TECHNICAL MANUAL

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

COMPRESSOR, AIR, RECIPROCATING ELECTRIC MOTOR DRIVEN, RECEIVER MOUNTED, 5 CFM AT 175 PSI CHAMPION PNEUMATIC MACHINERY CO., INC.

MODEL NO. HR2-6M-2
NSN 4310-01-054-6647

HEADQUARTERS, DEPARTMENT OF THE ARMY
31 DECEMBER 1979

WARNING

Death or severe injury to personnel or damage to property may result if personnel fail to observe safety precautions.

WARNING

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Use in a well ventilated area as the fumes are dangerous if inhaled. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 138°F. (38°C -59°C.).

WARNING

Compressed air and electricity are dangerous. Before performing any maintenance or adjustments, be sure the electrical power has been turned off. Never depend on the ON-OFF switch. Turn power off at the source.

WARNING

Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained professional.

Technical Manual

No. 5-4310-358-14

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 31 December 1979

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COMPRESSOR, AIR, RECIPROCATING, ELECTRIC MOTOR DRIVEN, RECEIVER MOUNTED, 5 CFM AT 175 PSI CHAMPION PNEUMATIC MACHINERY COMPANY MODEL NO. HR2-6M-2 NSN 4310-01-054-6647

REPORTING OF 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), or DA Form 2028-2 located in the back of this manual direct to: Commander, U. S. Army Troop Support & Aviation Materiel Readiness Command, ATTN: DRSTS-MTPS, 4300 Goodfellow Boulevard, St. Louis, MO 63120. A reply will be furnished directly to you.

LIST OF ILLUSTRATIONS

LIST OF TABLES

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope.

a. This manual is for your use in operating the air compressor, Model HR2-6M-2. It provides information on the operation, organizational, direct support, and general support maintenance of the air compressor, as well as a description of the main units and their functions in relation to the other components.

b. Appendix A contains a list of publications applicable to this manual. Appendix B contains the Maintenance Allocation Chart.

1-2. Maintenance Form and Records. Equipment maintenance forms and procedures for their use are contained in TM 38-750, The Army Maintenance Management System (TAMMS).

1-3. Reporting Equipment Improvement Recommendations (EIR). If your 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 a SF 368 (Quality Deficiency Report). Mail it to us at: U. S. Army Troop Support and Aviation Material Readiness Command, ATTN: DRSTS-MEM, 4300 Goodfellow Boulevard, St. Louis, MO 63120. We'll send you a reply.

1-4. Destruction of Army Materiel to Prevent Enemy Use.

a. Demolition of Air Compressors. Methods of destruction should achieve such damage to equipment and repair parts that it will not be possible to restore the equipment to a usable condition in the combat zone either by repair or cannibalization.

(1) Mechanical destruction. Using an axe, pick, mattock, sledge, or any other heavy implement, damage all vital elements.

(2) Explosives. Place 1/2-pound charges on the following for demolition with explosives.

(a) One 1/2-pound charge between the compressor and the air receiver tank.

(b) One 1/2-pound charge between the motor and the air receiver tank.

b. For additional data procedures for destruction of equipment to prevent enemy use, refer to TM 750-244-3.

1-5. Administrative Storage.

a. Storage Site.

(1) Select the best available site for administrative storage. Separate stored equipment from equipment in use. Conspicuously mark the area “Administrative Storage".

(2) Covered space is preferred. When sufficient covered space for all items to be stored is not available, priority should be given to items which are most susceptible to deterioration.

(3) Open sites should be improved hard-stand, if available. Unimproved sites should be firm, well-drained, and kept free of excess vegetation.

b. Storage Plan.

(1) Store equipment so as to provide maximum protection from the elements and to provide access for inspection, maintenance, and exercising. Anticipate removal or deployment problems and take suitable precautions.

(2) Take into account environmental conditions, such as extreme heat or cold; high humidity; blowing sand, dust, or loose debris; soft ground; mud; heavy snows; earthquakes; or combinations thereof and take adequate precautions.

(3) Establish a fire plan and provide for adequate fire fighting equipment and personnel.

(4) For further information, refer to TM 740-90-1 (Administrative Storage).

Section II. DESCRIPTION AND DATA

1-6. Description.

a. The HR2-6M-2 (Fig. 1-1 and 1-2) is a two cylinder, reciprocating type air compressor capable of delivering 5 cubic feet per minute (0.1415 cu meters per min). The compressor assembly and associated electric motor are mounted on a frame which is welded to the air receiver, and 60 gallon steel tank. The electric motor drives the compressor assembly by means of a matched pair of V-belts.

The pressure switch assembly determines cut-in and cut-out pressure for the compressor assembly. The switch can be adjusted for cut-out pressures over the range of 165 to 190 psi (11.60 to 13.36 kgs per sq cm). The switch can also be adjusted for a 25 psi to 65 psi (1.76 to 4.57 kgs per sq cm) differential between cut-in and cut-out pressure. The safety valve assembly releases when air receiver pressure exceeds 200 psi (14.06 kgs per sq cm).

b. The maintenance paragraphs of this manual contain detailed descriptions of its components.

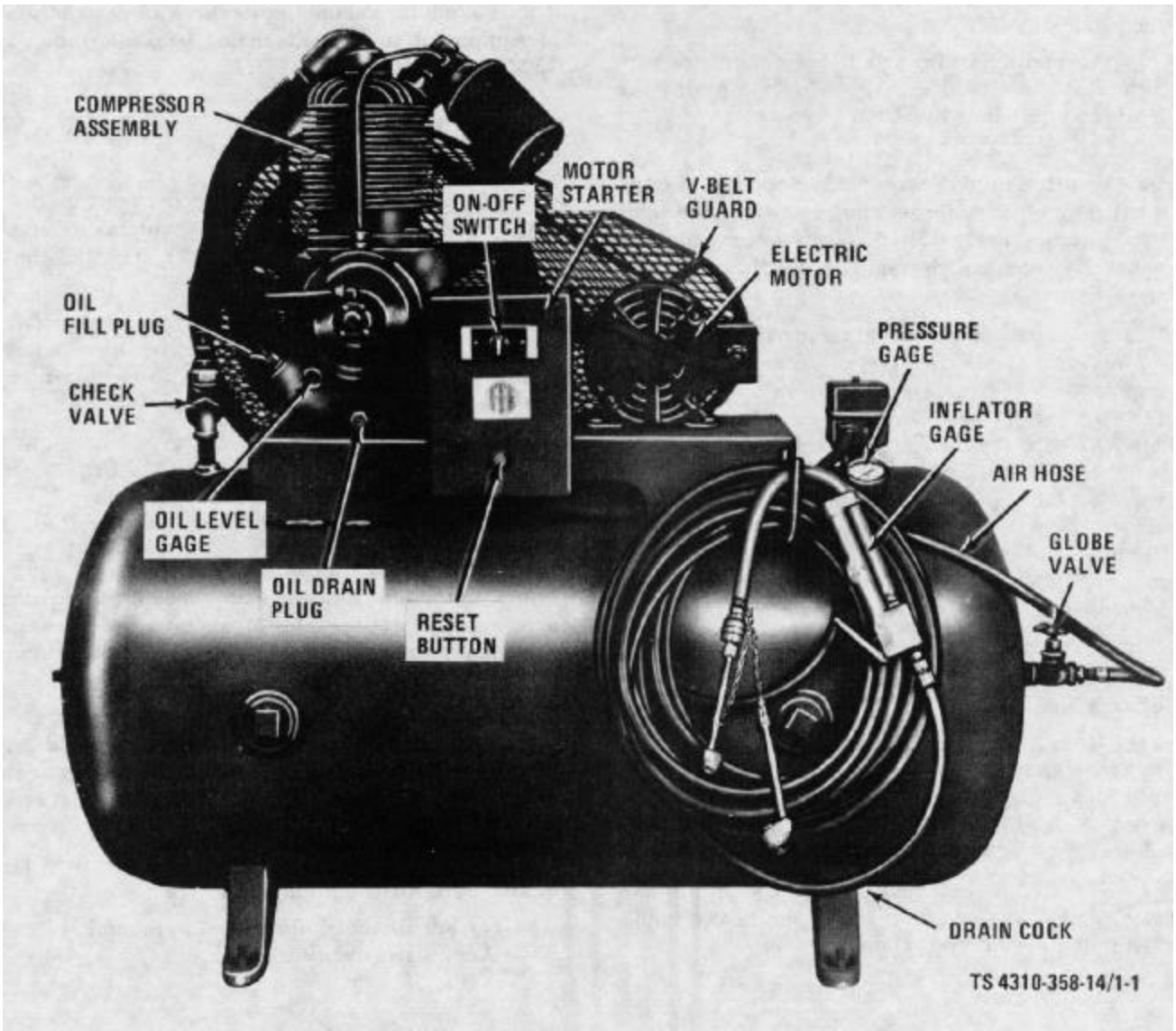


Figure 1-1. Air Compressor, right side view.

1-7. Identification.

a. Identification plate mounted on the top of the air receiver platform of the air compressor, specifies the name of the manufacturer, make, model number, date of manufacture, serial number, and National stock number.

b. The compressor identification plate mounted on the governor housing, specifies the name of the manufacturer and the model and serial numbers of the compressor.

c. The electric motor identification plate mounted on the electric motor housing, specifies the name of the manufacturer, model number, and data.

1-8. Differences in Models. This manual covers only the Champion Pneumatic Model HR2-6M-2 air compressor. No known unit differences exist for the model covered in this manual.

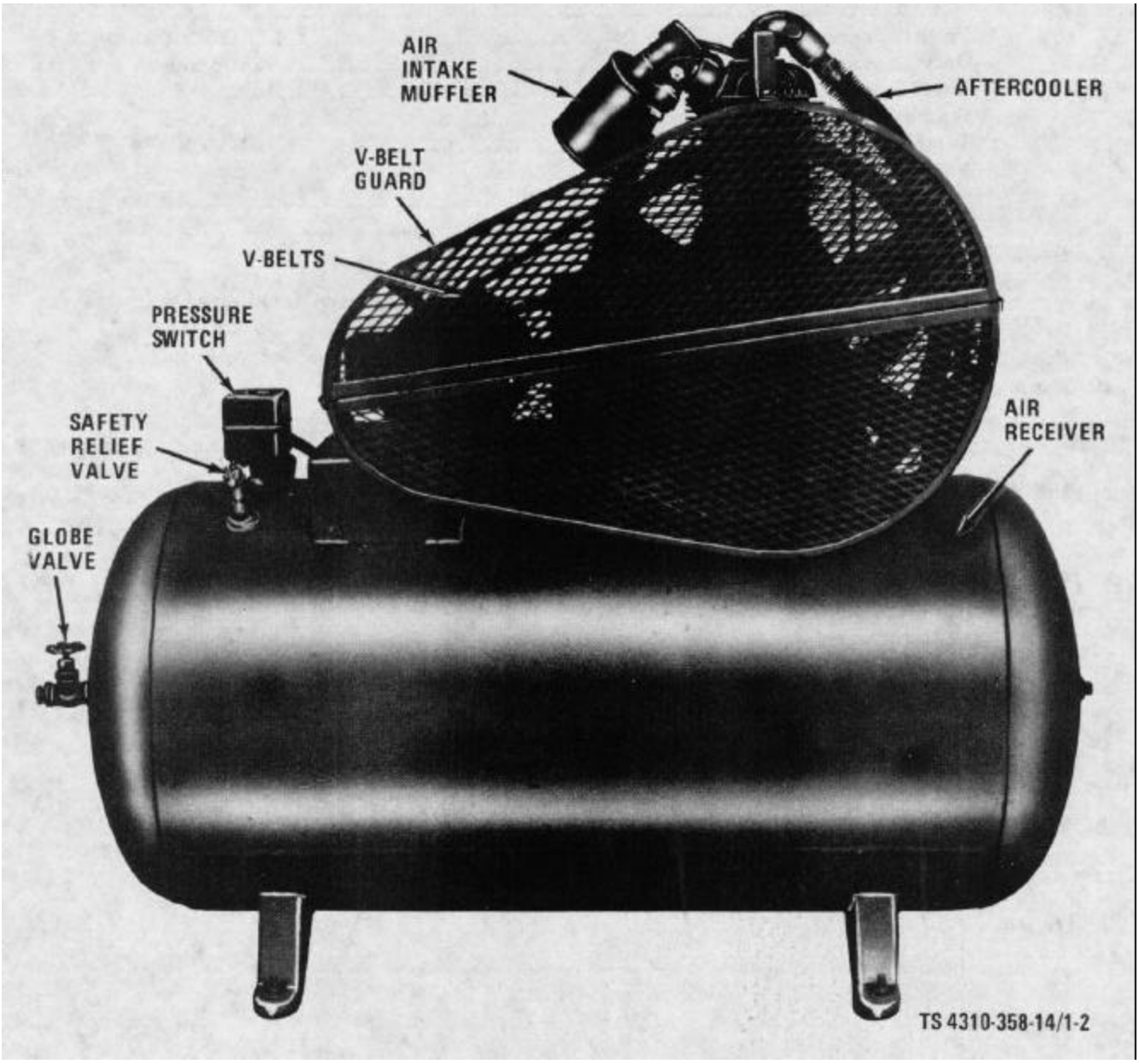


Figure 1-2. Air Compressor, left side view.

1-9. Tabulated.

a. General.

Manufacturer ..... Champion Pneumatic Machinery Co.
Model HR2-6M-2
Output ..... 5 cfm at 175 psi
(0.14 cu m/minute at 12.30 kgs per cm)

b. Electric Motor.

Manufacturer ..... Doerr Electric Corporation
Model 60520200
Type ..... TD
Hertz 60
Phase 1
Horsepower 2
Volts 115/230
Duty ..... Continuous
Rated speed 1800
Frame ..... 145 T
Temperature rise 104F (40C)
Amperes:
At 115 volts 2.5
At 230 volts 12.5

c. Compressor.

Manufacturer ..... Champion Pneumatic Machinery Co.
Model R-10B
Type ..... 2-stage vertical

d. Compressor Air Cleaner.

Manufacturer ..... Champion Pneumatic Machinery Co.
Type ..... Dry

e. Magnetic Starter Switch Assembly.

Manufacturer ..... I-T-E Imperial Corporation
Style A202C12C1

f. Pressure Switch.

Manufacturer ..... Furnas Electric
Type 69HA1
Maximum pressure ..... 250 psi
Minimum differential ..... 40 psi
(2.81 kgs per sq cm)

g. Capacities.

Compressor crankcase ..... 2 qt. (1.9L)
Air receiver tank ..... 8.02 cu ft. (0.23 cu m)

h. Air Receiver.

Manufacturer ..... Buckeye
Working pressure ..... 200 psi (1406 kgs per sq cm)

i. Air Hose.

Size ..... 5/16 in. x 50 ft.

j. Dimensions and Weight.

