(1) Inspect brushes. Replace if worn beyond wear limits.

(2) Inspect threaded parts and tapped holes. Repair or replace defective components.

(3) Inspect rotating field. Use multimeter to check for open or shorted circuit. Replace defective parts.

(4) Inspect diodes. Use multimeter to check forward and reverse resistance. Replace open or shorted diodes.

(5) Inspect front and rear bearings. Replace worn or damaged bearings.

(6) Inspect rotor shaft. Replace bent, scored or warped rotor.

(7) Inspect alternator housing for breaks, cracks or other damage. Replace defective housing.

d. Reassembly

(1) Install front and rear bearings onto rotor shaft.

(2) Position rotor assembly into front housing.

(3) Seat bearing into front housing. Secure with snap ring.

(4) Position spacer, fan, pulley, lock washer and pulley nut over the end of the rotor shaft. Secure the nut to 35-50 lb-ft torque.

(5) Install stator into front housing.

(6) Position rear housing over end of rotor assembly. Align rear housing bolt holes with bolt holes in front housing. Install and secure four bolts and four nuts.

(7) Position brush holder into opening in rear housing. Align brush holder with two pins in rear housing. Secure brush holder with two screws.

(8) Position voltage regulator over rear of alternator assembly. Connect lead from brush holder to voltage regulator. Secure voltage regulator to alternator with two screws.

(9) Install nylon sleeve over lower negative stud on rear of alternator housing. Position isolation diode over studs on rear of alternator housing.

(10) Install fibre washer over same stud as nylon sleeve. Secure isolation diode with two nuts.

5-9. ENGINE STARTER (Figure 5-17)

This task covers:

a. Disassembly

b. Cleaning

c. Inspection

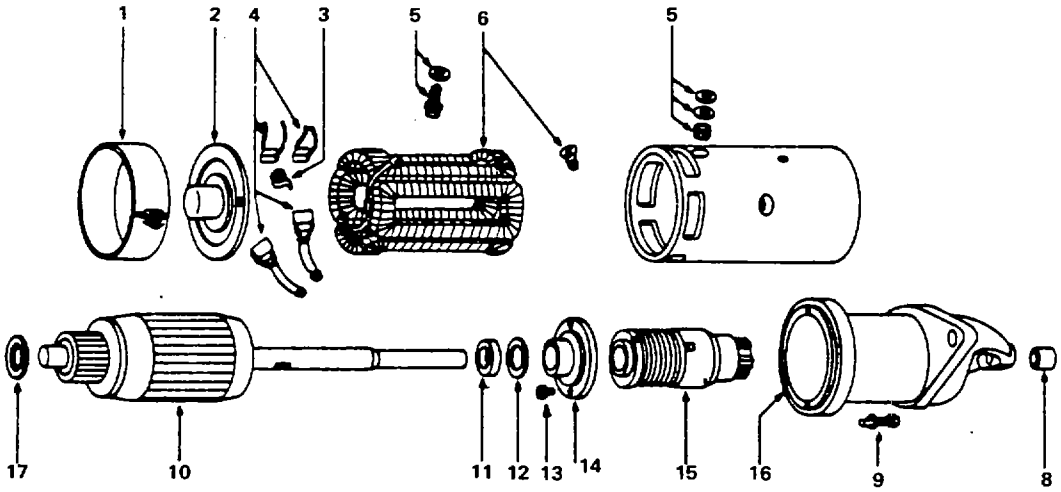
INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-23	Starter Removed



1. Cover Band
2. Commutator End Head Assembly
3. Brush Spring Set
4. Brush Set
5. Terminal Stud Package
6. Field Coil Package
7. Not Used
8. Bronze Bearing
9. Screw
10. Armature
11. Oil Seal
12. Gasket
13. Mounting Screw Package
14. Bearing Plate Assembly
15. Bendix Drive
16. Pinion Hosing Assembly
17. Thrust Washer Package

Figure 5-17. Engine Starter

General Safety Precautions

WARNING

Compressed air can be extremely hazardous. Use 30 PSI maximum air pressure for parts cleaning.

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 (38°C) - 138°F (59°C).

---

a. Disassembly

(1) Remove brush cover

(2) Remove two screws and commutator end cover.

(3) Remove drive housing and armature.

(4) Remove two screws and disassemble drive and retaining hardware from armature shaft

b. Cleaning. Clean the parts in cleaning solvent and dry thoroughly. Do not clean electrical wiring armature and field coils with solvent. These items are to be cleaned with dry compressed air.

c. Inspection

(1) Inspect all parts for wear and damage.

(2) Inspect brushes. Replace if worn beyond maximum wear line.

(3) Inspect all screw threads and tapped holes for thread damage. Replace defective parts.

(4) Inspect commutator contact surface for rough spots, discoloration, pitting, scoring and high mica. If commutator is rough, pitted or worn, turn commutator using a lathe. Under-cut mica after turning commutator. Replace starter if armature is defective or damaged.

(5) Inspect armature shaft for scoring or excessive wear. Replace starter if shaft is defective or damaged.

(6) Test armature and field housing in accordance with TM5-764. Replace all defective parts.

(7) Inspect starter drive for damaged or worn teeth, loose or damaged springs and clutch. Replace defective drive.

(8) Inspect brush springs and brush holders in the commutator housing. Replace damaged housing.

(9) Inspect bearings. Replace damaged or worn bearings.

d. Reassembly

(1) Assemble drive and hardware onto armature shaft.

(2) Assemble armature into drive end housing.

(3) Assemble field housing over armature. Align locating pin between field housing and drive housing.

(4) Install commutator end cover, brushes and brush springs. Secure with screws.

(5) Install and secure brush cover.

5-10. MAGNETO (Figure 5-18 and Figure 5-19)

This task covers:

a. Disassembly
b. Cleaning
c. Inspection
d. Reassembly

INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-26	Magneto Removed

General Safety Precautions

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 (38°C) - 138°F (59°C).

---

a. Disassembly

(1) Disassemble the magneto in the sequence shown in Figure 5-19.

(2) Discard capacitor and seal.

(3) Discard distributor block, rotor and contact point set.

b. Cleaning. Clean all parts with cleaning solvent and dry thoroughly. Do not clean cam wick.

c. Inspection

(1) Inspect cam wick. Replace if dirty or saturated with grease.

(2) Check coil for open circuit or shorts. Check for damaged insulation. Replace defective coil.

(3) Inspect gear teeth on rotor gear and shaft gear. Replace damaged or worn gears.

d. Reassembly

NOTE

Use no sealer on gasket. Use of sealer could render radio shielding inoperative.

(1) Reassemble magneto in reverse order of sequence shown in Figure 5-19.

(2) Install new parts from repair kit (capacitor, seal, distributor block, distributor rotor and point set).

(3) Lubricate cam portion of rotor gear with a light coat of distributor cam lube.

(4) Adjust maximum contact point gap to .015 inches. See Figure 5-18.

(5) Install magneto drive gear as shown in Figure 5-19.

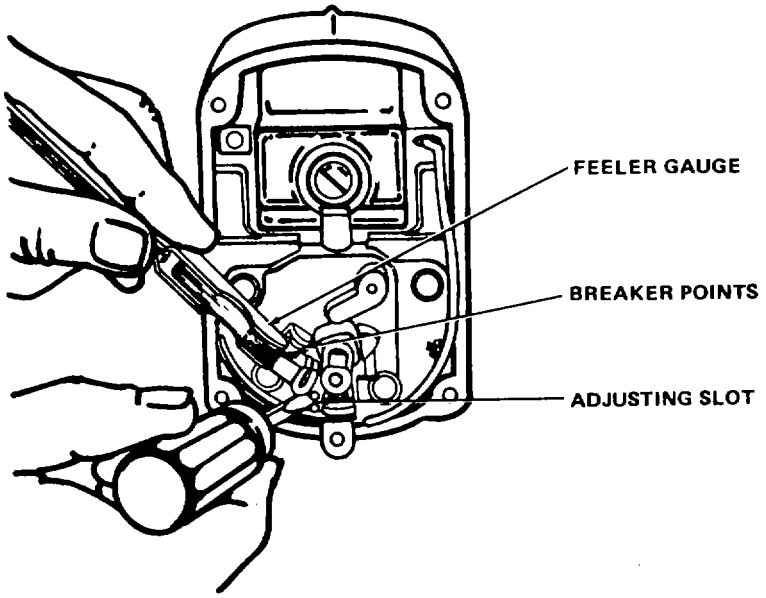
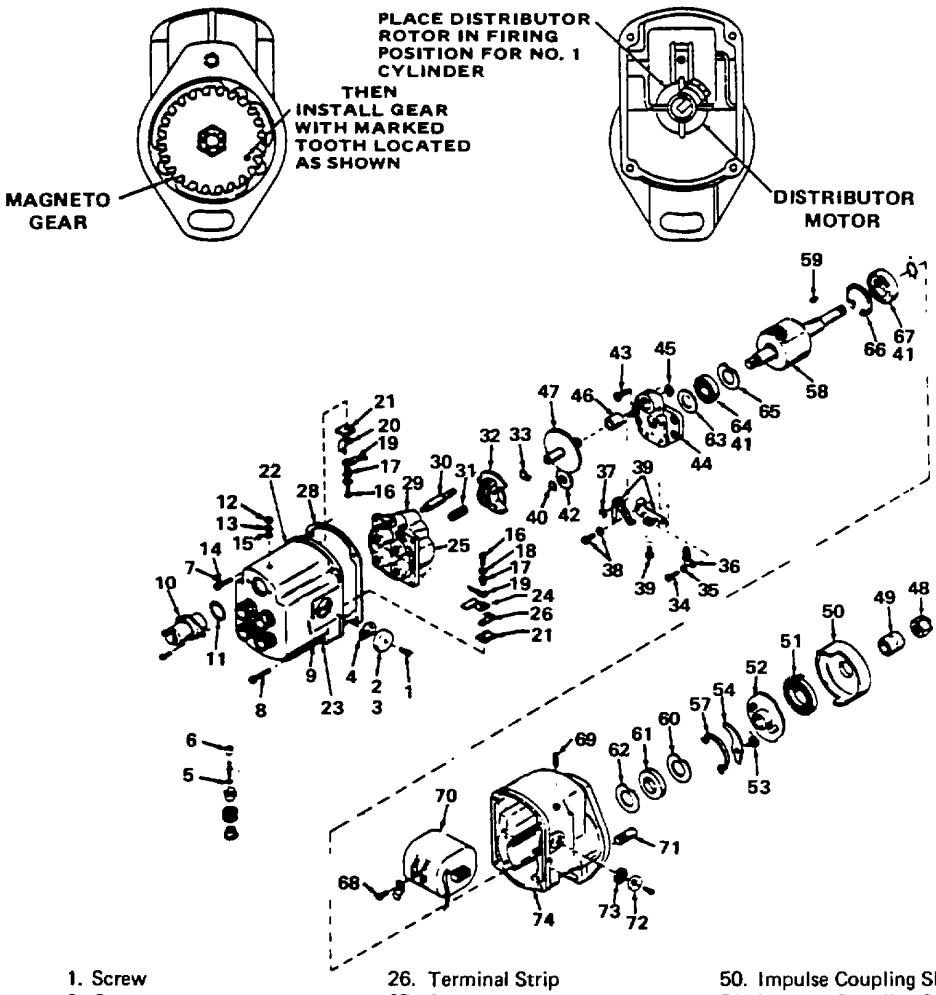


Figure 5-18. Contact Point Gap



1. Screw
2. Cover
3. Vent Cover
4. Screen Vent Cover
5. Ground Switch Spring
6. Ground Switch Spacer
7. Screw
8. Screw
9. End Cap Assembly
10. Feed Thru Condenser
11. O-Ring
12. Ground Switch Screw Nut
13. Ground Switch Lock Washer
14. Ground Switch Washer
15. Washer
16. Screw
17. Ground Switch Bushing
18. Screw
19. Ground Switch Wire Assembly
20. Condenser Contact
21. Ground Strip Guide
22. Insulator
23. Plunger Assembly
24. Contact
25. Screw
26. Terminal Strip
27. Screw
28. End Cap Gasket
29. Distributor Block
30. High Tension Lead
31. Brush Spring Assembly
32. Distributor Rotor
33. Distributor Spring Clip
34. Screw
35. Screw Plate Washer
36. Cam Wick and Holder
37. Snap Ring Pin
38. Screw and Lock Washer
39. Bracket, Sprocket, Points and Screw
40. Rotor Gear Snap Ring
41. Shim
42. Rotor Gear
43. Screw
44. Bearing Support
45. Snapping
46. Distributor Bearing
47. Distributor Gear Assembly
48. Nut
49. Impulse Coupling Bushing
50. Impulse Coupling Shell
51. Impulse Coupling Spring
52. Impulse Coupling Hub Assembly
53. Impulse Coupling Spring
54. Coupling Pawl
55. Pawl Snap Ring
56. Impulse Coupling Assembly
57. Bearing Rotor Snap Ring
58. Magnetic Rotor
59. Woodruff Key
60. Outer Rotor Washer
61. Rotor Drive End Seal
62. Inner Rotor Washer
63. Grease Retaining Washer
64. Cam End Rotor
65. Grease Retaining Washer
66. Shaft Snap Ring
67. Drive End Rotor
68. Screw
69. Setscrew
70. Coil
71. Stop Pawl Pin
72. Vent Cover
73. Screen Vent Cover
74. Magneto Housing

Figure 5-19. Magneto

General Safety Precautions

WARNING

Compressed air can be extremely hazardous. Use 30 PSI maximum air pressure for parts cleaning.

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 (38°C) - 138°F (59°C).

---

a. Disassembly

(1) Remove bowl retaining screws.

(2) Remove idle needle and spring.

(3) Remove float and pivot pin.

(4) Remove float valve and seal.

(5) Remove venturi.

(6) Remove discharge jet and washer.

(7) Remove plug, washer, main jet and seal.

(8) Remove other parts only as necessary.

(9) Discard parts included in repair kit.

b. Cleaning

(1) Thoroughly clean all parts in cleaning solvent. Dry thoroughly.

(2) Blow out all passages with dry compressed air.

c. Inspection

(1) Inspect all threaded parts and holes for damaged threads. Replace defective parts.

(2) Inspect all castings for cracks and damaged sealing surfaces. Replace all defective parts.

d. Reassembly

(1) Install main jet, seal, plug and seal washer.

(2) Install discharge jet and seal.

5-11. CARBURETOR ADJUSTMENT (Figure 5-20)

This task covers:

a. Adjustment

INITIAL SETUP

Applicable Configurations

All

---

a. Adjustment

(1) Start engine. Run until fully warm.

NOTE

This could be as much as 1 hour in extremely cold conditions.

(2) Disengage clutch and place throttle switch in idle speed position.

(3) Adjust idle adjusting needle for best engine idle performance.

(4) Stop engine.

5-12. CARBURETOR REPAIR AND OVERHAUL (Figure 5-21)

This task covers:

a. Disassembly

b. Cleaning

c. Inspection

d. Reassembly

INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-27	Carburetor Removed

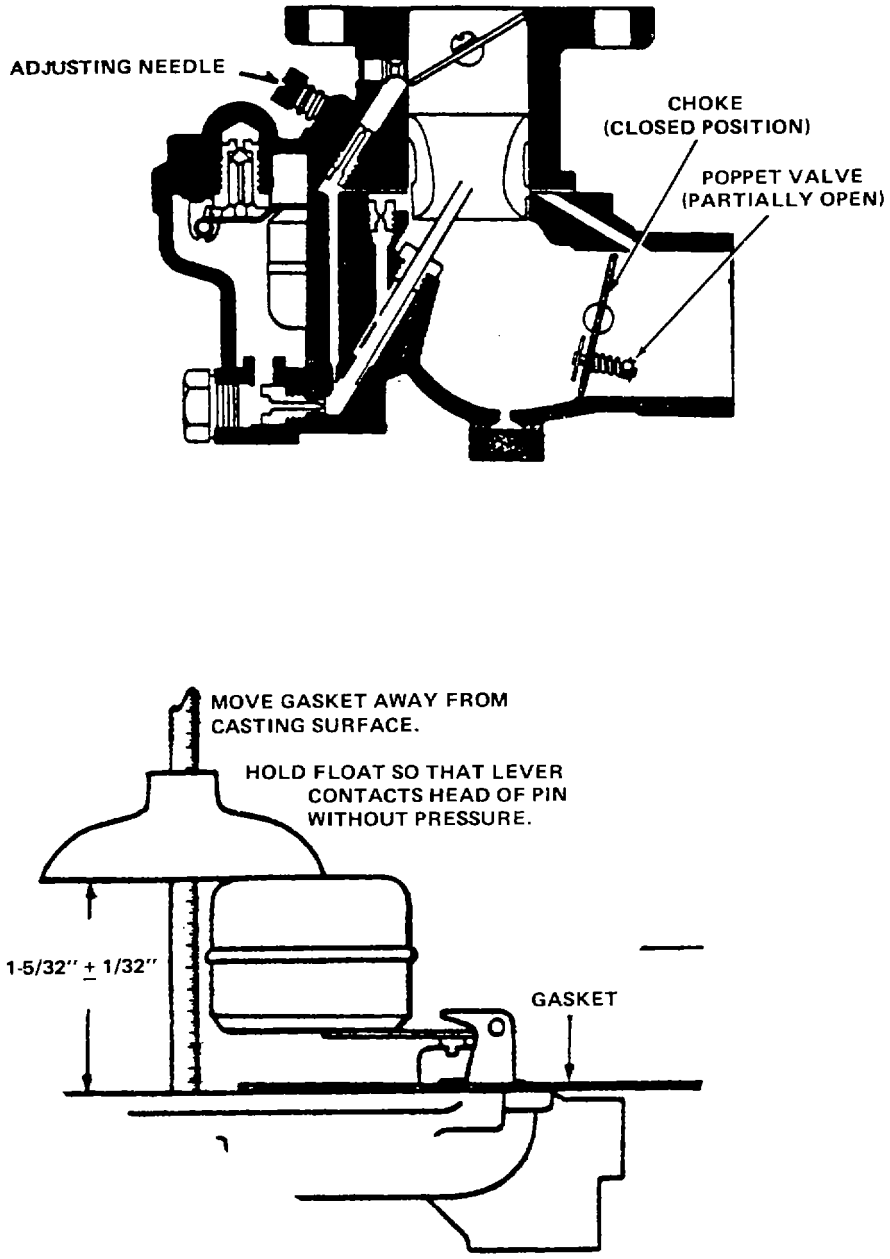
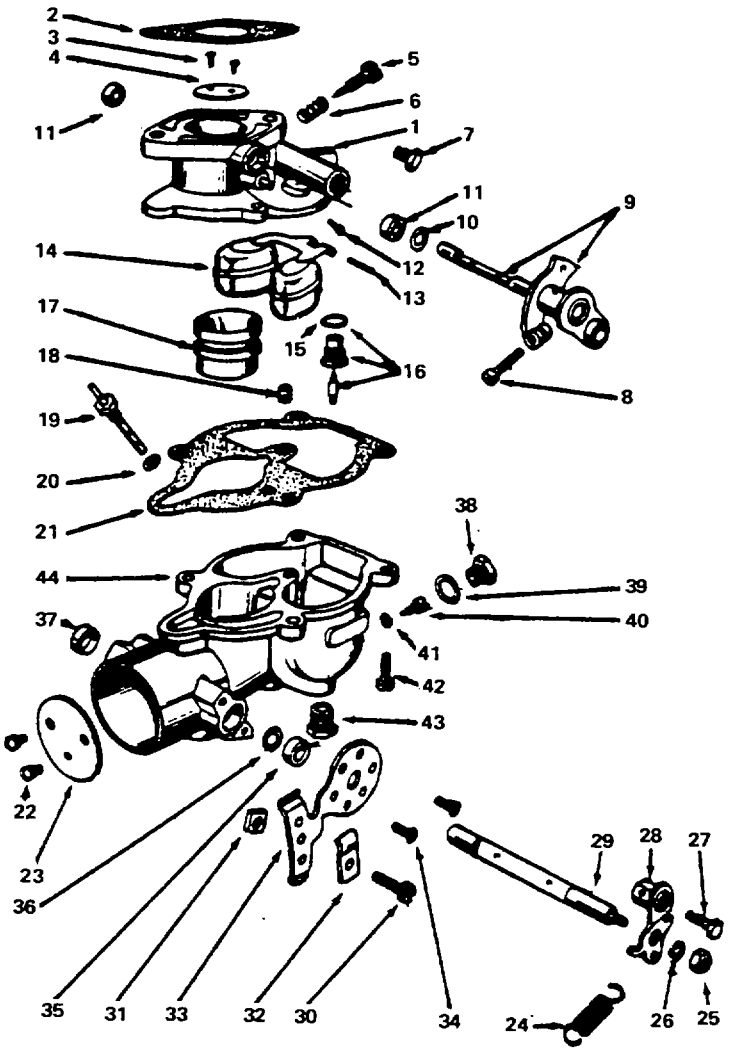


Figure 5-20. Carburetor Adjustments



1. Carburetor
2. Flange Gasket
3. Screw and Washer
4. Throttle Plate
5. Adjusting Needle
6. Idle Needle Spring
7. Plug
8. Throttle Stop Screw
9. Shaft and Stop Screw
10. Shaft Seal Retainer
11. Throttle Shaft Seal
12. Idle Jet
13. Axle Float
14. Float and Hinge Assembly
15. Solid Type Washer
16. Valve and Seat Fuel
17. Venturi
18. Jet-Well Vent
19. Discharge Jet
20. Fibre Washer
21. Gasket Bowl to Body
22. Choke Shaft Seal
23. Plate Choke
24. Return Spring
25. Choke Shaft Nut
26. Choke Lock Washer
27. Choke Lever Screw
28. Choke Lever
29. Choke Shaft
30. Bracket Clipscrew
31. Clamp Screw Nut
32. Bracket Tube Clip
33. Choke Bracket
34. Bracket Assembly Screw
35. Choke Shaft Retainer
36. Choke Shaft Seal
37. Choke Shaft Plug
38. Main Jet Plug
39. Fibre Washer
40. Main For # 1 Jet
41. Fibre Washer
42. Bowl/Body Screw
43. Bowl Drain Plug
44. Fuel Bowl

Figure 5-21. Carburetor Assembly

(3) Install all parts removed for service.

(4) Install float valve and seal.

(5) Install float and pivot pin.

(6) Adjust float level as shown in Figure 5-20.

(7) Install throttle body onto bowl.

(8) Install and secure screws.

5-13. FUEL PUMP (Figure 5-22)

This task covers:

a. Disassembly
b. Cleaning
c. Inspection
d. Reassembly

INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-28	Fuel Pump Removed

General Safety Precautions

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 (38°C) - 138°F (59°C).

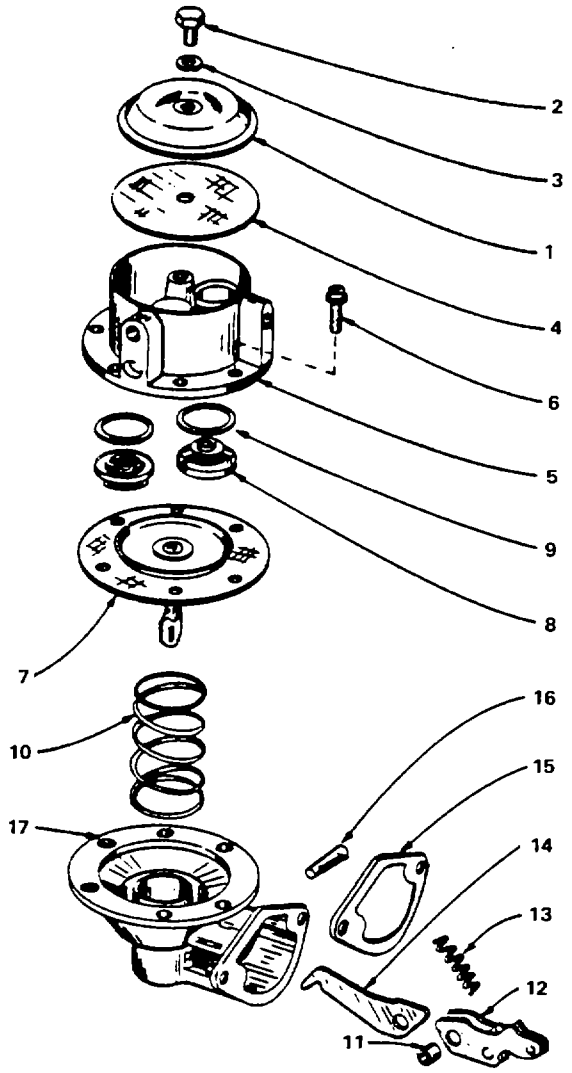
---

a. Disassembly

(1) File a groove across a point at the union of castings. This is a positive location of the fuel INLET and OUTLET positions when reassembling. Remove six head to flange screws and remove fuel head. Take off screw, remove cover and discard cover gasket.

(2) Turn fuel head over and remove both valve assemblies and gaskets. Note position of valves.

(3) Insert the end of a small screwdriver into the coils of rocker arm spring and remove.



1. Cover
2. Cover Screw
3. Washer
4. Gasket
5. Fuel Pump Head
6. Screw
7. Diaphragm
8. Valve Assembly
9. Gasket
10. Diaphragm Spring
11. Bushing
12. Rocker Arm
13. Spring
14. Link
15. Gasket
16. Pin
17. Mounting Bracket

Figure 5-22. Fuel Pump Assembly

(4) Hold mounting bracket in the left hand, with the rocker arm toward your body and the thumbnail on the end of link. With the heel of right foot on diaphragm, compress the diaphragm spring and at the same time pull toward your body. Unhook link from end of diaphragm and remove.

(5) Remove rocket arm pin. Note that pin is larger on one end. Drive pin out by means of a punch from small end.

(6) Discard all parts contained in repair kit.

b. Cleaning. Clean all parts in cleaning solvent and dry thoroughly.

c. Inspection. Inspect all threaded parts and tapped holes for damaged threads. Replace all defective parts.

d. Reassembly

(1) Place fuel head with diaphragm surface up. Assemble new valve gaskets and mount valve assemblies in positions shown on illustration. Press valves in evenly without distortion and stake in place.

(2) Mount new cover gasket, cover and washer. Securely tighten in place with cover screw.

(3) Assemble new link, bushing and pin to bracket along with rocker arm. Stake rocker arm pin in bracket to keep it in place.

(4) Place new diaphragm spring into bracket. Repeat in reverse above step 4, using a diaphragm. Assemble new rocker arm spring.

(5) Depress operating link to a position when the diaphgram is lying flat on the mounting bracket. Place the fuel head assembly back in position so the locating grooves of Step 1 are in line, and start the six head screws approximately three turns.

(6) Release the operating link. Again, depress the operating link to where the diaphragm is pulled down into mounting bracket to its lowest position. Securely tighten the six head screws.

5-14. ENGINE GOVERNOR (Figure 5-23)

This task covers:

a. Testing

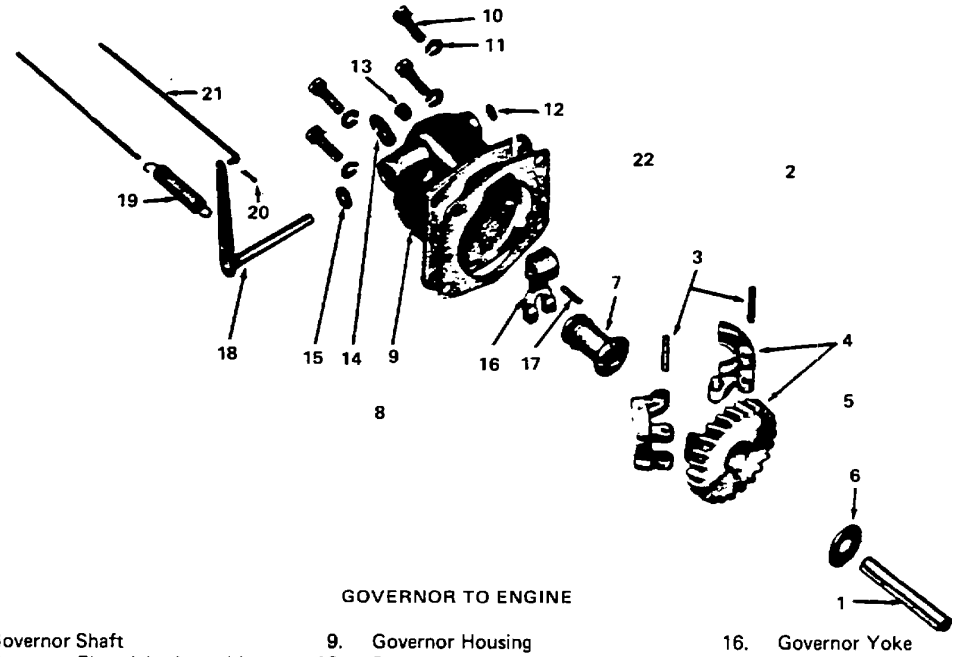
b. Adjustment

c. Replacement and Repair

INITIAL SETUP

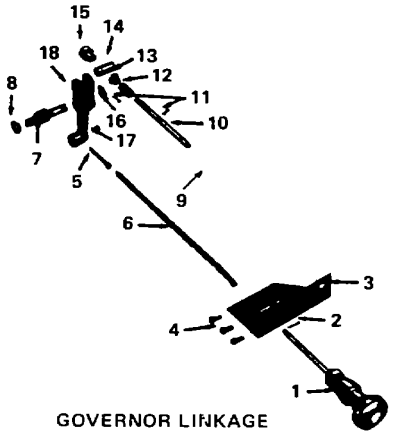
Applicable Configurations

All



GOVERNOR TO ENGINE

1. Governor Shaft
2. Governor Flyweight Assembly
3. Roll Pin
4. Governor Flyweight
5. Gear
6. Washer
7. Thrust Sleeve and Bearing
8. Governor Housing Assembly
9. Governor Housing
10. Screw
11. Lock Washer
12. Expansion Plug
13. Pipe Plug
14. Fitting
15. Oil Seal
16. Governor Yoke
17. Roll Pin
18. Cross and Lever Shaft
19. Governor Spring
20. Cotter Pin
21. Control Carburetor Rod
22. Gasket



GOVERNOR LINKAGE

1. Control
2. Cotter Pin
3. Control Bracket
4. Screw
5. Cotter Pin
6. Safety Chain
7. Pin
8. Lock Washer
9. Spring
10. Adjusting Screw
11. Cotter Pin
12. Spring
13. Retainer
14. Pin
15. Locknut
16. Plain Washer
17. Screw
18. Variable Speed Lever

Figure 5-23. Engine Governor

General Safety Precautions

WARNING

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a. Testing

(1) Start engine. Run 5 minutes.

(2) Move throttle switch to "High" position.

(3) Check engine speed with stroboscopic tachometer. No-load speed should be about 2750 RPM. Full-load should be about 2650 RPM.

(4) Return engine to idle speed.

(5) Stop engine.

b. Adjustment

(1) If engine speeds are not within limits shown in paragraph a. above, adjust as follows:

(a) Start engine. Run 5 minutes.

(b) Engage clutch and move throttle switch to "High."

(c) Check engine speed with stroboscopic tachometer.

(d) Adjust tension nut as required to reach proper engine speed.

(e) Return engine to idle speed. Disengage clutch.

(f) Stop engine.

c. Replacement and Repair

(1) Disconnect tension spring and throttle link from governor arm.

(2) Disconnect oil line from governor body fitting.

(3) Remove four screws and lock washers.

(4) Remove governor and gasket from engine.

(5) Clean the governor with solvent. Dry thoroughly.

(6) Examine governor housing for cracks and damaged sealing surfaces.

(7) Examine drive gear for damage or wear. Replace if defective.

(8) Position new gasket onto governor.

(9) Position governor onto engine. Align bolt holes in governor body with bolt holes in engine. Attach governor to engine with four screws and four washers. Secure screws. Connect and secure oil line to governor body fitting.

(10) Connect tension spring to top spring hole in governor arm. Attach throttle link rod to hole at top of governor arm.

(11) Start engine.

(12) Check for oil leaks.

(13) Check for proper governor operation.

(14) Stop engine.

5-15. ENGINE FLYWHEEL (Figure 5-24)

This task covers:

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

INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-19	Enclosure Corner Post Removed Flywheel Screen Removed

General Safety Precautions

WARNING

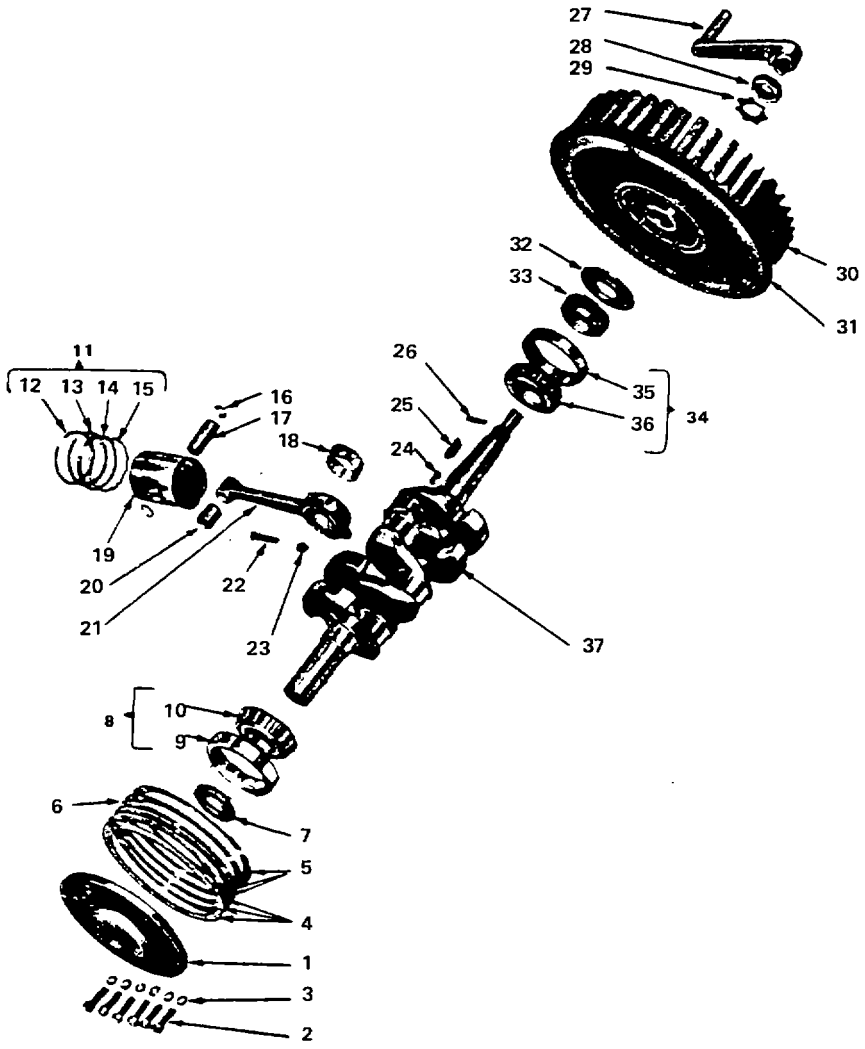
Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C) - 138°F (59°C).

---

a. Removal

(1) Drive starting crank pin out of crankshaft.

(2) Remove flywheel nut and washer.



1.	Bearing Plate	14.	Oil Ring	26.	Pin
2.	Bolt	15.	Oil Ring Expander	27.	Crank Handle
3.	Lock Washer	16.	Lock Ring	28.	Nut
4.	Shim	17.	Piston Pin	29.	Lock Washer
5.	Shim	18.	Rod Bearing	30.	Flywheel
6.	Gasket	19.	Piston	31.	Ring Gear
7.	Oil Slinger	20.	Bushing	32.	Oil Slinger
8.	Main Bearing	21.	Connecting Rod	33.	Gear
9.	Bearing Race	22.	Bolt	34.	Main Bearing
10.	Bearing	23.	Nut	35.	Bearing Race
11.	Piston Ring Set	24.	Key	36.	Bearing
12.	Top Compression Ring	25.	Key	37.	Crankshaft
13.	Second Compression Ring				

Figure 5-24. Engine Flywheel

(3) Pull up and out on rim of flywheel. Rap end of crankshaft with babbit mallet while pulling on flywheel. Repeat until flywheel is free.