Shipping weight	520 lbs. (236 kg)
Shipping cube	50 cu ft. (1.42 cu m)
Length	51 in. (129.5 cm)
Height	44 in. (111.8 cm)
Width	23 in. (58.4 cm)
Net weight	405 lbs. (184 kg)

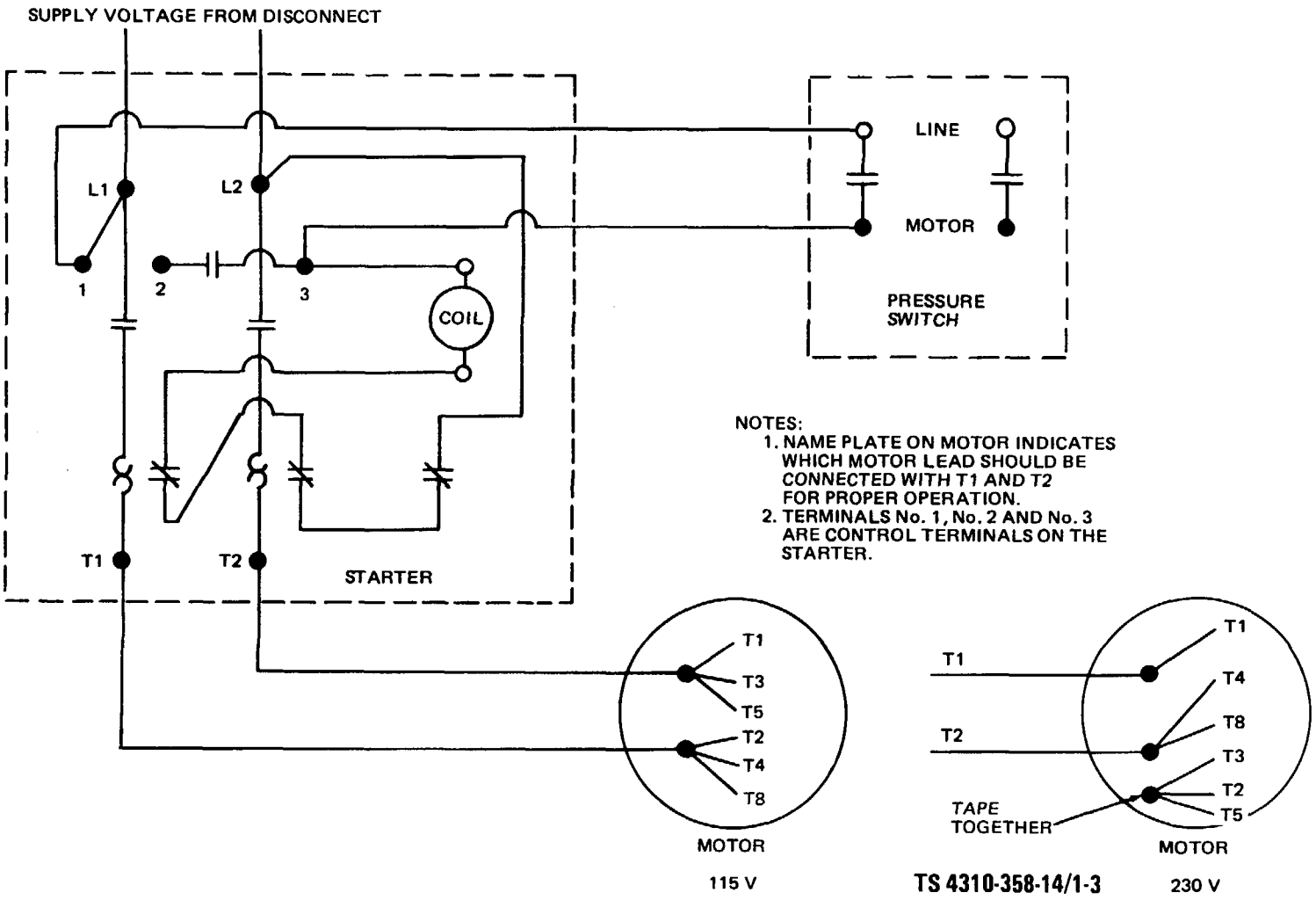


Figure 1-3. Wiring diagram.

CHAPTER 2
OPERATING INSTRUCTIONS

WARNING

If equipment fails to operate, refer to troubleshooting procedures in Chapter 3.

Section I. OPERATING PROCEDURES

2-1. Controls and Instruments.

a. General. This section describes, locates, illustrates and furnishes the operator sufficient information pertaining to the various controls and instruments provided for the proper operation of the air compressor.

b. Globe Valve. The glove valve (fig. 1-1) mounted on the end of the air receiver tank is a manually operated valve that opens the flow of compressed air to the air hose.

c. Drain Cock. The drain cock (fig. 1-1) mounted on the underside of the air receiver tank is a manually operated valve used to drain compressed air and condensation from the air receiver tank. Receiver should be drained daily when the air compressor is in use.

d. Oil Level Gage. The oil level gage (fig. 1-1) mounted in the compressor crankcase is a direct reading, glass covered gage used to check the level of the oil in the compressor crankcase.

e. Air Receiver Tank Pressure Gage. The air receiver tank pressure gage (fig. 1-1) mounted on the side of the air receiver tank, is a needle-indicating, direct-reading, pressure-operated gage graduated in pounds per square inch (psi) and kilograms per square centimeter (kgs per sq cm), the gage is graduated from 0 to 300 psi in increments of 5 psi, and from 0-21.1 kgs sq cm in increments of 50 centimeters. The gage indicates the air pressure in the air receiver tank. Normal operating pressure is 165 psi (11.60 kgs per sq cm) to 190 psi (13.36 kgs per sq cm).

f. Safety Relief Valve. The safety relief valve (fig. 1-2) is mounted on top of the air receiver tank at the motor end. It is a preset valve that is actuated when the air receiver tank receives a pressure of 200 psi (14.06 kgs per sq cm) or more. This valve can be tripped manually by pulling up on the ring at the end. It is manually tripped to release pressure in the air receiver tank and to test the valve.

g. ON-OFF Starter Switch. The on-off starter switch (fig. 1-1) is a manually actuated switch located top center of the motor starter box cover. In OFF position the compressor motor will not operate. When the selector is turned to ON position the compressor will operate until pressure in air receiver tank reaches 190 psi (13.36 kgs per sq cm) then the pressure switch automatically shuts-off the motor. The compressor will recycle again automatically when pressure drops below 165 psi (11.60 kgs per sq cm) and continue to cycle automatically in this ON position.

h. Reset Button. The reset button (fig. 1-1) mounted on the cover of the magnetic starter, below the ON-OFF switch, is a manually operated button, which when pushed, resets the thermal relay in the magnetic starter.

i. Pressure Switch. The pressure switch (fig. 1-2) is mounted on the top of the air receiver tank at the motor end. It automatically shuts off the motor when the pressure in the air receiver tank reaches 190 psi (13.36 kgs per sq cm). The pressure switch will automatically recycle the compressor when the pressure drops below 165 psi (11.60 kgs per sq cm).

j. Inflator Gage. The inflator gage (fig. 1-1) controls and indicates the amount of air being discharged.

2-2. Operation Under Usual Conditions.

a. General. The instructions in this section are published for the operation of the air compressor. It is essential that the operator know how to perform every operation of which the air compressor is capable. This section gives instructions on starting and stopping, and air-pressure adjustment.

b. Starting.

(1) Inspect the electric motor to make sure it is properly wired from incoming power source and that power is on.

(2) Turn ON-OFF switch (fig. 1-1) to "ON" position.

NOTE

Should the compressor fail to start, depress the reset button (fig. 1-1).

c. Stopping.

(1) Close glove valve (fig. 1-2).

(2) Turn ON-OFF switch (fig. 1-1) to "OFF" position.

(3) Open the drain cock (fig. 1-1) in the bottom of air receiver tank to release the compressed air and condensation from the air receiver tank.

Section II. OPERATION UNDER UNUSUAL CONDITIONS

2-3. Operation in Extreme Cold (Below 0° F.) (-18 C).

a. Locate the air compressor in a shed or building whenever possible. If the unit is operated outdoors, protect it from prevailing winds and cover it with a tarpaulin when not in use.

b. Lubricate the air compressor according to the lubrication order.

c. Avoid excessive handling, kinking, and sharp bending of the air hose, which will become brittle at low temperature.

d. Clean and tighten all wiring connections. Make sure there are no short circuits. As wiring insulation tends to become brittle at low temperatures, avoid excessive handling and sharp bending of wires. Protect the electric motor and magnetic starter from snow and ice.

CAUTION

Drain the air receiver tank after operating the air compressor to prevent freezing of condensation.

2-4. Operation in Extreme Heat.

a. Locate the air compressor in an operating area that is well ventilated or provide intake and exhaust fans to ventilate enclosed areas.

b. Lubricate the compressor in accordance with the lubrication order.

c. Check the drive-belt tension frequently. Improper drive-belt tension often results in overheating.

d. Keep the electric motor, compressor, and air receiver tank clean.

2-5. Operation in Dusty or Sandy Areas.

a. Lubricate the air compressor in accordance with the lubrication chart, making sure that all lubrication points are free from dirt and sand before applying lubricant. Keep all lubricant containers clean and tightly closed. Do not lubricate excessively as dirt and sand will adhere to excess lubricant and may work into moving parts. Wipe off all lubrication points after lubricating.

b. Keep the motor, magnetic starter, compressor, and air receiver tank free from accumulations of dirt and sand. Use compressed air for cleaning or a stiff brush where deposits are oily, gummy, or heavy.

c. Protect the air compressor from dust with screens, shelters built from tarpaulins, or other dust proof material. Keep the unit covered when not in use.

d. Clean the compressor air cleaner more often than when operating under normal conditions.

2-6. Operation in Salt Water or High Humidity Areas.

a. Protect the unit with a shelter of some kind. Keep the sides of the shelter open for ventilation.

b. Wipe the unit dry at frequent intervals, with particular emphasis on the electric motor and magnetic starter. If the unit becomes encrusted with salt, wash it with fresh water, taking care not to damage the electrical system with water.

c. Make sure all surfaces requiring lubrication are clean and dry before applying lubricant. Lubricate the unit in accordance with the lubrication order.

d. Coat exposed polished or machined metal surfaces with a suitable rustproof material after first removing accumulations of rust.

e. Open the drain cock frequently to blow condensate from the air receiver tank.

CHAPTER 3
OPERATOR/CREW MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION INSTRUCTIONS

3-1. General Instructions.

a. The electric motor used on the air compressor has been factory lubricated for its lifetime.

b. Check compressor crankcase oil level frequently, since excessive oil consumption is the principal method of determining compressors need for repairs.

3-2. Lubrication Instructions.

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

b. Cleaning. Wipe lubricating points free of dirt. Clean lubrication points after lubricating to prevent accumulation of foreign matter.

c. Service. Service lubrication points at proper intervals as shown in LO-5-4310-358-12.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-3. General. To insure that the air compressor is ready for operation at all times, you must inspect it systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services to be performed by you are listed in Table 3-1. The sequence number indicates the order in which you should perform the preventive maintenance checks and services. You shall record all deficiencies together with the corrective action taken on DA Form 2404 (Equipment Inspection and Maintenance Worksheet).

3-4. Preventive Maintenance Checks and Services. Refer to Table 3-1 for a listing of preventive maintenance checks and services which must be performed by the operator/crew.

WARNING

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Use in a well ventilated area as the fumes are dangerous if inhaled. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° F. - 138° F. (38° C. 59° C.).

WARNING

Compressed air and electricity are dangerous. Before performing any maintenance, or switch. Turn power off at the source.

LUBRICATION ORDER **LO 5-4310-358-12**

COMPRESSOR, AIR, TANK MOUNTED, ELECTRIC MOTOR DRIVEN, 5 CFM AT 175 PSI CHAMPIOM MODEL NO. HR2-6M-2 (4310-01-054-6647)

Intervals and related task-hour times are bases on normal hours of operation. The task-hour time specified is the time you need to do all the services prescribed for a particular interval. Change the interval if your lubricants are contaminated or if you are operating the equipment under adverse operating conditions, including longer-than-usual operating hours. You may extend the interval during periods of low activity, but you must take adequate preservation precautions.

*The time specified is the time required to perform all services at the particular interval.

Clean fittings before lubricating. Relubricate all areas exposed to water after amphibious operation. Lubricate points indicated by dotted arrow shaft on both sides of equipment. Clean parts with SOLVENT, dry cleaning, or with OIL, fuel, diesel. Dry before lubricating. Drain crankcases when HOT. Fill and check level. The lowest level of maintenance authorized to lubricate a point is indicated by one of the following: (c) operator/crew, or (O) organizational maintenance.

FOLD FOLD

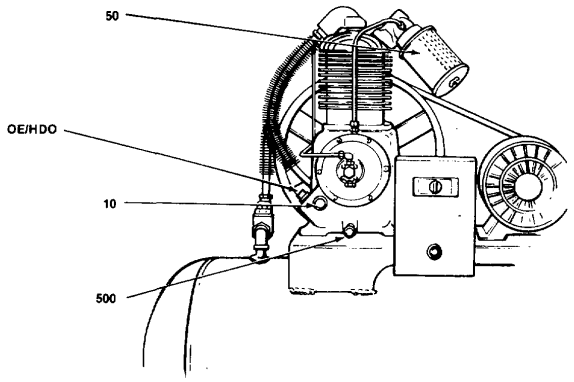
LUBRICANT • INTERVAL

Air intake Muffler Disassemble, Clean and Reassemble — 50

Oil Filler Cap (See Key) — OE/HDO

Oil Level Sight Gage (Check Level and add oil to full mark) — 10

Oil Drain Cap (Drain and Refill) (See Note 1) — 500



*TOTAL TASK HOURS		*TOTAL TASK HOURS	
INTERVAL	TASK HOURS	INTERVAL	TASK HOURS
10	0.1	500	0.5
50	0.25		

Figure 3-1. Lubrication Order (Sheet 1 of 2)

KEY

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above +32°F Above 0°C	+40°F to 10°F +5°C to 23°C	0°F to 65°F 18°C to 50°C	
OE/HDO, Lubricating Oil, Engine, Crankcase MIL-L-2104	2 qt. (1.9L)	10W30			Intervals given are in hours of normal operation.

NOTES:

1. CRANKCASE DRAIN. Remove plug and drain, Replace plug. Refill crankcase with proper grade OE/HDO to full mark on oil sight gage.

2. LUBRICANTS. The following is a list of lubricants with the Military Symbols and applicable specification numbers. OE/HDO MIL-1-2104.

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

BY ORDER OF THE SECRETARY OF THE ARMY:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

OFFICIAL:

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

FOLD FOLD

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Figure 3-1. Lubrication Order (Sheet 2 of 2)

STS Form 2273
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Previous edition is obsolete

Table 3-1. Operator/Crew Preventive Maintenance Checks and Services

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

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

Item No.	Interval B	D	A	W	M	C	Item to be Inspected	Procedures Check For And Have Repaired Or Adjusted As Necessary.	For Readiness Reporting, Equipment Is Not Ready/Available If:
1	•	•	•				**Compressor**	Evidence of lubricant leaks.	
2	•						**Oil Level Gage**	Check oil level in crankcase, fill to full mark on oil level gage. Refer to LO 5-4310-358-12.	
3	•					•	**Switches and Controls**	Check for loose wires on motor and switches.	Wires are disconnected.
4	•					•	**Drive Belts**	Inspect for worn or broken belts	Belts are broken.
5	•					•	**Hoses and Fittings**	Inspect hoses and fittings for damaged or loose connections.	Hoses are broken.
6	•					•	**Pressure Gage**	Watch pressure gage reading when motor starts and stops. Motor should stop when gage reads 190 psi & start at 165 psi.	Pressure gage does not start and stop motor.
7	•					•	**Safety Valve**	Test by pulling up on ring attached to lever on safety valve until you hear air escape.	Safety does not actuate at 200 psi.
8	•					•	**Cleanliness of equipment**	Wipe grease and oil from compressor belt guard, motor, V-belt and receiver.	

Section III. TROUBLESHOOTING

3-5. Scope. This section contains troubleshooting or malfunction information and tests for locating and correcting most of the troubles which may develop in the air compressor. Each malfunction or trouble symptom for an individual component, unit, or system is followed by a list of tests or inspections necessary for you to determine probable causes and suggested corrective actions for you to remedy the malfunction.

3-6. Troubleshooting.

a. This manual cannot list all possible malfunctions that may occur or all tests or inspections, and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, you should notify higher level maintenance.

b. Table 3-2 lists the common malfunction that you may find during the operation or maintenance of the air compressor or its components. You should perform the tests, inspections and corrective actions in the order listed.

NOTE

Before you use this table, be sure you have performed all applicable operating checks, table 3-1.

Table 3-2. Troubleshooting.

	MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1.	Compressor Pumping Oil	Step 1. Check for a clogged muffler intake filter.	a. Service the muffler intake filter (para 3-11).
		Step 2. Check oil level.	The oil level gage mounted in the compressor crankcase (fig. 1-1) is a direct-reading, glass covered gage used to check the level of the oil in the crankcase. If the oil level is low, remove the oil fill plug (fig. 1-1) and fill with OE/HD 10W 30 lubrication oil, to the full mark on the oil sight gage. Replace the fill plug.
2.	Knocks or Rattles	Step 1. Check for loose, damaged belts or pulleys.	Notify organizational maintenance.
		Step 2. Check for leaking valves, or restricted air passages.	Notify organizational maintenance
3.	Air Delivery Dropping	Step 1. Check for a clogged muffler intake filter.	a. Service the muffler intake filter (para 3-11).
4.	Excessive Starting and Stopping	Step 1. Check the receiver.	Drain the air receiver. a. Turn ON-OFF switch to OFF. b. Open draincock at the bottom of the air receiver (fig. 3-3) under the service line. c. When the air has escaped, leave draincock open for a few minutes for more of condensate to escape. d. Close draincock. e. Be sure that cleaning material and tools have been removed from the air receiver. f. Move the ON-OFF switch to ON.
		Step 2. Check for air leaks in the piping.	a. Make a solution of soapy water. b. Apply to the fittings. If a leak is present it will be indicated by the soapy water bubbling. c. If a leak is found, notify organizational maintenance.

Table 3-2. Troubleshooting (Con't).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 3. Pressure switch not set properly.	The pressure switch assembly determines cut-in and cut-out pressure for the compressor assembly. The switch can be adjusted for cut-out pressures over the range of 140 to 175 psi. The switch can also be adjusted for a 25 to 65 psi differential between cut-in and cut-out pressure. The safety valve assembly releases when the air receiver pressure exceeds 200 psi. If the pressure switch is not operating properly, notify Organizational Maintenance.
5. Compressor Running Hot	Step 1. Check for blockage of air to fan wheel.	Remove any object that is blocking the air passage. Use compressed air to remove any accumulation of dust or dirt.
	Step 2. Check oil level.	Refer to paragraph 1, step 2 for checking oil level.
	Step 3. Check for a clogged muffler intake filter.	a. Service the muffler intake filter (para 3-11).
6. Compressor Running Slow	Check motor terminal board for loose connections.	a. Tighten loose connections. b. Clean the terminal board with compressed air.

NOTE

If you have a malfunction which is not listed in this table, notify the next higher level of maintenance.

Section IV. MAINTENANCE PROCEDURES

3-7. Belt Guard Assembly.

a. General. The belt guard assembly (fig. 3-2) is a two piece guard that totally encloses the drive belts and pulleys. The mesh screening covers the flywheel fan used to circulate air for cooling the compressor unit.

b. Inspection. Inspect the guard for damage to the screen or panels. Check for accumulation of grease, dirt, or foreign matter.

WARNING

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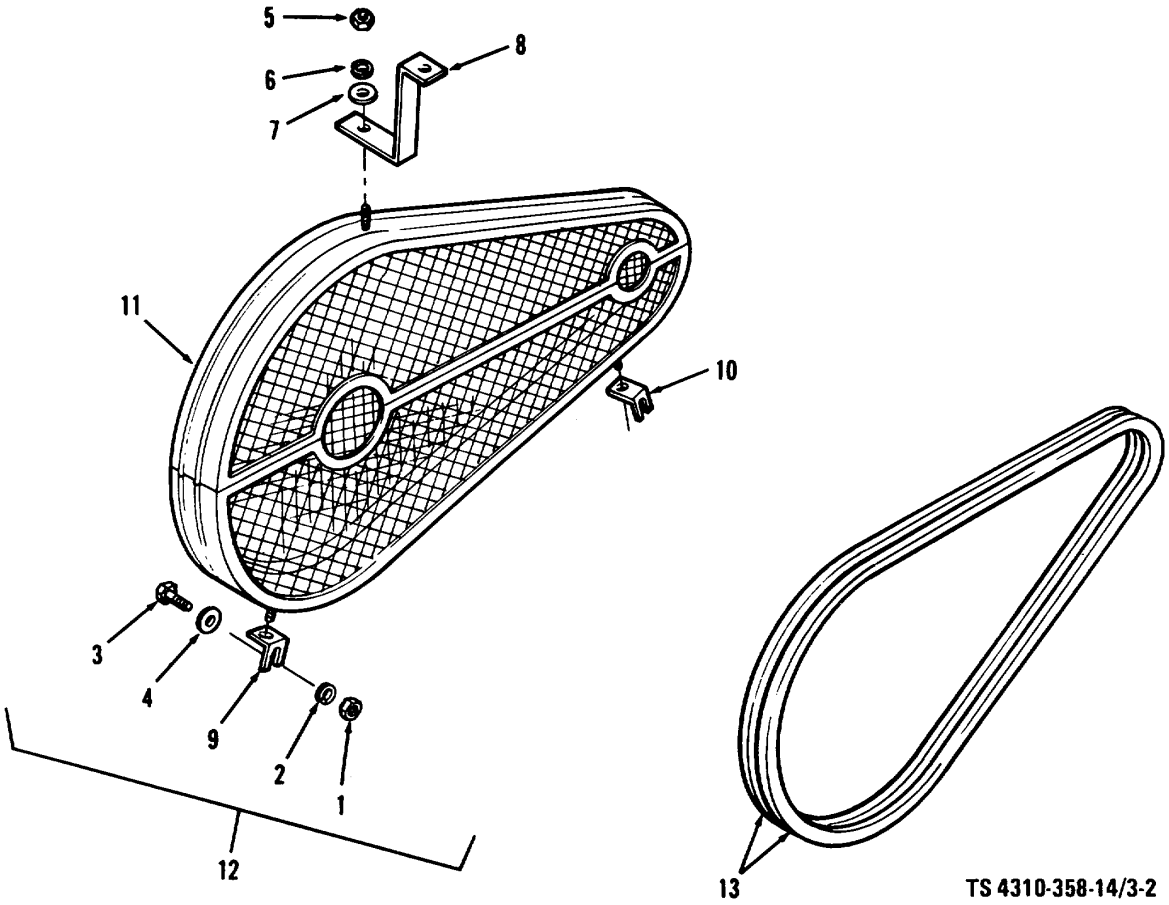
c. Cleaning. Clean the belt guard with a rag dipped in cleaning solvent, P-D-680, and dry thoroughly.

3-8. Motor.

a. Cleaning.

(1) Remove dust and dirt from the motor with compressed air.



1. Nut, hex (2)
2. Lockwasher
3. Capscrew (2)
4. Washer, flat (2)
5. Nut, hex (3)
6. Lockwasher (3)
7. Washer, flat (3)
8. Bracket
9. Bracket
10. Bracket
11. Guard, belt
12. Belt guard assembly
13. V-belts

Figure 3-2. Belt guard assembly.

(2) Use a rag which has been dampened in cleaning solvent, P-D-680, to wipe off the motor.

b. Inspection.

(1) Inspect the shaft for movement (end play).

(2) Notify organizational maintenance of a defective motor or shaft.

3-9. V-Belts.

a. Inspection.

(1) Make a visual inspection of the belts to determine their conditions.

(2) If the belts are bad, notify organizational maintenance.

b. Cleaning.

WARNING

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(1) Use a cloth dampened in cleaning solvent, P-D-680, to remove oil and dust from the belts.

(2) If the belts have become saturated with oil and dirt, notify organizational maintenance.

3-10. Air Compressor.

a. General. The compressor unit must be kept clean and lubricated at all times. If the compressor is allowed to become dirty it will run hot. Excessive heat will consume the compressor oil. Low oil causes the rings to wear, or cylinder scoring. Therefore, frequent inspections are necessary.

b. Inspection.

(1) Visually inspect relief valve signs of leaking.

(2) Check safety relief valve signs of leaking.

(3) Listen for excessive start-stop cycling.

(4) Listen carefully for a knock or rattle that might indicate internal damage.

(5) If any of the troubles listed in paragraphs 3, 4, and 5 are found, notify organizational maintenance.

3-11. Air Intake Muffler.

a. General. The air intake muffler is designed to clean the air entering the first stage cylinder. Should the operating area be exceptionally dusty, the muffler must be serviced more frequently. A clogged intake muffler reduces the efficiency of the compressor.

b. Cleaning and Inspection.

WARNING

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Use in a well ventilated area as the fumes are dangerous if inhaled. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° F. - 138° F. (38° C. - 59° C.).

(1) Use a rag which has been dampened in cleaning solvent, P-D-680, to wipe off the filter muffler.

(2) Inspect the filter muffler for damage or missing parts. If damage or missing parts are found, notify organizational maintenance.

(3) Service the filter muffler as follows:

(a) Remove wingnut (1, fig. 3-3).

(b) Remove cover lower (2).

(c) Remove plate (6).

(d) Remove element (4).

(e) Remove screen (3).

(4) Reassemble the air filter muffler as follows:

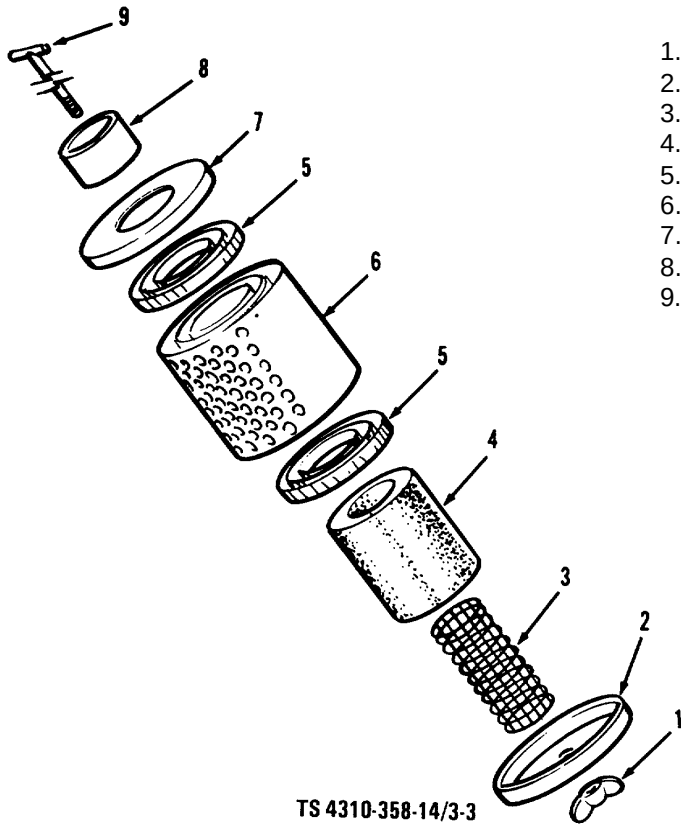
(a) Install the screen (3, fig. 3-3).

(b) Install the plate on the T-stud (9).

(c) Install cover lower (2) on the T-stud and secure with wingnut (1).

3-12. Air Receiver.

a. General. The air receiver stores compressed air at a pressure between 165 and 190 psi, (11.60 and 13.36 kgs per sq cm). Compressed air, moving from first stage to second stage of the compressor through the intercooler tube, then through the aftercooler tube to the air receiver tank, carries moisture (condensate) into the receiver. Frequent inspection and service is necessary.



1. Nut, wing
2. Cover, lower
3. Screen
4. Element
5. Separator
6. Ferrule
7. Cover, upper
8. Ferrule
9. T-stud

Figure 3-3. Air intake muffler

b. Inspection.

(1) Inspect the receiver for excessive accumulation of dust, and leaking or spilled oil.

(2) Check air lines and the service line for leaks. Tighten loose connections.

c. Cleaning.

(1) Use compressed air to blow dust off the receiver.

WARNING

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Use in a well ventilated area as the fumes are dangerous if inhaled. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat.

Flash point of solvent is 100° F. - 138° F. (38°C. - 59°C.).

(2) Use a rag which has been dampened with cleaning solvent, P-D-680, to remove all oil spots, then dry thoroughly, to avoid further accumulation.

d. Draining Condensate from Receiver.

(1) Turn ON-OFF switch to OFF.

(2) Open draincock at bottom of the air receiver tank (fig. 3-2) under the service line.

(3) When the air has escaped, leave draincock open for a few minutes to allow more of condensate to escape.

(4) Close draincock.

(5) Be sure that all rags, tools, etc., have been removed from the air receiver, then move the ON-OFF switch to ON

CHAPTER 4
ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIAL

4-1. Unloading the Air Compressor.

a. Remove tie-downs and blocking that secure the crate to carrier. Refer to figure 4-1.

b. A forklift truck, pipe rollers, or a suitable hoist must be used when removing the air compressor from the carrier. When using a hoist, center the lifting hook above the center of the crate; place slings about ten inches in from both ends of the crate, and lift the unit from the carrier.

4-2. Unpacking the Air Compressor.

a. Place the crated air compressor as close to the point of installation as possible. Remove the crate from the base being careful not to damage the air compressor while removing the crate. Remove the air hose, electric cable, tire gage, and publications. Remove the compressor from the base.

b. Remove the tape and protective covering from electric motor, compressor, and air receiver tank.