(4) Remove flywheel from engine.

b. Cleaning. Clean flywheel in cleaning solvent. Dry thoroughly.

c. Inspection

(1) Inspect flywheel for damaged or missing blower fins. Replace defective flywheel.

(2) Inspect starter ring gear.

d. Installation

(1) Verify installation of woodruff key in crankshaft.

(2) Position flywheel over end of crankshaft. Align keyway in flywheel bore with woodruff key. Install flywheel.

(3) Secure flywheel with nut and washer.

(4) Install starting crank pin.

5-16. TIMING COVER

This task covers:

a. Inspection

INITIAL SETUP

Applicable Configurations

All

---

a. Inspection. Inspect timing cover for evidence of damage or leaks.

5-17. COMPRESSOR OIL FILTER (Figure 5-25)

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Applicable Configurations

All

---

a. Removal

(1) Disconnect tube nut at top and bottom of oil filter tube assembly.

(2) Remove oil filter tube assembly.

b. Installation

(1) Use oil filter tube assembly as a pattern, and bend oil filter tube to fit compressor.

(2) Cut ends of tube as required. De-burr cuts.

(3) Install new 6 mm tube nut and ferrule onto each end of oil filter tube.

(4) Loose assemble oil filter tube and fittings to compressor.

(5) Hand tighten each tube nut.

(6) Tighten each tube nut 1-1/4 turns.

NOTE

The 1-1/4 turns are an exact measurement, not an estimate.

(7) Start engine and compressor and check for oil leaks.

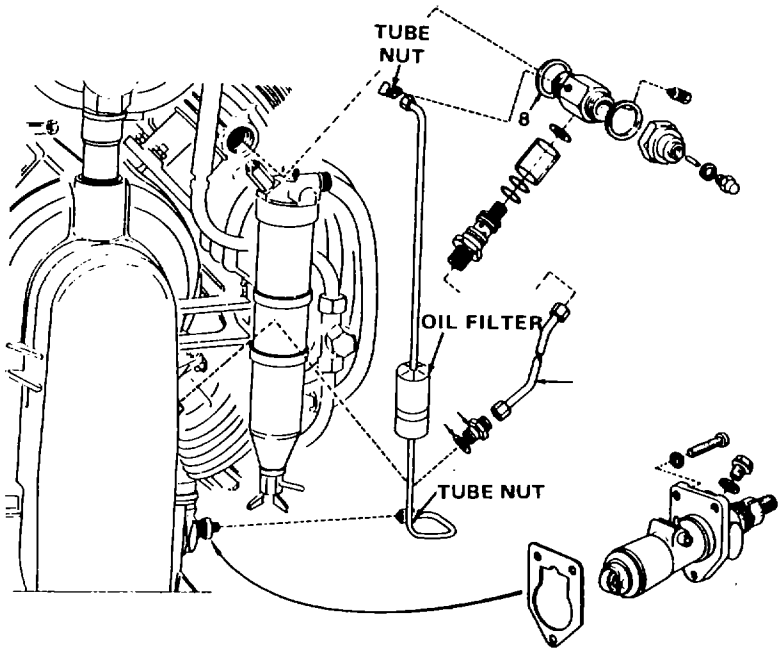


Figure 5-25. Compressor Oil Filter

5-18. CONDENSATE DRAIN/UNLOADER VALVE (Figure 5-26 and 5-27)

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Applicable Configurations

All

General Safety Precautions

WARNING

Before removal of valve, make sure all air pressure has been relieved from entire system.

---

a. Removal

(1) Disconnect seven tubes from valve body fittings.

(2) Remove two bolts, nuts and lock washers.

(3) Remove condensate drain valve assembly.

b. Installation

(1) Position condensate drain valve assembly against bracket on frame.

(2) Align bolt holes in valve with bolt holes in frame bracket.

(3) Install and secure valve to frame with two bolts, lock washers and nuts.

(4) Attach and secure seven tubes to proper fittings in condensate drain valve.

5-19. DEYHYDRATOR ASSEMBLY (Figure 5-26 and 5-28)

This task covers:

a. Removal

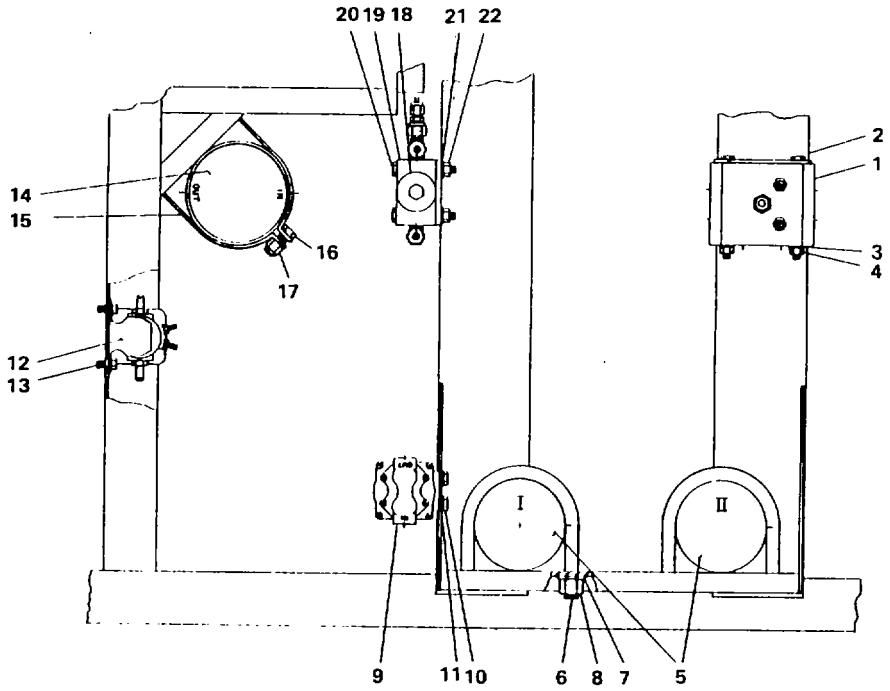
b. Disassembly

c. Cleaning

d. Inspection

e. Reassembly

f. Installation



1. Condensate Drain Valve
2. Bolt
3. Lock Washer
4. Nut
5. Dehydrator
6. Bolt
7. Nut
8. Lock Washer
9. Heater Fuel Pump
10. Bolt
11. Lock Washer
12. Start Solenoid
13. Bolt
14. 4th Stage Separator
15. Pipe Clamp
16. Bolt
17. Lock Nut
18. Relief Valve
19. Manifold Block
20. Bolt
21. Lock Washer
22. Nut

Figure 5-26. Dehydrator Parts

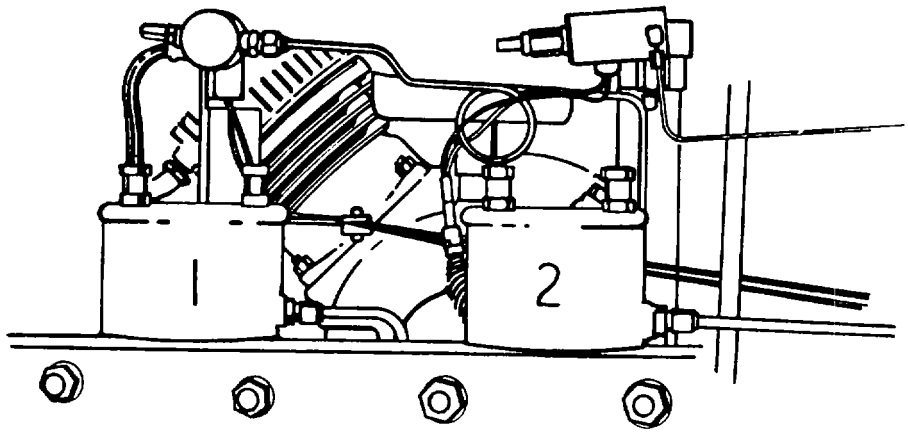
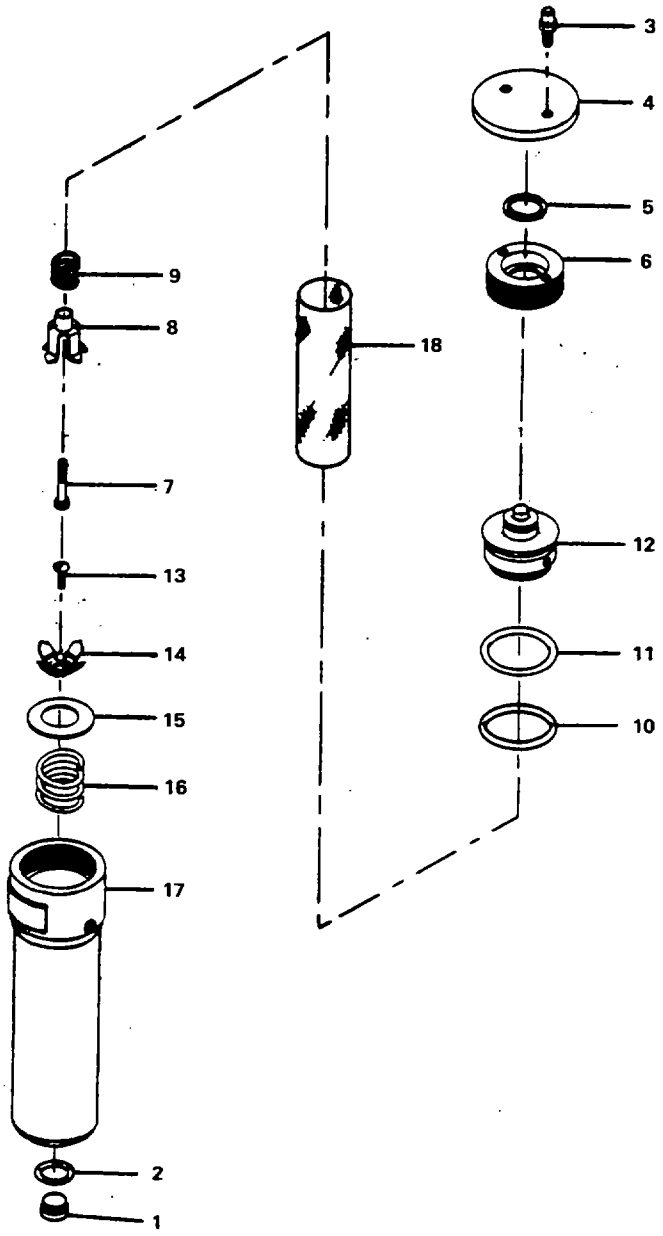


Figure 5-27. Dehydrator on Unit



1.	Bottom Plug	7.	Bolt	13.	Screw
2.	O-Ring	8.	Cutter	14.	Cutter
3.	Bolt	9.	Spring	15.	Plate
4.	Cover Plate	10.	O-Ring	16.	Spring
5.	Snap Ring	11.	O-Ring	17.	Cylinder
6.	Upper Screw Plug	12.	Top Plug	18.	Dehydrator Cartridge

Figure 5-28. Dehydrator Assembly

INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-19	Enclosure Panel Removed

General Safety Precautions

WARNING

Relieve all pressure from dehydrators before disconnecting any air lines. Open dehydrator bleed valve.

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 (38°C) - 138°F (59°C).

a. Removal

(1) Disconnect two tubes from each dehydrator.

(2) Loosen and remove two U-bolts, four lock washers and four nuts from each dehydrator.

(3) Remove dehydrator assembly.

b. Disassembly

(1) Secure main body of dehydrator assembly in a vice which has soft faces on jaws.

(2) Remove top plug.

(3) Remove dehydrator cartridge.

(4) Remove bottom tube fitting.

(5) Screw two 3/8-16 x 2" long socket head screws into tapped holes in bottom plug.

(6) Unscrew bottom plug.

c. Cleaning. Clean all parts in cleaning solvent. Dry thoroughly.

d. Inspection

(1) Inspect all threaded parts and tapped holes for damaged threads.

(2) Inspect top cutter and bottom cutter for wear and damage. Replace defective parts.

(3) Check operation of cutter spring. Replace defective spring.

e. Reassembly

(1) Install new O-rings on bottom plug.

(2) Install and secure bottom plug into dehydrator body. Remove two 3/8-16 x 2" socket head screws.

(3) Apply teflon tape to pipe threads of bottom tube fitting. Install and secure tube fitting into bottom plug. Note orientation of bottom fitting with respect to top fitting.

(4) Apply teflon tape to pipe threads of top tube fitting. Install and secure tube fitting into dehydrator body.

(5) Install new O-rings onto top plug.

(6) Install top plug into dehydrator body.

f. Installation

NOTE

Install # 1 and # 2 dehydrators in proper position.

(1) Position dehydrator assembly against frame bracket. Install and loose assemble two U-bolts, four lock washers and four nuts.

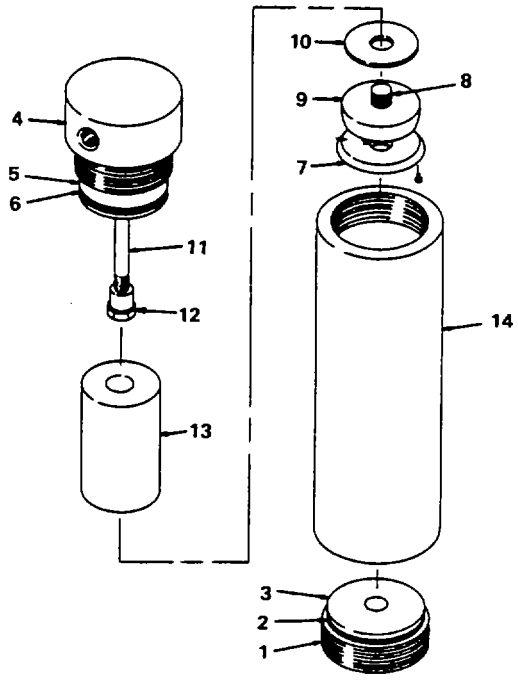
(2) Lift and rotate dehydrator assembly until the dehydrator assembly is in the correct position. Secure four nuts.

(3) Install and secure two tubes to each dehydrator assembly.

5-20. 4TH STAGE OIL/MOISTURE SEPARATOR (Figure 5-29 and 5-30)

This task covers:

a. Removal
b. Disassembly
c. Cleaning
d. Inspection
e. Reassembly
f. Installation



1. Bottom Plug
2. O-Ring
3. Backup Ring
4. Top Plug
5. O-Ring
6. Backup Ring
7. Deflector Plate
8. Spray Nozzle
9. Upper Deflector
10. Filter Retainer
11. Tube
12. Tube Nut
13. Filter
14. Housing

Figure 5-29. 4th Stage Oil/Moisture Separator

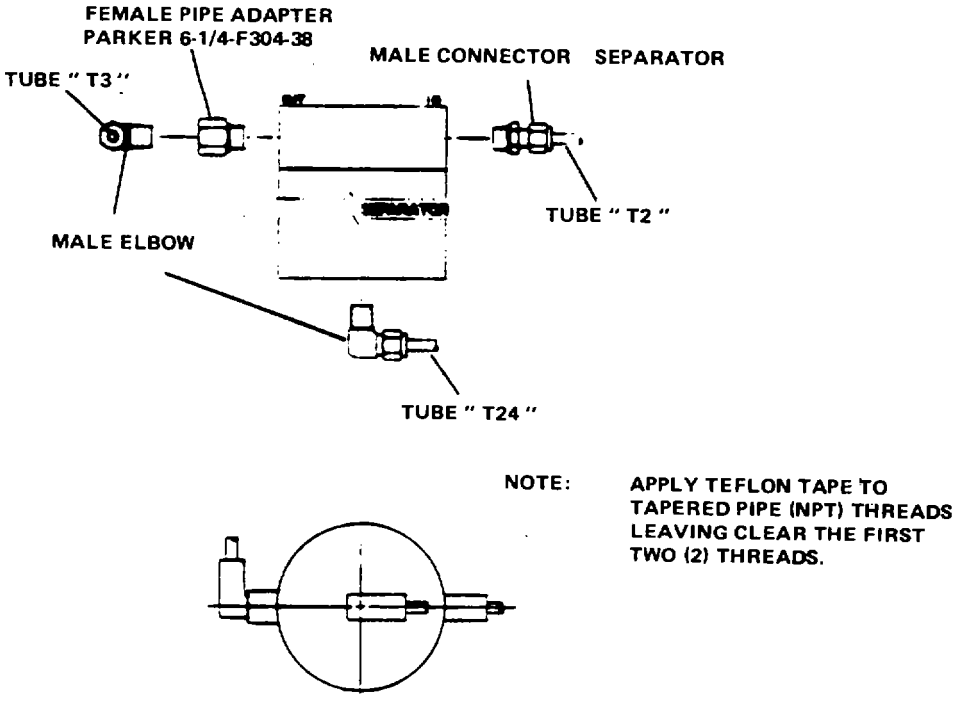


Figure 5-30. Separator Fittings

INITIAL SETUP

Applicable Configurations

All

General Safety Precautions

WARNING

Make sure all air pressure has been relieved from separator before disconnecting any air line. Note 4th stage pressure gage on instrument panel. Gage reading must be "0."

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 (38°C) - 138°F (59°C).

a. Removal

(1) Disconnect three tubes from separator assembly.

(2) Loosen and remove two bolts, nuts and four straps. Remove separator assembly from frame.

b. Disassembly

(1) Remove fittings from top of separator assembly.

(2) Remove one fitting from bottom of separator assembly.

(3) Secure body of separator in a vise which is equipped with soft jaws.

(4) Screw two 3/8-16 x 2" socket head screws into tapped holes in bottom plug. Unscrew bottom plug.

(5) Remove O-rings from bottom plug.

(6) Screw two 3/8-16 x 2" socket head screws into tapped holes in top plug.

(7) Remove screw and deflector plate.

(8) Remove spray nozzle.

(9) Remove upper deflector, filter retainer and filter element.

c. Cleaning. Clean all parts in cleaning solvent. Dry thoroughly.

d. Inspection

(1) Inspect all threaded parts and tapped holes for thread damage. Replace defective parts.

(2) Inspect O-rings and backup rings for cuts, wear and damage. Replace defective parts.

(3) Inspect filter element for cracks, holes or chips. Replace defective element.

e. Reassembly

(1) Position filter element, retainer plate and top deflector over tube in top plug. Assemble and secure parts with nozzle.

(2) Position deflector plate over nozzle.

(3) Align screw hole in plate with tapped hole in nozzle. Secure plate to nozzle with one screw.

(4) Assemble O-ring and lockup ring to bottom plug.

(5) Install and secure bottom plug into separator body. Remove two 3/8-16 x 2" socket head screws.

(6) Apply teflon tape to pipe threads of bottom fitting.

(7) Install and secure bottom fitting into bottom plug.

NOTE

Make sure bottom fitting is properly oriented.

(8) Assemble O-ring and lockup ring to top plug.

(9) Install and secure top plug into separator body. Remove two 3/8-16 x 2" socket head screws.

(10) Assemble and secure top fittings into separator top plug.

NOTE

Fitting with check valve is to be installed in "OUT" post.

e. Installation

(1) Position separator assembly against frame brackets.

(2) Loose assemble separator assembly to frame brackets with two straps, four bolts and four nuts.

(3) Hold separator in proper position and secure straps, bolts and nuts.

(4) Assemble and secure three tubes to separator assembly.

5-21. AIR RECEIVER

This task covers:

a. Removal
b. Disassembly
c. Cleaning
d. Inspection
e. Reassembly
f. Installation

INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-20	Enclosure Door Removed
4-19	Enclosure End Panel Removed

General Safety Precautions

WARNING

Relieve all pressure before attempting to disconnect any air line. Open receiver dump valve on instrument panel.

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 (38°C) - 138°F (59°C).

---

a. Removal

(1) Remove two straps, four nuts and four lock washers.

(2) Disconnect three tubes.

(3) Attach lifting sling.

(4) Lift air receiver out of frame.

b. Disassembly

(1) Remove bottom fitting.

(2) Remove fitting and reducing bushing from each air receiver.

c. Cleaning. Clean all parts with cleaning solvent. Dry thoroughly.

d. Inspection

(1) Inspect all threaded parts and tapped holes for thread damage. Repair or replace defective parts.

(2) Inspect air receiver for cracks, dents or other damage. Verify proof test date. Retest as required.

e. Reassembly

(1) Apply teflon tape to pipe threads on bottom tube fitting.

(2) Install and secure bottom tube fitting.

NOTE

Make sure fitting is properly oriented.

(3) Apply thread sealer to pipe threads on each reducing bushing.

(4) Install and secure reducing bushings.

(5) Apply teflon tape to the pipe threads of each side tube fitting.

(6) Install and secure each side tube fitting.

NOTE

Make sure side tube fittings are properly oriented.

f. Installation

(1) Attach lifting sling to air receiver.

(2) List air receiver into frame.

(3) Position air receiver into proper location in frame.

(4) Attach and secure three tubes.

(5) Install and secure two straps, four lock washers and four nuts.

5-22. INSTRUMENT PANEL ASSEMBLY (Figure 5-31)

This task covers:

a. Testing

b. Repair and Overhaul

INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-42	Instrument Panel Removed

a. Testing. Verify proper operation of each control and indicator and of all manual switches.

b. Repair and Overhaul

(1) Remove all instruments and controls. Note location of each item removed to ensure proper reinstallation.

(2) Repair any damage to the instrument panel. Refinish with proper camouflage paint.

(3) Inspect all instruments and controls. Replace all defective items.

(4) Reinstall all instruments and controls.

NOTE

Make sure all items are returned to the same location from which they came.

5-23. PRESSURE SWITCHES (Figure 5-31)

This task covers:

a. Testing and Adjustment

INITIAL SETUP

Applicable Configurations

All

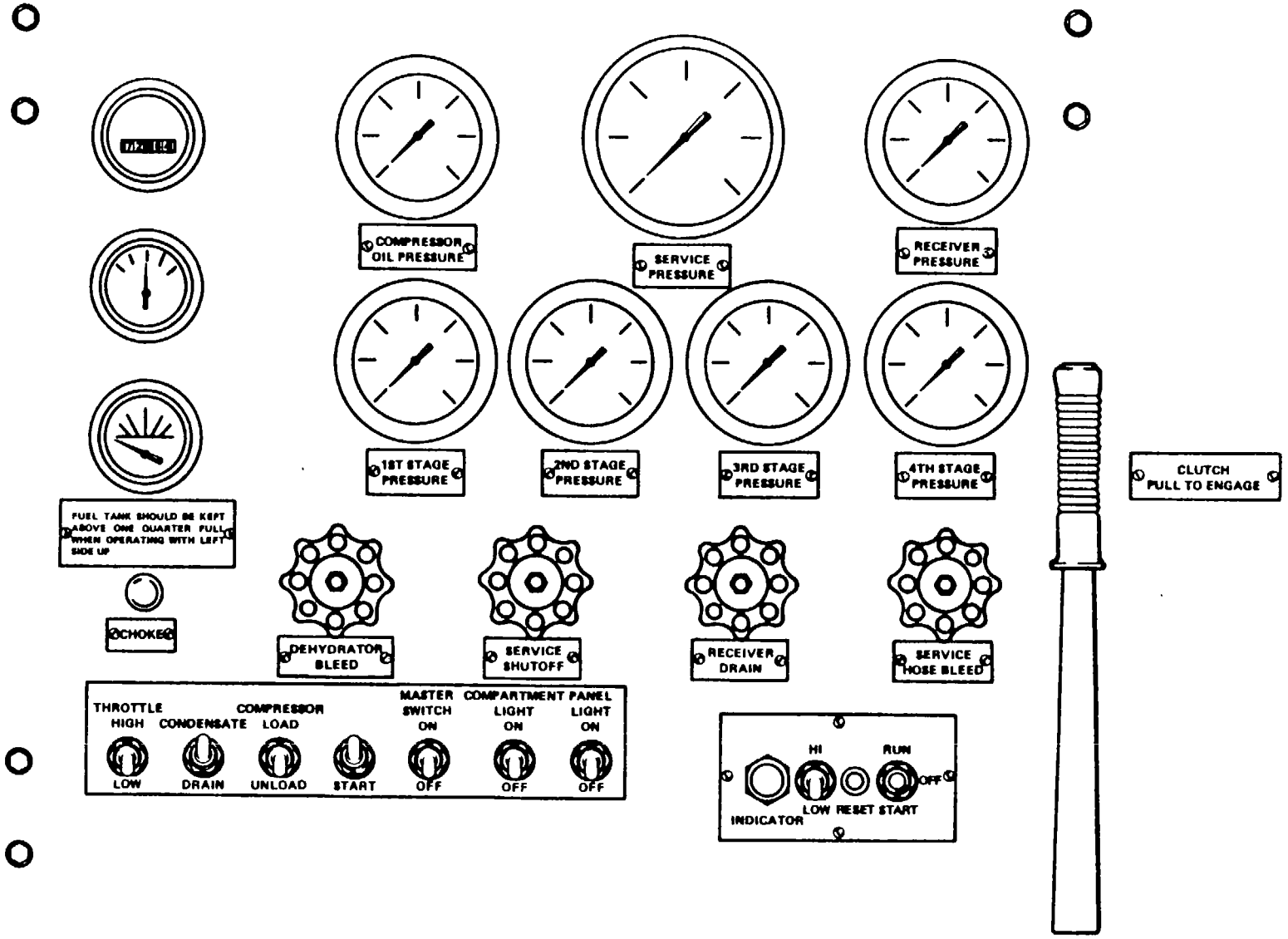


Figure 5-31. Pressure Switches

a. Testing and Adjustment

(1) Remove pressure switch. Refer to organizational maintenance.

(2) Connect pressure switch to proper pressure source.

(3) Connect multimeter to the common and normally closed contacts of the pressure switch.

(4) Slowly apply pressure to the pressure switch. Note the pressure at which the contacts open.

(5) The contacts should open as follows:

(a) Engine oil pressure - 1 + 1/2, -0 PSI.

(b) Compressor oil pressure - 600 +50, - 0 PSI.

(c) Air pressure switch - 3500 +150, -0 PSI.

(6) Slowly decrease the air pressure until the contacts reclose. Note the pressure at which the contacts reclose.

(7) The contacts should reclose as follows:

(a) Engine oil pressure - 1 + 0, 1/2 PSI.

(b) Compressor oil pressure - 600 + 0, -50 PSI.

(c) Air pressure switch - 3000 -0, +500 PSI.

(8) Adjust or replace defective switch.

5-24. AIR AND OIL PRESSURE GAGES (Figure 5-31)

This task covers:

a. Removal

b. Installation

INITIAL SETUP

Applicable Configurations

All

---

a. Removal

(1) Disconnect pressure line.

(2) Remove attaching hardware.

(3) Remove gage from panel.

(4) Remove tube fitting.

b. Installation

(1) Apply teflon tape to pipe thread connection at back of gage.

(2) Install and secure tube fitting onto gage.

NOTE

Hold gage fitting with open end wrench during tightening.

(3) Install gage into instrument panel.

(4) Secure gage with proper hardware.

(5) Attach and secure pressure tube.

5-25. MANUAL SWITCHES (Figure 5-31)

This task covers:

a. Testing

b. Replacement

INITIAL SETUP

Applicable Configurations

All

---

a. Testing

(1) Operate switch. Verify proper operation.

(2) Disconnect wiring and check continuity with multimeter.

b. Replacement

(1) Disconnect wiring. Note location of wires for reconnection late.

(2) Loosen and remove mounting nut and washer.

(3) Remove switch from instrument panel.

(4) Position switch into hole in instrument panel.

(5) Secure switch with nut and washer.

(6) Connect wiring.

NOTE

Make sure wire connections are the same as before switch replacement.

5-26. FRAME

This task covers:

a. Disassembly

b. Reassembly

INITIAL SETUP

Applicable Configurations

All

Equipment Condition

Paragraph	Condition Description
4-18	Enclosure Removed
4-42	Instrument Panel Removed

---

a. Disassembly

(1) Remove engine (paragraph 5-2).

(2) Remove compressor (paragraph 5-3).

(3) Remove heater (paragraph 5-27).

(4) Remove axle assembly (paragraph 5-4).

(5) Remove fuel tank (paragraph 5-5).

(6) Remove miscellaneous equipment.

b. Reassembly

(1) Install all miscellaneous equipment.

(2) Install fuel tank (paragraph 5-5).

(3) Install axle (paragraph 5-4).

(4) Install heater (paragraph 5-27).

(5) Install compressor (paragraph 5-3).

(6) Install engine (paragraph 5-2).

(7) Start engine and compressor. Check for leaks, belt chafing, etc. Repair as required.

5-27. COMPARTMENT HEATER

This task covers:

a. Removal
b. Disassembly
c. Cleaning
d. Inspection
e. Reassembly
f. Installation

INITIAL SETUP

Applicable Configurations

All

General Safety Precautions

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 (38°C) - 138°F (59°C).

---

a. Removal

(1) Disconnect wire assembly at heater.

(2) Disconnect fuel line at heater.

(3) Disconnect three air ducts at heater.

(4) Remove two straps, two bolts, four nuts and four washers.

(5) Lift heater slightly and remove exhaust pipe.

(6) Remove heater from frame.

b. Disassembly

NOTE

Disassemble heater only to extent necessary to make required repairs.

(1) Remove cover.

(2) Remove four screws and fuel control assembly.

(3) Remove four screws and flame switch cover.

(4) Disconnect four wires and flame switch assembly.

(5) Remove one wire and unscrew ignition seal.

(6) Remove relay.

(7) Remove limit switch.

(8) Remove rear cover.

(9) Remove rear housing.

(10) Remove blower assembly.

(11) Remove front housing.

(12) Remove burner housing from fan housing.

(13) Remove two screws and microswitch from bracket.

(14) Remove two rods.

(15) Remove condenser.

(16) Remove thermostat.

(17) Remove fuel regulator from bracket.

c. Cleaning. Clean all parts in cleaning solvent. Dry thoroughly.

d. Inspection

(1) Inspect all threaded parts and tapped holes for thread damage. Repair or replace defective components.

(2) Inspect burner chamber for cracks.

(3) Check igniter for open circuit. Replace defective component.

e. Reassembly

(1) Assemble fuel regulator to bracket.

(2) Install thermostat.

(3) Install condenser.

(4) Install two rods into tube on bracket.

(5) Align holes in microswitch with holes in bracket. Secure with two screws and nuts.

(6) Assemble burner housing and fan housing.

(7) Install front housing.

(8) Install blower assembly.

(9) Install rear housing.

(10) Install rear cover.

(11) Install limit switch.

(12) Install relay.

(13) Install igniter and seal. Connect wire.

(14) Install flame switch. Connect four wires.

(15) Install flame switch cover.

(16) Install fuel control assembly.

(17) Install cover.

f. Installation

(1) Position heater over frame mounting bracket.

(2) Align exhaust pipe with exhaust port on heater. Install exhaust pipe. Secure with muffler clamp.

(3) Secure heater to bracket with two straps, two bolts, four washers and four nuts.

(4) Connect three air ducts to heater. Secure with three hose clamps.

(5) Connect fuel line to heater. Secure with hose clamp.

(6) Connect and secure wire harness to heater.

(7) Adjust flame switch as follows:

(a) Turn nut clockwise until fan starts.

(b) Turn nut counterclockwise until fan stops.

(c) Turn nut additional 1/2 turn counterclockwise from point in (b) above.

CHAPTER 6

GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

6-1. SCOPE

These instructions are published for the use of general support maintenance personnel maintaining the Bauer Model KA15-03-P air compressor. They provide information on the maintenance of the equipment which is beyond the scope of tools, equipment, personnel, or supplies normally available to using organizations.

Section II. SPECIAL TOOLS AND EQUIPMENT

6-2. SPECIAL TOOLS AND EQUIPMENT

No special tools and equipment are required for general support maintenance for performing maintenance on the air compressor engine. One special tool, a valve spanner, is required for removal and installation of certain compressor valves.

Section III. ENGINE ASSEMBLY

6-3. GENERAL

The engine is a four cylinder, four stroke cycle, spark ignition, reciprocating, piston, air cooled engine. The cylinders are arranged in two banks of two cylinders per bank. The included angle between the two banks is 900.

6-4.REMOVAL

Remove the engine.

a. Removal

(1) Remove enclosure roof. (Figure 6-1)

(2) Drain engine oil. (Figure 6-2)

(3) Disconnect fuel line at fuel pump. (Figure 6-3)

(4) Disconnect starter cable and ground cable. (Figure 6-4)

(5) Disconnect main wire harness at throttle solenoid, magneto and oil pressure switch.

(6) Remove four engine mounting bolts and nuts.

(7) Remove drive belts for compressor and alternator. (Figure 6-5)

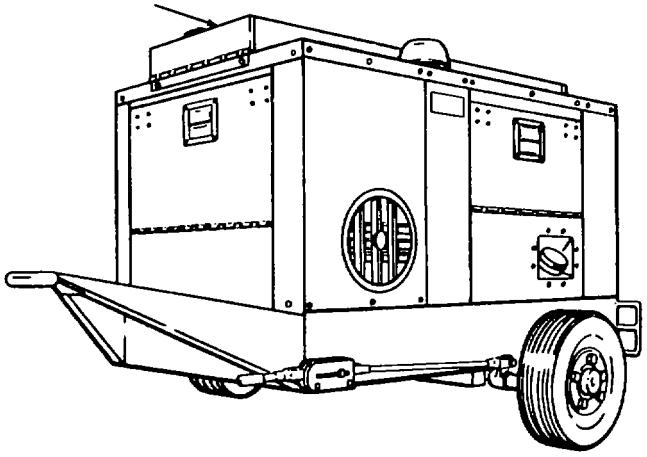


Figure 6-1. Enclosure Roof

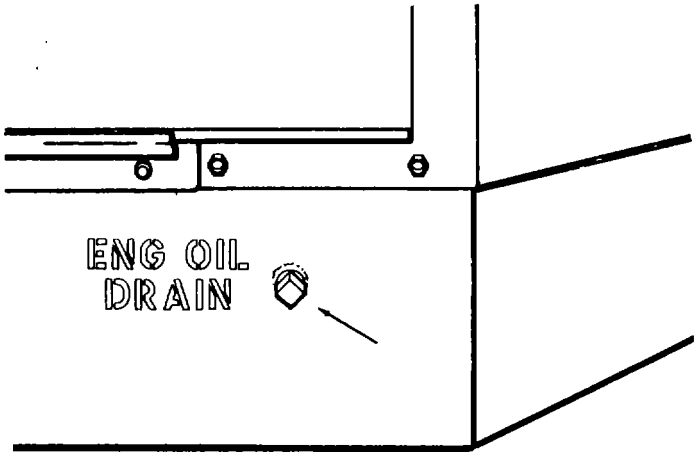


Figure 6-2. Engine Oil Drain

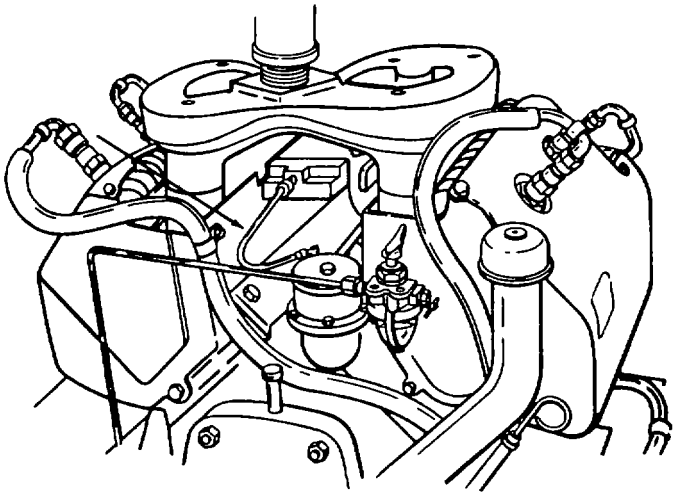


Figure 6-3. Fuel Line at Fuel Pump

(8) Disconnect clutch linkage at clutch.

(9) Attach lifting device beneath exhaust manifold.

(10) Disconnect oil drain line at engine.