4-3. Inspection and Servicing Equipment.

a. Make a thorough inspection of the air compressor for any loss or damage that may have occurred during shipping or handling.

b. Inspect for dents, breaks, loose mounting bolts or other defects. Inspect for loose connections, damaged wiring or other defects.

c. Turn over the electric motor and compressor several times to be sure the motor and compressor do not bind. Prepare a written report of all damage incurred as a result of shipping or vandalism. Report any unrepairable damage immediately to the proper authority.

4-4. Installation of Separately Packed Components. Connect air hose (fig. 4-2) to globe valve assembly and connect inflator gage assembly to air hose.

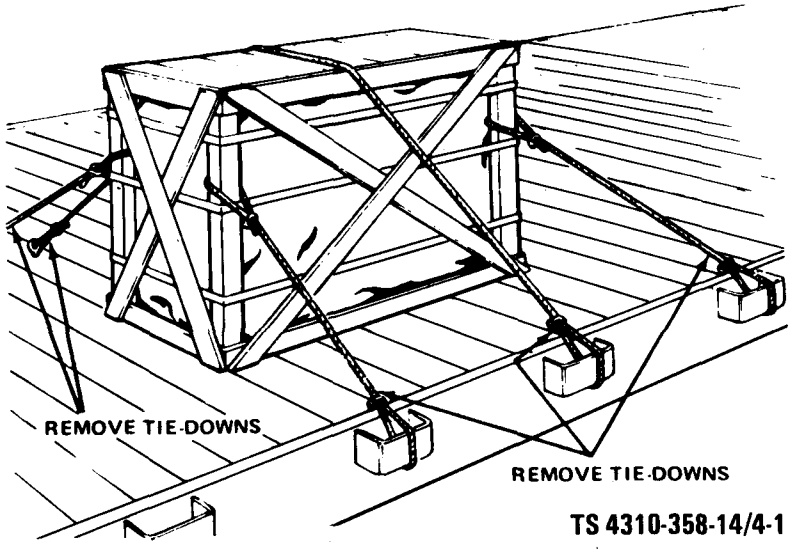


Figure 4-1. Shipping tie-downs.

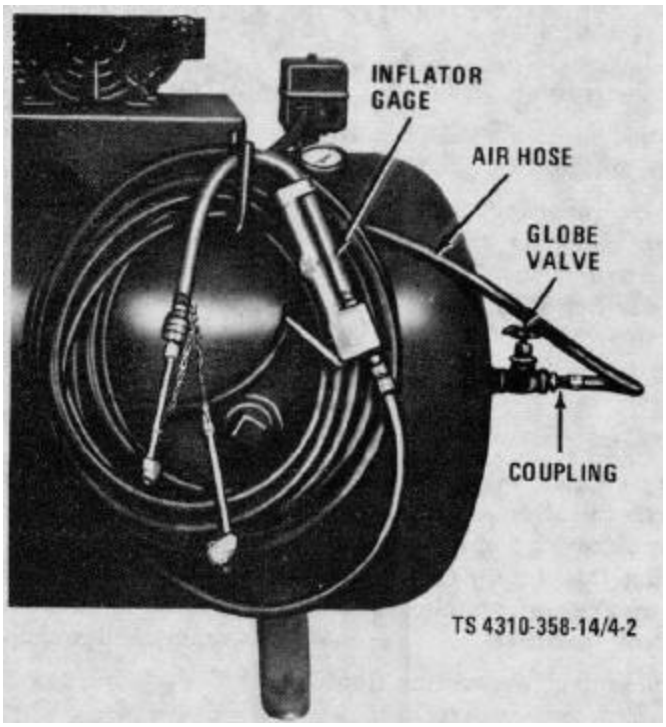


Figure 4-2. Air hose assembly, removal points

4-5. Installation.

a. Location and Leveling. Locate the air compressor as near to the electrical power source as possible. Avoid muddy, sandy or dusty locations if possible. If it is necessary to use the unit on soft ground, provide a suitable, level foundation of planking.

b. Grounding. The air compressor must be grounded prior to operation. The ground lead may be connected to an under-ground water system if the water system is constructed of metallic pipe. A ground may be fabricated from a metallic rod driven not less than 4 feet into the ground. The ground lead must be securely bolted or clamped to the water pipe or ground rod, and the feet or motor platform of the air receiver tank of the air compressor.

c. Connecting the Incoming Power Source.

(1) Remove the cover from the magnetic starter (fig. 4-3).

(2) Remove knockout plug from the starter box and insert the incoming power source wires through the opening.

WARNING

Be sure the incoming power lines are connected to disconnect switch that is locked in the OFF position before handling the wires.

(3) Insert the bare ends of the incoming power source wires in the L-1 power line connector and L-2 power line connector and tighten the terminal screws.

(4) Install cover on the magnetic starter.

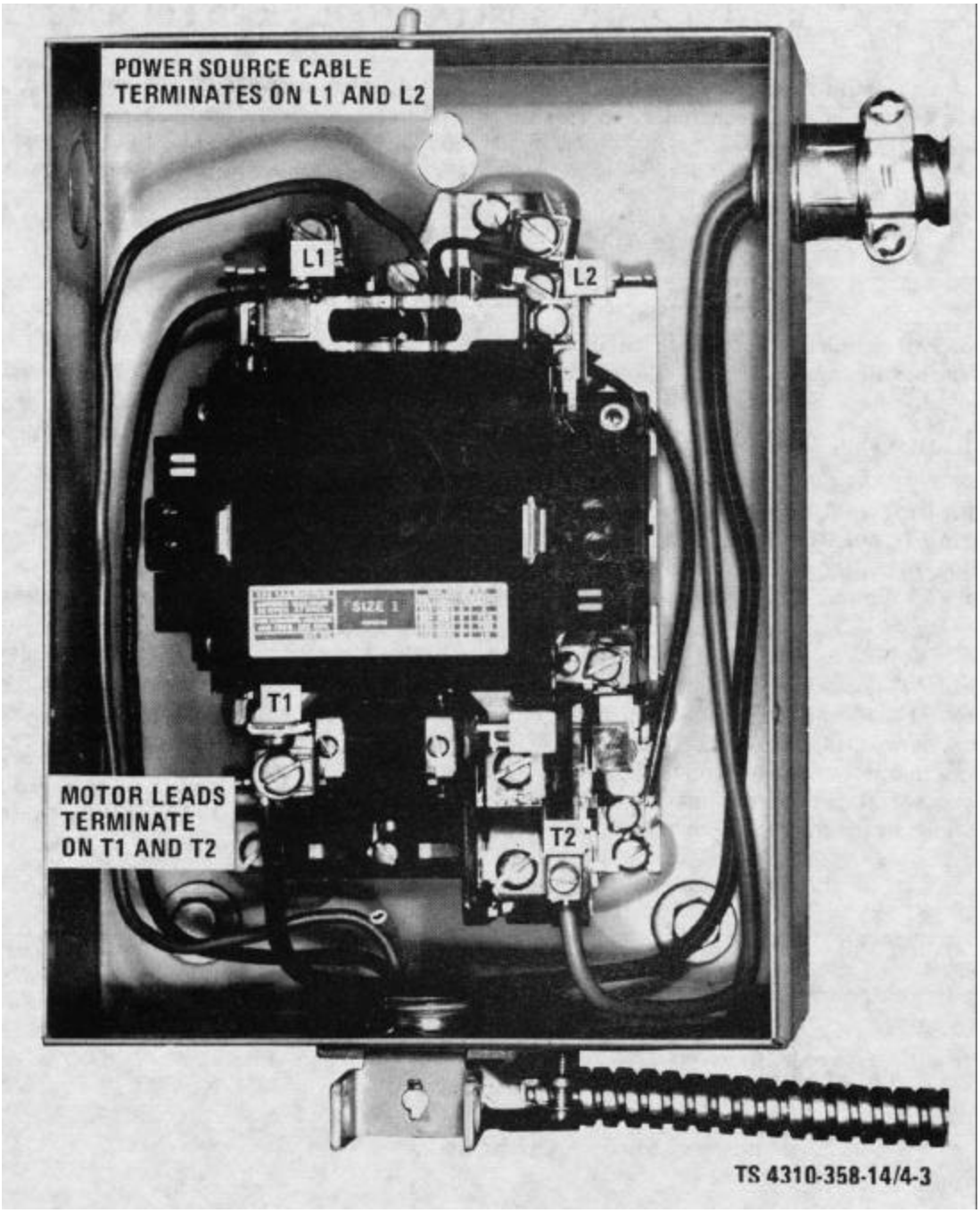


Figure 4-3. Magnetic starter (shown with cover removed).

Section II. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

4-6. Special Tools and Equipment. There are no special tools or equipment required to perform maintenance on the air compressor.

4-7. Maintenance Repair Parts. Repair parts and equipment are listed and illustrated in TM 5-4310-358-24P, Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools Lists.

Section III. LUBRICATION INSTRUCTIONS

Refer to Paragraph 3-2 for lubrication instruction for this air compressor.

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

Because all required inspections must be made daily, or more frequently, organizational maintenance personnel will refer to table 4-1, for procedures to be followed during their periodic inspection.

4-8. General. This section lists the preventive maintenance checks and services which shall be performed on a monthly or quarterly basis by organizational maintenance personnel. It includes and expands upon the preventive maintenance services performed by operator/crew maintenance and includes additional services which are allocated to organizational maintenance.

4-9. Preventive Maintenance Checks and Services. Refer to table 4-1 for a listing of the Preventive Maintenance checks and services which are allocated to organizational maintenance.

NOTE

Use Tables 3-1 and 3-2 for preventive maintenance checks and services, then return to this Table for expansion of checks and services.

Table 4-1. Organizational Preventive Maintenance Checks and Services

Item No.	Interval Q	Item to be Inspected	Procedures	Equipment will be Reported Not Ready (Red) if:
1	•	Compressor Frame Oil	Refer to LO 4310-358-12	
2	•	Capscrews, screws, and bolts	Check for tightness	

Section V. TROUBLESHOOTING

4-10. Scope.

a. This section contains troubleshooting or malfunction information and tests for locating and correcting most of the troubles which may develop in the air compressor. Each malfunction or trouble symptom for an individual component, unit, or system is followed by a list of tests or inspections necessary for you to determine probable causes and suggested corrective actions for you to remedy the malfunction.

b. This manual cannot list all possible malfunctions that may occur oo all tests or inspections, and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, you should notify higher level maintenance.

c. Only those functions which are solely within the cope of organizational maintenance are listed. For troubleshooting procedures which are within the scope of operator/crew maintenance, refer to paragraph 3-3.

4-11. Organizational Maintenance Troubleshooting Chart. Refer to table 4-2 for troubleshooting which is allocated organizational maintenance levels.

NOTE

Before you use this table be sure you have performed all operating checks.

Table 4-2. Troubleshooting

	MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1.	Compressor Pumping Oil	Step 1. Check for a leaking release valve.	Refer to paragraph 4-16 and replace a leaking release valve.
		Step 2. Check for a hot cylinder head. If one seems hotter than the other, there could be damage to the rings	Notify direct support maintenance.
2.	Knocks or Rattles	Step 1. Check for loose belt wheel or pulley.	Refer to figure 4-4 and replace the electric motor if the pulley is bad.
		Step 2. Check for leaking release valve.	Refer to paragraph 4-16 and replace a leaking release valve.
3.	Air Delivery Dropping	Step 1. Check for air leaks in piping.	
		a. Make a solution of soapy water.	
		b. Apply to the fittings, if a leak is present it will be indicated by the soapy water bubbling.	Refer to paragraph 4-18 and replace fittings if tightening does not stop the bubbles.
		Step 2. Check for a leaking release valve.	Refer to paragraph 4-17 and replace a leaking valve.
		Step 3. Check for restricted air passages, leaking or broken valves.	Notify Direct Support Maintenance.
4.	Motor Overload Relay Trips	Step 1. Check line voltage or motor terminals for loose connections.	Tighten loose connections.
		Step 2. Check for defective starter heaters.	If a defective starter heater is found, notify Direct Support Maintenance.

Table 4-2. Troubleshooting (Con't)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Excessive Starting or Stopping	Step 1. Check receiver for condensate.	Refer to paragraph 3-12 and drain the condensate.
	Step 2. Check for air leaks in piping, or the receiver check valve leaking.	Repeat Step 1 in paragraph 3 above.
	Step 3. Check for leaking, broken, or worn pressure switch (fig. 1-2).	Notify Direct Support Maintenance.
6. Compressor Running Hot	Step 1. Check that air passage is not blocked at fan wheel.	Remove any foreign objects that may be blocking ventilation.
	Step 2. Check for a leaking check valve.	Refer to paragraph 4-18 and replace a defective check valve.
7. Compressor Running Slow	Step 1. Check for low line voltage, or a defective motor starter heater.	Tighten loose connections. If the compressor still runs slowly, notify Direct Support Maintenance.
	Step 2. Check for a leaking release valve.	Refer to paragraph 4-17 and replace a leaking release valve.

Section VI. MAINTENANCE OF THE ELECTRIC MOTOR AND COMPRESSOR

4-12. General. The electric motor can be removed from the air receiver tank as a unit after removal of the V-belt guard, belts, and electrical leads have been disconnected. The air compressor assembly can be removed as a unit after the V-belt guard, belts and aftercooler tube are removed.

4-13. Electric Motor.

a. Removal. Refer to figure 4-4 and remove electric motor as follows:

CAUTION

Make sure main power source is disconnected.

(1) Remove attaching hardware and remove V-belt guard.
(2) Tag and disconnect electrical leads.
(3) Remove motor mounting bolts.
(4) Remove V-belts from motor pulley.
(5) Remove electric motor assembly.

b. Installation. Refer to figure 4-4 and install electric motor as follows:

(1) Place electric motor in position and loosely install mounting bolts.
(2) Install and adjust V-belt tension as described in paragraph 4-14 below.
(3) Install V-belt guard and tighten attaching hardware securely.
(4) Connect electrical leads.

4-14. Compressor Assembly.

a. Removal. Refer to figure 4-4 and remove the compressor assembly as follows:
(1) Remove attaching hardware and remove V-belt guard.
(2) Disconnect and remove aftercooler tube.
(3) Remove compressor mounting bolts.
(4) Remove V-belts from compressor flywheel and remove compressor assembly.

b. Installation. Refer to figure 4-4 and install the compressor assembly as follows:
(1) Position compressor assembly on tank and install mounting bolts after aligning flywheel with motor pulley and installing V-belts on pulleys.
(2) Tighten compressor mounting bolts.
(3) Install and connect aftercooler tube.
(4) Install V-belt guard and attaching hardware.

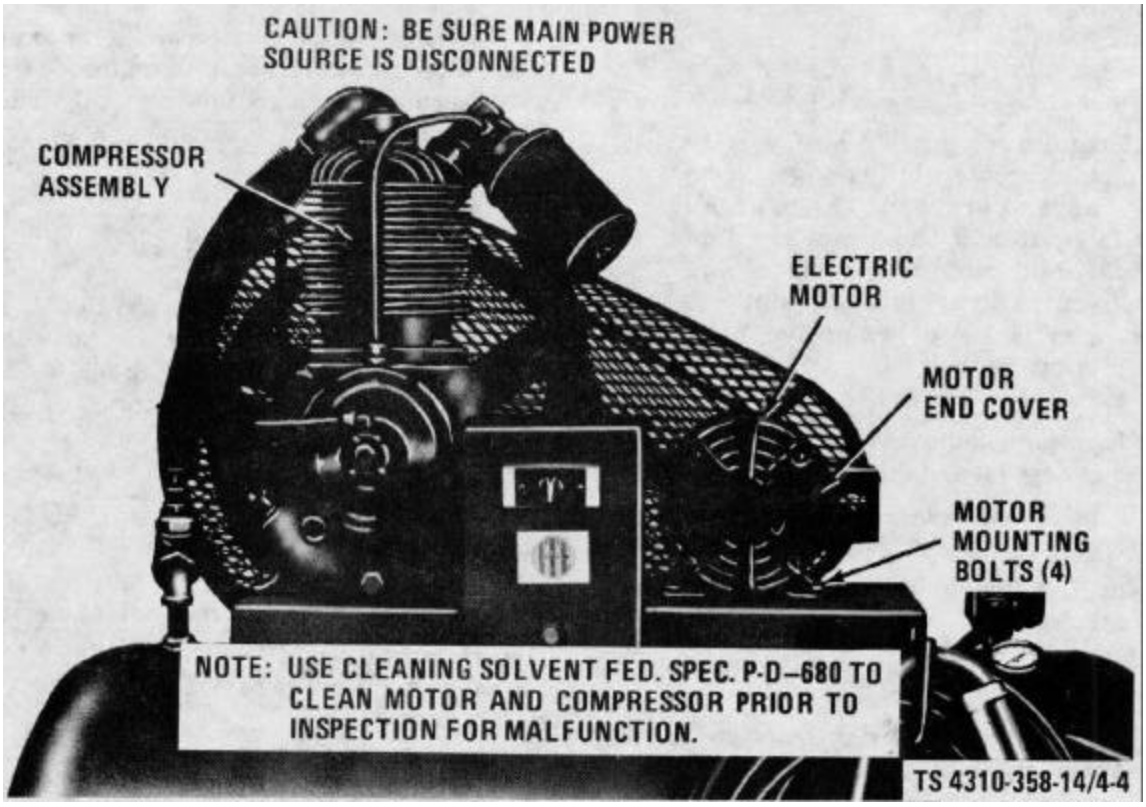


Figure 4-4. Electric motor and compressor assembly, removal and installation.

4-15. V-Belts.

a. Inspection.

(1) Make a visual inspection of the belts to determine their condition.

(2) If the belts are worn, frayed or bad, replace with a new set.

b. Cleaning.

WARNING

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Use in a well ventilated area as the fumes are dangerous if inhaled. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° F. 138° F. (38°C. 59°C.).

(1) Use a cloth dampened in cleaning solvent, P-D-680, to remove oil and dust from the belts.

(2) If the belts have become saturated with oil and dirt, replace with a new set.

c. Removal. Refer to figure 4-5 and remove v-belts as follows:

(1) Remove attaching hardware and remove v-belt drive guard.

(2) Loosen motor mounting bolts and move motor towards compressor to loosen v-belt tension.

(3) Remove v-belts.

d. Installation. Refer to figure 4-5 and install v-belts as follows:

(1) Install v-belts on compressor and motor pulleys.

(2) Move motor away from compressor increasing v-belt tension. Make sure pulleys are in correct alignment. Tighten motor mounting bolts slightly.

(3) Press on the v-belts with your fingers midway between the motor drive pulley and the compressor flywheel. Proper v-belt tension is when the belt deflection is no more than one-half inch.

(4) When proper belt tension is obtained tighten motor mounting bolts securely.

(5) Install v-belt drive guard and attaching hardware and tighten securely.

e. Adjustment.

(1) If necessary, adjust the tension as follows:

(a) Loosen motor mounting screws (fig. 4-5). It is not necessary to remove the mounting screws.

(b) Move the motor away from compressor until proper tension is obtained on the v-belts, para d.(3). Be sure pulleys are in correct alignment.

(c) Tighten motor mounting bolts to secure adjustment.

CAUTION

Do not adjust the v-belts too tightly as this will overload motor and compressor bearings. Also check to be sure motor pulley is square in relationship to the mounting base and flywheel to avoid binding and excessive wear of the v-belts.

(2) Install v-belt guard.

4-16. Release Valve Assembly Replacement.

a. Removal and Disassembly. Refer to figure 4-6 and remove and disassemble release valve assembly as follows:

Remove release valve body (1, fig. 4-6), spring (2), ball (3), and plunger (4).

b. Cleaning, Inspection and Repair.

(1) Clean all parts and wipe dry with a lint free cloth.

(2) Check the spring (2) for disfiguration, or loss of tension. Replace a defective spring.

(3) Check ball (3), body (1), and plunger (4) for excessive wear, burred threads and general condition. Replace damaged or defective parts as necessary.

(4) Replace deteriorated gaskets.

c. Reassembly and Installation.

Refer to figure 4-6 and reverse the disassembly and removal procedures.

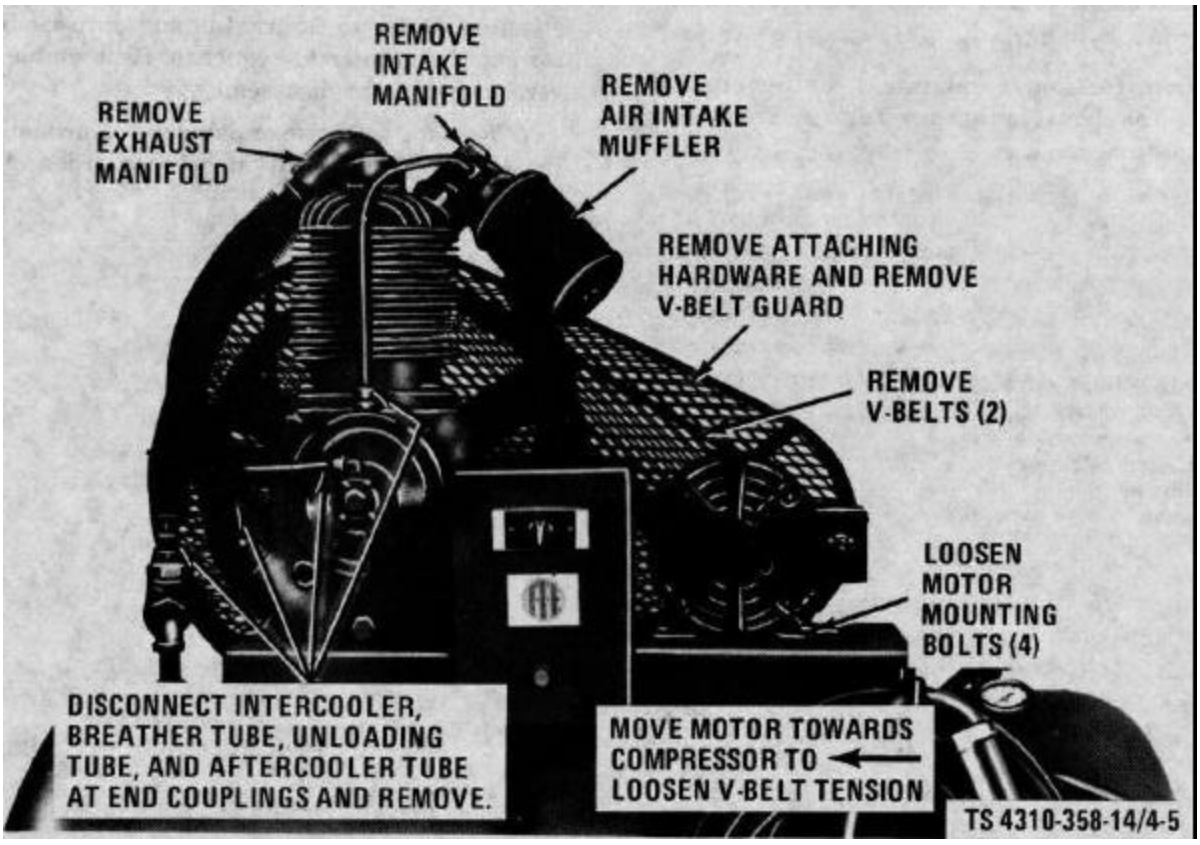


Figure 4-5. Compressor components and v-belt drive.

4-17. Air Intake Muffler.

a. Removal. Refer to figure 4-5 and remove air intake muffler as follows:

Loosen set screw securing air intake muffler to intake manifold and remove intake muffler.

b. Cleaning. Refer to paragraph 3-9.

c. Installation. Install intake muffler on intake manifold as shown in figure 4-5 and secure by tightening setscrew.

4-18. Air Receiver Repair.

a. Refer to figure 4-7 and remove the defective components by disassembling in numerical sequence as shown.

b. The check valve (9), can be disassembled for cleaning. Refer to figure 4-8, and disassemble following the numerical sequence. Reassemble in reverse order of the disassembly.

c. Replace defective or damaged components and reassemble and install in reverse order of their removal.

1. Body, release valve
2. Spring, release
3. Ball, release valve
4. Plunger, release valve
5. Body, muffler
6. Screen
7. Felt

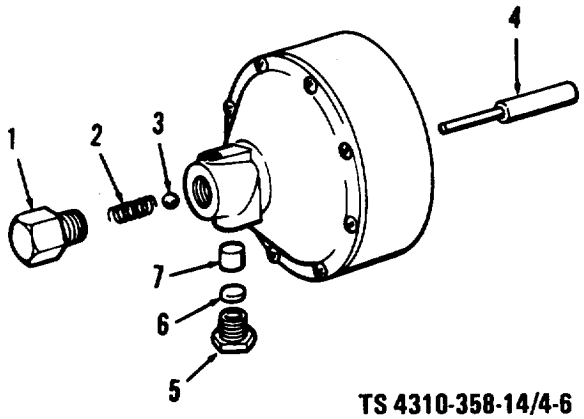
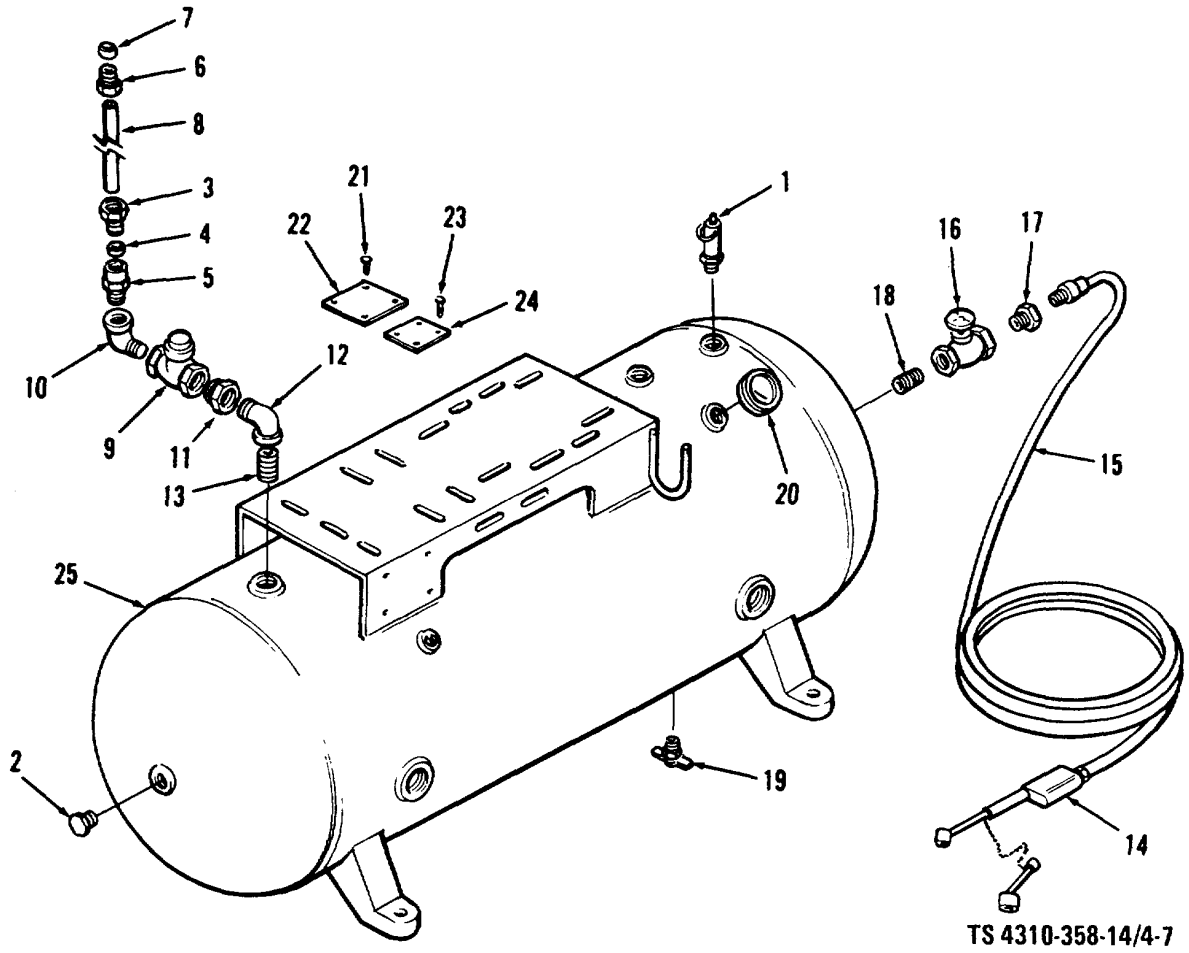
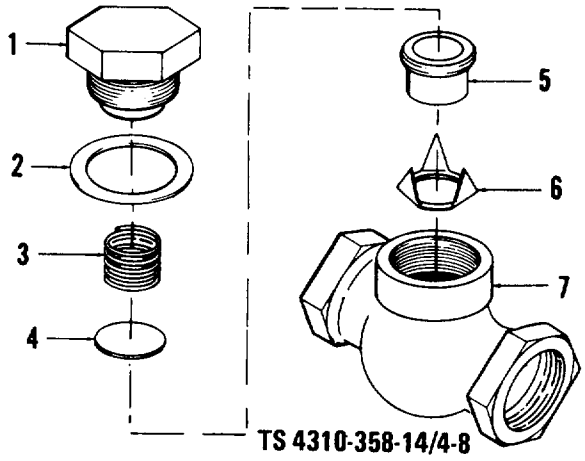


Figure 4-6. Compressor release valve assembly, removal and installation



1. Valve, safety
2. Plug, pipe
3. Nut compression fitting
4. Ferrule compression fitting
5. Body, compression fitting
6. Nut, compression fitting
7. Ferrule, compression fitting
8. Tube, aftercooler
9. Valve, check
10. Elbow, street
11. Bushing, face
12. Elbow, street
13. Nipple, pipe
14. Gage, inflator
15. Air hose assembly
16. Valve, globe
17. Bushing, pipe
18. Nipple, pipe
19. Cock, drain
20. Gage, pressure
21. Screw, drive
22. Plate, instruction
23. Screw, drive
24. Plate, identification
25. Air receiver

Figure 4-7. Air receiver repair.