(11) Disconnect air cleaner tube at carburetor. (Figure 6-6)

(12) Remove engine from frame.

6-5. DISASSEMBLY

a. Starter. Remove starter. (Fig. 6-7)

(1) Disconnect starter cable at the starter.

(2) Remove two nuts and lock washers.

(3) Remove starter support bracket.

(4) Remove three bolts and lock washers. Remove the starter.

b. Clutch. Remove clutch. (Fig. 6-8)

(1) Remove three bolts and lock washers from drive sheave bushing.

(2) Insert two bolts into threaded holes in bushing. Tighten bolts to push drive sheave off of bushing.

(3) Remove bushing, drive sheave and shaft key from output shaft.

c. Magneto. Remove magneto (Fig. 6-9)

(1) Disconnect four spark plug wires.

(2) Disconnect ground strap.

(3) Disconnect main wire harness at one place.

(4) Remove nut.

(5) Remove bolt, lock washers and nut.

(6) Remove magneto.

d. Manifolds and Carburetor. Remove intake and exhaust manifold complete with carburetor.

(1) Remove two bolts, two nuts and four washers. Remove seal clamp.

(2) Disconnect exhaust pipe from exhaust manifold elbow.

(3) Remove four nuts and four washers.

(4) Remove intake and exhaust manifold assembly.

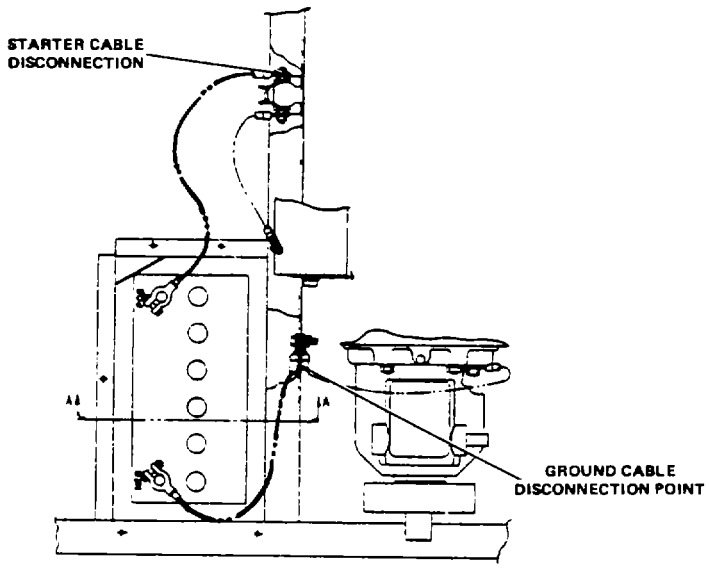


Figure 6-4. Cables

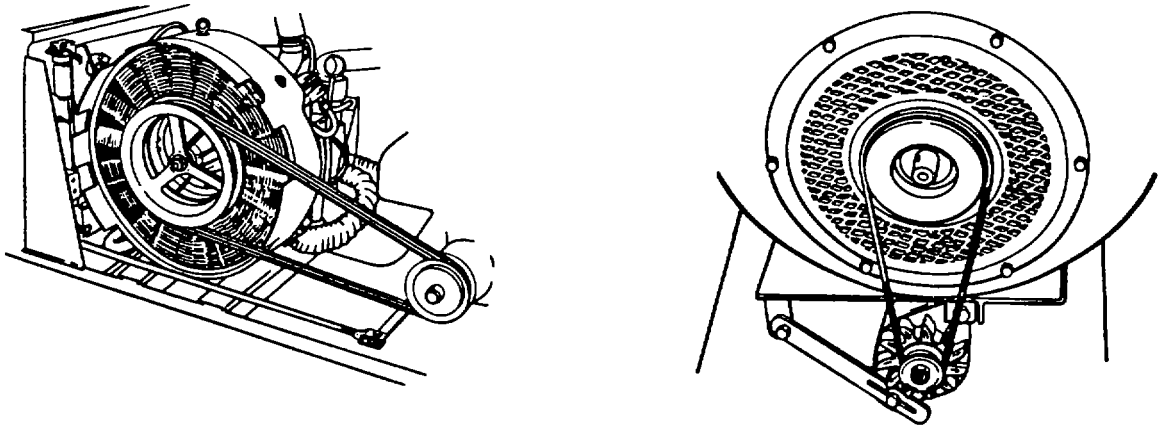


Figure 6-5. Drive Belts

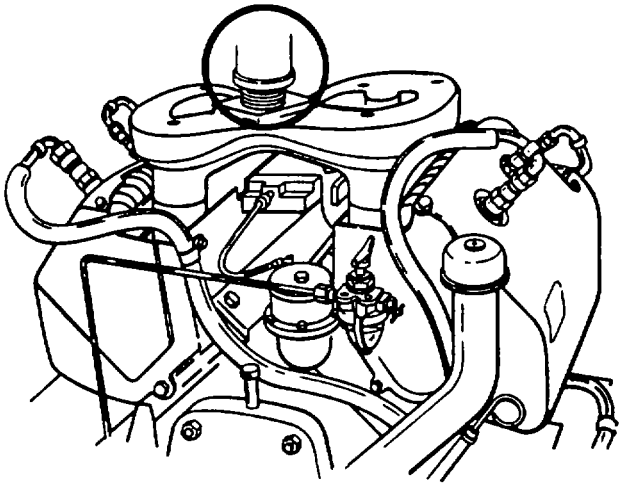


Figure 6-6. Air Cleaner Tube

e. Flywheel Screen. Remove flywheel screen.

f. Flywheel. Remove flywheel.

(1) Drive starting crank pin out of crankshaft. (Figure 6-11).

(2) Remove flywheel nut and washer.

(3) Pull up and out on rim of flywheel. Rap end of crankshaft with babbit mallet while pulling on flywheel. Repeat until flywheel is free.

(4) Remove flywheel from engine.

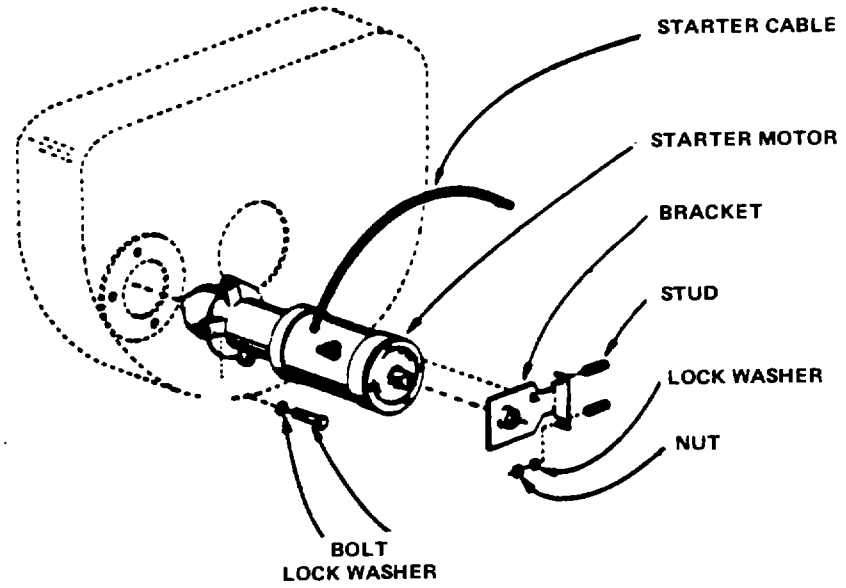


Figure 6-7. Starter Assembly

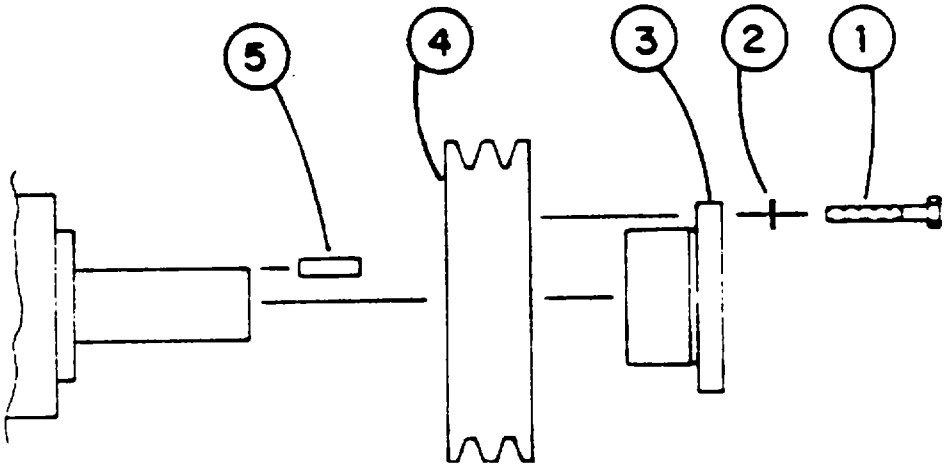


Figure 6-8. Clutch Assembly

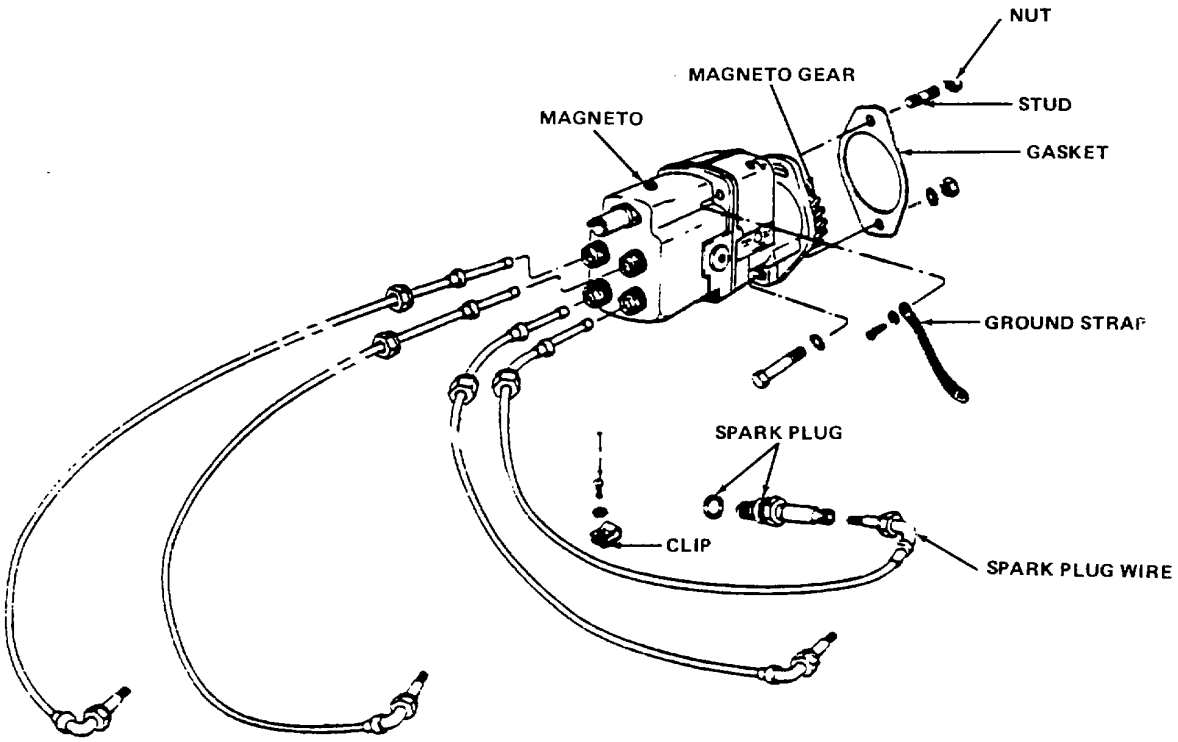


Figure 6-9. Magneto Assembly

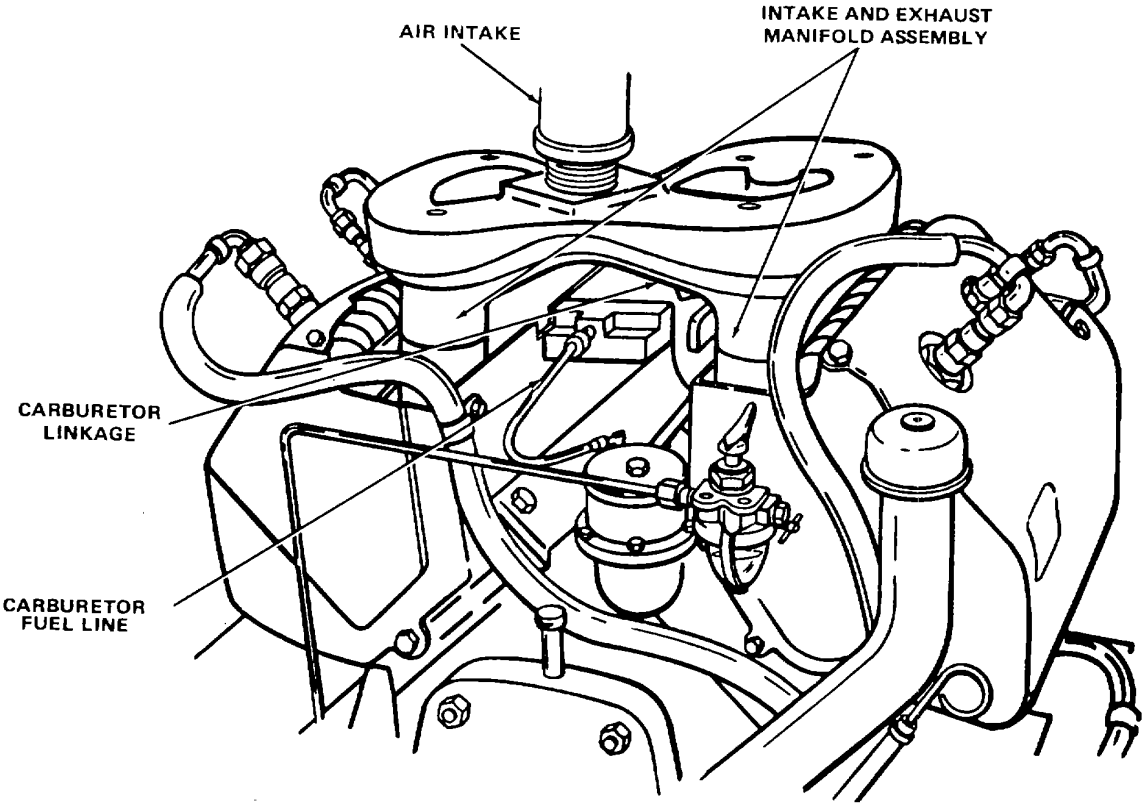


Figure 6-10. Manifolds and Carburetor Accessories

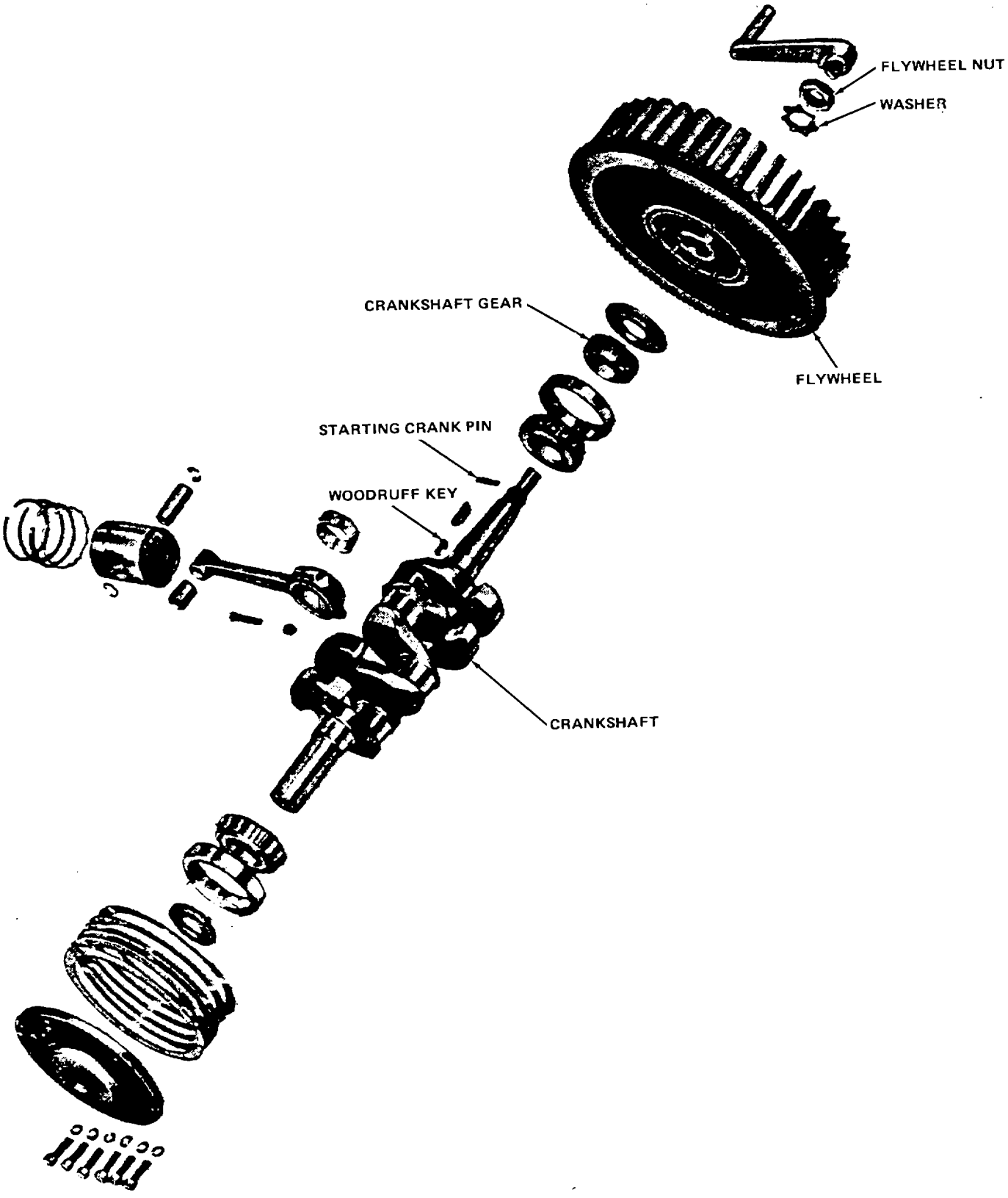


Figure 6-11. Crankshaft Assembly

g. Air Shrouding. (Figure 6-12)

(1) Remove six 1/4-20" screws and lock washers from left cylinder head shroud.

(2) Remove left cylinder head shroud.

(3) Remove six 1/4-20" screws and lock washers from right cylinder head shroud.

(4) Remove right cylinder head shroud.

(5) Remove three 1/4-20" screws and lock washers from left rear shroud cover.

(6) Remove left rear shroud cover.

(7) Remove three 1/4-20" screws and lock washers from right rear shroud cover.

(8) Remove right rear shroud cover.

(9) Remove left heat deflector.

(10) Remove three 1/4-20" screws and lock washers from side shroud cover.

(11) Remove right heat deflector and side shroud cover.

(12) Remove six 5/16-18" screws and lock washers from flywheel shroud.

(13) Remove flywheel shroud.

(14) Remove left lower cylinder shroud.

(15) Remove right lower cylinder shroud.

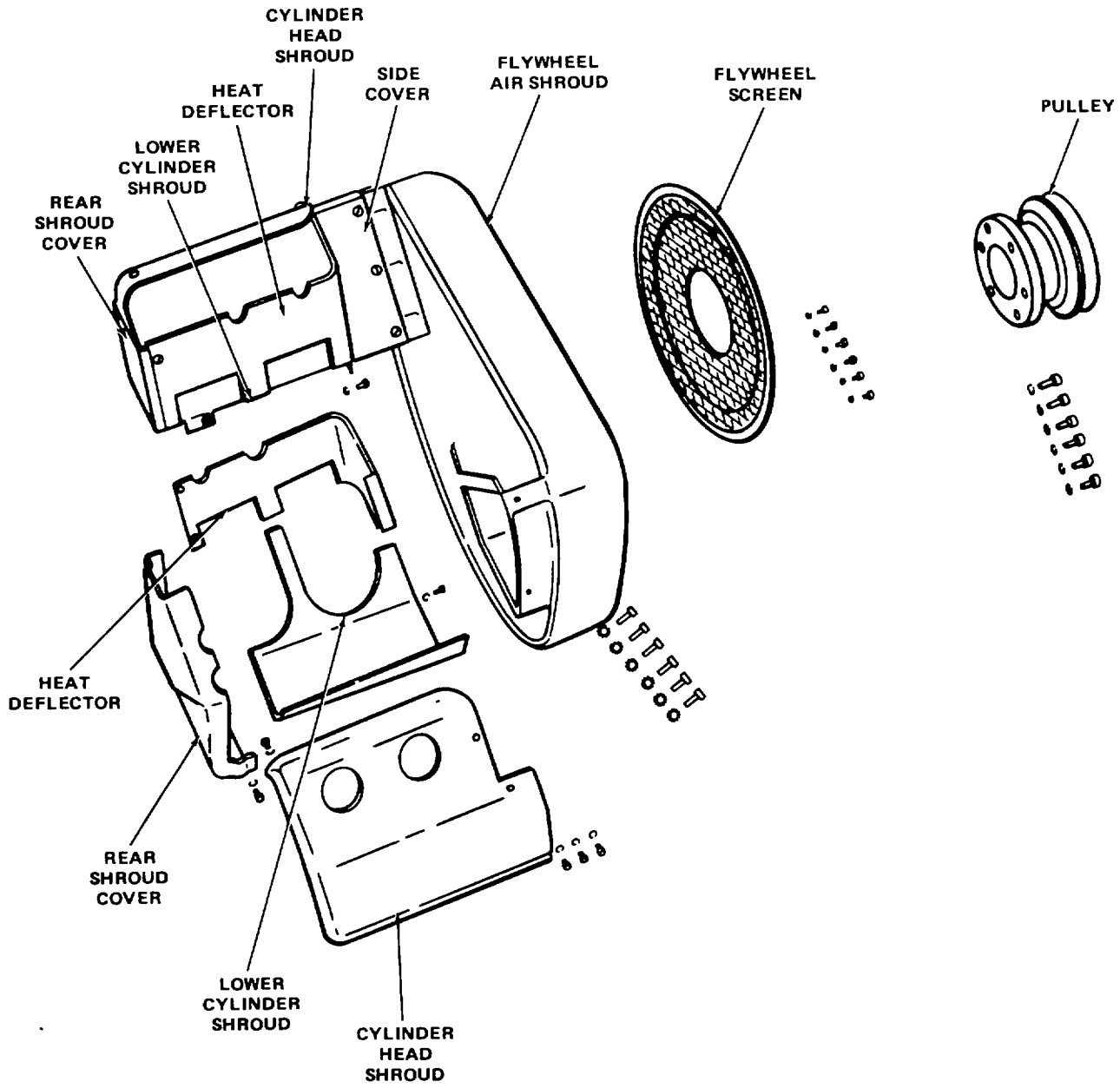


Figure 6-12. Shrouds

h. Cylinder Heads. (Figure 6-13)

(1) Remove spark plugs from left cylinder head.

(2) Remove two 5/16-18" x 1-3/8" bolts and lock washer.

(3) Remove fifteen 5/16-18" x 1 1/4" bolts and lock washer.

(4) Remove left cylinder head.

(5) Repeat steps 1, 2, 3 and 4 for right cylinder head.

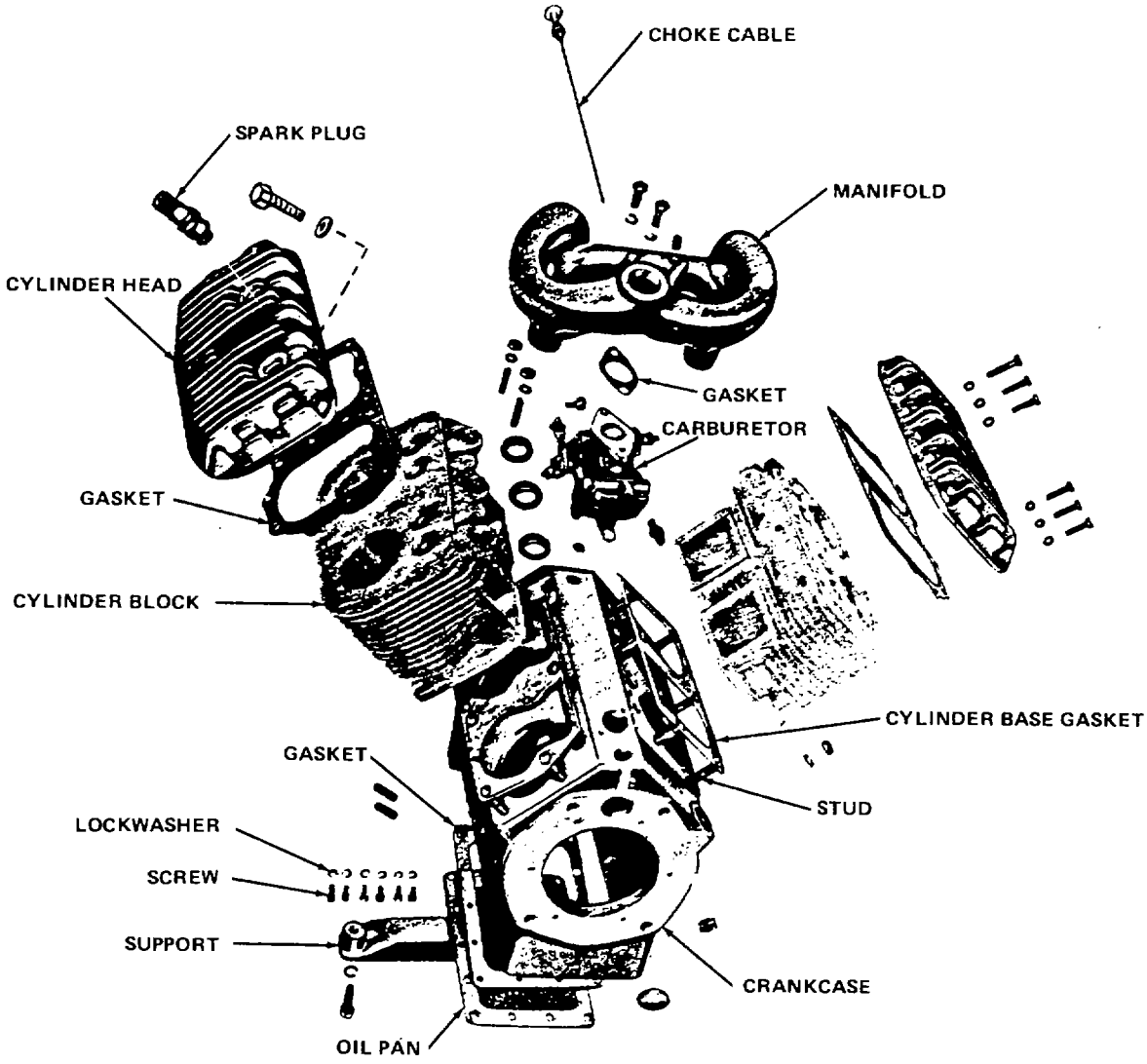


Figure 6-13. Cylinder Assembly

i. Gear Cover. (Figure 6-14)

(1) Remove ten 5/16-18" x 1 1/4" screws, eight spring lock washers and two external tooth lock washers.

(2) Remove two 5/16-18" x 3/4" screws and lock washers.

(3) Rap gear cover with soft hammer to break seal and remove gear cover.

(4) Remove five 5/16-18" x 5/8" screws, three 5/16" lock washers and two 5/16" flat copper washers.

(5) Remove gear cover spacer.

(6) Remove two dowel pins.

(7) Remove oil seal from gear cover.

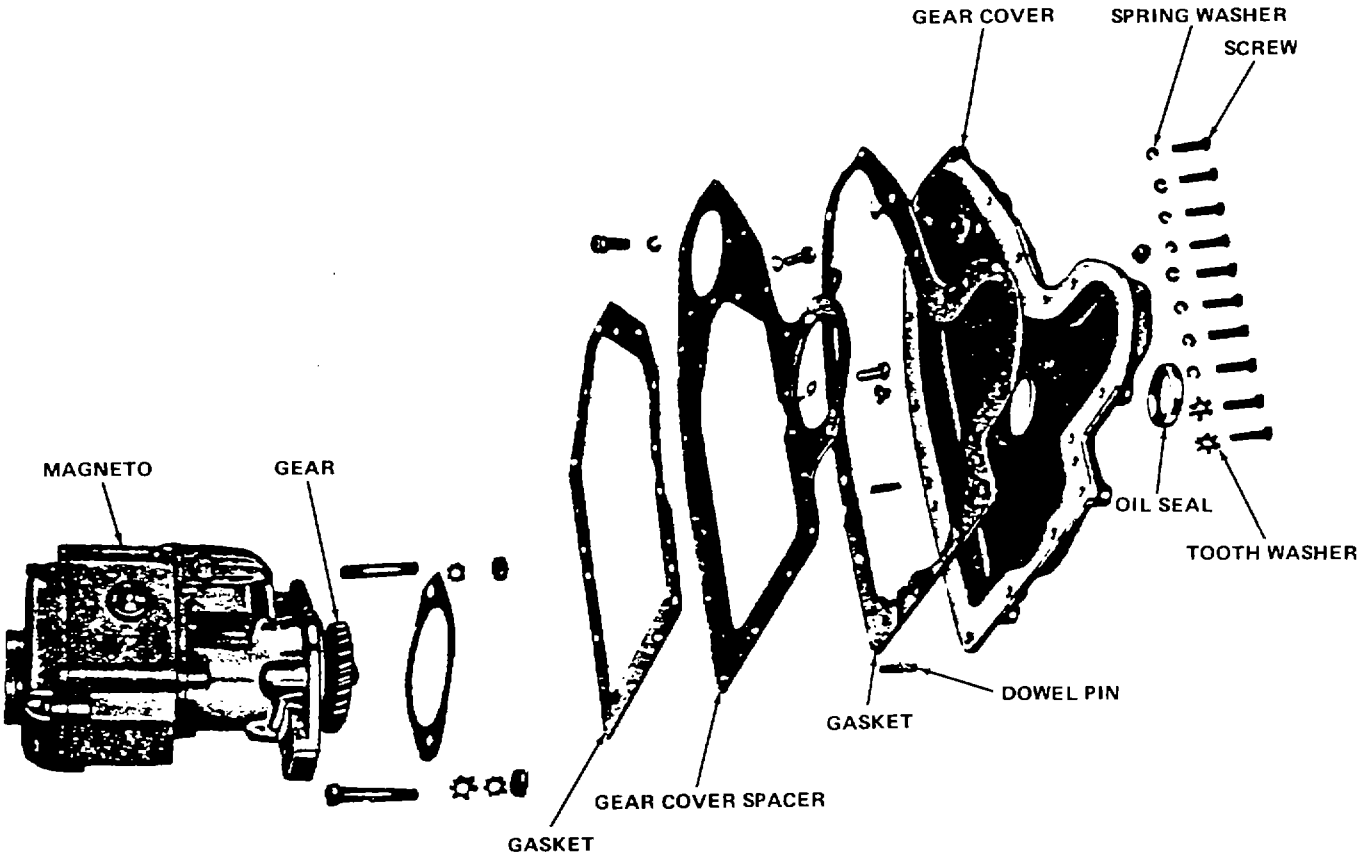


Figure 6-14. Gear Covers

j. Idler Gear. (Figure 6-15)

(1) Remove alien head setscrew.

(2) Install suitable gear puller and remove idler gear shaft and idler gear.

k. Camshaft Gear. (Figure 6-16)

(1) Remove three 5/16-18" x 1" screws and lock washers.

(2) Remove thrust button.

(3) Pry camshaft gear off of end of camshaft.

(4) Remove thrust plunger and spring.

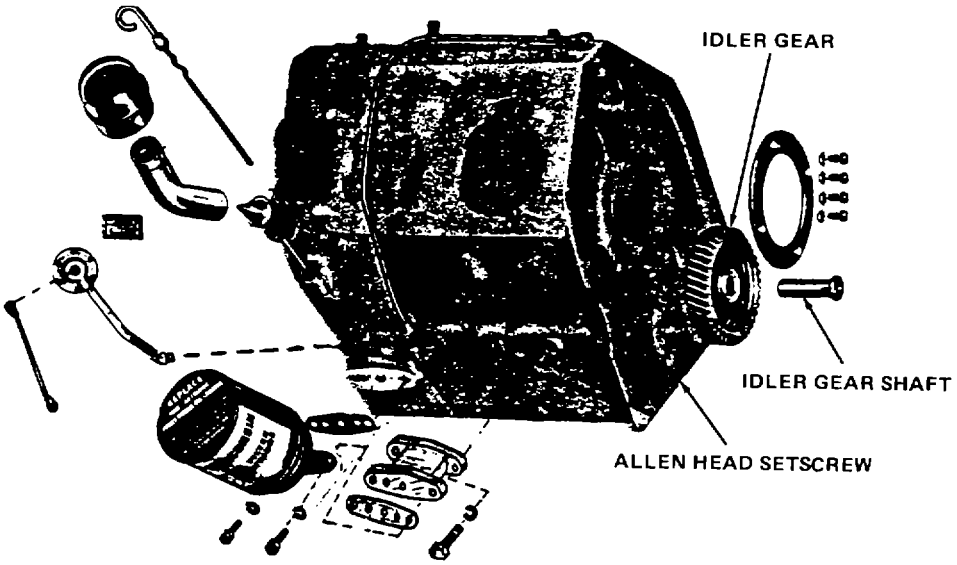


Figure 6-15. Idler Gear Assembly

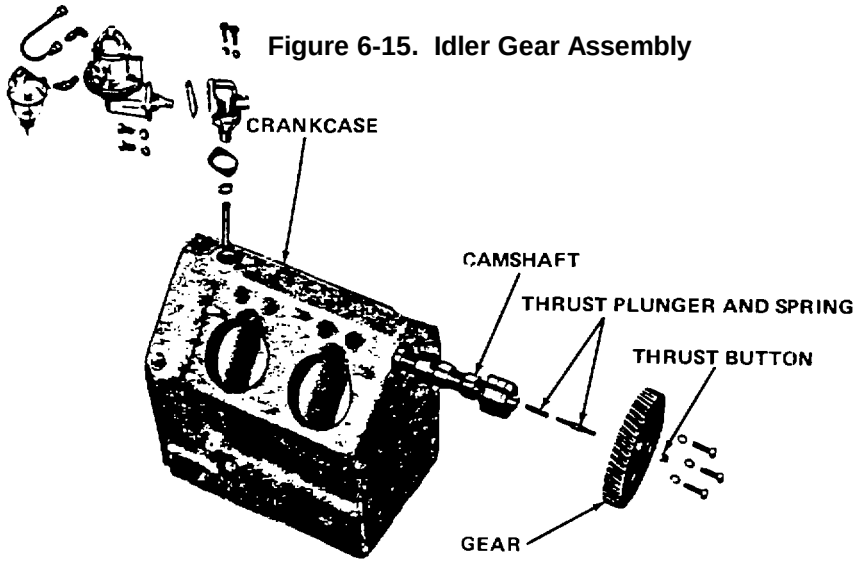


Figure 6-16. Camshaft

l. Oil Pan. (Figure 6-13)

(1) Invert engine.

(2) Remove fourteen 5/16-18" screws and lock washers.

(3) Remove oil pan.

m. Oil Pump. (Figure 6-17)

(1) Remove slotted head pipe plug.

(2) Using 5/32" alien wrench, remove setscrews.

(3) Remove oil pump gear retaining nut.

(4) Using hammer and drift pin, drive oil pump out of oil pump drive gear.

(5) Remove relief spring retaining pin, spring and ball.

(6) Remove two # 10-32 x 1-1/4" screws, one # 10-32 x 3/8" screw, four # 10-32 x 1/2" screws and seven # 10 washers.

(7) Separate pump cover from pump body.

(8) Remove woodruff key from drive shaft.

(9) Remove drive shaft, drive gear, driven gear and idler shaft.

(10) Remove retaining pin and separate drive gear from drive shaft.

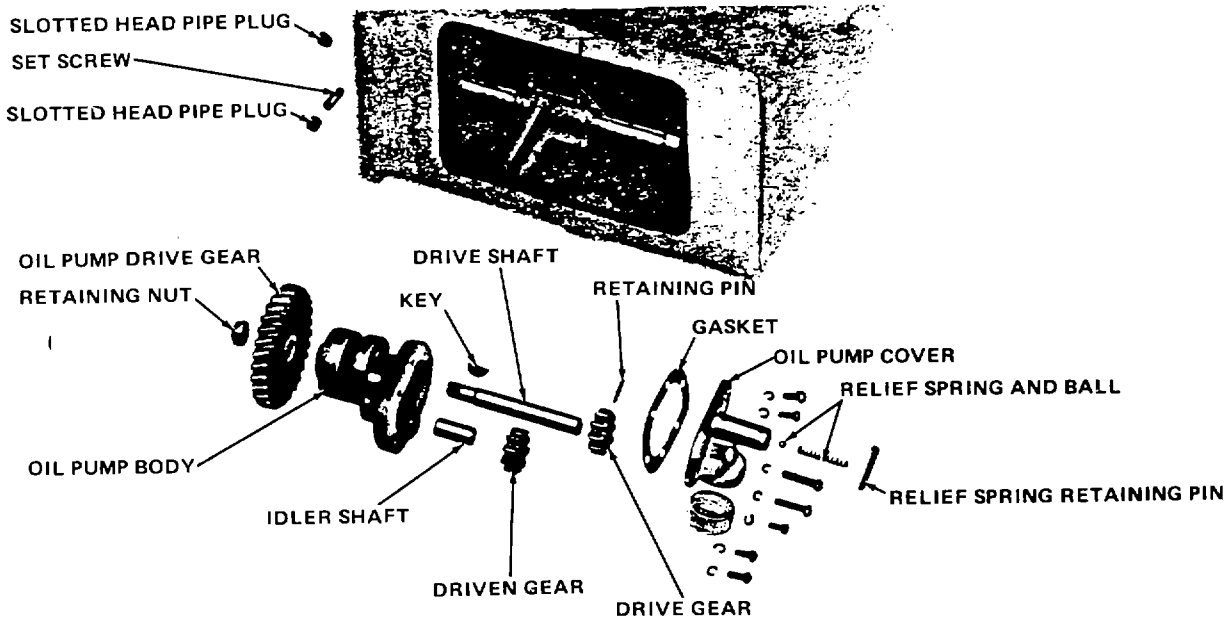


Figure 6-17. Oil Pump Assembly

n. Pistons and Connecting Rods. (Figure 6-18)

(1) Remove 5/16-24" hex lock nuts from connecting rod bolts.

(2) Using a soft mallet, tap four connecting rod bolts to loosen. Remove connecting rod bolts.

(3) Lift four connecting rod caps off of four connecting rods.

(4) Using a wooden rod placed against the underside of the connecting rod, drive the piston and connecting rod assembly out of the cylinder.

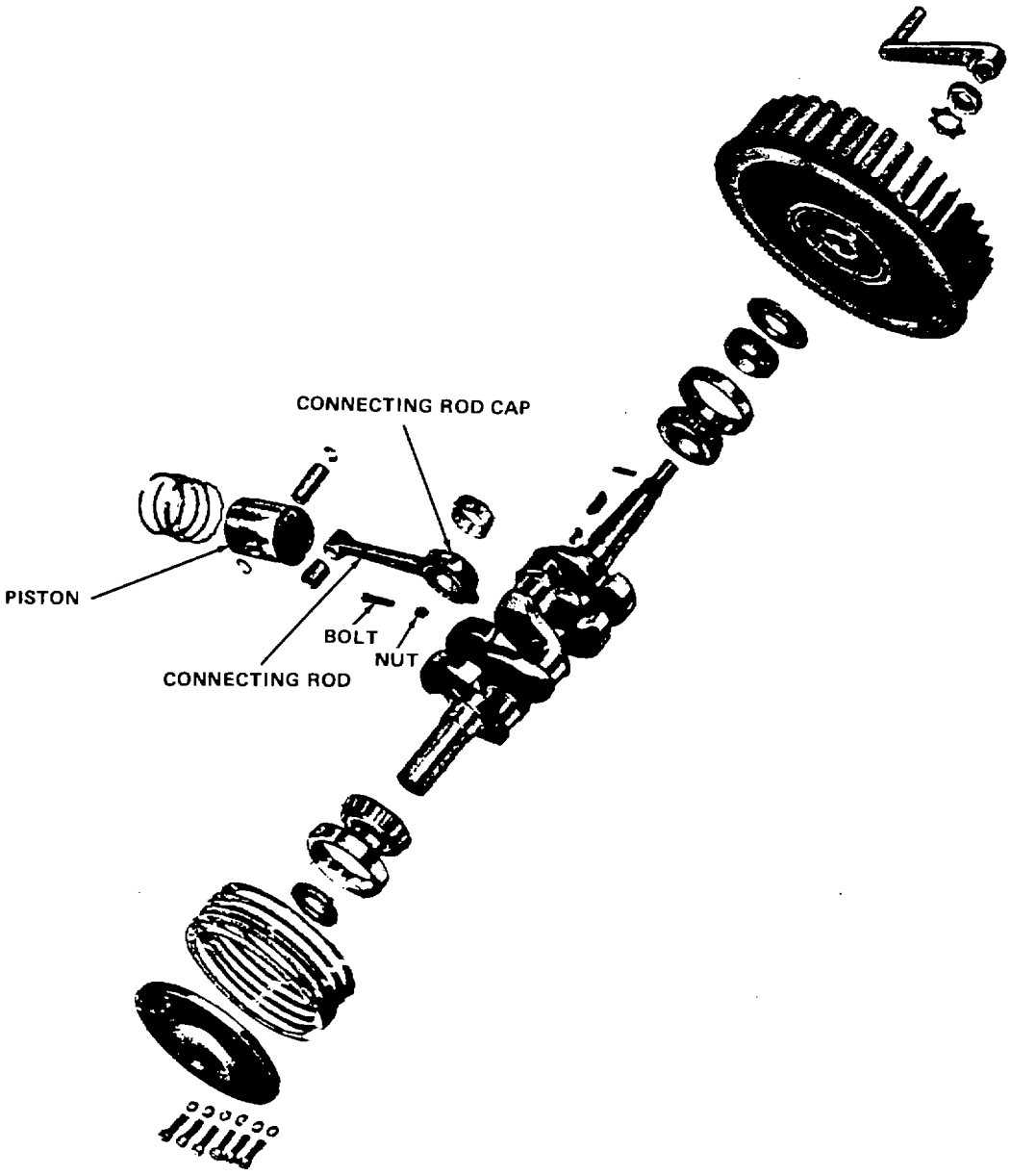


Figure 6-18. Pistons and Connecting Rods

o. Cylinder Block. (Figure 6-19)

(1) Remove one 5/16-18" x 1-1/2" screw and 5/16" copper washer from each valve cover.

(2) Remove two valve covers from each cylinder block.

(3) Apply valve spring compressor (Figure 6-20) to intake valve for # 1 cylinder.

(4) Compress valve spring and remove split valve keepers.

(5) Release and remove valve spring compressor.

(6) Remove valve spring retainer.

(7) Remove valve.

(8) Remove valve spring.

(9) Repeat steps 3, 4, 5, 6, 7 and 8 for each remaining valve.

(10) Remove six 7/16-20" hex nuts and six 7/16" external tooth lock washers from each cylinder block.

(11) Remove cylinder block.

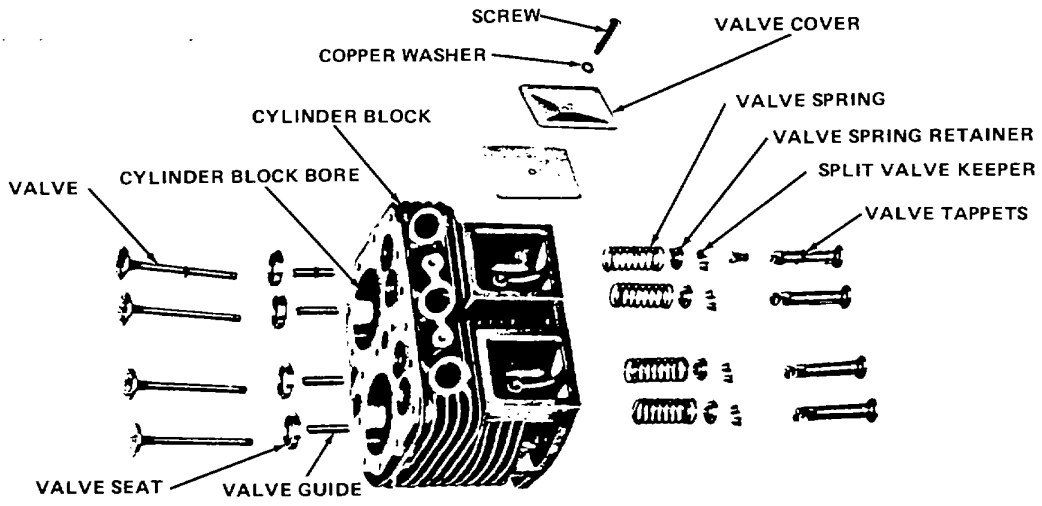


Figure 6-19. Cylinder Block

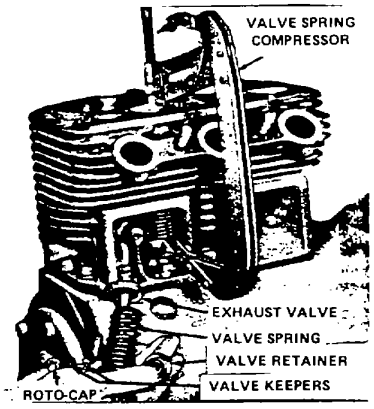


Figure 6-20. Valve Spring Assembly

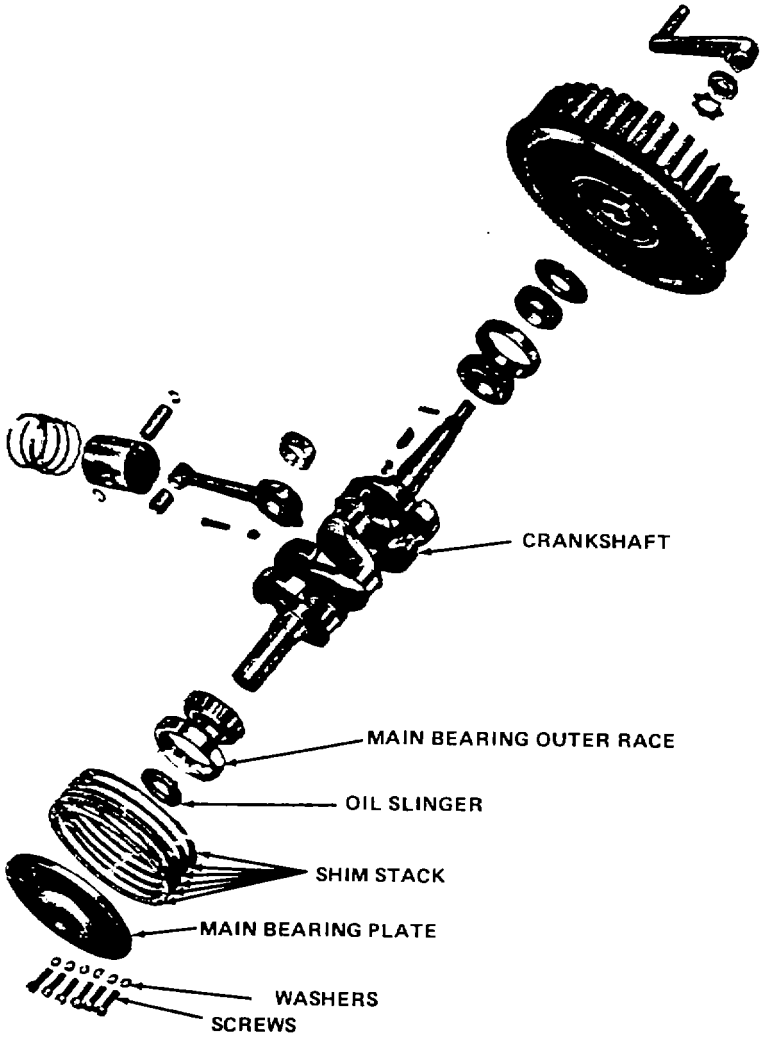


Figure 6-21. Crankshaft

p. Crankshaft. (Figure 6-21)

(1) Remove six 3/8-16" x 1-1/4" screws and six 3/8" lock washers.

(2) Remove main bearing plate, shim stack and main bearing outer race.

(3) Remove crankshaft.

q. Camshaft

(1) Push eight valve tappets (Figure 6-19) up against underside of crankcase (Figure 6-16). Secure in place with elastic bands.

(2) Remove camshaft (Figure 6-16).

r. Valve Tappets. (Figure 6-19)

(1) Remove elastic bands installed in paragraph q.

(2) Remove eight valve tappets.

6-6. CLEANING

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 (38°C) - 138°F (59°C).

a. Clean all parts with dry cleaning solvent. Dry thoroughly.

b. Remove all carbon and lead deposits from cylinder heads.

c. Remove all carbon and lead deposits from pistons.

d. Blow out all oil passages. Use small bore brush where necessary to thoroughly clean oil passages.

6-7. INSPECTION

a. Inspect all parts for signs of abnormal or excessive wear or damage.

b. Using one inch to two inch range outside micrometer, measure the crankshaft journals as shown in Figure 6-24.

c. Inspect pistons for wear or damage. Replace any piston which is scored, cracked, broken, has wear patterns which have obliterated the machining marks on the skirt or which has worn beyond the limits shown in Figure 6-24.

d. Inspect cylinder block for damaged sealing surfaces and broken or damaged fins. Inspect cylinder bores for scoring, damage, taper or piston to cylinder wear beyond the limits in Figure 6-24.

e. Inspect valves for damage, bending, burning and excessive wear.

f. Inspect valve springs for damage and wear.

g. Inspect valve tappets for wear and scoring.

h. Inspect camshaft for damage and wear to bearing journals and cam lobes.

PISTON RING GAP		.010 to .020"
PISTON RING SIDE CLEARANCE IN GROOVES	TOP RING	.002 to .004"
	SCRAPER RING	.002 to .004"
	OIL RING	.001 to .003"
PISTON PIN TO CONNECTING ROD BUSHING		.0004 to .0012"
PISTON PIN TO PISTON		.0000 to .0008" Hand
CONNECTING ROD TO CRANK PIN – SIDE CLEARANCE		.009 to .016"
CONNECTING ROD SHELL BEARING TO CRANK PIN DIA. (VERTICAL)		.0012 to .0033"

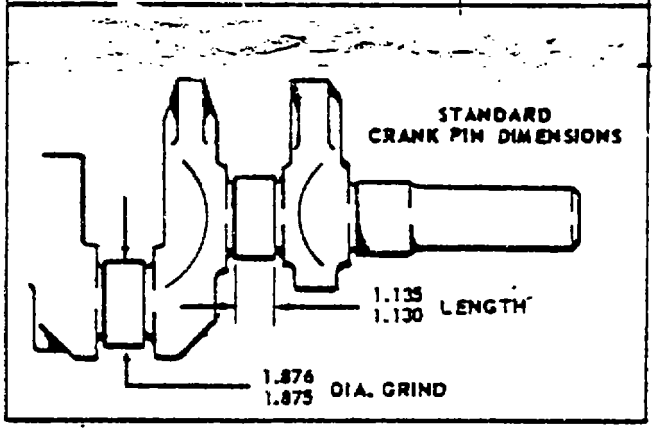


Figure 6-24. Crankshaft Journals

6-8. REPAIR AND REPLACEMENT

a. Crankshaft. (Figure 6-25)

(1) Regrind crankshaft as required.

(2) Replace main bearings as required.

(3) Install crankshaft into crankcase (Figure 6-13).

(4) Install new oil seal into main bearing plate.

(5) Assemble main bearing plate, shim pack and gasket over end of crankshaft.

(6) Rotate main bearing plate and shim and gasket pack so that the bolt holes align with the tapped holes in the crankcase (Figure 6-13).

(7) Install six 3/18-16" x 1-1/2" screws and lock washers into the bolt holes in the main bearing plate. Secure the bolts to a torque of 20 lb-ft.

(8) Check end play of crankshaft. End play must be no less than .002 inches nor more than .004 inches. Adjust shim pack as required to obtain proper end play.

b. Camshaft and Tappets. (Figure 6-16 and 6-19)

(1) Replace any tappets which show any sign of wear or scoring.

(2) Replace camshaft if journals or any cam lobe show any sign of wear or scoring.

NOTE

Do not install used tappets with a new camshaft. New tappets may be installed on a used camshaft.

(3) Install tappets into same location in crankcase from which they were removed.

(4) Push tappets up against underside of crankcase. Hold in place with elastic band.

(5) Install camshaft into crankcase.

(6) Remove elastic bands from tappets.

c. Cylinder Block. (Figure 6-19)

(1) Replace any cylinder block which has broken fins.

(2) Measure cylinder bore and piston clearance. Replace or recondition cylinder blocks which do not meet requirements shown in Figure 6-24.

(3) Replace any valve which shows signs of bending, warping, overheating or burning.

(4) Replace any valve seat which shows signs of damage or overheating.

(5) Check clearance between valve stem and valve guide. If clearance exceeds .008 inches, replace valve guide.

(6) Grind face of each valve to an angle of 45°.

(7) Grind each valve insert to an angle of 45°.

(8) Lap each valve into its seat with valve lapping compound.

(9) Thoroughly clean cylinder block with dry cleaning solvent. Dry thoroughly.

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 (38° C) - 138° F (59° C).

(10) Loose assemble valves, valve springs and valve spring retainers into correct location in cylinder block.

(11) Install valve spring compressor (Fig. 6-21) and compress valve spring.

(12) Install valve keepers onto valve stem.

(13) Release and remove valve spring compressor (Fig. 6-21)

NOTE

Visually inspect valve keepers to insure proper assembly. Repeat for each valve.

(14) Position new cylinder base gasket (Fig. 6-13) over studs on crankcase. Repeat for both banks of cylinders.

(15) Position cylinder block over studs (Fig. 6-13).

NOTE

Be sure that each cylinder block is installed in same location from which it was removed.

(16) Secure each cylinder block to crankcase (Fig. 6-13) with six 7/16-20" hex nuts and 7/16" internal tooth lock washers. Tighten nuts to 40-50 lb-ft torque.

(17) Manually rotate camshaft until the valve tappet is at its lowest point. Adjust each valve tappet in turn so that the cold clearance is .008 inch for intake and .016 inch for exhaust valves.

(18) Position valve inspection cover and new gasket over opening in cylinder block. Secure each cover to block with one 5/16-18" x 1-1/2" screw and 5/16" copper washer.

d. Pistons, Piston Rings and Connecting Rods. (Fig. 6-25)

(1) Replace piston pin bushing if clearance between bushing and piston pin is greater than limits shown in Figure 6-24.

(2) Using piston ring expander, install piston rings onto piston. (See Figure 6-27) Install in the following order:

(a) Oil ring expander

(b) Oil ring

(c) Scraper ring

(d) Compression ring

The word "top" on the scraper ring and compression ring should be closest to the top of the piston. (See Figure 6-27).

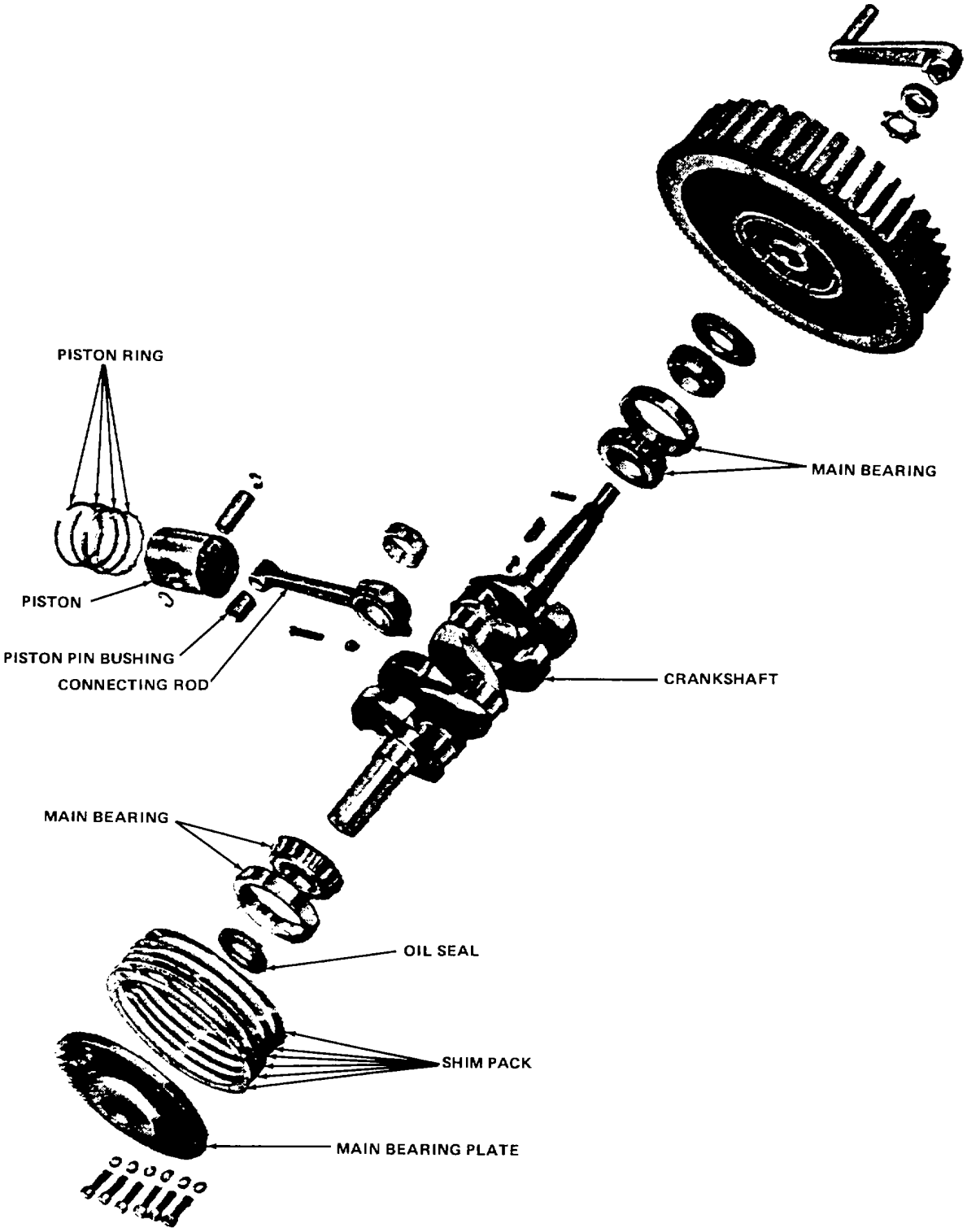


Figure 6-25. Pistons, Piston Rings, and Connecting Rods

(3) Rotate the piston rings on the piston so that the end gap of the oil ring is at 12 o'clock position, the scraper ring is at 4 o'clock position, and the compression ring is at 8 o'clock position.

(4) Apply a liberal coat of engine oil to the outside of the piston and piston rings.

(5) Install piston ring compressor to the piston and compress the piston rings.

(6) Position the piston and connecting rod assembly into the bore of the cylinder block (Fig. 6-19).

NOTE

Make sure the piston is reinstalled into the same cylinder from which it was removed. Make sure front mark is positioned toward flywheel end of crank.

(7) Using a rubber mallet and wooden block, tap piston into cylinder.

NOTE

Take care not to damage crankshaft journals.

(8) Install connecting rod sheel bearing halves into connecting rod and connecting rod cap. See Figure 6-28.

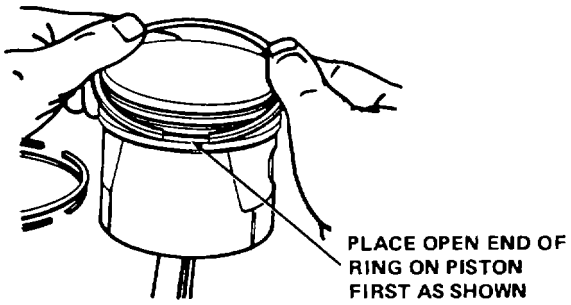


Figure 6-26. Top of Piston

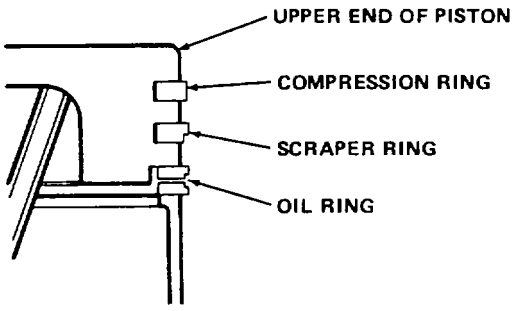


Figure 6-27. Top of Piston

(9) Apply a liberal coat of engine oil to the crankshaft. Tap on the head of the piston with a wooden block until the connecting rod and bearing is seated on the crankshaft. Install the connecting rod cap over theconnecting rod bolts.

NOTE

Be sure that the marks on the connecting rod and connecting rod cap agree and are on the oil filter side of the block. See Figure 6-29.

(10) Install two new 5/16-24" hex locking nuts onto two connecting rod bolts. Tighten nuts to 22-28 lb-ft torque.

(11) Repeat 9 and 10 above for each piston and connecting rod assembly.

(12) Rotate crankshaft several turns by hand to ensure that there is no binding.

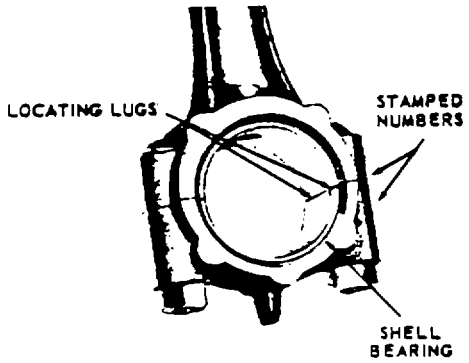


Figure 6-28. Rod Sheel Bearing Halves

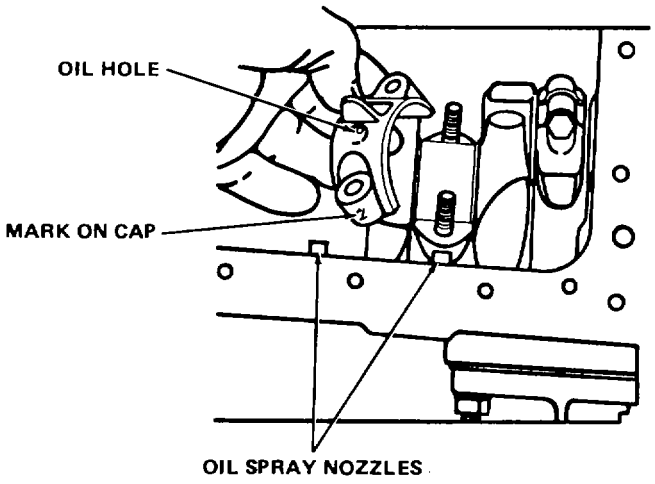


Figure 6-29. Oil Filter Side of Block

e. Oil Pump. (Figure 6-17)

(1) Position oil pump drive gear over drive shaft. Align hole in drive gear with hole in drive shaft and install pin.

(2) Install idler shaft into pump housing. Install oil pump driven gear into idler shaft.

(3) Install drive shaft into pump housing.

(4) Position end cover and new gasket over end of pump housing. Align holes and install # 10-32 x 1-1/4" screws, one # 10-32 x 3/8" screw, four # 10-32 x 1/2" screws and seven # 10 lock washers. Secure end cover to pump housing.

(5) Install ball check valve, valve spring and cotter pin.

(6) Install filter screen.

(7) Immerse oil pump into a container of clean oil. Rotate oil pump drive shaft to ensure oil pump is primed.

(8) Position oil pump into mounting hole in crankcase. Using soft mallet, seat oil pump into hole in crankcase, Figure 6-13.

(9) Install alien setscrew and slotted head pipe plug. See Figure 6-30.

(10) Install woodruff key.

(11) Position oil pump drive gear over end of oil pump drive shaft. Align keyway in drive gear with woodruff key. Seat drive gear onto drive shaft with soft hammer.

(12) Secure drive gear onto shaft with hex nut.

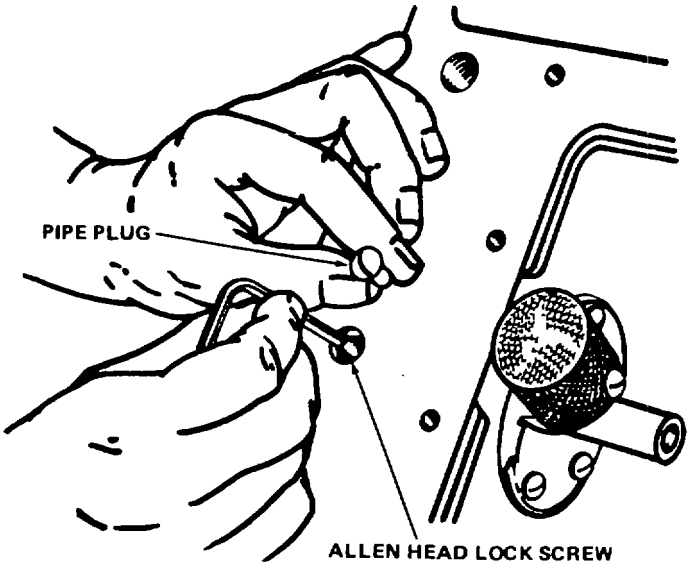


Figure 6-30. Head Pipe Plug

f. Oil Pan. (Figure 6-13)

(1) Position oil pan and new oil pan gasket over opening in bottom of crankcase.

(2) Align holes in oil pan and gasket with bolt holes in bottom of crankcase.

(3) Secure oil pan and gasket to crankcase with fourteen 5/16-18" x 5/8" screws and 5/16" lock washers. Tighten screws to 6-9 lb-ft torque.

g. Gear Cover Spacer. (Figure 6-14)

(1) Position 2 dowel pins over holes in front of crankcase. Drive dowel pins into crankcase about 1/4 inch.

(2) Position gear cover spacer and new crankcase gasket over dowel pins. (Figure 6-13)

(3) Secure gear cover spacer and crankcase gasket to crankcase with five 5/16-18" x 5/8" screws, three 5/16" lock washers and two 5/16" flat copper washers. Tighten screws to 6-9 lb-ft torque.

h. Crankshaft Gear. (Figure 6-11)

(1) Position woodruff key over keyway in crankshaft. Seat woodruff key with small, soft mallet.

(2) Position crankshaft gear over end of crankshaft.

(3) Align keyway in crankshaft gear with woodruff key. Seat crankshaft gear onto crankshaft with soft mallet.

i. Camshaft Gear. (Figure 6-16)

(1) Install thrust plunger and spring into front of camshaft.

(2) Align camshaft gear with front of camshaft.

Timing mark on crankshaft gear and camshaft gear must align. See Figure 6-31.

(3) Secure camshaft gear to camshaft with three 5/16-18" x 1" screws and 5/16" lock washers. Tighten screws to 6-9 lb-ft torque.

(4) Install thrust button.

j. Idler Gear and Shaft. (Figure 6-31)

(1) Position idler gear between the crankshaft gear and oil pump drive gear. See Figure 6-17.

(2) Position idler gear shaft into hole in idler gear and corresponding hole in crankcase. Seat idler gear shaft with soft mallet.

(3) Install alien setscrew. Secure idler gear shaft with setscrew.

(4) Secure gear cover (Figure 6-14) to crankcase with ten 5/16-18" x 1-1/4" screws, eight spring lock washers and two external tooth lock washers. Secure screws to 6-9 lb-ft torque.

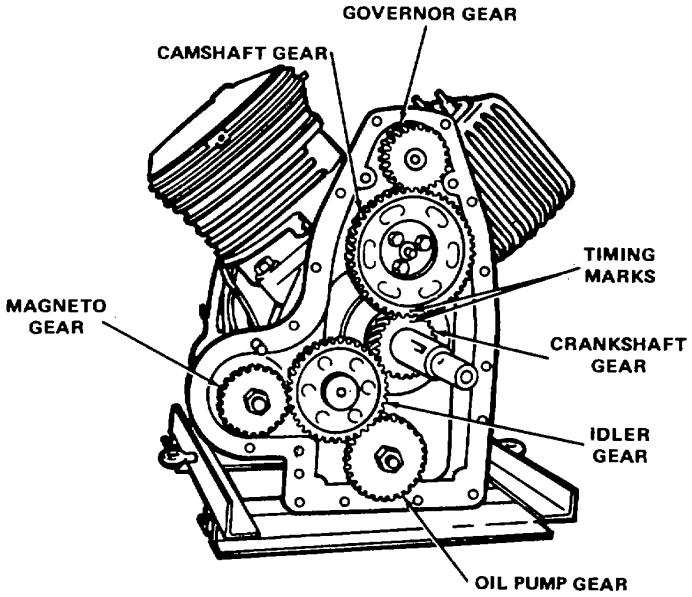


Figure 6-31. Idle Gear and Shaft

l. Cylinder Heads. (Figure 6-13)

(1) Position cylinder head and new cylinder head gasket over right cylinder bank.

(2) Align cylinder head and gasket with cylinder block and install two 5/16-18" x 13/8" screws, fifteen 5/16-18" x 1-1/4" screws and seventeen 5/16" lock washers.

(3) Tighten screws to 24 lb-ft torque. Use tightening sequence shown in Figure 6-32.

NOTE

Long screws are to be installed in positions 20 and 21 in Fig. 6-32.

m. Air Shrouding. (Figure 6-12)

(1) Install left lower cylinder shroud.

(2) Install right lower cylinder shroud.

(3) Position flywheel shroud over front of engine. Align bolt holes in flywheel shroud with holes in engine cover and secure flywheel shroud to engine with six 5/16-18" screws and lock washers.

(4) Install right heat deflector and side shroud cover.

(5) Install three 1/4-20" screws and lock washers into side shroud cover.

(6) Install left heat deflector.

(7) Install right rear shroud cover.

(8) Install three 1/4-20" screws and lock washers into right rear shroud cover.

(9) Install left rear shroud cover.

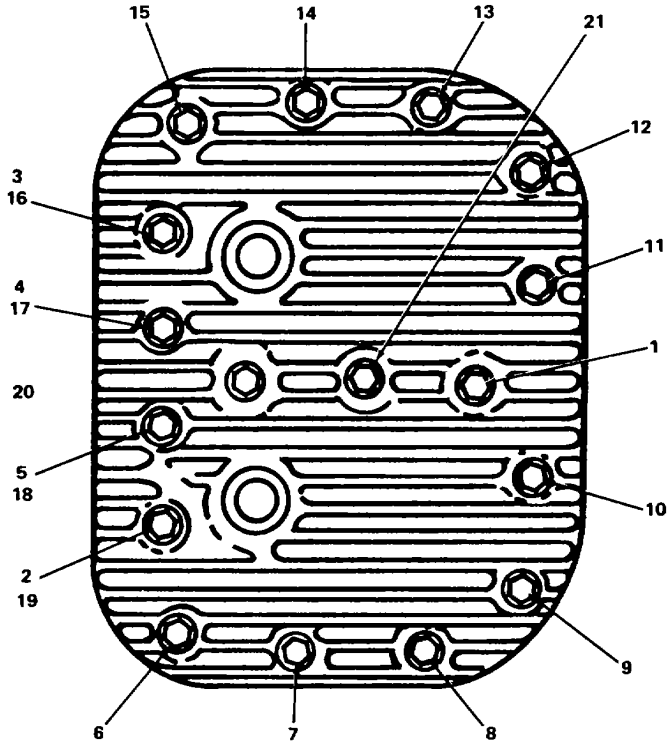


Figure 6-32. Cylinder Head Bolt Tightening Sequence

(10) Install three 1/4-20" screws and lock washers into left rear shroud cover.