1. Cap
2. Gasket
3. Spring
4. Disc
5. Seat
6. Guide
7. Body

Figure 4-8. Check valve exploded view.

CHAPTER 5

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS - SPECIAL TOOLS AND EQUIPMENT

5-1. Special Tools and Equipment. There are no special tools, or equipment, required for maintenance of the air compressor assembly.

5-2. Maintenance Repair Parts. Repair parts and equipment covering direct and general support maintenance of the air compressor assembly are listed and illustrated in TM 5-4310-358-24P.

Section II. TROUBLESHOOTING

5-3. Scope.

a. This section contains troubleshooting or malfunction information and tests for locating and correcting most of the troubles which may develop in the air compressor. Each malfunction or trouble symptom for an individual component, unit, or system is followed by a list of tests or inspections necessary for you to determine probable causes and suggested correction actions for you to remedy the malfunction.

b. This manual cannot list all possible malfunctions that may occur or all tests or inspections, and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, you should notify higher level maintenance.

c. Table 5-1. Lists the common malfunctions that you may find during the operation or maintenance of the air compressor or its components. You should perform the test, inspections and corrective actions

NOTE

Before you use this table, be sure you have performed all applicable operating checks.

Table 5-1. Troubleshooting

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Electric Motor Fails To Start or Fail to Run	Step 1. Check motor leads for proper connection in magnetic starter box, and at motor conduit box, refer to figure 1-3, Wiring Diagram for proper voltage. If motor leads are connected properly, proceed to Step 2. If leads are not connected properly, repair as follows:	a. Disconnect main power source. b. Remove screw from bottom of magnetic starter box cover and remove the cover. c. Look on the name plate on the motor to check the correct way the leads should be connected into the magnetic starter box. d. Refer to figure 1-3, wiring diagram and use figure 5-1 as a guide and connect the terminal lead from the motor marked T1 to the screw marked T1 in the magnetic starter box. Follow the same procedure with terminal T2. e. Replace the magnetic starter box cover and replace the cover screw. f. Reconnect the main power source.

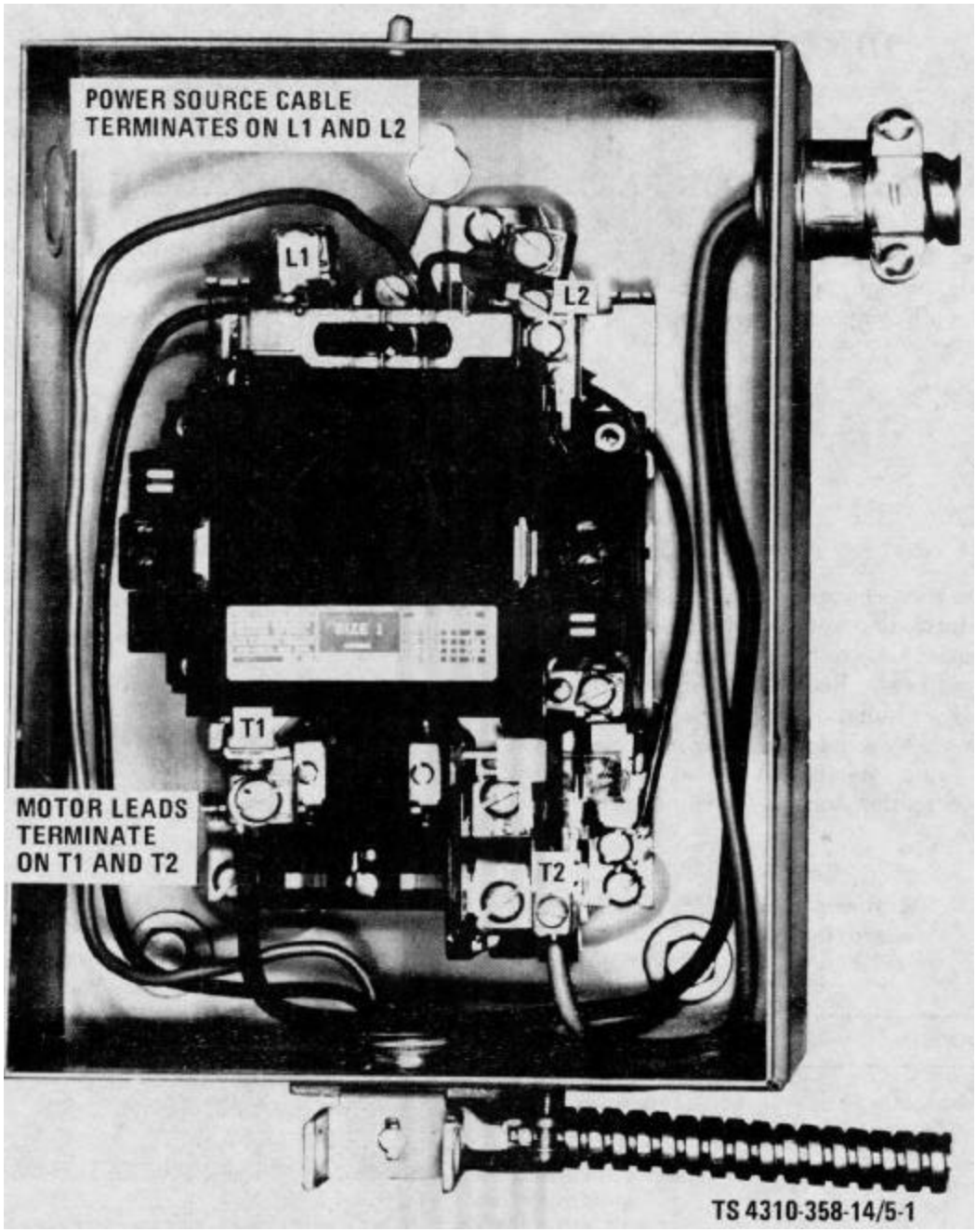
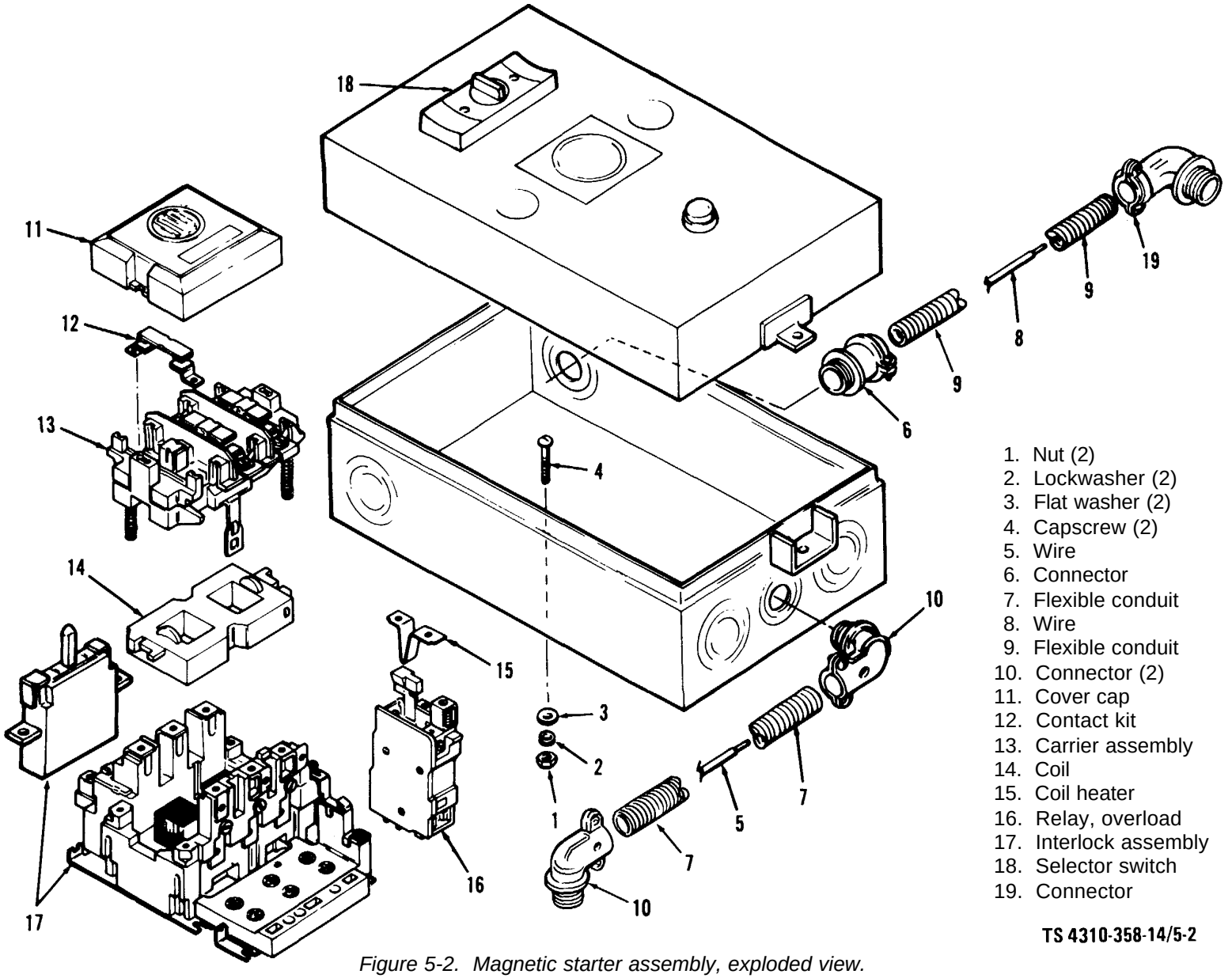


Figure 5-1. Magnetic starter (shown with cover removed).

Table 5-1. Troubleshooting (Con't)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 2. Check magnetic starter switch to see if it is defective. Use compressed air and remove all dust or dirt from magnetic starter components, check continuity of heater coil, operating coil, relay overload, contact carrier and interlock assembly. Check on-off switch continuity and stem action. If the magnetic starter switch and on-off switch checks out, proceed to Step 3. If not replace the magnetic switch as follows:	a. Disconnect main power source. b. Remove screw from bottom of magnetic starter box cover and remove the cover. c. Tag and disconnect all wiring. d. Use figure 5-2 as a guide and disassemble the magnetic starter assembly as follows: (1) Remove connector (6) and (10) from the magnetic switch box. (2) Remove nut (1), lockwasher (2), flatwasher (3) and capscrew (4) and remove the control box. (3) Remove contact cap (11), contact kit (12), contact carrier (13), operating coil (14), coil heater (15), overload relay (16), and interlock assembly (17). (4) Replace any defective part. (5) Replace interlocking assembly (17), overload relay (16), coil heater (15), operating coil (14), contact carrier (13), contact kit (12) and contact cap (11). (6) Replace the magnetic control box with capscrew (4), flatwasher (3), lockwasher (2) and nut (1). (7) Replace connector (11) and (6) to the magnetic control box. e. Reconnect all wiring. f. Replace magnetic starter box cover and install capscrew. g. Connect main power source.
	Step 3. Check for a defective motor. Connect leads from the motor direct to the power source. If motor fails to run remove, repair or replace.	a. Disconnect main power source. b. Remove attaching hardware and remove V-belt guard. c. Loosen motor mounting bolts, slide motor towards compressor and remove V-belts. d. Tag and disconnect electric leads. e. Remove mounting bolts and remove the electric motor and disassemble using figure 5-3 as a guide.



1. Nut (2)
2. Lockwasher (2)
3. Flat washer (2)
4. Capscrew (2)
5. Wire
6. Connector
7. Flexible conduit
8. Wire
9. Flexible conduit
10. Connector (2)
11. Cover cap
12. Contact kit
13. Carrier assembly
14. Coil
15. Coil heater
16. Relay, overload
17. Interlock assembly
18. Selector switch
19. Connector

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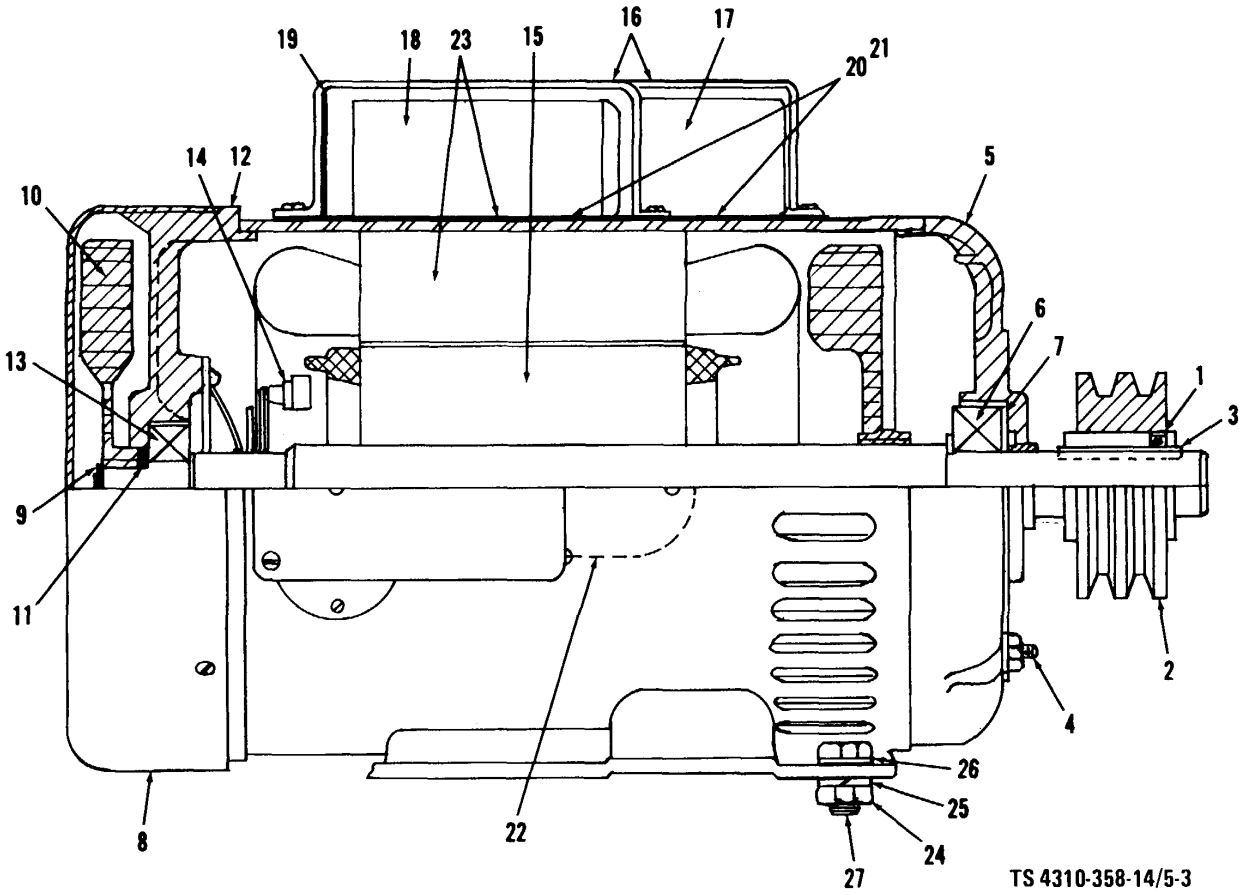
Figure 5-2. Magnetic starter assembly, exploded view.