(11) Install right cylinder head shroud.

(12) Install left cylinder head shroud.

(13) Install six 1/4-20" screws and lock washers into right cylinder head shroud.

(14) Install six 1/4-20" screws and lock washers with left cylinder head shroud.

n. Flywheel. Install flywheel (Figure 6-11).

(1) Verify installation of woodruff key in crankshaft.

(2) Position flywheel over end of crankshaft. Align keyway in flywheel bore with woodruff key. Install flywheel.

(3) Secure flywheel with nut and washer.

(4) Install starting crank pin.

o. Flywheel Screen

(1) Install flywheel screen.

(2) Examine starter ring gear. If damaged, press off old gear.

(3) Heat new ring gear to 4500 F to 550°F.

(4) Position hot ring gear over cool flywheel.

(5) Seat in place with soft mallet.

p. Manifolds and Carburetor. Install manifolds complete with carburetor (Figure 6-10).

(1) Install four new manifold seals into cylinder block.

(2) Position intake and exhaust manifold assembly over studs in cylinder block.

(3) Carefully lower intake and exhaust manifold assembly over studs. Seat manifold onto seals.

(4) Install four nuts and four washers. Tighten to 18 lb-ft torque.

(5) Connect exhaust pipe to exhaust manifold elbow.

(6) Install seal clamp.

(7) Install and secure two bolts, two nuts and four washers.

q. Magneto. Install magneto (Figure 6-33).

(1) Remove # 1 spark plug.

(2) Rotate engine while holding finger over # 1 spark plug hole.

(3) Locate the letters "DC" near one of the blower vanes on the flywheel.

(4) Slowly turn engine until air blows out of # 1 spark plug hole.

(5) Continue turning engine until the letters "DC" are aligned with mark on shroud.

r. Starter. Install starter (Figure 6-7).

(1) Position starter into opening in engine shroud.

(2) Align bolt holes in starter flange with bolt holes in engine shroud.

(3) Install three bolts and lock washers into starter and engine shroud.

(4) Position starter support bracket over mounting studs and end of starter.

(5) Install and secure two nuts and lock washers.

(6) Connect and secure starter cable at starter.

s. Clutch. Install clutch (Figure 6-34).

(1) Install shaft key (30) into crankshaft.

(2) Slide clutch assembly (31) onto crankshaft. Secure with pinch bolt (25), washers (26 and 27) and nut (28). (Figure 6-35)

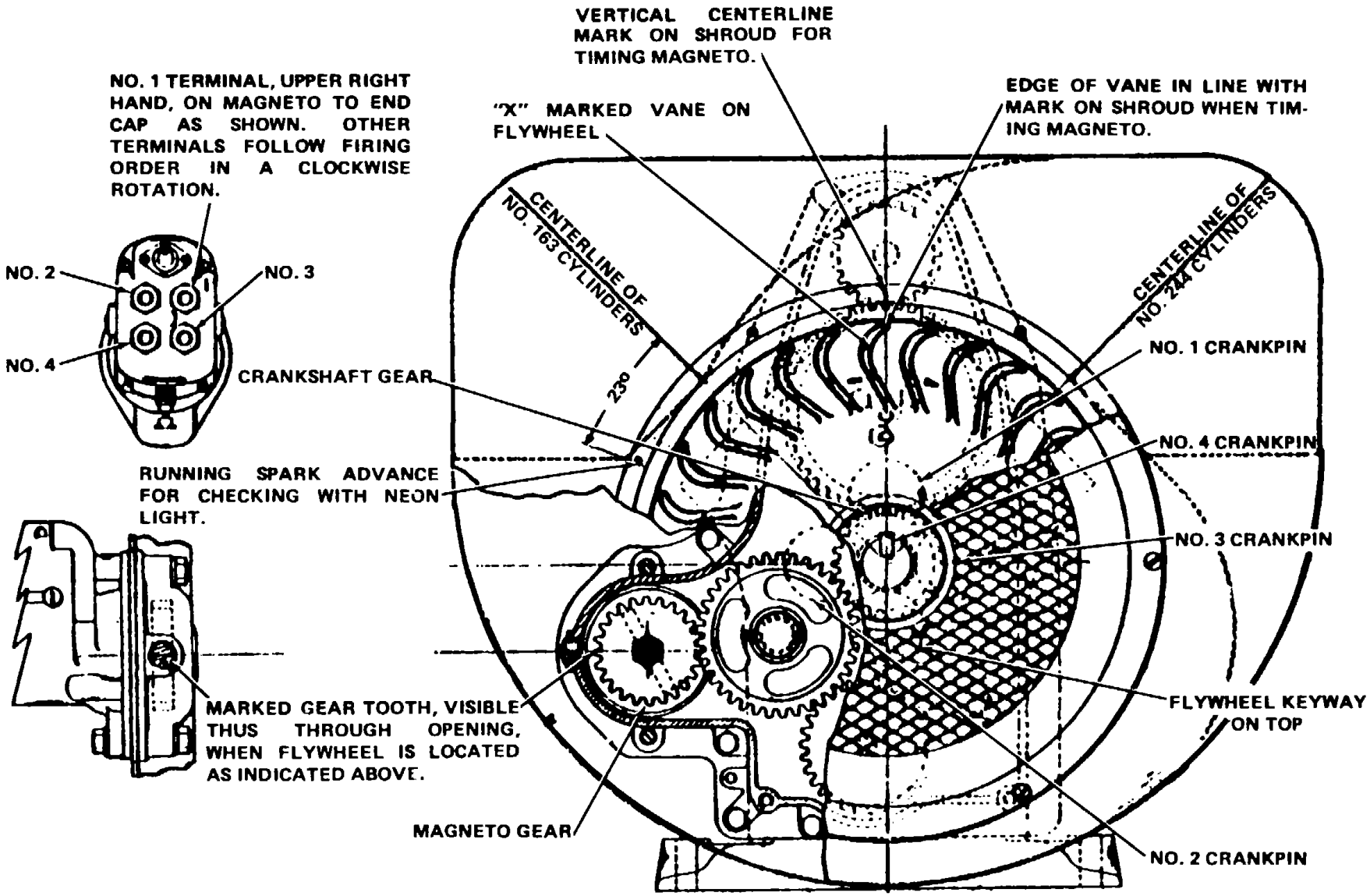
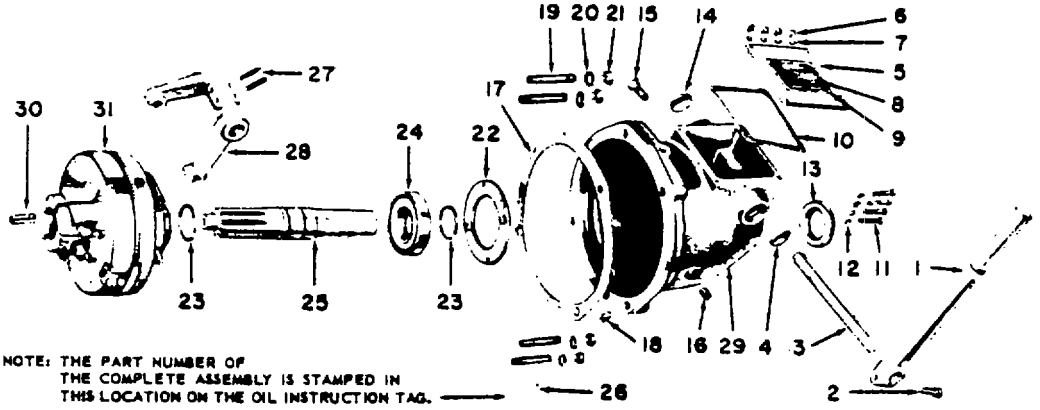
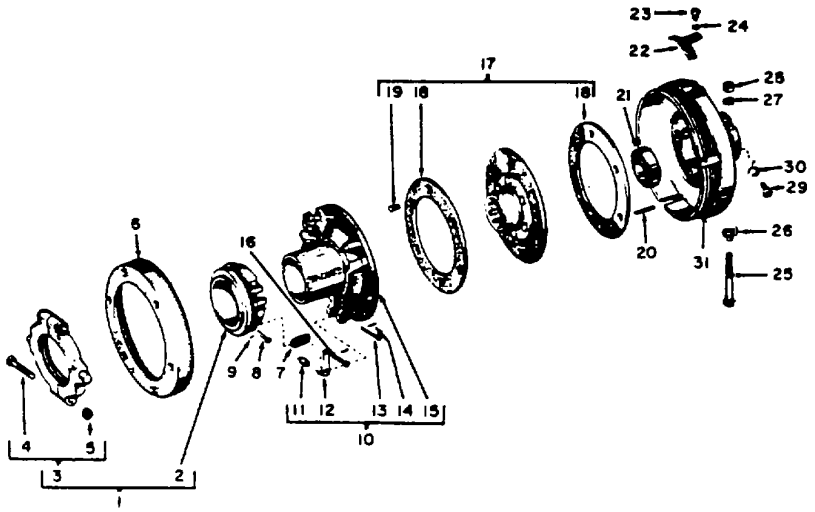


Figure 6-33. Magneto Installed



1. Clutch Handle
2. Pinch Bolt
3. Yoke Shaft
4. Shaft Seal
5. Cover Plate
6. Bolt
7. Lock Washer
8. Instruction Plate
9. Drive Screw
10. Gasket
11. Gasket
12. Lock Washer
13. Oil Seal
14. Plug
15. Bolt
16. Pipe Plug
17. Gasket
18. Pipe Plug
19. Stud
20. Lock Washer
21. Nut
22. Bearing Retainer
23. Snap Ring
24. Bearing
25. Shaft
26. Identification Plate
27. Roll Pin
28. Yoke
29. Housing
30. Key
31. Clutch Assembly

Figure 6-34. Clutch Assembly



1. Release Sleeve Assembly
2. Yoke Sleeve
3. Split Sleeve
4. Bolt
5. Nut
6. Adjusting Ring
7. Link
8. Pivot Pin
9. Lock Pin
10. Pressure Plate Assembly
11. Roller
12. Lever
13. Lever Pin
14. Cotter Pin
15. Pressure Plate
16. Link Pin
17. Driven Member Assembly
18. Clutch Facing
19. Rivet
20. Spring
21. Bearing
22. Adjustment Lock
23. Bolt
24. Lock Washer
25. Pinch Bolt
26. Lock Tab
27. Lock Washer
28. Nut
29. Lock Bolt
30. Lock Washer
31. Housing

Figure 6-35. Release Sleeve Assembly

(3) Install and secure setscrew (29) and washer (30). (Figure 6-35)

(4) Position gasket (17) and clutch housing (29) over four studs in engine. Secure with four nuts (21) and washers. (Figure 6-34)

(5) Insert clutch yoke (28) into inspection opening. Position ends of clutch yoke (28) over lugs on release collar (3). (Figure 6-35)

(6) Install yoke shaft (3) into clutch housing (29) and through yoke (28).

(7) Align holes in yoke (28) with holes in yoke shaft (3). Secure with two roll pins (27).

(8) Install clutch operating lever (1) over end of yoke shaft (3). Secure with pinch bolt (2).

(9) Adjust clutch. Secure with adjustment lock (22), bolt (23) and washer (24). (Figure 6-35).

(10) Slide drive sheave onto PTO shaft. (Figure 6-36)

NOTE

Large diameter of tapered bore must be away from clutch housing (29).

(11) Install shaft key into keyway in PTO shaft. Slide bushing onto PTO shaft. (Figure 6-36)

(12) Install and secure three bolts and lock washers into drive sheave. (Figure 6-36)

(13) Fill with oil. Install and secure inspection cover, gasket, bolts and washers.

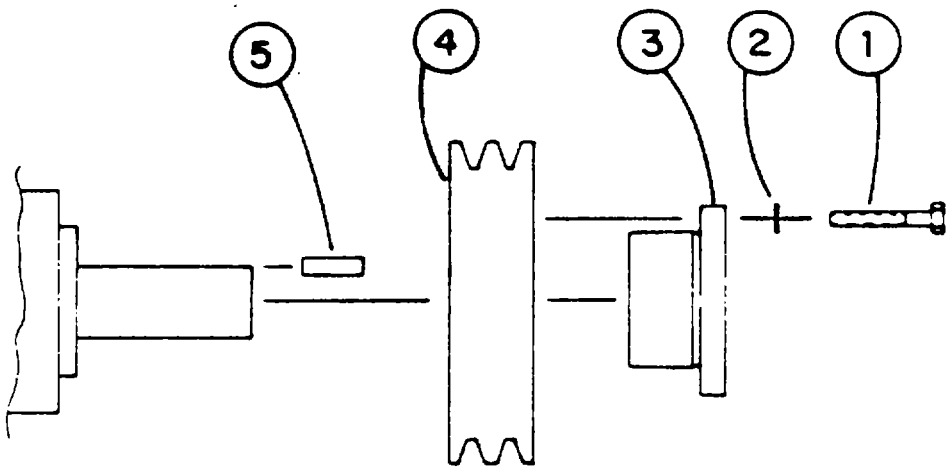


Figure 6-36. PTO Shaft

6-9. INSTALLATION

Install engine into frame.

a. Installation

(1) Turn belt tensioner screw counterclockwise until engine base plate is at full travel toward compressor.

(2) Lift engine onto base plate. Align holes in engine, base plate and frame. Loose assemble four bolts and nuts.

(3) Attach and secure starter cable and ground cable. (Figure 6-4)

(4) Attach and secure fuel line at fuel pump. (Figure 6-3)

(5) Attach and secure main wire harness at throttle solenoid, magneto and oil pressure switch.

(6) Install drive belts for compressor and alternator. Refer to organizational maintenance for belt adjustment. (Figure 6-5)

(7) Attach clutch linkage at clutch. Secure with cotter pin.

(8) Attach and secure oil drain line at engine.

(9) Fill with proper oil. (Figure 6-37)

(10) Install roof panel. (Figure 6-1)

(11) Connect air cleaner at carburetor. (Figure 6-6)

6-10. POST OVERHAUL RUN-IN

After a complete overhaul or rebuilding of the engine a thorough run-in period at no load is required. Start and run the engine at no load at 1200 to 1500 RPM for about 30 minutes. The engine speed should then be increased to 2600 to 2650 RPM and run at no load for an additional 3-1/2 hours for a total of 4 hours run-in.

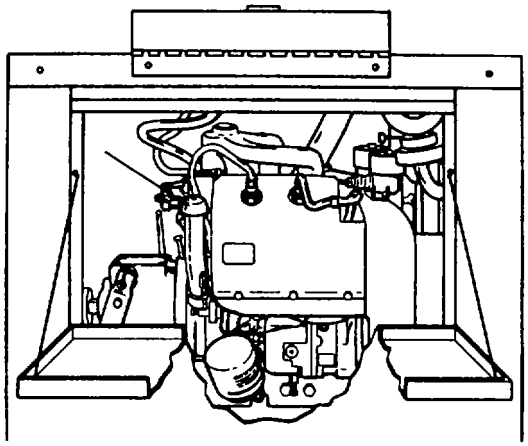


Figure 6-37. Engine Oil Breather

Section IV. COMPRESSOR ASSEMBLY

6-11. GENERAL

The compressor is a four stage, four cylinder, single acting, reciprocating, belt driven, air cooled compressor with a rated capacity of 15 SCFM at 3500 PSI.

6-12. REMOVAL

Remove the compressor from the frame.

a. Removal

(1) Drain compressor oil. (Figure 6-38)

(2) Remove enclosure roof. (Figure 6-39)

(3) Remove side access panel. (Figure 6-39)

(4) Disconnect air cleaner at compressor.

(5) Remove drive belts. (Figure 6-40)

(6) Disconnect oil drain hose at compressor.

(7) Remove four nuts and washers.

(8) Disconnect all gage tubing at compressor.

(9) Disconnect air line at aftercooler.

(10) Disconnect condensate drain tubes.

(11) Disconnect main wiring at two solenoid valves.

(12) Attach lifting device and remove compressor. (Figure 6-41)

6-13. DISASSEMBLY

a. Table of Limits

Figure 6-42. Table of Limits

Description	Minimum	Maximum	Replacement Max.
AIR COMPRESSOR ASSEMBLY			
Piston and Pin Assembly, First Stage			
Piston Pin Diameter	19.994 mm	19.998 mm	
Piston Pin Borehole	20.002 mm	20.006 mm	
Piston Diameter	109.95 mm	110.0 mm	
Piston Clearance in Cylinder	0.10 mm	0.20 mm	
Piston Distance From Cylinder Head	1.0 mm	1.2 mm	
Height of Piston Ring Groove (1st & 2nd)		3.54 mm	
Height of Piston Oil Ring Groove	5.04 mm	5.05 mm	
Piston Ring Gap	0.6 mm	0.8 mm	
Second Stage			
Piston Pin Diameter	19.994 mm	19.998 mm	
Piston Pin Borehole	20.004 mm	20.009 mm	
Piston Diameter	59.96 mm	60.0 mm	
Piston Clearance in Cylinder		0.15 mm	
Piston Distance From Cylinder Head	1.0 mm	1.2 mm	
Height of Piston Ring Groove (1st & 2nd)	2.54 mm	2.55 mm	
Height of Piston Oil Ring Groove	3.54 mm	3.55 mm	
Piston Ring Gap	0.35 mm	0.50 mm	
Third Stage			
Piston Pin Diameter	19.994 mm	19.998 mm	
Piston Pin Borehole	20.004 mm	20.009 mm	
Piston Diameter	35.93 mm	36.0 mm	
Piston Clearance in Cylinder		0.8 mm	
Piston Distance from Cylinder Head	1.0 mm	1.2 mm	
Height of Piston Ring Grooves	2.015 mm	2.030 mm	
Piston Ring Gap	0.2 mm	0.35 mm	

Figure 6-42. Table of Limits (Continued)

Description	Minimum	Maximum	Replacement Max.
AIR COMPRESSOR ASSEMBLY (cont'd)			
Fourth Stage			
Piston Diameter		14.0 mm	
Piston Clearance in Cylinder	4.5 mm	5.5 mm	
Piston Distance from Cylinder Head	0.5 mm	0.7 mm	
Guide Pistons, 3rd & 4th Stage			
Piston Diameter	59.94 mm	60.0 mm	
Cylinders			
1st Stage Diameter	110.0 mm	110.26 mm	110.10 mm
2nd Stage Diameter	60.0 mm	60.12 mm	60.11 mm
3rd Stage Diameter	36.0 mm	36.05 mm	36.01 mm
4th Stage Diameter	14.0 mm	14.004 mm	14.002 mm
Cylinder Adapter, 3rd & 4th Stage	60.0 mm	60.10 mm	60.09 mm
Valves (Valve Stroke)			
1st Stage Intake	1.0	1.1	
1st Stage Delivery	0.9	1.0	
2nd Stage Intake	1.0	1.25	
2nd Stage Delivery	1.0	1.25	
3rd Stage Intake	0.8	1.05	
3rd Stage Delivery	0.8	1.05	
4th Stage Intake	0.85	1.35	
4th Stage Delivery	0.9	1.2	

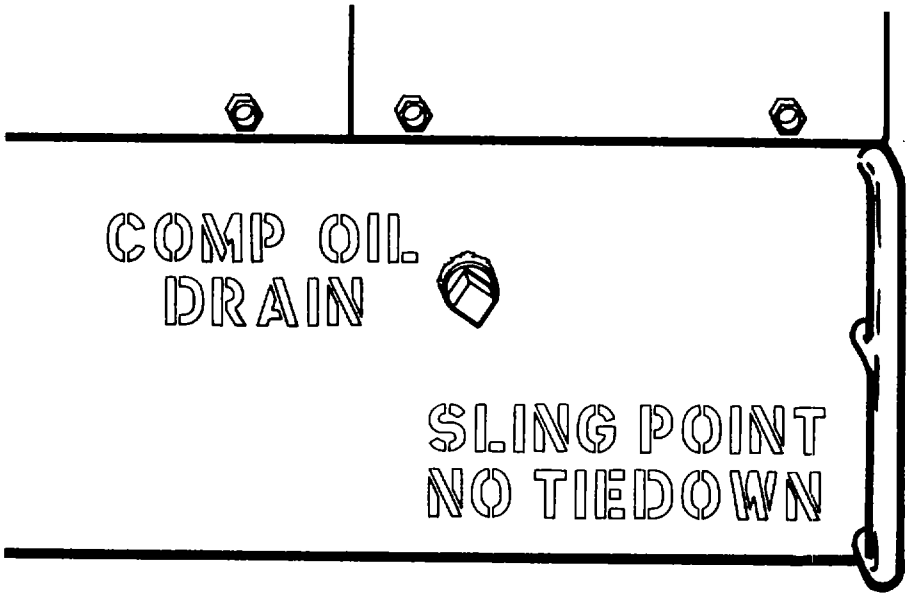


Figure 6-38. Compressor Oil Drain

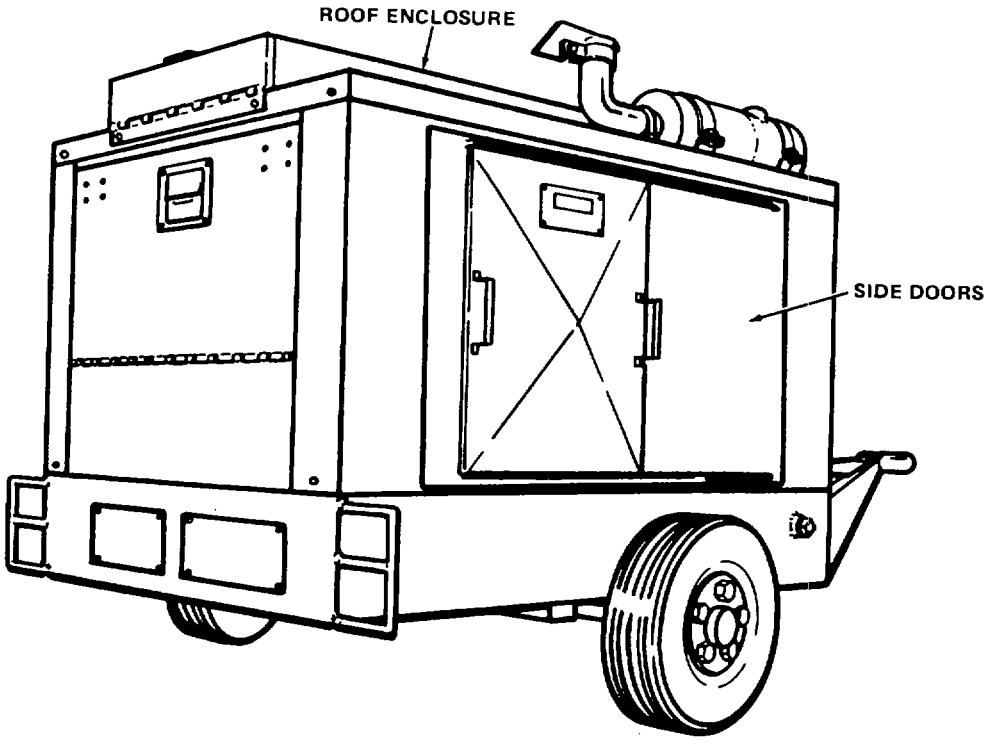


Figure 6-39. Access Panels

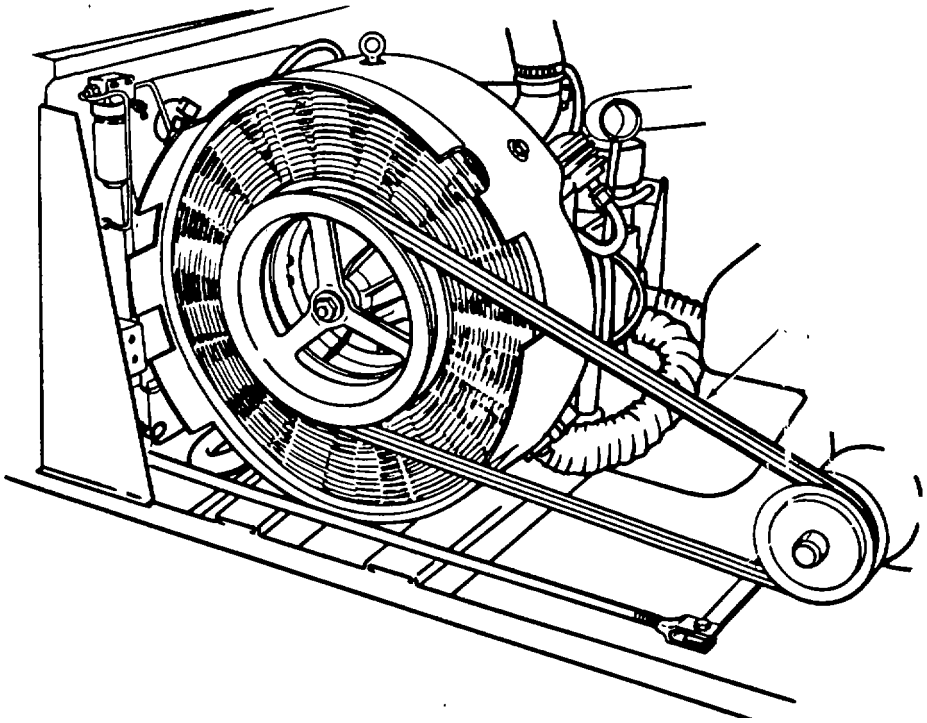


Figure 6-40. Drive Belts

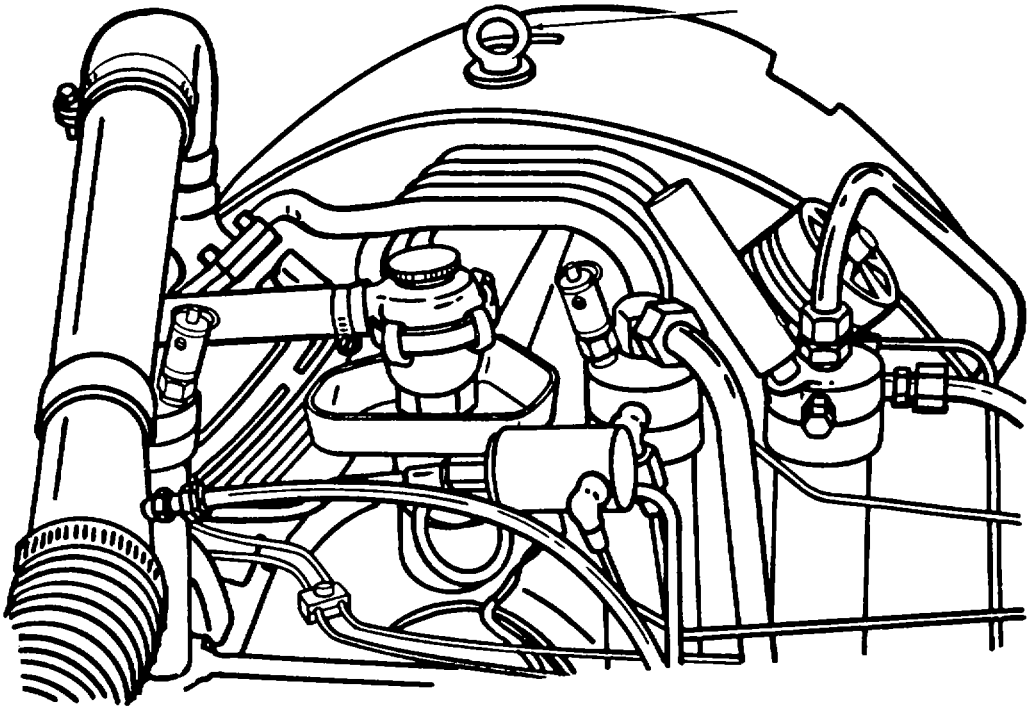


Figure 6-41. Compressor Lifting Ring

b. Spring Data

Figure 6-43. Spring Data

Description	Minimum	Maximum	Replacement Max.
AIR COMPRESSOR ASSEMBLY			
2nd Stage Valve Spring			
Intake	10.5	12.0	
Delivery	21	24	
3rd Stage Valve Spring			
Intake	9.0	10.5	
Delivery	21	24	
4th Stage Valve Spring			
Intake	6.5	8.0	
Delivery	9.5	11.0	

6-14. COMPRESSOR BLOCK ASSEMBLY

The compressor block disassembly work sequence plan (Figure 6-44) is provided to serve as a guide in disassembling the compressor block. With this plan the work sequence for each repair can be clearly seen. The individual assembly groups are illustrated in the work sequence plan by fields.

NOTE

Disassemble the compressor block only to the extent necessary to replace or repair a defective part of parts.

-- sequence of operation number

A13

Discharge valve 2nd stage

-- assembly designation

6-15. EXAMPLE FOR THE USE OF THE WORK SEQUENCE PLAN

a. See sequence plan. (Figure 6-44).

b. Locate assembly group to be repaired (dismantled) in work sequence plan.

c. Trace all connecting lines leading from this assembly group directly to the starting point. All affected assembly groups are to be dismantled along with the assembly group in question.

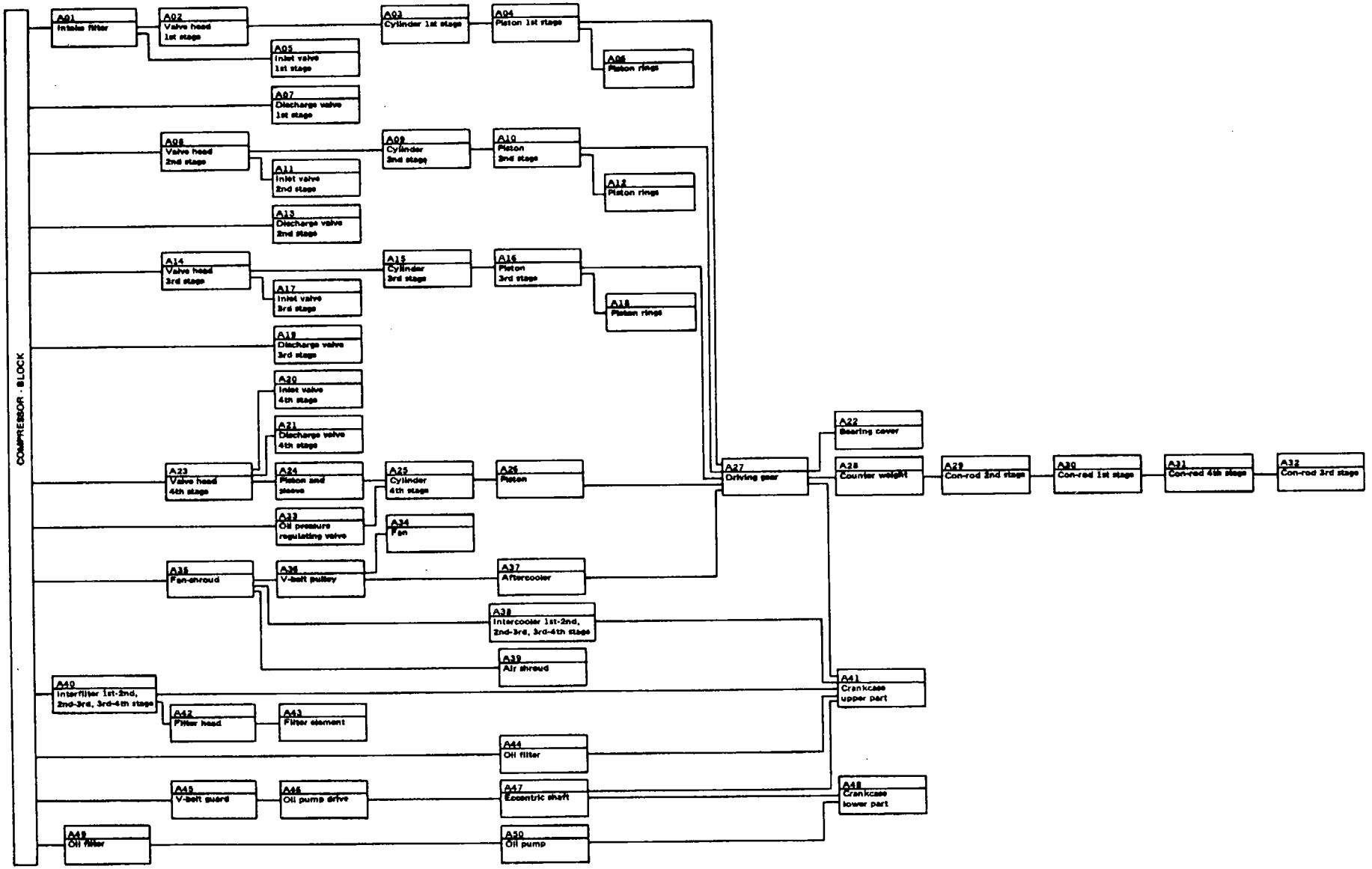


Figure 6-44. Work Sequence Plan

d. As a rule, begin dismantling from the starting point and follow the connecting lines to the right.

e. If several connecting lines from the left converge on one assembly group field, all assembly groups on these lines are to be previously dismantled.

6-16. EXAMPLE (See Figure 6-44)

The assembly group A41, upper part of crankcase, is to be dismantled. The following assembly groups must also be dismantled in the order shown: A01 intake filter, A02 valve head 1st stage, A03 cylinder 1st stage, A04 piston 1st stage, A08 valve head 2nd stage, A09 cylinder 2nd stage, A10 piston 2nd stage, A14 valve head 3rd stage, A15 cylinder 3rd stage, A16 piston 3rd stage, A23 valve head 4th stage, A24 floating piston with piston sleeve, A33 oil pressure regulating valve, A25 cylinder 4th stage, A26 guide piston, A35 fan shroud, A36 V-belt pulley, A37 aftercooler, A27 driving gear, A38 intercooler 1st to 2nd, 2nd to 3rd and 3rd to 4th stage, A40 interfiller list to 2nd, 2nd to 3rd and 3rd to 4th stage, A44 oil filter, A45 V-belt guard, A46 oil pump drive, A47 eccentric shaft and A41 upper part of crankcase.

6-17. A40/42 1ST TO 2ND STAGE INTERSTAGE FILTER (Figure 6-45)

a. On filter head (30), loosen connecting tubes to 2nd stage (24), 1st stage interstage gage (at 29) and 1st stage intercooler (at 26).

b. Unscrew three tube fittings (25), (26) and (29) and safety valve (27) from filter head (30).

c. Unscrew one tube fitting (2) from housing (39A).

d. At two places, unscrew hex-head nut (35) and remove flat washers (36).

e. At two places, pull hex head screw (34) back one inch and remove spacers (37) and (38). Remove interstage filter (23).

f. Remove two clamps (33) from filter housing (39A).

g. Loosen threaded collar (32) on filter head (30) and pull downward.

h. Separate filter head (30) from filter housing (39A).

i. Remove O-ring (31) from filter head (30).

6-18. A40/42/43 2ND TO 3RD STAGE INTERSTAGE FILTER (Figure 6-45)

a. On filter head (10), loosen connecting tubes to valves and 3rd stage head (3), 2nd stage interstage (6), and 2nd stage intercooler (at 7).

b. Unscrew four tube fittings (4), (7), (6) and (5) and safety valve (8) from filter head (10).

c. Unscrew one tube fitting (2) from filter housing (22).

d. At two places, unscrew hexagonal nut (19) and remove flat washer (20).

e. At two places, pull out hexagonal screws (18) and washers (18A) and remove spacers (21). Remove interstage filter (1).

f. Remove two clamps (17) from filter housing (22).

g. Loosen threaded collar (16) on filter head (10) and pull downward.

h. Separate filter head (10) from filter housing (22).

i. Remove O-ring (15) from filter head (10).

j. Unscrew center screw (14) from filter head (10).

k. Remove vortex plate (11), baffle cone (12) and filter element (13) from center screw (14).

6-19. A40/42/43 3RD TO 4TH STAGE INTERSTAGE FILTER (Figure 6-45)

a. On filter housing (47), loosen two connecting tubes (41) and (43).

b. At two places, remove hex nut (35), washer (36) and spacer (37).

c. At two places, remove hex-head screw (34) and washer (34A) with three spacers (37), (38) and (39). Remove interstage filter (40).

d. Unscrew four tube fittings (41), (43), (46B) and (2), plug (44), and safety valve (45) from filter housing (47).

e. Remove two clamps (46A) from filter housing (47).

f. For filter disassembly refer to organizational maintenance.