1. Set screw, socket
2. Pulley
3. Key
4. Thru bolt
5. End shield, front
6. Bearing
7. Spring
8. Fan guard
9. Lockring
10. Fan
11. Spacer
12. End shield assembly, rear
13. Bearing
14. Rotary switch
15. Rotor and shaft assembly
16. Capacitor case
17. Capacitor
18. Capacitor
19. Insulation
20. Gasket
21. Gasket
22. Name plate
23. Stator frame and base
24. Hex nut
25. Lockwasher
26. Flat washer
27. Capscrew

Figure 5-3. Electric motor assembly.

Table 5-1. Troubleshooting (Con't)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
		(1) Remove setscrew (1), pulley (2) and Key (3). (2) Remove four thru bolts (4), fan guard (8), lock-ring (9), fan (10), spacer (11), rear end shield assembly (12), bearing (13), front end shield (5), bearing (6), spring (7), rotor and shaft (15), capacitor case (16), capacitors (17 and 18), from stator frame and base (23). **WARNING** **Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Use in a well ventilated area as the fumes are dangerous if inhaled. Do not use near open flame or excessive heat. Flash point of solvent is 100° F. 138° F.** (3) Clean all parts except rotor, bearings and stator in dry cleaning solvent, P-D-680, and wipe dry with a lint free cloth. (4) Use compressed air to clean dust and dirt off rotor, bearings, and stator, then wipe with a cloth dampened in dry cleaning solvent P-D-680. (5) Inspect bearings and rotor shaft for excessive wear, and rough or scored surfaces. Use a file or emery cloth to smooth rough or scored surfaces. Replace defective bearings or a defective rotor shaft. If the motor is beyond repair, replace the motor. (6) Install capacitors (17 and 18), and capacitor case (16) on stator frame and base (23). Replace rotor and shaft (15), spring (7), bearing (6), front end shield (5), bearing (13), rear end shield assembly (12), spacer (11), fan (10), lockring (9), fan guard (8), and four thru bolts (4). (7) Replace key (3) in shaft, pulley (2) on shaft, and replace the setscrew (1). f. Mount electric motor on compressor and replace mounting bolts. g. Connect electrical leads. h. Replace V-belts and slide motor away from compressor to tighten V-belts to proper tension. Tighten motor mounting bolts.

Table 5-1. Troubleshooting (Con't)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
		i. Replace V-belt guard and replace attaching hardware. j. Reconnect main power source.
2. Electric Motor Reverses	Step 1. Check motor leads for proper connection in magnetic starter box.	If motor leads are not connected properly, repair as follows: a. Disconnect main power source. b. Remove screw from bottom of magnetic starter box cover and remove the cover. c. Look on the name plate on the motor to check the correct way the leads should be connected into the magnetic starter box. d. Connect the terminal lead from the motor marked T1 to the screw marked T1 in the magnetic starter box. Follow the same procedure with terminal T2. e. Replace the magnetic starter box and replace the cover screw. f. Reconnect the main power source.
3. Electric Motor Overheats	Step 1. Use a volt meter and check for low line voltage from power source. Step 2. Check V-belts for out of alignment. Also make a visual inspection of belts and condition to determine if the belts require removal for cleaning and deglazing. If deglazing appears necessary, remove the lock belt guard. **WARNING** **Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Use in a well ventilated area as the fumes are dangerous if inhaled. Do not use near open flame or excessive heat. Flash point of solvent is 100°F. - 138° F. (38°C. 59°C.).**	If voltage is low from power source, connect to another power source. a. Loosen motor mounting screws (fig. 5-4) securing motor to receiver. Move motor toward compressor, then lift belts off of the pulley. b. Use a cloth dampened in dry cleaning solvent, P-D-680, to remove oil and dust film. If the belts appear to have been saturated, and the heat has glazed the surfaces of the Vee's , proceed as follows: c. Use a medium grade of grit paper (not emery cloth) and rough up the surfaces with strokes of uneven direction. d. Wipe off all grit particles. When surfaces have been deglazed, install the belts on pulleys.

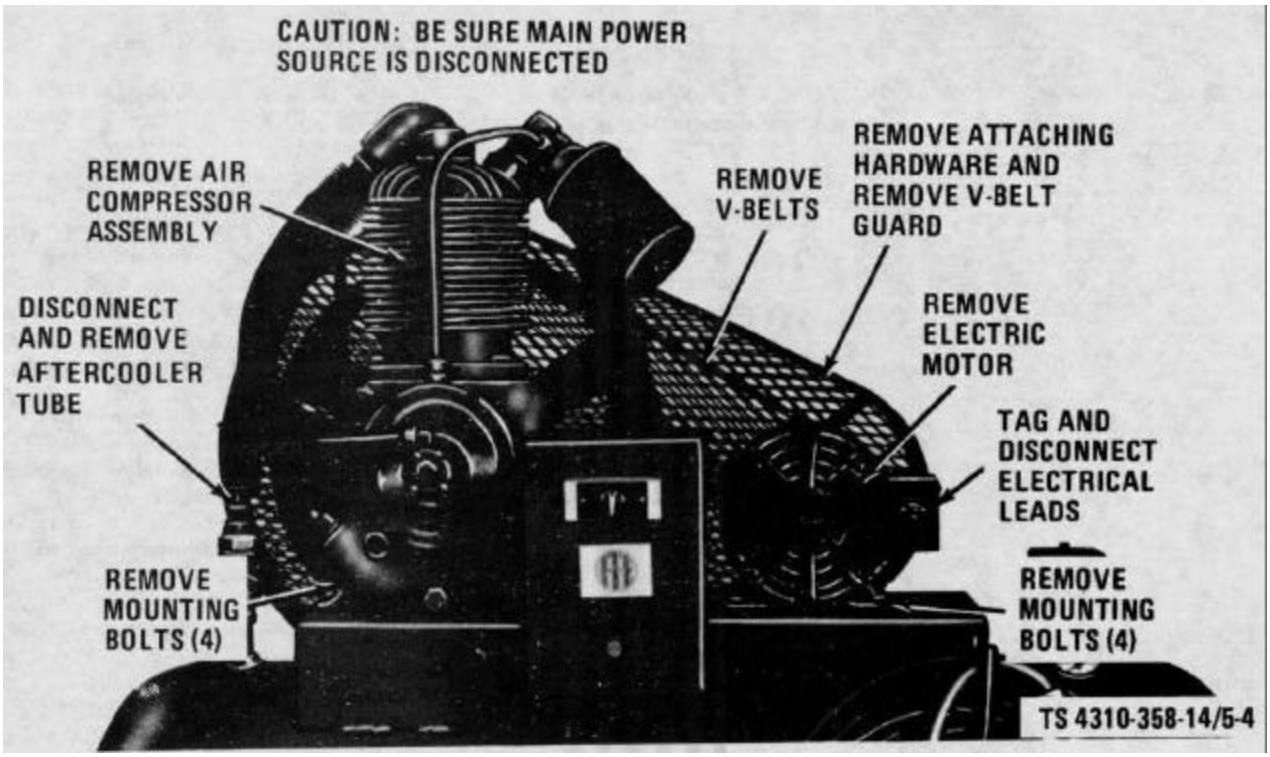


Figure 5-4. Electric motor and compressor, cleaning, v-belt removal and installation

Table 5-1. Troubleshooting (Con't)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	NOTE **When installing new belts, never pry the belts over the pulley grooves.**	
		e. To adjust the belts, move the motor away from the compressor until there is tension on the V-belts. Depress one of the V-belts midway between the pulley and flywheel; when the top lines up with the bottom of the belt next to it under normal thumb pressure the tension is correct.
	CAUTION **Do not adjust the V-belts too tightly as this will overload motor and compressor bearings. Also check and be sure pulley alignment is maintained.**	
		f. Tighten motor mounting bolts securely.
	Step 3. Check electric motor, compressor cooling fins and belt guard for poor ventilation.	Remove any dirt, trash or other foreign matter away from the compressor with an air hose.
4. Electric Motor Noisy	Step 1. Check to see if electric motor mounting bolts are loose.	Tighten mounting bolts and check the belt tension.
	Step 2. Electric motor bearings may be worn. If the noise is coming from inside the motor, disassemble the motor and determine if bearings are worn.	a. Disconnect main power source. b. Remove attaching hardware and remove V-belt guard. c. Loosen motor mounting bolts, slide motor forward towards compressor and remove V-belts d. Tag and disconnect electric leads. e. Remove mounting bolts and remove the electric motor and disassemble using figure 5-3 as a guide. (1) Remove setscrew (1), pulley (2), and key (3). (2) Remove four thru bolts (4), fan guard (8), lockring (9), fan (10), spacer (11), rear end shield assembly (12), bearing (13), front end shield (5), bearing (6), spring (7), rotor and shaft (15), capacitor case (16), capacitors (17 and 18), from stator frame and base (23).

Table 5-1. Troubleshooting (Con't)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
		WARNING **Dry cleaning solvent P-D-680, used to clean parts, is potentially dangerous to personnel and property. Use in a well ventilated area as the fumes are dangerous if inhaled. Do not use near open flame or excessive heat. Flash point of solvent is 100°F. - 138°F. (38°C. - 59°C.).** (3) Clean all parts except rotor, bearings and stator in dry cleaning solvent P-D-680 and wipe dry with a lint free cloth. (4) Use compressed air to clean dust and dirt off rotor, bearings, and stator, then wipe with a cloth dampened in dry cleaning solvent P-D-680. (5) Inspect bearings for excessive wear. Replace defective bearings. (6) Install capacitors (17 and 18), and capacitor case (16) on stator frame and base (23). Replace rotor and shaft (15), spring (7), bearing (6), front end shield (5), bearing (13), rear end shield assembly (12), spacer (11), fan (10), lockring (9), fan guard (8), and four thru bolts (4). (7) Replace key (3) in shaft, pulley (2) on shaft, and replace the setscrew (1). f. Mount electric motor on compressor and replace mounting bolts. g. Connect electrical leads. h. To adjust the belts, move the motor away from the compressor until there is tension on the V-belts. Depress one of the V-belts midway between the pulley and flywheel; when the top lines up with the bottom of the belt next to it under normal thumb pressure the tension is correct. **CAUTION** **Do not adjust the V-belts too tightly as this will overload motor and compressor bearings. Also check and be sure pulley alignment is maintained.** i. Tighten motor mounting bolts securely.
5. Electric Motor Does Not Cut In At 165 PSI (11.60 kgs), And Cut Out At 190 PSI (13.36 kgs).	Step 1. Check incoming power source for disconnection. Connect air compressor to incoming power source.	

Table 5-1. Troubleshooting (Con't)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 2. Check pressure switch for proper setting.	a. Start the air compressor to determine adjustment. The pressure switch is preset by manufacturer at 165 psi (11.60 kgs) CUT-IN, and 190 psi (13.36 kgs) CUT-OUT setting. If adjustment is necessary, shut off the outside power source. b. Remove cover from pressure switch. c. To raise the CUT-IN and CUT-OUT pressure turn the pressure adjusting screw clockwise (fig. 5-5). d. To decrease the difference between the CUT-IN and CUT-OUT pressure, turn the differential screw counterclockwise (fig. 5-5).

CAUTION

When adjusting the differential screw, do not turn it farther than it will turn easily.

e. To increase the differential and maintain the same CUT-OUT pressure, turn the differential screw clockwise and, at the same time, the pressure adjusting screw counterclockwise.

NOTE

If the differential is increased only by turning the differential screw clockwise, and CUT-IN pressure changes only slightly, and the CUTOUT pressure rises.

f. Turn on the outside power to check the adjustment. To check the CUT-IN pressure, open the drain cock and allow pressure to fall below 165 psi (11.60 kgs). Close the drain cock and the compressor should start immediately.

g. Install the cover on the pressure switch.

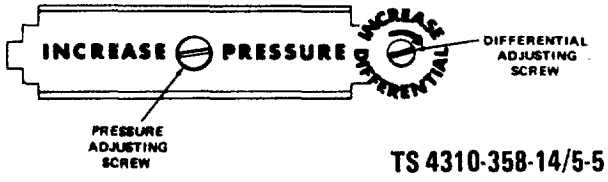


Figure 5-5. Pressure switch adjustment.

Table 5-1. Troubleshooting (Con't)

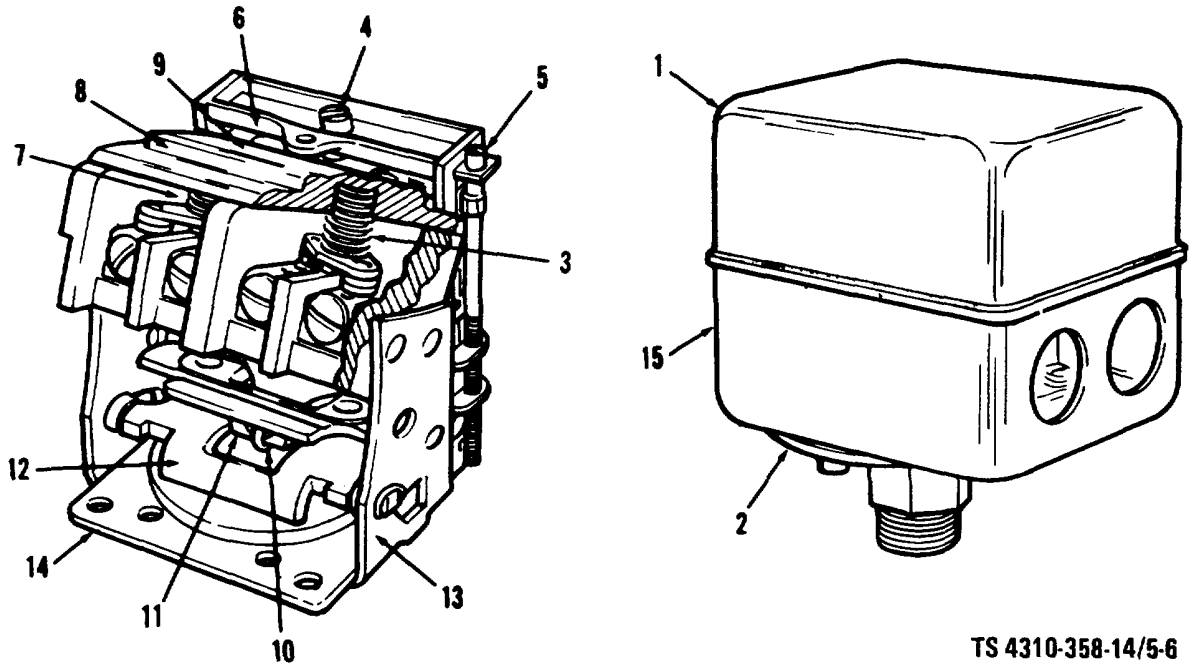
MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 3. Check for defective pressure switch. If adjustment as outlined in Step 2 above does not help, repair or replace the pressure switch.	a. Shut off outside power source. b. Tag and disconnect all electrical leads c. Unscrew switch assembly from air receiver.