6-20. A49 OIL FILTER (Figure 6-46)

a. Unscrew threaded collars at each end of oil filter (1) and remove.

6-21. A35/39 FAN GUARD AND SHROUD EXTENSION (Figures 6-47 and 6-48)

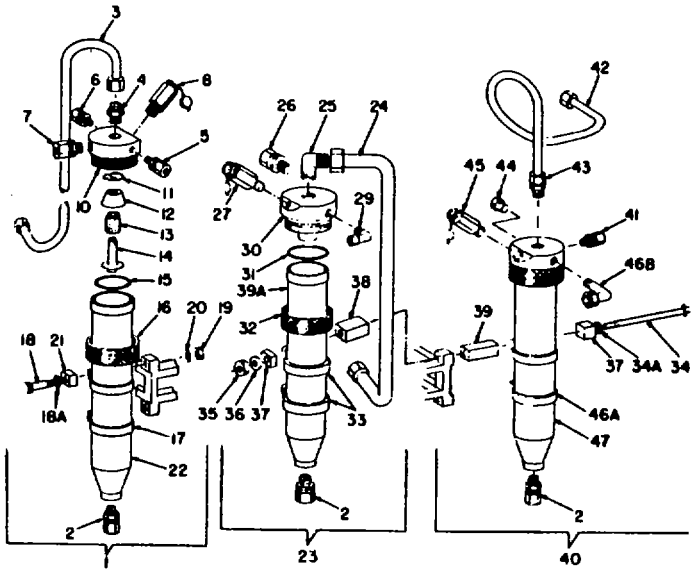
a. Unscrew eyebolt (25) from fan guard (1) and remove two washers (26). (Figure 6-47)

b. Unscrew four hex-head screws (3) and washers (4) from fan guard (1). (Figure 6-48)

c. Remove fan guard (1). (Figure 6-48)

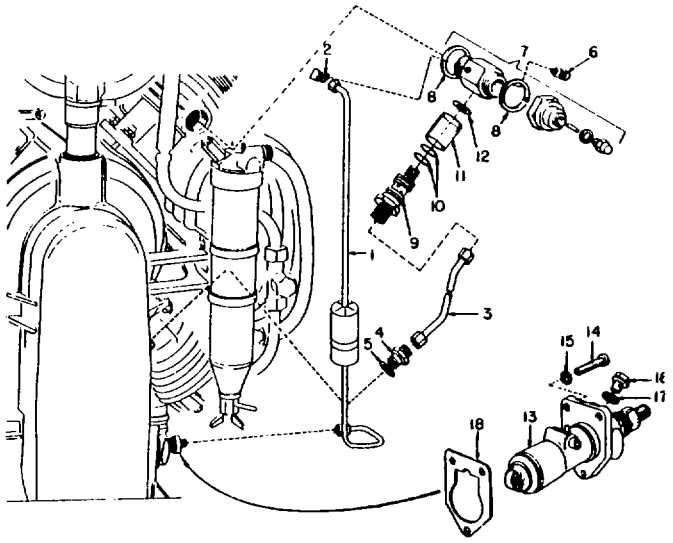
d. Unscrew three hex-head screws (49) and washers (50). (Figure 6-48)

e. Remove shroud extension (48). (Figure 6-48)



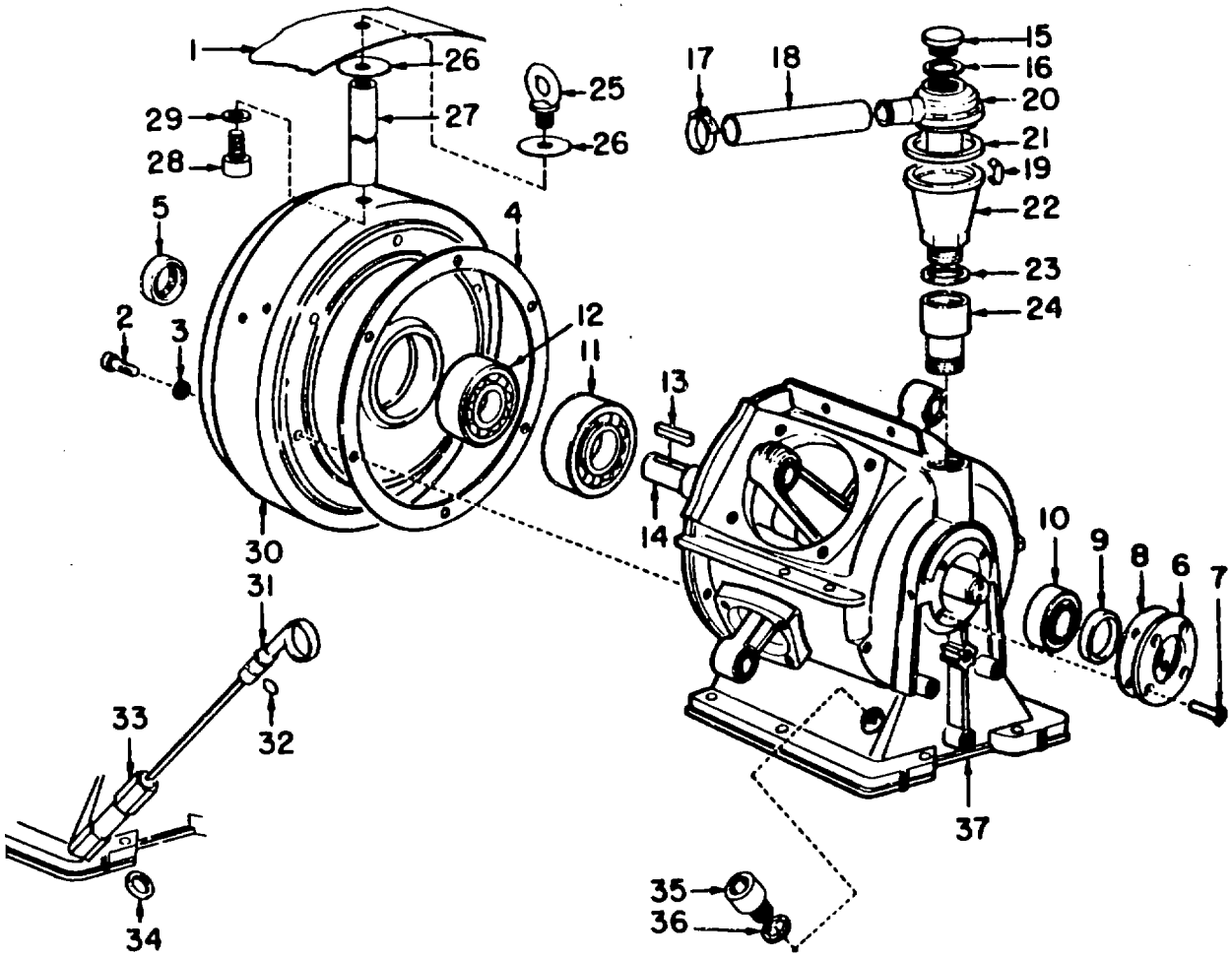
1. Interfilter Assembly
2. Fitting
3. Tube
4. Fitting
5. Fitting
6. Fitting
7. Fitting
8. Relief Valve
9. Not Used
10. Head
11. Vortex Plate
12. Baffle Cone
13. Filter Element
14. Center Screw
15. "O"-Ring
16. Ring Nut
17. Clamp
18. Bolt
18A. Washer
19. Nut
20. Washer
21. Spacer
22. Body
23. Interfilter Assembly
24. Tube
25. Fitting
26. Fitting
27. Relief Valve
28. Not Used
29. Fitting
30. Head
31. "O"-Ring
32. Ring Nut
33. Clamp
34. Bolt
34A. Washer
35. Nut
36. Washer
37. Spacer
38. Spacer
39. Spacer
39A. Body
40. Interfilter Assembly
41. Fitting
42. Tube
43. Fitting
44. Plug
45. Relief Valve
46A. Clamp
46B. Fitting
47. Body

Figure 6-45. Interstag Filter Assemblies



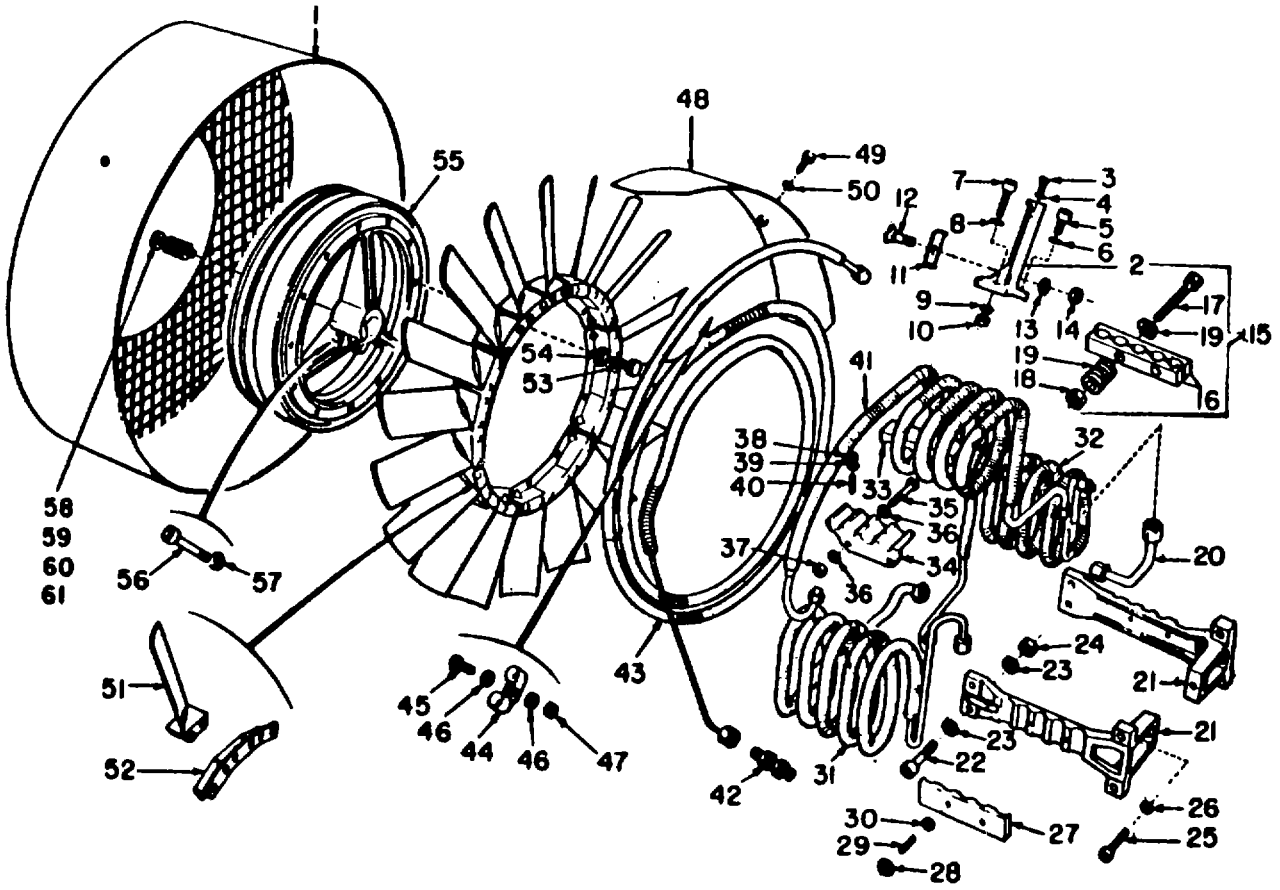
1. Filter, Oil
2. Fitting
3. Tube Assembly
4. Fitting
5. Seal Ring
6. Fitting
7. Oil Pressure Regulator
8. Seal Ring
9. Fitting
10. "O"-Ring
11. Sight Glass
12. Seal Ring
13. Oil Pump
14. Bolt
15. Lock Washer
16. Plug
17. Seal Ring
18. Gasket

Figure 6-46. Oil Filter Assembly



1. Fan Shroud
2. Bolt
3. Lock Washer
4. Gasket
5. Shaft Seal
6. Retainer, Bearing
7. Screw
8. Gasket
9. Shaft Seal
10. Bearing
11. Bearing
12. Bearing
13. Key
14. Crankshaft
15. Plug
16. Seal Ring
17. Hose Clamp
18. Hose
19. Clip
20. Demister Top
21. Seal Ring
22. Demister Body
23. Seal Ring
24. Standpipe
25. Eye Bolt
26. Washer
27. Extension
28. Bolt
29. Washer
30. Housing
31. Dipstick
32. "O"-Ring
33. Tube, Dipstick
34. Seal Ring
35. Plug
36. Seal Ring
37. Crankcase, Upper

Figure 6-47. Compressor Crankcase Assembly



1. Fan Shroud
2. Support
3. Bolt
4. Washer
5. Bolt
6. Lock Washer
7. Bolt
8. Washer
9. Lock Washer
10. Nut
11. Retainer
12. Screw
13. Washer
14. Nut
15. Pipe Clamp Assembly
16. Pipe Clamp
17. Bolt
18. Nut
19. Spring Plate
20. Tube
21. Bracket
22. Bolt
23. Washer
24. Nut
25. Bolt
26. Washer
27. Clamp
28. Nut
29. Stud
30. Washer
31. Intercooler
32. Intercooler
33. Clamp
34. Clamp
35. Bolt
36. Washer
37. Nut
38. Nut
39. Washer
40. Stud
41. Intercooler
42. Fitting
43. Aftercooler
44. Clamp
45. Bolt
46. Washer
47. Nut
48. Shroud Extension
49. Screw
50. Washer
51. Fan Wing
52. Retainer
53. Bolt
54. Washer
55. Flywheel
56. Bolt
57. Washer
58. Bolt
59. Washer
60. Washer
61. Washer

Figure 6-48. Flywheel and Cooler

6-22. A02 1ST STAGE VALVE HEAD (Figure 6-49)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Loosen tube (at 7) to intercooler 1st and 2nd stage. Loosen clamp and remove oil breather hose at air filter inlet (1).

c. Unscrew four hex-head screws (13) and remove flat washers (14).

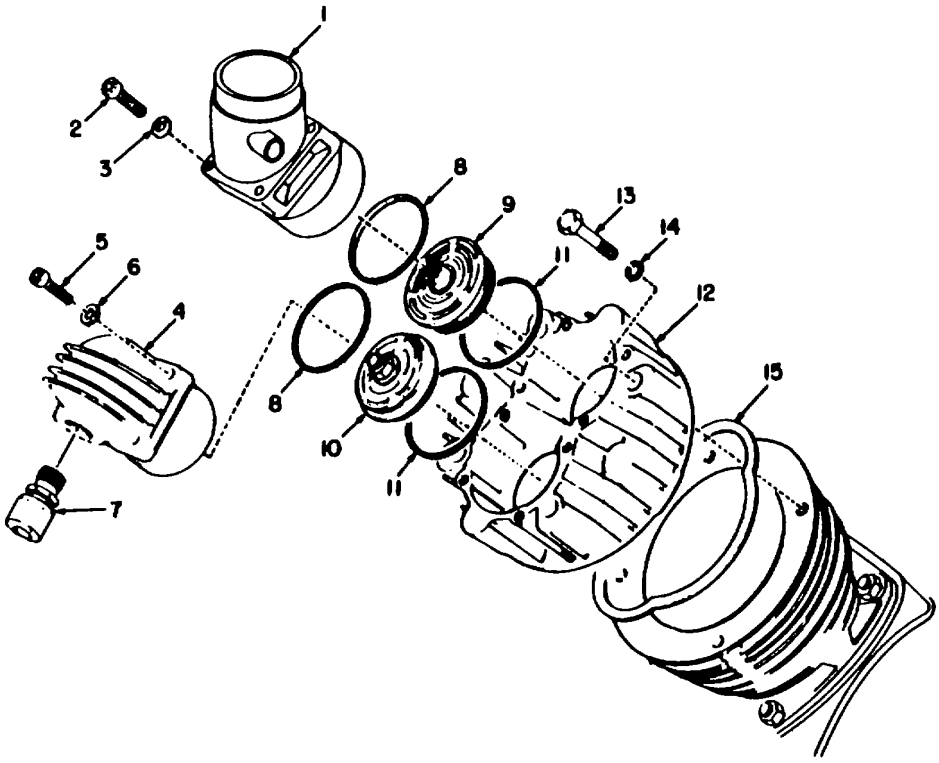
d. Loosen and remove valve head (12) from cylinder.

6-23. A08 2ND STAGE VALVE HEAD (Figure 6-50)

a. Loosen two tubes (at 22) to the intercoolers 1st to 2nd stage and 2nd to 3rd stage.

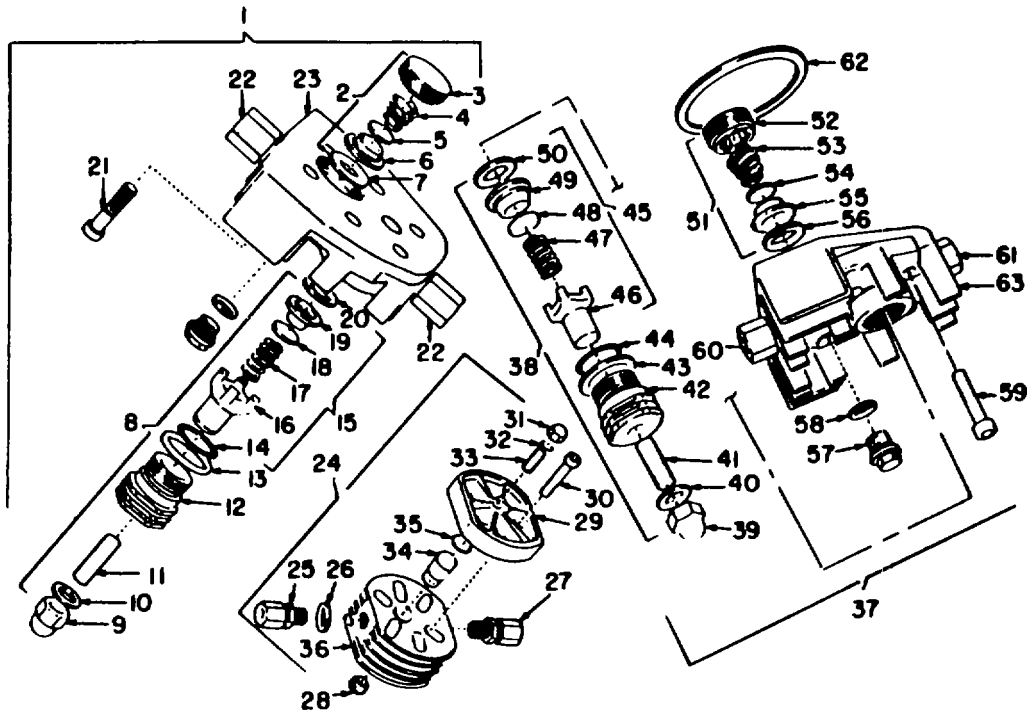
b. Unscrew four internal hex-head screws (21).

c. Loosen and remove valve head (23) from cylinder.



1. Inlet Fitting
2. Bolt
3. Washer
4. Discharge Fitting
5. Bolt
6. Washer
7. Fitting
8. Seal Ring
9. Valve Assembly
10. Valve Assembly
11. Seal Ring
12. Cylinder Head
13. Bolt
14. Washer
15. Gasket

Figure 6-49. Valve Head, 1st Stage



1. Head Assembly
2. Valve Assembly
3. Valve Cover
4. Valve Spring
5. Valve Plate
6. Valve Seat
7. Gasket
8. Valve Assembly
9. Acorn Nut
10. Seal Ring
11. Stud
12. Valve Cover
13. Seal Ring
14. "O"-Ring
15. Valve Repair Kit
16. Valve Insert
17. Valve Spring
18. Valve Plate
19. Valve Seat
20. Gasket
21. Bolt
22. Fitting
23. Cylinder Head
24. Head Assembly
25. Fitting
26. Seal Ring
27. Fitting
28. Valve Assembly
29. Head Cover
30. Bolt
31. Acorn Nut
32. Seal Ring
33. Stud
34. Valve Assembly
35. "O"-Ring
36. Cylinder Head
37. Head Assembly
38. Valve Assembly
39. Acorn Nut
40. Seal Ring
41. Stud
42. Valve Cover
43. Seal Ring
44. "O"-Ring
45. Valve Repair Kit
46. Valve Insert
47. Valve Spring
48. Valve Plate
49. Valve Seat
50. Gasket
51. Valve Repair Kit
52. Valve Cover
53. Valve Spring
54. Valve Plate
55. Valve Seat
56. Gasket
57. Plug
58. Seal Ring
59. Bolt
60. Fitting
61. Fitting
62. Gasket
63. Cylinder Head

Figure 6-50. Valve Heads, 2nd thru 4th Stage

6-24. A14 3RD STAGE VALVE HEAD (Figure 6-50)

a. Loosen two tubes (at 60 and 61).

b. Unscrew six internal hex-head screws (59) holding valve head to cylinder.

c. Loosen and remove valve head (63) from cylinder.

6-25. A23 4TH STAGE VALVE HEAD (Figure 6-50)

a. Loosen two tube fittings (27).

b. Unscrew acorn nut (31) and loosen free stud (33) by a few twists.

c. Unscrew six internal hex-head screws (30).

d. Remove head cover (29) from valve head (36) and valve head (36) from cylinder.

6-26. A05 1ST STAGE INLET VALVE (Figure 6-49)

CAUTION

Do not interchange inlet or discharge valves (Figure 6-31, Index Nos. 9 and 10).

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Unscrew four internal hex-head screws (2) and washers (3) on intake connection (1).

c. Remove intake connection (1).

d. Remove inlet valve (9) with two gaskets (8) and (11) from valve head (12).

6-27. A07 1ST STAGE DISCHARGE VALVE (Figure 6-49)

CAUTION

Do not interchange inlet or discharge valves (Figure 6-49, Index Nos. 9 and 10).

a. Unscrew four internal hex-head screws (5) and washers (6) on discharge pressure joint (4).

b. Remove discharge pressure joint (4).

c. Unscrew discharge valve (10) and remove valve and two gaskets (8) and (11) from valve head (12).

6-28. A17 3RD STAGE INLET VALVE (Figure 6-50)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Using hedgehog wrench (4555), remove inlet valve cover (3).

c. Remove inlet valve spring (4), valve disk (5), valve seat (6) and gasket (7) from valve head (23).

6-29. A19 3RD STAGE DISCHARGE VALVE (Figure 6-50)

a. Unscrew acorn nut (9) and remove washer (10).

b. Loosen free stud (11) a few turns.

c. Remove discharge valve cover (12) with spring plate (13) and O-ring ('14) from valve head (23).

d. Remove O-ring (14) and spring plate (13) from discharge valve cover (13).

e. Remove discharge valve insert (16), discharge valve spring (17), valve disk (18), valve seat (19) and gasket (20) from valve head (23).

6-30. All 2ND STAGE INLET VALVE (Figure 6-50)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Using hedgehog wrench (4555), remove inlet valve cover (52).

c. Remove inlet valve spring (53), valve disk (54), valve seat (55) and gasket (56) from valve head (63).

6-31. A13 2ND STAGE DISCHARGE VALVE (Figure 6-50)

a. Unscrew acorn nut (39) and remove washer (40).

b. Loosen free stud (41) a few turns.

c. Remove discharge valve cover (42) with spring plate (43) and O-ring (44) from valve head (63).

d. Remove O-ring (44) and spring plate (43) from discharge valve cover (42).

e. Remove discharge valve insert (46), discharge valve spring (47), valve disk (48), valve seat (49) and gasket (50) from valve head (63).

6-32. A20 4TH STAGE INLET VALVE (Figure 6-50)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Using hedgehog wrench (4555), remove inlet valve (28) from valve head (36).

6-33. A21 4TH STAGE DISCHARGE VALVE (Figure 6-50)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Lift out discharge valve (34) and O-ring (35).

6-34. A33 OIL PRESSURE REGULATING VALVE (Figure 6-46)

a. Loosen oil return pipe (3) from oil level screw (9).

b. Unscrew threaded collar of oil pressure tube (1) from tube fitting (2).

c. Unscrew oil level screw (9) from oil pressure regulating valve (7).

d. Remove gasket (12), inspection glass (11), and two O-rings (10) from oil level screw (9).

e. Unscrew two tube fittings (2) and (6) from oil pressure regulating valve (7).

f. Unscrew oil pressure regulating valve (7) from cylinder.

g. Unscrew acorn nut from oil pressure regulating valve (7) and remove nut and gasket. Loosen free stud a few turns.

h. Unscrew cap of oil pressure regulating valve (7) and remove gasket (8) along with discharge valve spring and ball bearing guide with ball.

6-35. A05 1ST STAGE CYLINDER (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Unscrew four hex-head nuts (4) from cylinder (3) and remove washers (5).

c. Remove cylinder (3) with O-ring (6) from upper crankcase.

d. Remove O-ring (6) from cylinder (3).

e. Unscrew four studs (35) from upper crankcase.

6-36. A09 2ND STAGE CYLINDER (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Unscrew four hex-head nuts (14) from cylinder (13) and remove washers (15).

c. Remove cylinder (13) with O-ring (19) from upper crankcase.

d. Remove O-ring (19) from cylinder (13).

e. Unscrew four studs (35) from upper crankcase.

6-37. A15 3RD STAGE CYLINDER (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-44).

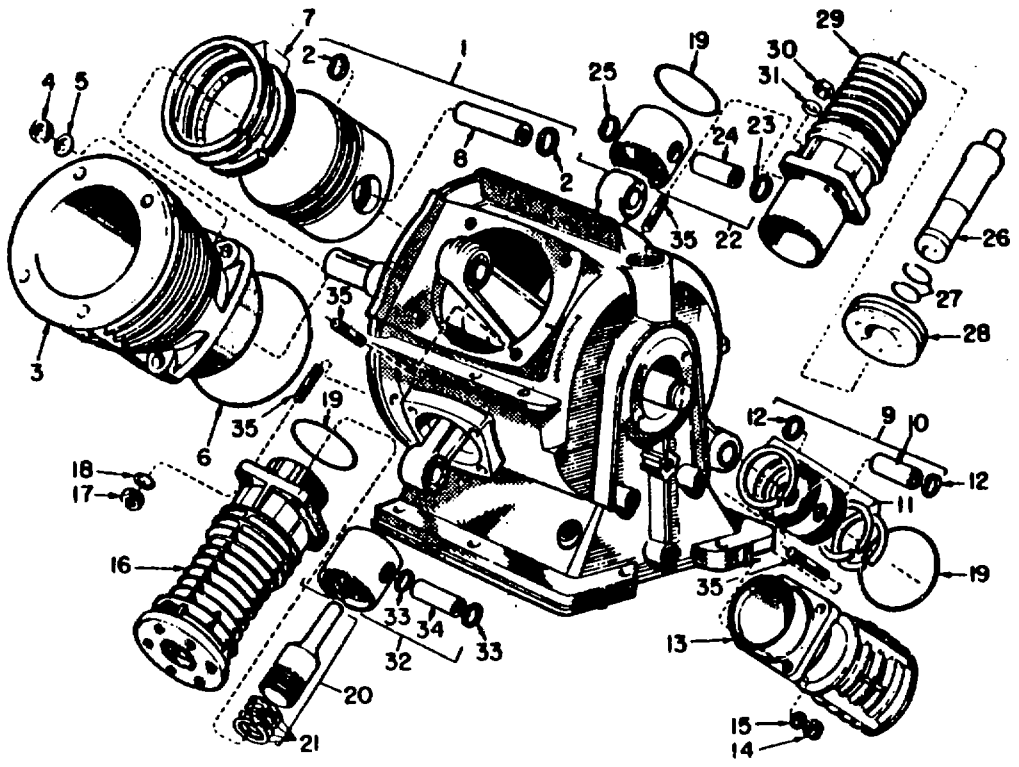
b. Unscrew four hex nuts (17) from cylinder (16) and remove washers (18).

c. Remove cylinder (16) with floating piston (20) and O-ring (19) from upper crankcase.

d. Remove O-ring (19) from cylinder (16).

e. Push floating piston (20) out of cylinder (16).

f. Unscrew four studs (35) from upper crankcase.



1. Piston Assembly
2. Retainer Ring
3. Cylinder
4. Nut
5. Washer
6. "O"-Ring
7. Piston Rings
8. Piston Pin
9. Piston Assembly
10. Piston Pin
11. Piston Rings
12. Retainer Ring
13. Cylinder
14. Nut
15. Washer
16. Cylinder
17. Nut
18. Washer
19. "O"-Ring
20. Piston Assembly
21. Piston Rings
22. Piston Assembly
23. Retainer Ring
24. Piston Pin
25. Retainer Ring
26. Piston and Bushing
27. "O"-Ring
28. Heat Dissipator
29. Cylinder
30. Nut
31. Washer
32. Piston Assembly
33. Retainer Ring
34. Piston Pin
35. Stud

Figure 6-51. Pistons and Cylinders

6-38. A25 4TH STAGE CYLINDER (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Unscrew four hex nuts (30) from cylinder (29) and remove washers (31).

c. Remove cylinder (29) with O-ring (19) from upper crankcase,

d. Remove O-ring (19) from cylinder (29).

e. Unscrew four studs (35) from upper crankcase.

6-39. A04 1ST STAGE PISTON (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Remove two internal retaining rings (2) from wrist pin bore.

c. Push out wrist pin (8).

d. Remove piston (1) from connecting rod.

6-40. A10 2ND STAGE PISTON (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Remove two internal retaining rings (12) from wrist pin bore.

c. Push out wrist pin (10).

d. Remove piston (9) from connecting rod.

6-41. A16 3RD STAGE PISTON (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Remove two internal retaining rings (33) from wrist pin bore.

c. Push out wrist pin (34).

d. Remove piston (32) from connecting rod.

6-42. A26 4TH STAGE GUIDE PISTON (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Remove two internal retaining rings (23) and (25) from wrist pin bore.

c. Push out wrist pin (24).

d. Remove guide piston (22) from connecting rod.

6-43. A24 4TH STAGE FLOATING PISTON WITH PISTON SLEEVE (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Remove heat dissipator (28).

c. Remove piston sleeve (26) with floating piston from cylinder of 4th stage (29).

d. Remove two O-rings (27) from piston sleeve (26).

e. Pull floating piston out of piston sleeve (26).

6-44. A06 1ST STAGE PISTON RINGS (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Remove piston ring set (7) consisting of tapered compression ring, oil scraper ring and double bevelled slotted oil control ring from piston (1) with piston ring pliers.

6-45. A12 2ND STAGE PISTON RINGS (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Remove piston ring set (11) consisting of two tapered compression rings, one oil scraper ring and one slotted oil control ring from piston (9) with piston ring pliers.

6-46. A18 3RD STAGE PISTON RINGS (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Remove piston ring set (12) consisting of one tapered compression ring and three plain compression rings from 3rd stage floating piston (20).

6-47. A36/34 V-BELT PULLEY AND IMPELLER (Figure 6-48)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Loosen internal hex-head screw (56). Remove bolt, lock washer and two flat washers from end of crankshaft, and remove V-belt pulley (55) from crankshaft.

c. Unscrew twelve hex-head screws (53) from fan blade support (52) and remove washers (54).

d. Remove fan blade support (52).

e. Remove eighteen fan blades (51).

6-48. A37 AFTERCOOLER (Figure 6-48)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Unscrew threaded collars at each end of aftercooler (43) from 4th stage valve head and discharge valve cover (42).

c. Unscrew four countersunk screws (12).

d. Remove four retaining clamps (11).

e. Remove aftercooler (43).

6-49. A38 1ST TO 2ND, 2ND TO 3RD AND 3RD TO 4TH STAGE INTERCOOLERS (Figure 6-48)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Unscrew threaded collars at each end of 1st to 2nd stage intercooler (41) from 1st stage pressure joint and 1st to 2nd stage filter head.

c. Unscrew two nuts (38), remove washers (39) and finned tube support (33).

d. Remove 1st to 2nd stage intercooler (41).

e. Unscrew two studs (40) from finned tube support (34).

f. Unscrew two hex-head nuts (37) and remove washers (36).

g. Remove two hex-head screws (35), two washers (36) and finned tube support (34) from upper crankcase.

h. Unscrew threaded collars at each end of 2nd to 3rd stage intercooler (31) from 2nd stage valve head and 2nd to 3rd stage filter head.

i. Unscrew three hex-head nuts (28), remove washers (30) and finned tube support (27).

j. Remove 2nd to 3rd stage intercooler (31).

k. Unscrew three studs (29) from finned tube support (21).

l. Unscrew one internal hex-head screw (25), remove lock washer (26), two hex-head nuts (24) and two washers (23).

m. Remove two internal hex-head screws (22), two washers (23) and finned tube support (21) from upper crankcase.

n. Unscrew threaded collars at each end of 3rd to 4th stage intercooler (32) from 3rd stage valve head and 3rd to 4th stage filter head.

o. Unscrew three hex-head nuts (18), remove spring plates (19), two finned tube supports (16), three hex-head screws (17) and three spring plates (19).

p. Unscrew three hex nuts (28), remove washers (30), and remove 3rd to 4th stage finned tube support (27).

q. Remove 3rd to 4th stage intercooler (32).

r. Unscrew three studs (25) from finned tube support (21).

s. Unscrew one internal hex-head screw (25), remove lock washer (26), two hex nuts (24) and two washers (23).

t. Remove two internal hex-head screws (22), two washers (23), and finned tube support (21) from upper crankcase.

6-50. A44 OIL FILTER (Figure 6-47)

a. Loosen two hose clamps (17), pull out vent hose (18) from intake connection of 1st stage and from demister top (20).

b. Unscrew plug (15) and remove O-ring (16).

c. Remove retaining clip (19) and demister top (20) with gasket (21) from demister body (22).

d. Unscrew demister body (22) with gasket (23) from extension (24).

e. Unscrew extension (24) from crankcase (37).

6-51. A45 V-BELT GUARD (Figure 6-52)

a. Unscrew four internal hex-head screws (2).

b. Remove washers (3) and V-belt guard (1).

6-52. A46 OIL PUMP DRIVE (Figure 6-52)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Unscrew three internal hex-head screws (18) on lower V-belt pulley and remove lock washers (20).

c. Unscrew two internal hex-head screws (19) and remove two lock washers (20).

d. Remove V-belt pulley part (17), spacers (21) and V-belt (7).

e. Remove V-belt pulley part (22) from eccentric shaft (30).

f. Unscrew two internal hex-head screws (5) from upper V-belt pulley part (4) and remove two lock washers (6).

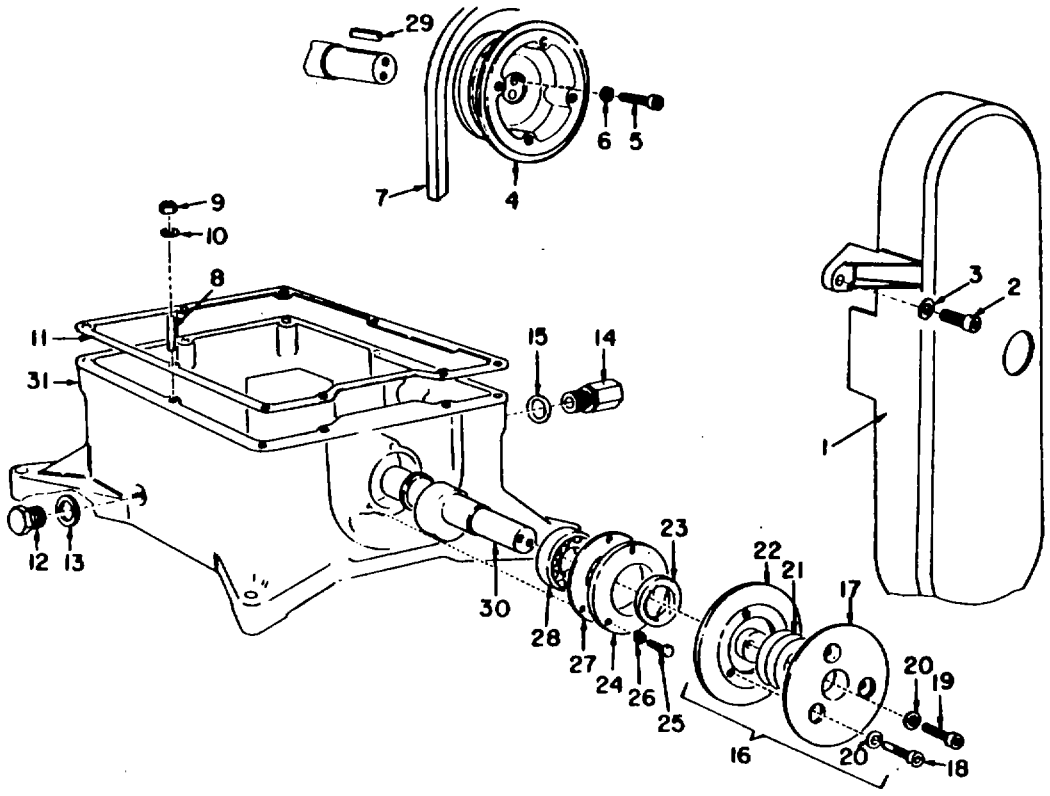
g. Remove V-belt pulley (4) from crankshaft and remove key (29) from key slot.

6-53 A50 OIL PUMP (Figure 6-46)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Unscrew three internal hex-head screws (14) and remove washers (15).

c. Remove oil pump (13) from crankcase and remove gasket (18).



1. Cover, Oil Pump Drive Belt
2. Bolt
3. Washer
4. Sheave
5. Bolt
6. Lock Washer
7. Belt, Oil Pump Drive
8. Stud
9. Nut
10. Washer
11. Gasket
12. Plug
13. Seal Ring
14. Adapter
15. Seal Ring
16. Pulley Assembly
17. Pulley, Outer
18. Bolt
19. Bolt
20. Lock Washer
21. Spacer
22. Pulley, Inner
23. Seal, Shaft
24. Retainer, Bearing
25. Bolt
26. Lock Washer
27. Gasket
28. Bearing
29. Key
30. Shaft, Eccentric
31. Crankcase, Lower

Figure 6-52. Crankcase, Lower

6-54. A47 ECCENTRIC SHAFT (Figure 6-52)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Unscrew three hex-head screws (25) on cover and remove washers (26).

c. Remove cover (24) with shaft seal (23) and gasket (27) from eccentric shaft (30).

d. Push out shaft seal (23) from cover (24).

e. Pull out eccentric shaft (30) with ball bearing (28) from crankcase lower part (31).

f. Remove ball bearing (28) from eccentric shaft (30).

6-55. A27 DRIVING GEAR ASSEMBLY (Figures 6-47, 6-53 and 6-48)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Unscrew internal hex-head screw (28) and remove washer (29) and spacer (27). (Figure 6-47)

c. Unscrew four hex nuts (10), and remove four internal hex-head screws (7) and eight washers (8) and (9). (Figure 6-48)

d. Unscrew four internal hex-head screws (5) and remove four washers (6) and four fan guard supports (2). (Figure 6-48)

e. Unscrew six internal hex-head screws (2) and remove six spacers (3). (Figure 6-47)

f. Remove bearing case (30) (Figure 6-47) with driving gear assembly (10) (Figure 6-53) from upper crankcase (37) (Figure 6-47) while pressing against crankshaft on oil pump drive side.

g. Remove gasket (4) (Figure 6-47) from bearing case (30).

6-56. A22 BEARING COVER (Figures 6-47 and 6-53)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Remove bearing cover (30) (Figure 6-47) from driving gear assembly (10) (Figure 6-53).

c. Press out shaft seal (5) (Figure 6-47) from bearing cover (30).

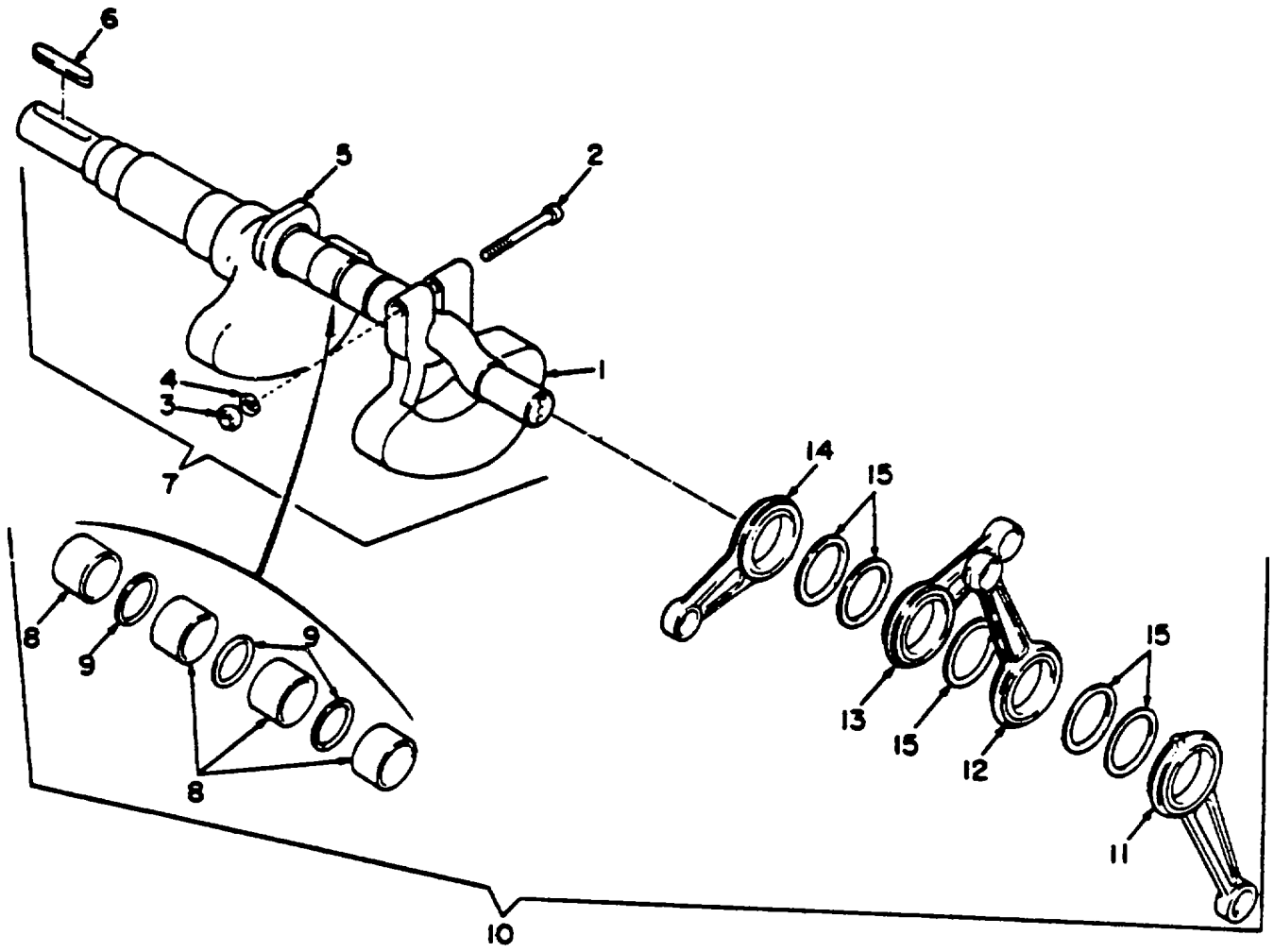
d. Remove two ball bearings (11 and 12, Figure 6-47) from driving gear assembly (10) (Figure 6-53).

6-57. A28 COUNTERWEIGHT (Figure 6-53)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Unscrew hex nut (3), remove lock washer (4) and pull out internal hex-head screw (2) from counterweight (1).

c. Remove counterweight (1).



1. Counterweight
2. Bolt
3. Nut
4. Lock Washer
5. Crankshaft
6. Key
7. Crankshaft Assembly
8. Bearing
9. Spacer
10. Drive Gear Assembly
11. Connecting Rod
12. Connecting Rod
13. Connecting Rod
14. Connecting Rod
15. Spacer

Figure 6-53. Connecting Rods, Crankcase

6-58. A29/30/31/32 2ND, 1ST, 4TH AND 3RD STAGE CONNECTING RODS (Figure 6-53)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Remove 2nd stage connecting rod (11), needle bearing (8) and three spacers (15) and (9) from driving gear assembly (10).

c. Remove 1st stage connecting rod (12), needle bearing (8), and two spacers (15) and (9) from driving gear assembly (10).

d. Remove 4th stage connecting rod (13), needle bearing (8) and two or three spacers (15) and (9) from driving gear assembly (10).

e. Remove 3rd stage connecting rod (14) and needle bearing (8) from driving gear assembly (10).

6-59. A41 UPPER CRANKCASE (Figure 6-47)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Unscrew four internal hex-head countersunk screws (7) and remove bearing cover (6) and gasket (8).

c. Press out shaft seal (9) from bearing cover (6).

d. Press out ball bearing (10) from upper crankcase (37).

e. Unscrew internal hex-head screw (35) from upper crankcase (37) and remove gasket (36).

f. Pull out dipstick (31) and remove O-ring (32).

g. Unscrew dipstick tube (33) from upper crankcase (37) and remove gasket (34).

h. Unscrew seven hex nuts (9) (Figure 6-52) and remove washers (10, Figure 6-22).

i. Remove upper crankcase (37) and gasket (11) (Figure 6-52) from lower crankcase (31) (Figure 6-52).

6-60. A48 LOWER CRANKCASE (Figure 6-52)

a. Accomplish necessary prerequisites (see Figure 6-44).

b. Unscrew seven hex nuts (9) from upper crankcase and remove washers (10).

c. Remove lower crankcase (31) and gasket (11) from upper crankcase.

d. Unscrew seven studs (8) from lower crankcase (31).

e. Unscrew adapter (14) from lower crankcase (31) and remove gasket (15).

f. Unscrew plug (12) from lower crankcase and remove gasket (13).

g. Press out eccentric shaft ball bearing (28) from lower crankcase (31).

6-61. COMPRESSOR BLOCK ASSEMBLY

The compressor block assembly work sequence plan (Figure 6-54) is provided to serve as a guide in assembling the compressor block. With this plan the work sequence for each step of assembly can be clearly seen. The individual assembly groups are illustrated in the work sequence plan by fields.

-- sequence of operation number

A13

Discharge valve 2nd stage

-- assembly designation

a. Instructions for Use of the Work Sequence Plan

(1) See work sequence plan.

(2) Locate all assembly groups to be assembled or replaced in the work sequence plan.

(3) Trace all connecting lines leading from each assembly group to be assembled or replaced to the starting point. All affected assembly groups must be assembled before the assembly group selected can be assembled.

(4) Assemble groups closer to the starting point before groups further displaced from the starting point, following the connecting lines to the right.

(5) If several connecting lines from the left converge on one assembly group field, all assembly groups on these lines must be previously assembled.

b. Example (see Figure 6-54). The assembly group A23, valve head 4th stage, is to be assembled. The following assembly groups must be assembled first: A22 bearing cover, A32 connecting rod 3rd stage, A31 connecting rod 4th stage, A30 connecting rod 1st stage, A29 connecting rod 2nd stage, A28 counterweight, A41 upper part of crankcase, A27 driving gear, A26 guide piston 4th stage, A25 cylinder 4th stage, A24 floating piston with piston sleeve 4th stage, A21 discharge valve 4th stage, A20 inlet valve 4th stage.

6-62. A48 LOWER PART OF CRANKCASE (Figure 6-52)

a. Place the SCHOTT fitting for the aftercooler in the lower part of the crankcase (31), screw hex nut on fitting and tighten to 25.6 lb-ft.

b. Place adapter (14) on gasket (15), and screw adapter into lower part of crankcase (31).

c. Screw seven studs (8) into lower part of crankcase (31).

6-63. A47 ECCENTRIC SHAFT (Figure 6-52)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Press ball bearing (28) onto eccentric shaft (30).

c. Press eccentric shaft (30) with ball bearing (28) into lower part of crankcase.

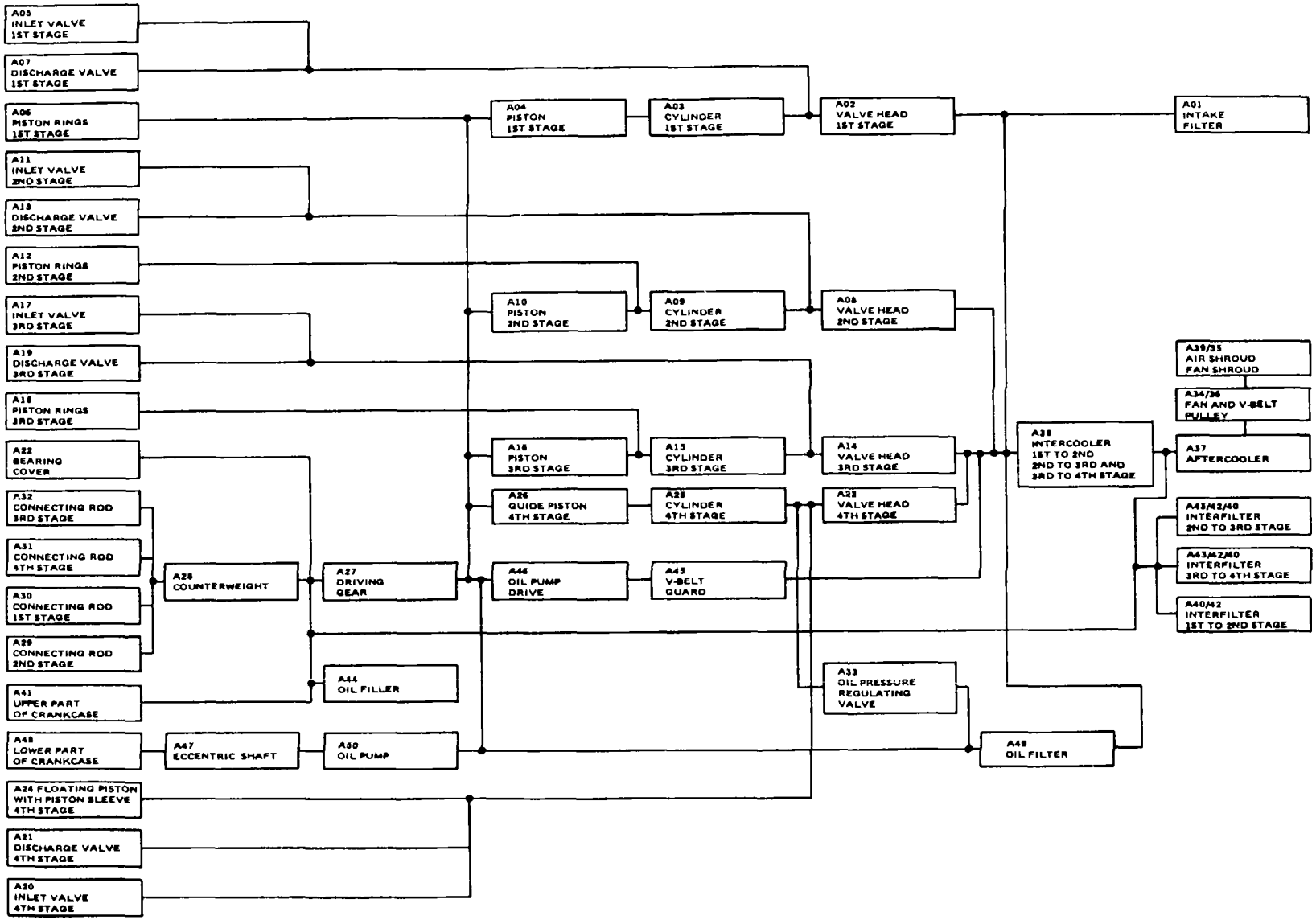


Figure 6-54. Work Sequence Plan (Compressor Block Assembly)

d. Press shaft seal (23) into cover (24).

e. Slide cover (24) with gasket (27) onto eccentric shaft (30).

f. Place three washers (26) on three hex-head screws (25) and screw through cover (24) into lower part of crankcase (31). Tighten to 7-8 lb-ft.

6-64. A50 OIL PUMP (Figure 6-46)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Place gasket (18) on oil pump (13).

c. Place three washers (15) on three internal hex-head screws (14) and screw through oil pump (13) into lower part of crankcase.

d. Tighten internal hex-head screws (14) to 18 lb-ft.

e. Insert 0.3 mm or .012 in. feeler gage between eccenter and pump plunger and turn eccenter shaft by hand. If eccenter does not turn place an additional gasket between oil pump (13) and lower part of crankcase. Pump plunger must lie against eccenter with no free space between.

6-65. A41 UPPER PART OF CRANKCASE (Figures 6-32 and 6-47)

a. Brush gasket (11) (Figure 6-52) with non-setting sealing material and place on lower part of crankcase (31). Place upper part of crankcase (37) (Figure 6-47) on lower part of crankcase.

b. Place seven washers (10) (Figure 6-52) on studs (8). Fasten upper part of crankcase (37) (Figure 6-47) to lower part of crankcase (31) (Figure 6-52) with seven hex nuts (9) (Figure 6-52). Tighten down evenly to 18 lb-ft.

c. Place gasket (34) (Figure 6-47) on dipstick tube (33) and screw dipstick tube into upper part of crankcase (37). Tighten to 25.8 lb-ft.

d. Slide O-ring (32) (Figure 6-47) onto dipstick (31) and insert dipstick into dipstick tube (33).

e. Place gasket (36) (Figure 6-47) on internal hex-head screw (35) and screw into upper part of crankcase (37). Tighten to 20 lb-ft.

6-66. A32/31/30/29 CONNECTING ROD 3RD, 4TH, 1ST AND 2ND STAGE (Figure 6-53)

a. Place needle bearing case (8) on driving gear (7). Slide connecting rod 3rd stage (14) onto needle bearing case.

b. Place one spacer (15) and next needle bearing cage (8) on driving gear (7) and slide connecting rod 4th stage (13) onto needle bearing cage.

c. Place one spacer (15) and next needle bearing case (8) on driving gear (7) and slide connecting rod 1st stage (12) onto needle bearing case.

d. Place two spacers (15) and next needle bearing case (8) on driving gear (7) and slide connecting rod 2nd stage (11) onto needle bearing case.

6-67. A28 COUNTERWEIGHT (Figure 6-53)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Place counterweight (1) on driving gear (7).

c. Insert tight-fit screw (2) through counterweight (1), place lock washer (4) on screw and screw on hex nut (3) tightening to 18 lb-ft.

6-68. CHECK AXIAL AND RADIAL TOLERANCE OF RODS ON CRANKSHAFT

a. Move all connecting rods to one side and measure the axial clearance with a feeler gage. Tolerance is 0.4 mm minimum, 0.8 mm maximum (Figure 6-55). If axial clearance is greater than 0.8 mm it can be reduced by an additional spacer (15) between connecting rod 3rd stage (14) and connecting rod 4th stage (13). If axial clearance is still greater than 0.8 mm, replace driving gear assembly.

b. Tilt each connecting rod in turn from side to side and measure the maximum movement. Radial clearance is acceptable if upper end of each connecting rod can be tilted by 1-2 mm (Figure 6-56). If not, replace driving gear assembly.

NOTE

Replacing individual connecting rods is not recommended as the various bearing tolerances are only adjusted at the factor using needle cages with different needle diameters.

6-69. A22 BEARING COVER (Figure 6-47)

a. Press two ball bearings (12) and (11) onto the driving gear (10) (Figure 6-53).

b. Press shaft seal (5) into bearing cover (30).

c. Press bearing cover (30) onto driving gear (10, Figure 6-25).

6-70. A27 DRIVING GEAR (Figure 6-47)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Place gasket (4) on bearing cover (30).

c. Insert driving gear (10) (Figure 6-53) with bearing cover (30) into upper part of crankcase (37).

d. Place six spacers (3) on six internal hex-head screws (2).

e. Screw bearing cover (30) to upper part of crankcase (37) with the six internal hex-head screws (2). Torque to 8 lb-ft.

f. Press ball bearing (10) simultaneously into upper part of crankcase (37) and onto driving gear (10) (Figure 6-53).

g. Press shaft seal (9) into cover (6).

h. Place gasket (8) on cover (6). Screw cover (6) onto upper part of crankcase (37) with four internal hex-head screws (7) and tighten to 8 lb-ft.

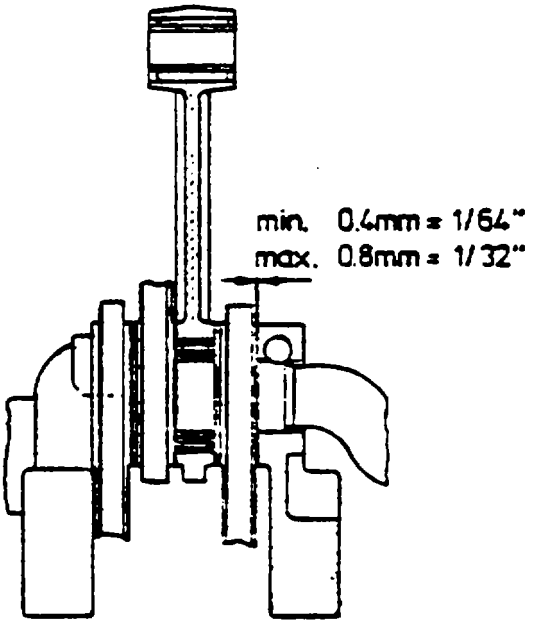


Figure 6-55. Connecting Rod Tolerances

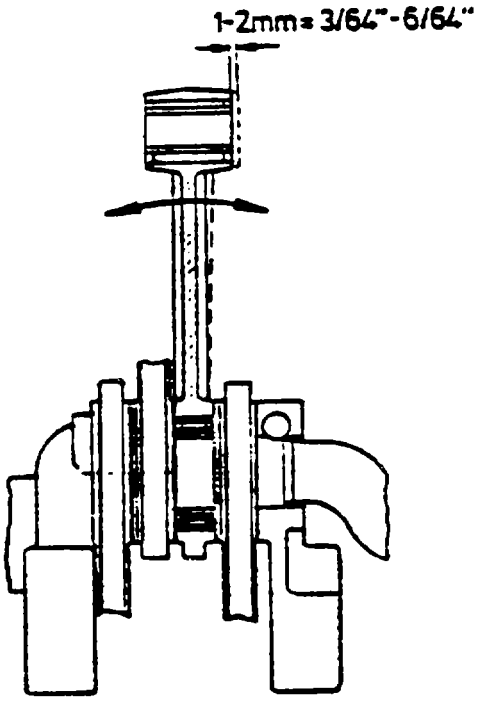


Figure 6-56. Connecting Rod Tolerances

i. Place four washers (6) on four internal hex-head screws (5) and use them to attach four fan shroud supports (2) to bearing cover (30) (Figure 6-48).

j. Place four washers (8) on four internal hex-head screws (7). Stick internal hex-head screws (5) through fan shroud supports (2) and bearing cover (30). Place washers (9) on the internal hex-head screws (5) and screw on four hex nuts (10). Tighten to 18 lb-ft (Figure 6-48).

k. Place washer (29) on internal hex-head screw (28), place distance collar (27) on bearing cover (30), and screw together with internal hex-head screw (28). Tighten to 33 lb-ft (Figure 6-47).

6-71. A46 OIL PUMP DRIVE (Figure 6-52)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Insert key (29) into key slot of crankshaft and slide V-belt pulley (4) onto crankshaft.

c. Place two lock washers (6) on two internal hex-head screws (5) and screw on upper V-belt pulley (4). Tighten to 18 lb-ft.

d. Slide rear V-belt pulley part (22) onto eccentric shaft (30), place two lock washers (20) on two internal hex-head screws (19), and screw on rear V-belt pulley part. Tighten screws (19) to 7.3 lb-ft.

e. Place V-belt (7) over upper V-belt pulley (4).

f. Place three lock washers (20) on three internal hex-head screws (18) and stick screws through the front V-belt pulley part (17).

g. Place spacers (21), if necessary, on V-belt pulley part (22), screw front V-belt pulley part (17) to rear V-belt pulley part (22) with three screws (18). Tighten to 8 lb-ft.

6-72. CHECK AND ADJUST V-BELT TENSION (Figure 6-52)

Press V-belt firmly with the thumb in the middle between the two pulleys. Deviation should be approximately 5 mm. If belt bends more than 5 mm, spacers (21) should be removed. If belt bends less than 5 mm, spacers should be added.

6-73. A45 V-BELT GUARD (Figure 6-52)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Place four washers (3) on four internal hex-head screws (2), hold V-belt guard (1) to upper and lower parts of crankcase and attach with the internal hex-head screws. Tighten to 3 lb-ft.

6-74. A18 PISTON RINGS, 3RD STAGE (Figure 6-51)

Use a piston ring mounting sleeve to install the piston rings.

a. Slide three plain compression rings and one tapered compression ring (21) onto the piston ring mounting sleeve.

b. Guide piston ring mounting sleeve from above over the floating piston of the 3rd stage (20) until just before the last piston ring slot. Slide one plain compression ring from the piston ring mounting sleeve into the piston ring slot.

c. Pull back piston ring mounting sleeve so that the next piston ring slot, the second from the bottom, is barely exposed. Slide one plain compression ring from the piston ring mounting sleeve into the piston ring slot.

d. Pull back piston ring mounting sleeve so that the next piston ring slot, the third from the bottom, is barely exposed. Slide one plain compression ring from the piston ring mounting sleeve into the piston ring slot.

e. Pull back piston ring mounting sleeve so that the next piston ring slot, the fourth from the bottom, is barely exposed. Slide one tapered compression ring from the piston ring mounting sleeve into the piston ring slot.

f. Remove piston ring mounting sleeve from the floating piston of the 3rd stage (20). Make sure the piston ring gaps are properly spaced.

6-75. A12 PISTON RINGS, 2ND STAGE (Figure 6-51)

Use piston ring pliers to mount the 2nd stage piston rings.

a. Mount one slotted oil control ring (11) in the piston ring slot from the top of the piston (9) using the piston ring pliers.

b. Mount one oil scraper ring in the middle piston ring slot of the piston (9) using the piston ring pliers.

c. Mount one tapered compression piston ring each in both upper piston ring slots of the piston (9) using the piston ring pliers.

d. Make sure the piston ring gaps are properly spaced.

6-76. A06 PISTON RINGS, 1ST STAGE (Figure 6-57)

Use piston ring pliers to mount the 1st stage piston rings.

a. Mount one double bevelled slotted oil control ring (7) in the lower piston ring slot of the piston (1) using the piston ring pliers.

b. Mount one oil scraper ring in the middle piston ring slot of the piston (1) using the piston ring pliers.

c. Mount one tapered compression ring in the upper position ring slot of the piston (1) using the piston ring pliers.

d. Make sure the piston ring gaps are properly spaced.

6-77. A26 GUIDE PISTON, 4TH STAGE (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Place guide piston (22) on connecting rod.

c. Place wrist pin (24) in wrist pin bore of piston (22) and through the connecting rod eye of the connecting rod.

d. Secure wrist pin (24) in the bore of the piston by two snap rings (23 and 25).

6-78. A16 PISTON, 3RD STAGE (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Place 3rd stage guide piston (32) on connecting rod.

c. Place wrist pin (34) in wrist pin bore of piston (32) and through eye of connecting rod.

d. Secure wrist pin (34) by two snap rings (33).

6-79. A10 PISTON, 2ND STAGE (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Place 2nd stage piston (9) on connecting rod.

c. Place wrist pin (10) in wrist pin bore of piston (9) and through the eye of the connecting rod.

d. Secure wrist pin (10) by two snap rings (12).

6-80. A04 PISTON, 1ST STAGE (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Place 1st stage piston (1) on connecting rod.

c. Place wrist pin (8) in wrist pin bore of piston (1) and through the eye of the connecting rod.

d. Secure wrist pin (8) by two snap rings (2).

6-81. A24 FLOATING PISTON WITH PISTON SLEEVE, 4TH STAGE (Figure 6-51)

a. Place floating piston in the piston sleeve (26), making sure the piston is correctly positioned in the sleeve with the lug on the bottom.

b. Slip two O-rings (27) onto the piston sleeve (26).

c. Press piston sleeve (26) with floating piston into the cylinder of the 4th stage (29), checking position of lubricating bores in the piston sleeve. Bores must lie crosswise to the hook-up bore for the oil pressure regulating valve of the 4th stage.

d. Place head dissipater (28) on cylinder of the 4th stage (29).

6-82. A25 CYLINDER, 4TH STAGE (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Screw four studs (35) into upper part of crankcase.

c. Slip O-ring (19) into oil cylinder track of cylinder (29).

d. Place cylinder (29) on the upper part of crankcase and place washers (31) on the studs (35).

e. Attach cylinder (29) with four hex nuts (30). Tighten nuts to a torque of 18 lb-ft.

6-83. A15 CYLINDER, 3RD STAGE (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Oil cylinder track.

c. Screw four studs (35) into upper part of crankcase.

d. Slip O-ring (19) onto cylinder (16).

e. Place cylinder (16) with floating piston (20) on upper part of the crankcase with a cylinder head bolt hole in the 12 o'clock position. Place washers (18) on the studs (35).

f. Attach cylinder (16) with four hex nuts (17). Tighten nuts to a torque of 18 lb-ft.

6-84. A09 CYLINDER, 2ND STAGE (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Screw four studs (35) into upper part of crankcase.

c. Slip O-ring (19) into oil cylinder track of cylinder (13).

d. Press four piston rings (11) into piston-ring slots of the piston (9).

e. Slide cylinder (13) carefully over piston (9) and place cylinder on upper part of crankcase.

f. Place washers (15) on the studs (35), attach cylinder (13) with four hex nuts (14). Tighten to a torque of 18 lb-ft.

6-85. A03 CYLINDER, 1ST STAGE (Figure 6-51)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Screw four studs (35) into upper part of crankcase.

c. Slip O-ring (6) onto cylinder (3), oil cylinder track.

d. Slide cylinder (3) carefully over piston (1). When all piston rings are covered by the cylinder, place cylinder on upper part of crankcase.

e. Place washers (5) on the studs (35), attach cylinder (3) with four hex nuts (4). Tighten nuts to a torque of 18 lb-ft.

6-86. A21 DISCHARGE VALVE, 4TH STAGE (Figure 6-50)

a. Slip O-ring (35) onto discharge valve (34).

b. Press discharge valve (34) into valve head (36).

6-87. A20 INLET VALVE, 4TH STAGE (Figure 6-50)

Use hedgehog wrench (4555) to mount the inlet valve.

a. Place valve head (36) on hedgehog.

b. Screw inlet valve (28) into valve head (36) using special wrench, secure against loosening by two punch marks.

6-88. A19 DISCHARGE VALVE, 3RD STAGE (Figure 6-50)

Use hedgehog wrench (11365) to mount the discharge valve.

a. Place valve head (23) on hedgehog.

b. Place valve gasket (20), valve seat (19), valve disk (18), discharge valve spring (17) and discharge valve insert (16) into valve head (23).

c. Place plate spring (13) on discharge valve cover (12), slip O-ring (14) onto discharge valve cover.

d. Screw discharge valve cover (12) into valve head (23) and tighten to 3.5 lb-ft.

e. Screw stud (11) into discharge valve cover (12) with a torque of 12 lb-ft, place washer (10) on stud. Install acorn nut (9) and tighten.

6-89. A17 INLET VALVE, 3RD STAGE (Figure 6-50)

Use the hedgehog (11365) and special wrench (4555) to mount the inlet valve.

a. Place valve head (23) on hedgehog.

b. Insert gasket (7), valve seat (6), valve disk (5) and inlet valve spring (4) into valve head (23).

c. Screw inlet valve cover (3) into valve head (23) with special wrench and secure against loosening by two punch marks.

6-90. A13 DISCHARGE VALVE, 2ND STAGE (Figure 6-50)

The installation of the discharge valve 2nd stage (38) is the same as that of the discharge valve 3rd stage (18).

6-91. All INLET VALVE, 2ND STAGE (Figure 6-50)

The installation of the inlet valve 2nd stage (51) is the same as that of the inlet valve 3rd stage (12).

CAUTION

Do not interchange inlet and discharge valves. After completing assembly, crank compressor by hand.

6-92. A07 DISCHARGE VALVE, 1ST STAGE (Figure 6-49)

NOTE

Large side of valve down.

a. Place one gasket (8) in the valve head (12).

b. Place discharge valve (10) and another gasket (8) in the valve head (12).

c. Place discharge connection (4) on discharge valve (10).

d. Place four washers (6) on four internal hex-head screws (5) and attach discharge connection (4) to valve head (12) with the internal hex-head screws. Tighten to a torque of 18 lb-ft.

6-93. A05 INLET VALVE, 1ST STAGE (Figure 6-49)

NOTE

Large side of valve up.

a. Place one gasket (11) on the valve head (12).

b. Place inlet valve (9) and another gasket (8) on the valve head (12).

c. Place inlet connection (1) on the inlet valve (9).

d. Place four washers (3) on four internal hex-head screws (2) and attach inlet connection (1) to valve head (12) with the internal hex-head screws. Tighten to a torque of 18 lb-ft.

6-94. A23 VALVE HEAD, 4TH STAGE (Figure 6-50)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Screw valve head (36) and valve head cover (29) to cylinder (29, Figure 6-49).

c. Tighten internal hex-head screws (30) to 18 lb-ft.

d. Screw stud (33) to head cover (29) with a torque of 12 lb-ft. Place washer (32) on stud (33).

e. Install acorn nut (31) and tighten.

6-95. A14 VALVE HEAD, 3RD STAGE (Figure 6-50)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Place valve head (23) on cylinder (16, Figure 6-51) with flat side of head away from aftercooler with six internal hex-head screws (21).

c. Tighten internal hex-head screws (21) with a torque of 18 lb-ft.

6-96. A08 VALVE HEAD, 2ND STAGE (Figure 6-54)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. The installation of the valve head of the 2nd stage (37) is the same as that of the valve head of the 3rd stage (1).

6-97. A02 VALVE HEAD, 1ST STAGE (Figure 6-49)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Place gasket (15) on cylinder (3) (Figure 6-49).

c. Place valve head (12) on cylinder (3) (Figure 6-49) with inlet up. Place four washers (14) on four hex-head screws (13).

d. Attach valve head (12) to cylinder (3) (Figure 6-49) with the hex-head screws (13). Tighten to a torque of 33 lb-ft.

6-98. A33 OIL PRESSURE REGULATING VALVE (Figure 6-46)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Place ball bearing guide with ball, spring and washer in oil pressure regulating valve housing.

c. Place gasket (8) on housing. Screw cap onto oil pressure regulating valve housing.

d. Screw stud into cap. The oil pressure is adjusted with this stud. Turning clockwise = pressure increase. Turning counterclockwise = pressure decrease.

e. Place gasket on stud. Install acorn nut.

f. Screw two tube fittings (6) and (2) into oil pressure regulating valve and tighten.

g. Slip two O-rings (10) onto oil check fitting (9), mount oil sight glass (11) and gasket (12).

h. Screw oil check fitting (9) into oil pressure regulating valve (7) and tighten.

i. Screw oil pressure regulating valve (7) into cylinder of the 4th stage and tighten. Shim with washers as required to assure proper tube alignment.

j. Screw oil-return tube (3) onto oil check fitting (9).

6-99. A49 OIL FILTER (Figure 6-46)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Place oil filter with oil supply tube (1) on the threaded pipe angle (2), on the oil pressure regulating valve (7) and on the oil pump (13).

c. Screw threaded collars of oil supply tube to oil pump (13) and threaded pipe angle (2) and tighten.

6-100. A44 OIL FILLER (Figure 6-47)

a. Screw extension pipe (24) into upper part of crankcase (37).

b. Place gasket (23) on extension (24) and screw demister body (22) into extension.

c. Place gasket (21) on demister body (22) and cover with demister top (20).

d. Mount four retaining clips (19).

e. Place O-ring (16) in cover plug (15), screw cover plug into demister top (20).

f. Slide two hose clamps (17) onto vent hose (18).

g. Place vent hose (18) on inlet connection of the 1st stage and on demister top (20) and tighten hose clamp.

6-101. A38 INTERCOOLER, 1ST TO 2ND, 2ND TO 3RD AND 3RD TO 4TH STAGE (Figure 6-48)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. For 3rd to 4th stage intercooler (32) place two washers (23) on two internal hex-head screws (22). Place against upper part of crankcase (37, Figure 6-47) and insert internal hex-head screws (22) with washers (23) through finned tube clamp (21) and upper part of crankcase. Place washers (23) on internal hex-head screws (22), screw on hex nuts (24), place lock washer (26) on internal hex-head screw (25), insert internal hex-head screw through finned tube clamp (21) into upper part of crankcase. Tighten hex nuts (24) and internal hex-head screw (25) with a torque of 18 lb-ft.

c. Screw three studs (29) into finned tube clamp (21), place intercooler 3rd to 4th stage (32) and finned tube clamp (27). Place washers (30) on studs (29), screw on hex nuts (28). Tighten nuts with a torque of 8 lb-ft.

d. Mount one plate spring (19) for each of the three hex-head screws (17), insert screws through finned tube clamp (16). Place finned tube clamp on intercooler 3rd to 4th stage (32). Place other finned tube clamp (16) and seven plate springs (19) on each of the three hex-head screws (17) and screw on hex nuts (18). Tighten hex nuts (18) to a torque of 3 lb-ft.

e. Screw two intercooler tubes (32) to the valve head of the 3rd stage and filter head 3rd to 4th stage and tighten with a torque of 23 lb-ft.

f. For intercooler 2nd to 3rd stage, place two washers on two internal hex-head screws (22). Place finned tube clamp (21) on upper part of crankcase (37, Figure 6-47) and insert internal hex-head screws (22) through finned tube clamp and upper part of crankcase. Place washers (23) on internal hex-head screws (22) and screw on hex nuts (24). Place lock washer (26) on internal hex-head screw (25), insert internal hex-head screw through finned tube clamp (21) into upper part of crankcase. Tighten hex nut (24) and internal hex-head screw (22) with a torque of 18 lb-ft.

g. Screw three studs (29) into finned tube clamp (21). Place intercooler 2nd to 3rd stage (31) and finned tube clamp (27) on finned tube clamp (21). Place washers (30) on the studs (29), screw on hex nuts (28). Tighten with a torque of 8 lb-ft.

h. Screw two intercooler tube collars (31) onto valve head of the 2nd stage and tighten with a torque of 25.6 lb-ft.

i. For intercooler 1st to 2nd stage, place two washers (36) on two hex-head screws (35). Place finned tube clamp (34) on upper part of crankcase (37, Figure 6-47) and insert hex-head screws (35) through finned tube clamp (34) and upper part of crankcase. Place washers on hex-head screws (35), screw on hex nuts (37) and tighten with a torque of 18 lb-ft.

j. Screw two studs (40) into finned tube clamp (34), place intercooler 1st to 2nd stage (41) and finned tube clamp (33) on finned tube clamp (34). Place two washers (39) on the studs (40) and screw on hex nuts (38). Tighten hex nuts.

k. Screw two intercooler tube collars onto discharge connection of the 1st stage and intercooler 1st to 2nd stage and tighten.

6-102. A37 AFTERCOOLER (Figure 6-48)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Place four clamps (11) on four countersunk screws (12).

c. Hold aftercooler (43) against fan shroud supports and attach with the countersunk screws (12). Tighten with a torque of 8 lb-ft.

d. Screw two aftercooler tube collars onto valve head of the 4th stage and bulkhead fitting and tighten.

6-103. A34/36 FAN AND V-BELT PULLEY (Figure 6-48)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Place eighteen fan wings (51) on the six wing supports (52). Place wing supports (52) on V-belt pulley (55).

c. Place twelve washers (54) on twelve hex-head screws (53) and screw wing supports (52) to V-belt pulley (55). Tighten hex-head screws with a torque of 18 lb-ft.

d. Place complete V-belt pulley (55) on crankshaft and tighten internal hex-head screw (56) with a torque of 33 lb-ft.

e. Install bolt, lock washer, and two flat washers in center of crankshaft, and tighten.

6-104. A39/35 AIR SHROUD AND FAN SHROUD (Figure 6-48)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Place two washers (50) on two hex-head screws (49).

c. Hold air shroud (48) to fan shroud (1) and attach with hex-head screws (49). Tighten with a torque of 8 lb-ft.

d. Place four washers (4) on four hex-head screws (3).

e. Slip fan shroud (1) over the fan shroud supports and attach with four hex-head screws (3). Slip one washer (26) and screw eyebolt through fan shroud (1) and washer (26) into the distance collar (27) (Figure 647).

f. Place one washer (26) on the eyebolt (25) and screw eyebolt through fan shroud (1) and washer (26) into the distance collar (27) (Figure 6-47).

g. Tighten the hex-head screws (3) with a torque of 12 lb-ft and tighten eyebolt (25) (Figure 6-47).

6-105. A42/40 INTERFILTER 1ST TO 2ND STAGE (Figure 6-45)

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Insert O-ring (31) into filter Head (30).

c. Place filter head (30) on filter housing (39A) and tighten with threaded collar (32).

d. Screw one tube fitting (2) into filter housing (39A) and three tube fittings (25), (29) and (26) and the safety valve (27) into filter head (30).

e. Tighten tube fittings and the safety valve.

f. Slide two clamps (33) onto filter housing (39A).

g. Place four spacers (37) and (38) and the interfilter on two hex-head screws (34) and insert them through the finned tube clamp.

h. Place two washers (36) on the hex-head screws (34) and screw on two hex nuts (35).

i. Tighten hex nuts (35) with a torque of 18 lb-ft.

j. Screw connecting tubes to tube fittings (25, 29 and 26) in filter head (30) and tube fitting (2) in filter housing (39A). Tighten tubes.

6-106. A43/42/40 INTERFILTER, 2ND TO 3RD STAGE (Figure 6-45).

a. Accomplish necessary prerequisites (see Figure 6-54).

b. Place filter element (13), baffle cone (12) and vortex plate (11) on center screw (14).

c. Screw center screw (14) into filter head (10).

d. The further assembly of the interfilter 2nd to 3rd stage (1) is the same as that of the interfilter 1st to 2nd stage (23).

6-107. A43/42/40 INTERFILTER, 3RD TO 4TH STAGE

The assembly of the interfilter 3rd to 4th stage (40) is the same as that of the interfilter 2nd to 3rd stage (1).

Section V. SATELLITE EQUIPMENT

6-108. GENERAL

This section covers the test and repair of the air receiver, air pressure gages, service air hose, intercoolers and frame.

6-109. AIR RECEIVER (Figure 6-57)

a. Remove Receiver. Remove air receiver from frame (paragraph 5-21).

(1) Remove two straps (8), four nuts (9) and four lock washers (10).

(2) Disconnect three tubes.

(3) Attach lifting sling.

(4) Life air receiver (11) out of frame.

b. Test Receiver

(1) Place air receiver in a suitable explosion pit.

(2) Connect air receiver to air pressure source rated at 5250 PSI.

(3) Apply 4375 PSI to receiver and hold for 5 minutes.

(4) Release pressure and examine receiver for deformation. Scrap any deformed receiver.

c. Repair Receiver

(1) Connect air receiver to air to air pressure source rated at 5250 PSI.

(2) Apply 2500 PSI to receiver.

(3) Using suitable leak detector, check all fillings for air leaks. Repair as required.

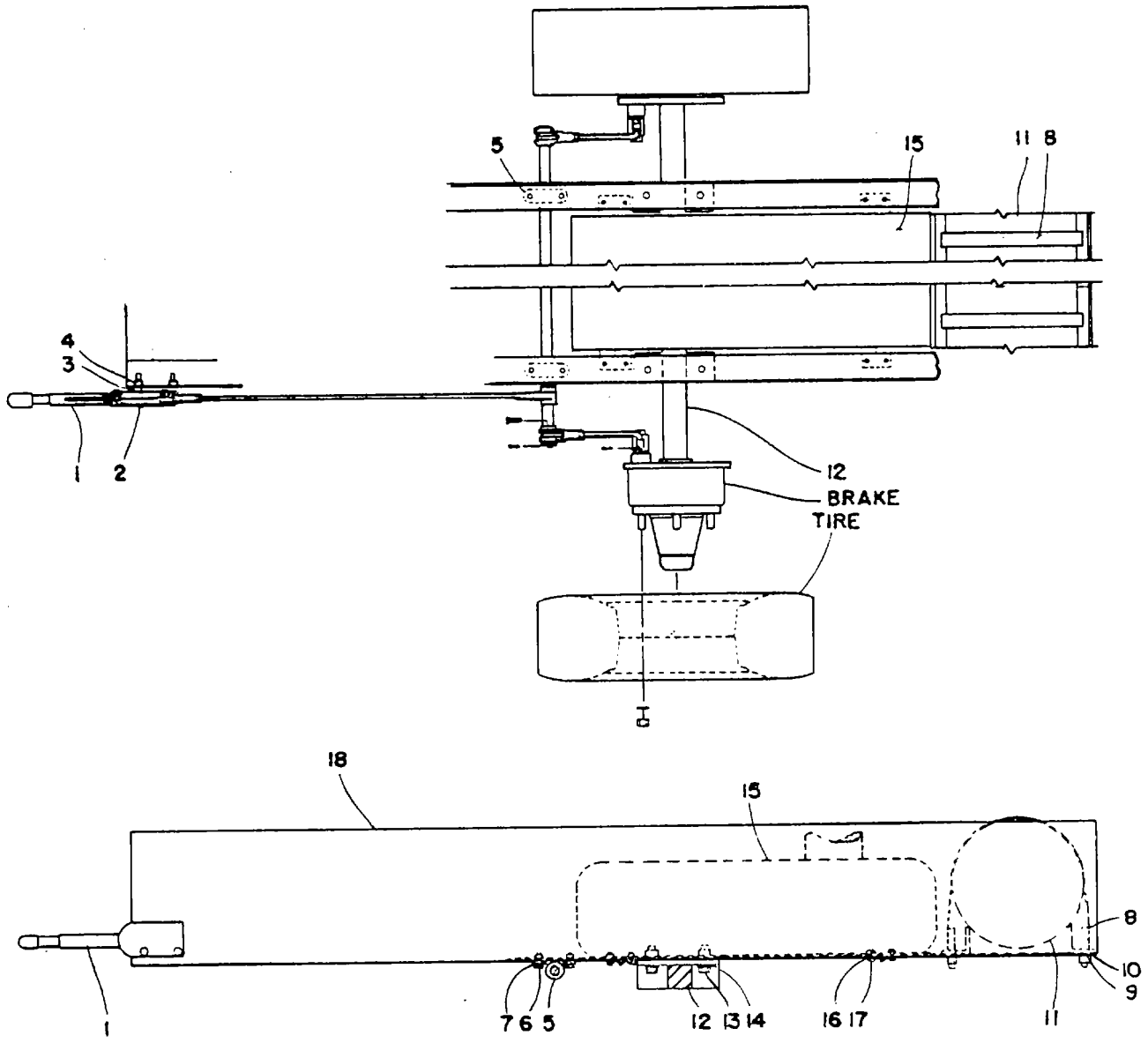
6110. AIR RECEIVER GAGES

a. Test Gages

(1) Connect pressure gage to suitable gage test bench.

(2) Apply pressure to gage. Pressure should represent half scale and full scale reading for gage being tested.

(3) Replace any gage which exhibits an error more than ± 5% of full scale reading.



1. Handbrake Lever
2. Bolt
3. Jam Nut
4. Lock Nut
5. Cross Brake Bearing
6. Bolt
7. Lock Washer
8. Air Receiver Strap
9. Nut
10. Lock Washer
11. Air Receiver
12. Axle
13. Bolt
14. Lock Washe
15. Fuel Tank
16. Lock Washe
17. Bolt
18. Frame

Figure 6-57. Air Receiver

6-111. SERVICE AIR HOSE

a. Test Hose

(1) Connect air hose to air pressure source rated at 4375 PSI.

(2) Apply 3500 PSI to air hose.

(3) Inspect for leaking fittings and damaged hose.

b. Repair Air Hose. Repair air hose. (Figure 6-58)

(1) Replace all damaged or defective components.

6-112. INTERCOOLERS

a. Inspection Intercoolers. Visually inspect intercoolers for damaged fittings, fins and tubes.

b. Test Intercoolers.

(1) Connect intercoolers to suitable air pressure source rated at 5250 PSI.

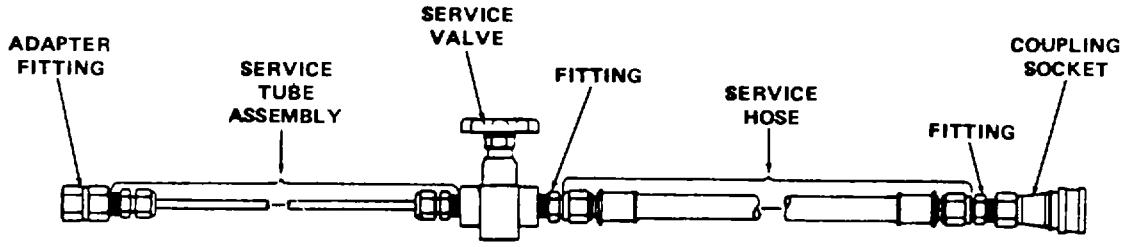


Figure 6-58. Service Hoses and Fittings

(2) Apply pressure to intercoolers as follows:

First stage	80 PSI
Second stage	330 PSI
Third stage	1500 PSI
Aftercooler	5250 PSI

(3) Examine for leaks.

c. Repair Intercoolers. No repair is recommended.

6-113. FRAME

a. Repair Frame

(1) Determine damage.

(2) Using suitable 11-gage steel plate, repair cracked or broken frame members.

APPENDIX A

REFERENCES

A-1. Fire Protection and Safety

TB 5-4200-200-10	Hand Portable Fire Extinguisher for Army Users.

A-2. Lubrication

C91001L	Fuels, Lubricants, Oils and Waxes.

A-3. Painting

TM 43-0139	Painting Instructions for Field Use.

A-4. Maintenance

TM 5-4310-368	Organizational, Direct Support, and General Support Repair Parts and Special Tools List for Air Conditioner, Horizontal Compact, 18,000 BTU/HR
TM 5-38-750	The Army Maintenance Management System (TAMMS)
TM 11-483	Radio Interference Suppression

A-5. Shipment and Storage

TM 74-2	Administration Storage of Equipment

A-6. Demolition

TM 750-244-3	Procedures for Destruction of Equipment to Prevent Enemy Use

APPENDIX B

MAINTENANCE ALLOCATION CHART

SECTION I. INTRODUCTION

B-1. GENERAL

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance categories.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance categories.

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II

B-2. MAINTENANCE FUNCTIONS

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination (e.g. by sight, sound, or feel).

b. Test. To verify serviceability by measuring the mechanical pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Aline. To adjust specified variable elements of an item to bring about optimum or desired performance.

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. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment of system.

h. Replace. To remove an unserviceable counterpart in its place, "Replace" is authorized by the MAC and is shown as the 3d position code of the SMR code.

i. Repair. The application of maintenance services[1] including fault location/troubleshooting[2], removal/installation, and disassembly/assembly[3] procedures, and maintenance actions[4] to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

[1]Services - Inspect, test, service, adjust, aline, calibrate, and/or replace.

[2]Fault locate/troubleshoot - the process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UUT).

[3]Disassembly/assemble - encompasses the step-by-step taking apart (or breakdown) of a spare/functional group coded item to the level of its least componency identified as maintenance significant (i.e., assigned an SMR code) for the category of maintenance under consideration.

[4]Actions - welding, grinding, riveting, straightening, facing, remachinery, and/or resurfacing.

j. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publication (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuilt. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipment/components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II

a. Column 1, Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group number shall be "00".

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 B-2.)

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific task identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance categories are as follows:

C	Operator or Crew
O	Organizational 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, TMDE, and support equipment required to perform the designated function.

f. Column 6, Remarks. This column shall, when applicable, contain a letter code, in alphabetic order, which shall be keyed to the remarks contained in Section IV.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III

a. Column 1, Reference Code. The tool test equipment reference code correlates with a code used in the MAC, Section I, Column 5.

b. Column 2, Nomenclature. Name or identification of the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National Stock Number. The National stock number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

SECTION II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
01	Wire Assy	Inspect	0.1						
		Test		0.3					
		Replace		0.5					
	Drains, Engine and Compressor	Inspect	0.5						
		Replace		0.5					
	Frame	Inspect		0.5					
	Repair					1.0			
	Repair				8.0				
	Compressor Drive Belt	Inspect	0.1						
	Replace			0.2					
02	Compressor Enclosure								
	Roof	Inspect	0.1						
	Repair			1.0					
	Replace			1.0					
	Doors, Latches & Tool Box	Inspect	0.1						
		Repair		0.5					
		Replace		1.0					
	Side Access Panel	Repair		0.5					
		Replace		1.0					
	End Panel	Inspect	0.1						
		Repair		1.0					
		Replace		1.0					
	Underpan	Inspect	0.1						
		Repair		1.0					
		Replace		1.0					
	Fuel Lines, Hoses and Fittings	Inspect	0.1						
		Replace		0.2					
		Repair		0.3					
03	Air Cleaner Assy	Inspect	0.1						
		Service		0.1					
		Replace		0.5					
04	Exhaust Muffler	Inspect	0.1						
		Replace		0.5					
07	Compartment Heater	Inspect			0.5				
		Repair			1.0				
		Replace			4.0				
11	Brush Assembly	Inspect			0.1				
		Replace			0.5				

* Subcolumns are as follows:
C - Operator/Crew
O - Organizational
F - Direct Support
H - General Support
D - Depot

MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
11	Stator Assembly	Inspect			0.2				
		Test			0.3				
		Replace			1.0				
	Bearings	Inspect			1.0				
		Replace			1.0				
	Alternator, Assy	Inspect	0.1						
		Test		1.0					
		Replace		0.5					
		Repair			1.5				
	Belt	Inspect	0.1						
		Adjust		0.4					
		Replace		0.4					
	Diodes	Inspect			0.2				
		Test			0.1				
		Replace			0.5				
	Rotor	Inspect			0.2				
		Test			0.5				
		Replace			1.0				
12	Carburetor	Inspect		0.1					
		Adjust			0.2				
		Replace			0.4				
		Repair			1.0				
		Overhaul			2.0				
14	Governor Assy	Inspect		0.1					
		Test			0.5				
		Adjust			0.2				
		Replace			1.0				
		Repair			1.5				
15	Clutch Assy & Housing Group	Inspect		0.1					
		Adjust		0.2					
		Repair		1.0					
		Replace		3.0					
18	Starter Assembly	Inspect	0.1						
	Engine	Test		0.3					
		Replace		1.0					
		Repair			1.5				
	Brushes	Inspect			0.2				
		Replace			1.5				

* Subcolumns are as follows:
C - Operator/Crew
O - Organizational
F - Direct Support
H - General Support
D - Depot

MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
18	Armature	Test			0.5				
		Replace			1.0				
		Repair			1.0				
	Drive	Inspect			0.5				
		Replace			1.0				
	Field Assembly	Inspect			0.1				
		Test			0.2				
		Replace			1.0				
	Holder, Brush	Inspect			0.1				
		Replace			0.2				
	Bearing	Inspect			0.2				
		Replace			1.0				
19	Spark Plugs & Cables	Inspect		0.5					
		Replace		1.0					
20	Gears, Timing	Inspect				0.1			
		Replace				4.0			
21	Magneto	Inspect		0.1					
		Test		0.1					
		Replace		1.0					
		Repair			2.0				
		Overhaul			3.0				
22	Housing	Inspect				0.1			
		Replace				2.0			
	Covering, Timing	Inspect				0.1			
		Replace				2.0			
23	Switch, Temperature	Inspect		0.1					
		Test		0.2					
		Replace		0.3					
24	Oil Filter, Engine	Inspect	0.1						
		Replace	0.2						
	Breather, Crankcase	Inspect	0.1						
		Service	0.2						
		Replace		0.1					
	Dipstick, Oil Level	Inspect		0.1					
		Replace	0.1						
25	Oil Pan Assy	Inspect	0.1						
		Replace				1.0			
		Repair				1.0			

* Subcolumns are as follows:
C - Operator/Crew
O - Organizational
F - Direct Support
H - General Support
D - Depot

MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
25	Manifold Exhaust & Intake	Inspect		0.1					
		Replace		1.5					
	Engine, Assy	Inspect	0.1						
		Test		1.0					
		Service	0.8						
		Replace			16.0				
		Repair				12.0			
		Overhaul				80.0			
	Crank Case Assy	Inspect				0.2			
		Replace				30.0			
		Repair				2.0			
		Overhaul				4.0			
26	Cylinder Block Assy	Inspect				0.1			
		Replace				5.0			
		Repair				2.0			
		Overhaul				4.0			
	Valve, Intake & Exhaust	Inspect				0.1			
		Replace				0.3			
		Repair				1.5			
	Spring, Valve	Test				0.2			
		Replace				1.5			
	Guide, Valve	Inspect				0.1			
		Replace				4.1			
27	Connecting Rod	Inspect				0.1			
		Replace				10.0			
	Rod Bearings	Inspect				0.1			
		Replace				2.0			
	Piston	Inspect				0.2			
		Replace				10.0			
	Piston Pin	Inspect				0.1			
		Replace				6.0			
	Piston Rings	Inspect				0.1			
		Replace				2.0			
	Crankshaft	Inspect				0.2			
		Replace				6.0			
	Main Bearing	Inspect				0.2			
		Replace				6.0			
	Bearing, Camshaft	Inspect				0.2			
		Replace				7.0			

* Subcolumns are as follows:
C - Operator/Crew
O - Organizational
F - Direct Support
H - General Support
D - Depot

MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
27	Flywheel Assembly	Inspect			0.1				
		Replace			1.0				
	Ring Gear	Inspect				0.1			
		Replace				2.0			
	Seal, Oil Pan	Replace				1.0			
28	Oil Pump	Test				1.0			
		Replace				3.0			
		Repair				2.0			
30	Pump, Fuel	Inspect	0.1						
		Test		0.2					
		Replace		0.4					
		Repair			1.0				
		Overhaul			1.0				
32	Air Compressor Assy	Inspect	0.1						
		Test		0.5					
		Adjust		1.0					
		Service	0.8						
		Replace			6.0				
		Repair				8.0			
		Overhaul				15.0			
	Breather Assy	Inspect	0.1						
		Replace		0.5					
		Repair		0.5					
33	Crankshaft, Bearing, Connecting Rods	Inspect				2.0			
		Replace				8.0			
35	Piston Rings	Inspect				2.0			
		Replace				8.0			
36	Intercoolers and After Cooler	Inspect		0.1					
		Test				1.0			
		Replace				3.0			
37	Oil Pump	Inspect				1.0			
		Replace				3.0			
		Repair				4.0			
	Oil Lines & Fittings	Inspect	0.1						
		Replace			0.5				
	Oil Strainer Assy	Inspect		0.1					
		Replace		0.5					
		Repair				1.0			
		Service		0.8					

* Subcolumns are as follows:
C - Operator/Crew
O - Organizational
F - Direct Support
H - General Support
D - Depot

MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
39	Cylinder Heads	Inspect				3.0			
		Replace				6.0			
41	Pneumatic System								
	Air Lines, Hoses & Fittings	Inspect	0.1						
		Replace		0.2					
42	Gage, Oil Pressure	Inspect	0.1						
		Test		0.3					
		Replace		0.5					
	Control, Throttle & Unloader	Inspect	0.1						
		Adjust		0.2					
		Replace		0.5					
	Air Cleaner Indicator	Inspect	0.1						
		Replace		0.5					
	Instrument & Control Panel Assy	Inspect	0.1						
		Test			1.0				
		Service		1.0					
		Repair			2.0				
		Overhaul			3.0				
		Replace		2.0					
	Manual Switches	Inspect	0.1						
		Test		0.1					
		Replace		0.5					
	Pressure Switches	Inspect	0.1						
		Test			0.3				
		Replace		0.5					
	Oil Pressure Gage	Inspect	0.1						
		Test		0.3					
		Replace		0.5					
	Air Pressure Gages	Inspect	0.1						
		Test				1.5			
		Replace			2.0				
	Switch, Panel Light	Inspect	0.1						
		Test			0.3				
		Replace			0.5				
	Lamp, Panel	Inspect	0.1						
		Test	0.1						
		Replace	0.1						
	Hourmeter	Inspect	0.1						
		Test	0.1						
		Replace		1.0					

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MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
42	Fuel Gage	Inspect							
		Test		0.2					
		Replace		0.5					
	Master Switch	Inspect	0.1						
		Test		0.3					
		Replace		0.5					
	Ammeter	Inspect	0.1						
		Test		0.3					
		Replace		0.5					
	Vibration Mounts	Inspect	0.1						
		Replace		0.5					
46	Dehydrators Assy	Inspect			1.0				
		Service		1.0					
		Replace			1.5				
		Repair			2.0				
48	Condensate Unloader Valve Assy	Inspect		0.1					
		test		0.5					
		Adjust		0.5					
		Replace			1.0				
50	Moisture Separator Assy	Inspect		1.0					
		Service		1.0					
		Repair			1.5				
		Replace			2.0				
51	Air Receiver	Inspect		0.1					
		Test				1.0			
		Repair				1.0			
		Replace			1.0				
	Chassis Assy	Inspect	0.2						
		Repair		0.1					
		Replace				8.5			
	Tires	Inspect	0.5						
		Service	0.5						
		Replace		1.0					
		Repair		1.0					
52	Fuel Tank Assy	Inspect	0.1						
		Service	0.1						
		Replace			1.0				
		Repair			1.5				
	Filler Cap	Inspect		0.1					
		Replace		0.1					

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MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIP	(6) REMARKS
			C	O	F	H	D		
52	Neck	Inspect		0.1					
		Replace			2.0				
		Repair			0.5				
	Hose & Line	Inspect		0.1					
		Replace		0.2					
	Strap, Assy	Inspect		0.3					
		Replace		0.5					
		Repair		0.3					
53	Running Gear Assy	Inspect	0.5						
		Repair		1.0					
		Replace		1.0					
54	Wheel Assy	Replace		1.5					
	Wheel Hub & Seal	Inspect		0.5					
		Repair		0.5					
		Replace		0.5					
	Bearings	Inspect		0.5					
		Replace		1.0					
		Service		1.0					
55	Brake Assy	Inspect		0.5					
		Replace		0.5					
		Repair		1.5					
56	Battery & Hold Down Assy	Inspect		0.1					
		Test		0.2					
		Install		0.5					
		Replace		0.5					
	Cables, Battery	Inspect	0.1						
		Replace		0.3					
57	Service Hose & Fittings	Inspect	0.1						
		Test				1.0			
		Repair			1.0				
		Replace		0.3					

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Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

MAINTENANCE ALLOCATION CHART

(1) Tool or Test Equipment Reference Code	(2) Maintenance Category	(3) Nomenclature	(4) National/NATO Stock number	(5) Tool number
		Multimeter Tachometer	6615-00-581-2036 6680-00-892-1510	

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

Section I. INTRODUCTION

C-1. SCOPE

This appendix lists components of end item and basic issue items for the air conditioner to help you inventory items required for safe and efficient operation.

C-2. GENERAL

The Components of End Item and Basic Issue Items Lists are divided into the following sections:

a. Section II. Components of End Item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the air conditioner in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the air conditioner during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BI, based on TOE/MTOE authorization of the end item.

C-3. EXPLANATION OF COLUMNS

The following provides an explanation of columns found in the tabular listings:

a. Column (1) - Illustration Number (Illus Number). This column indicates the number of the illustration in which the item is shown.

b. Column (2) - National Stock Number. Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

c. Column (3) - Description. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number.

d. Column (4) - Unit of Measure (U/M). Indicates the measure used in performing the actual operation/- maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr).

e. Column (5) - Quantity required (Qty rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

Section II. COMPONENTS OF END ITEM

(1) Illus number	(2) National Stock number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
		20635-3-000651 Service Hose and Fitting FSCM 57328			1
		MA-2 82990 Dehydrators Cartridge			2
		2-K16C/2H16C Coupler Q-Disk 50992			1
		20635-1-00440 Air Chuck and Valve Assy 57328			1

Section III. BASIC ISSUE ITEMS

(1) Illus number	(2) National Stock number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
		TM 5-4310-368-14			1
		LO 5-4310-368-12			1

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

D-1. SCOPE

This appendix lists additional items you are authorized for the support of the air conditioner.

D-2. GENERAL

This list identifies items that do not have to accompany the air conditioner and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA,

D-3. EXPLANATION OF LISTING

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name under the type document (i.e., CTA, MTOE, TDA, or JTA) which authorized the item(s) to you.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) Illus number	(2) National Stock number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
		10645-3-00-4555 57328 Compressor Valve Wrench		EA	1
	4210-00-555-8837	Fire Extinguisher		EA	1
	7520-00-559-9618	Cotton Duck Case		EA	1
	4240-00-022-2946	Protector, Aural		EA	1
	7510-00-889-3494	Log Book Binder		EA	1

APPENDIX E

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

E-1. SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the Air Conditioner. These items are authorized to you by CTA50-970, Expendable items (except Medical, Class V, Repair Parts, and Heraldic Items).

E-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 solder, Item 1, App. E").

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item.

c. Column (3) - National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

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 Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

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) Illus number	(2) National Stock number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty rqr
	6850-00-274-5421	Dry Cleaning Solvent P-D-680		Gal	

APPENDIX F

ILLUSTRATED LIST OF MANUFACTURED ITEMS

INTRODUCTION

The intent of this appendix is to include complete instructions for making items authorized to be manufactured or fabricated at organization level.

A part number index in alphanumeric order is provided for cross-referencing the part number of the item to be manufactured to the figure number which covers fabrication criteria.

All bulk material needed for manufacture of an item are listed by part number or specification number in a tabular list on the illustration.

There are no parts authorized to be manufactured or fabricated by organizational maintenance personnel.

GLOSSARY

A

AC - Alternating current.

ADJUST - To bring to a specified position or state.

ADVANCE - To move forward; to move ahead.

AH - Ampere/hour.

AIR RECEIVER - A tank for storage of compressed air.

ALINE - To bring into line, to line up, to bring into precise adjustment, correct relative position.

AMBIENT TEMPERATURE - Temperature of the air surrounding the equipment; atmosphere temperature.

ASSEMBLE - To fit and secure together several parts; to make or form by combining parts.

ASSURE - To make sure or certain.

B

BACK PRESSURE VALVE - Same as check valve.

BACKOFF - To cause to go in reverse or backward.

BALANCE - To equalize in weight, height, number, or proportion.

BE SURE - To confirm that a proper condition exists.

BLEED - To extract or let out some or all of a contained substance.

BLOW - To send forth air.

BTU - British Thermal Unit

C

CAUTION - A statement used to call attention to possible equipment damage.

CHECK - To examine for satisfactory accuracy, safety or performance; to confirm or determine measurement by use of visual or mechanical means.

CHECK VALVE - Permits flow in only one direction; prevents reverse flow.

CONDENSATE DRAIN VALVE - Valve used to drain oil and moisture from the oil/moisture seperator.

CORRECTIVE ACTION - To make or set right; to alter or adjust so as to bring to some standard or required condition.

CHARGE - To restore the active material in a storage battery by the passage of a direct current through in the opposite direction of discharge.

CHOKE - To enrich the fuel mixture of an engine by partially shutting the air intake of the carburetor.

CLAMP - To fasten or press two or more parts together so as to hold firmly.

CLEAR - To move people or objects away from.

CONTROL - To exercise directing influence over; to fix or adjust the time, amount, or rate.

CRACK - To open slightly, the throttle of an engine.

D

DC - Direct current.

DEHYDRATOR CARTRIDGE - A container filled with a chemical drying agent.

DIRECT SUPPORT MAINTENANCE - Maintenance performed on equipment which includes the removal, repair and installation of major components.

DISCONNECT - To open connections between, to separate keyed or matched equipment parts.

DISENGAGE - To release or detach interlocking parts; to unfasten.

DRAIN - To draw off liquid gradually or completely.

E

ENSURE - To make certain.

EXAMINE - To perform a critical visual observation or check for specific condition; to test the condition of.

G

GENERAL SUPPORT MAINTENANCE - Maintenance performed on equipment that is beyond the scope of tools, personnel and supplies normally available to using organization.

GPH - Gallons per hour.

GROUND - To connect a current, wire, or a piece of electrical equipment to land or other specified surface.

H

HOSE SERVICE VALVE - Used to turn the air pressure ON and OFF at the service end of the service hose.

I

INSPECT - To look for physical damage, listen for unusual noise or sounds, smelling for odors not normally associated with the equipment, and feeling for abnormal temperatures or vibration.

INTEGRAL - Formed as a unit with another part.

IDENTIFY - To establish the identity of.

IDLE - To run an engine under reduced power.

L

LUBRICATION POINT - A place where oil or grease is applied.

M

MAGNETO - A device to supply high voltage electrical power in proper sequence and time to the spark plugs.

MALFUNCTION - Failure to operate in the normal or usual manner.

MEASURE - To determine the dimensions, capacity, or amount by use of standard instruments or utensils.

N

NM - Newtons per square meter.

O

OIL MOISTURE SEPARATOR - Produces a centrifugal force within the unit which separates the liquid from the gas.

ORGANIZATIONAL IVIAINTENANCE - Maintenance performed on equipment while it is installed in its normal operating position.

OVERHAUL - The act of disassembling equipment units down to all removable parts; cleaning, inspecting, repairing, restoring and replacing if necessary; assembling, adjusting, alining, recalibrating, and verifying operational readiness by test or checkout; packaging for transportation and storage.

OPERATE - To control equipment in order to accomplish a specific purpose.

P

PERFORM - To do, carry out, bring about; to reach an objective.

PMCS - Preventive Maintenance checks and service.

PNEUMATIC - Compressed air.

PROTECTIVE SYSTEM - Installed components that will cause the equipment to shut down if certain faults occur in the equipment.

PSI - Pounds force per square inch.

PLUG IN - To attach or mate to a service outlet.

PRE-SET - To put in a desired position, adjustment of condition beforehand.

PRESSURIZE - To apply pressure within by filling with gas or liquid.

PREVENT - To keep from happening.

PURGE - To free of sediment or trapped air by flushing or bleeding.

R

REASSEMBLE - To refit and secure together the parts after they have been taken apart.

RELIEF VALVE - Spring loaded popper valve which will open at a preset pressure.

REMOVAL - To perform an operation necessary to take an equipment out of or off of the next larger assembly.

REPAIR - To restore damaged, wornout, or malfunctioning equipment to a serviceable, usable, or operable condition.

REPLACEMENT - To put something new in place of a lost or damaged part.

RPM - Revolutions per minute.

RAISE - To move or cause to be moved from a lower to a higher position.

READJUST - To adjust again, to move back to a specified condition.

REGULATE - To fix or adjust the time, amount of or rate of.

RELEASE - To unfasten or detach interlocking parts; to set free from restraint or confinement.

RESET - To put back into desired position, adjustment, or condition.

S

SCFM - Standard cubic feet per minute.

SERVICE - To perform operations such as clean-up, lubrication and replenishment to prepare a unit for use.

SOLENOID VALVE - Electrically operated valve.

SYSTEM - An independent group of components forming a unified whole.

SECURE - To make fast or safe.

T

TEST - To perform specified operations to verify operational readiness of equipment.

TROUBLESHOOT - To locate, isolate, and correct a malfunction or breakdown.

THROW - To move a switch so as to make or break a connection.

TUNE - To adjust for precise functioning.

TURN OFF - To shut off or stop.

TURN ON - To start, to cause to flow or operate.

V

V - Volts or Voltage.

VERIFY - To confirm or establish that a proper condition exists.

W

WARNING - A statement used to call attention to possible personnel injury or loss of life if safety precaution is not observed.

ALPHABETICAL INDEX

ALPHABETICAL INDEX - Continued

ALPHABETICAL INDEX - Continued

ALPHABETICAL INDEX - Continued

ALPHABETICAL INDEX - Continued

ALPHABETICAL INDEX - Continued

By Order of the Secretary of the Army:

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

Official:

ROBERT M. JOYCE
Brigadier General, United States Army
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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
acres
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47

1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

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