WARNING

Dry cleaning solvent P-D-680, used to clean parts is potentially dangerous to personnel and property. Use in a well ventilated area as the fumes are dangerous if inhaled. Do not use near open flame or excessive heat. Flash point of solvent is 100°F. - 138° F. (38°C. - 59° C.).

d. Use compressed air and remove all dust and dirt from pressure switch components, then wipe with a cloth dampened in an approved cleaning solvent.

e. Using figure 5-6 as a guide, disassemble the pressure switch assembly.



1. Cover enclosure
2. Diaphragm
3. Spring, conical
4. Screw, pressure adjusting
5. Screw and Nut. differential adjusting
6. Bar top
7. Contact board assembly
8. Spring, equalizer
9. Spring, main
10. Spring, main
11. Toggle
12. Lever
13. Plate, diaphragm
14. Frame assembly
15. Enclosure

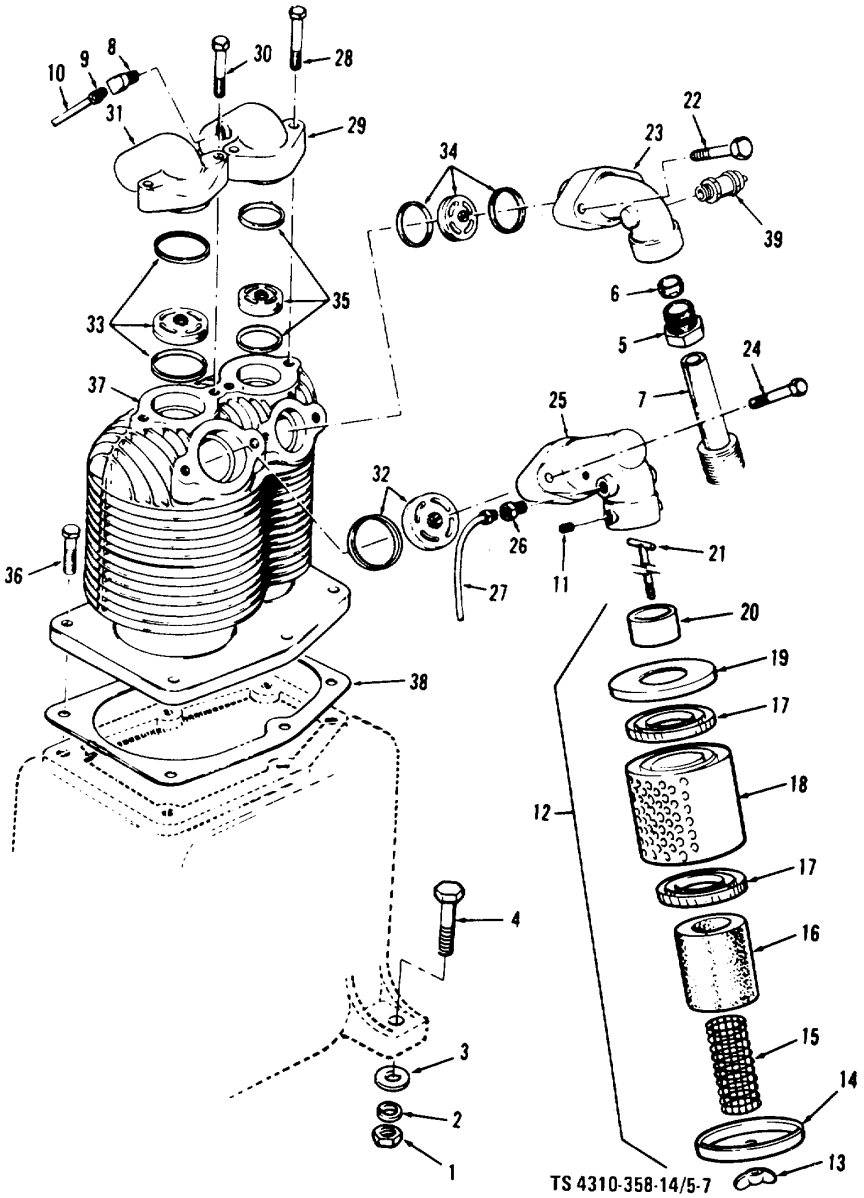
Figure 5-6. Pressure switch assembly.

Table 5-1. Troubleshooting (Con't

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
		f. Remove the cover (1) , pressure adjusting screw (4) , differential adjusting screw and nut (5) , top bar (6) , spring equalizer (8) , main spring () , conical spring (3) , contact board assembly (7) , toggle spring (10) , toggle (11) , lever (12) , plate diaphragm (13) , diaphragm (2) , frame assembly (14) and enclosures (15). g. Inspect the contact board contacts (7) for pitting or burning. Use sand paper to remove pitting or burning. h. Inspect diaphragm (2) for cracks or breaks and general condition i. Inspect all threaded parts for damaged or defective threads. j. Replace damaged or defective parts as necessary. k. Reassemble the pressure switch starting with the enclosure (15), then frame assembly (14), diaphragm (2), plate diaphragm (13), lever (12) , toggle (11) , toggle spring (10), contact board assembly (7), conical spring (3) , main spring (9), spring equalizer (8) , top bar (6), differential adjusting screw and unit (5), pressure adjusting screw (4) and cover (1). l. Install pressure switch assembly on air receiver m. Connect all electrical wiring. n. Turn on outside power source.
6. Compressor Pumps To Slow.	Step 1. Check intake muffler to see if it is clogged	a. Wipe off the outside of the muffler body. b. Using figure 5-7 as a guide, disassemble the intake muffler as follows: (1) Remove wing nut (13) , lower cover (14), screen (15) , element (16) , separator (17) , plate (18) , upper cover (19) , ferrule (20) and T-stud (21).

WARNING

Dry cleaning solvent P-D-680, used to clean parts is potentially dangerous to personnel and property. Use in a well ventilated area as the fumes are dangerous if inhaled. Do not use near open flame or excessive heat. Flash point of solvent is 100°F. - 138°F. (38°C. 59°C.).



1. Nut (4)
2. Lockwasher (4)
3. Flat washer (4)
4. Capscrew (4)
5. Nut, compression (2)
6. Ferrule, compression (2)
7. Intercooler tube
8. Fitting, compression
9. Fitting, compression
10. Inloading tube
11. Set screw, slotted
12. Muffler assembly
13. Wing nut
14. Lower cover
15. Lower cover
16. Element
17. Separator (2)
18. Plate
19. Upper cover
20. Ferrule
21. T-stud
22. Capscrew
23. Intake manifold H. P.
24. Capscrew (2)
25. Intake manifold, L. P
26. Fitting, compression
27. Breather tube
28. Capscrew (2)
29. Exhaust manifold, H. P.
30. Capscrew (2)
31. Exhaust manifold, L. P.
32. Valve assembly, L. P intake
33. Valve assembly, L.. P. exhaust
34. Valve assembly, H. P. intake
35. Valve assembly, H. P. exhaust
36. Capscrew (6)
37. Cylinder
38. Gasket, cylinder

Figure 5-7. Crankcase assembly, cylinders, manifolds and related components, exploded view

Table 5-1. Troubleshooting (Con't)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
		(2) Wash all parts of the muffler and wipe dry. Wash element and blow dry with low compressed air. (3) Inspect element for excessive wear or loss of capacity to retain dust and dirt. Replace a defective element. c. Reassemble the intake muffler as follows: (1) Install the T-stud (21), ferrule (20), upper cover (19), plate (18), separator (17), element (16), screen (15), lower cover (14) and wing nut (13). (2) Tighten wing nut finger tight.
	Step 2. Check V-belts for proper adjustment. Also make a visual inspection of belts and condition to determine if the belts require removal for cleaning and deglazing. If deglazing appears necessary, remove the lock belt guard.	a. Loosen motor mounting screws (fig. 5-4 securing motor to receiver. Move motor toward compressor, then lift belts off of the pulleys.
	WARNING **Dry cleaning solvent P-D-680, used to clean parts is potentially dangerous to personnel and property. Use in a well ventilated area as the fumes are dangerous if inhaled. Do not use near open flame or excessive heat. Flash point of solvent is 100°F. - 138°F. (38°C. - 59°C.).**	b. Use a cloth dampened in dry cleaning solvent P-D-680 to remove oil and dust film. If the belts appear to have been saturated, and the heat has glazed the surfaces of the Vee's, proceed as follows: c. Use a medium grade of grit sand paper (not emery cloth) and rough up the surface with strokes of uneven direction. d. Wipe off all grit particles. When surfaces have been deglazed, install the belts on pulleys. **NOTE** **When installing new belts. never pry the belts over the pulley grooves.** e. To adjust the belts, move the motor away from the compressor until there is tension on the V-belts. Depress one of the V-belts midway between the pulley and flywheel; when the top lines up with the bottom of the belt next to it under normal thumb pressure the tension is correct.

Table 5-1. Troubleshooting (Con't)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	CAUTION **Do not adjust the V-belts too tightly as this will overload motor and compressor bearings. Also check and be sure pulley alignment is maintained.**	
	Step 3. Check oil level in crankcase for low oil.	Remove fill plug in crankcase and fill to level in accordance with LO 5-4310-358.12.
	Step 4. Check for faulty intake and exhaust valves.	

Section III. REPAIR AND OVERHAUL INSTRUCTIONS

AIR COMPRESSOR ASSEMBLY AND ELECTRIC MOTOR

5-4. Pistons, Piston Rings, Connecting Rods, and Cylinder Block.

a. Removal and Disassembly.

(1) Remove the compressor assembly as described in paragraph 4-14, a.

(2) Refer to figure 5-7 and remove intake muffler assembly (12), by loosening set screw (11). To disassemble the intake muffler follow the sequence of the reference numbers shown on the exploded view.

(3) Refer to figure 5-9 and remove flywheel (8) by loosening nut (6) and bolt (7). Pull from crankshaft and remove key (9). Removing the flywheel at this point facilitates the disassembly of tubes and fittings.

(4) Refer to figure 5-7 and disconnect and remove all tubing and fittings. Follow any logical sequence in removing tubes and fittings. Take care in removing intercooler tubes so as not to damage cooling fins.

(5) Remove intake manifolds (23 and 25) and exhaust manifolds (29 and 31).

(6) Remove intake valves (32 and 34) and exhaust valves (33 and 35) from cylinder head valve cavities. If disassembly of valves is desired follow the sequence of reference numbers shown in figure 5-8.

CAUTION

Keep the parts of each valve assembly together, and separate from those of other valve assemblies. If serviceable, these parts shall be installed together.

(7) Remove cylinder capscrews (36, fig. 5-7) and remove cylinder head (37) by pulling straight away from crankcase. Do not cock or twist or use undue lateral force against cylinder to avoid damage to the pistons and connecting rods. Remove gasket (38) and discard.

(8) Access to connecting rod attaching bolts (10, fig. 5-9) is provided from above after cylinder head has been removed. Remove connecting rod bolts and withdraw lower connecting rod segment (16) from crankcase. Immediately tag lower cap segment to identify it with the exact rod from which it was removed. Each rod half is matched when manufactured. Remove oil dipper (15) only if replacement is required.

CAUTION

Mark the connecting rod from which the caps were removed, and reassemble caps on the same rod. Do not intermix the connecting rods and caps.

1. Gasket, valve
2. Screw, machine
3. Cage, exhaust
4. Spring, valve
5. Disc, valve
6. Seat, exhaust
7. Gasket, valve
8. Gasket, valve
9. Screw, machine
10. Seat, intake
11. Disc, valve
12. Spring, valve
13. Cage, intake
14. Gasket, valve
15. Gasket valve
16. Screw, machine
17. Cage, exhaust
18. Spring, valve
19. Disc, valve
20. Seat, exhaust
21. Gasket, valve
22. Screw, machine
23. Lockwasher
24. Seat, intake
25. Disc, valve
26. Spring, valve
27. Cage, intake
28. Gasket, valve

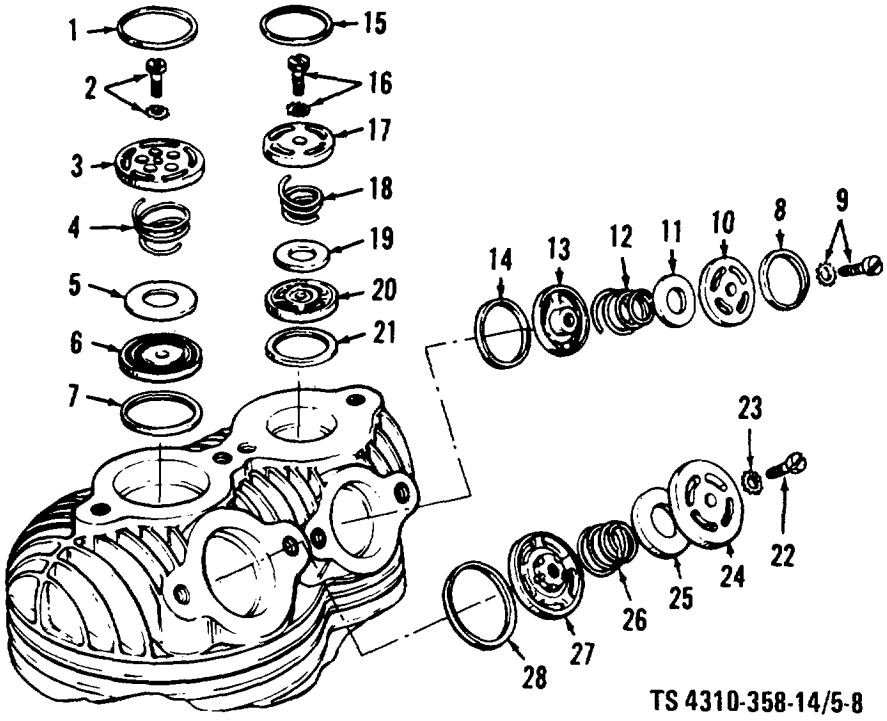


Figure 5-8. Compressor valve assemblies, disassembly and reassembly.

(9) Disassemble rods (16) from pistons (13 and 18) by removing piston pin retaining rings (11) and piston pins (12 and 17).

NOTE

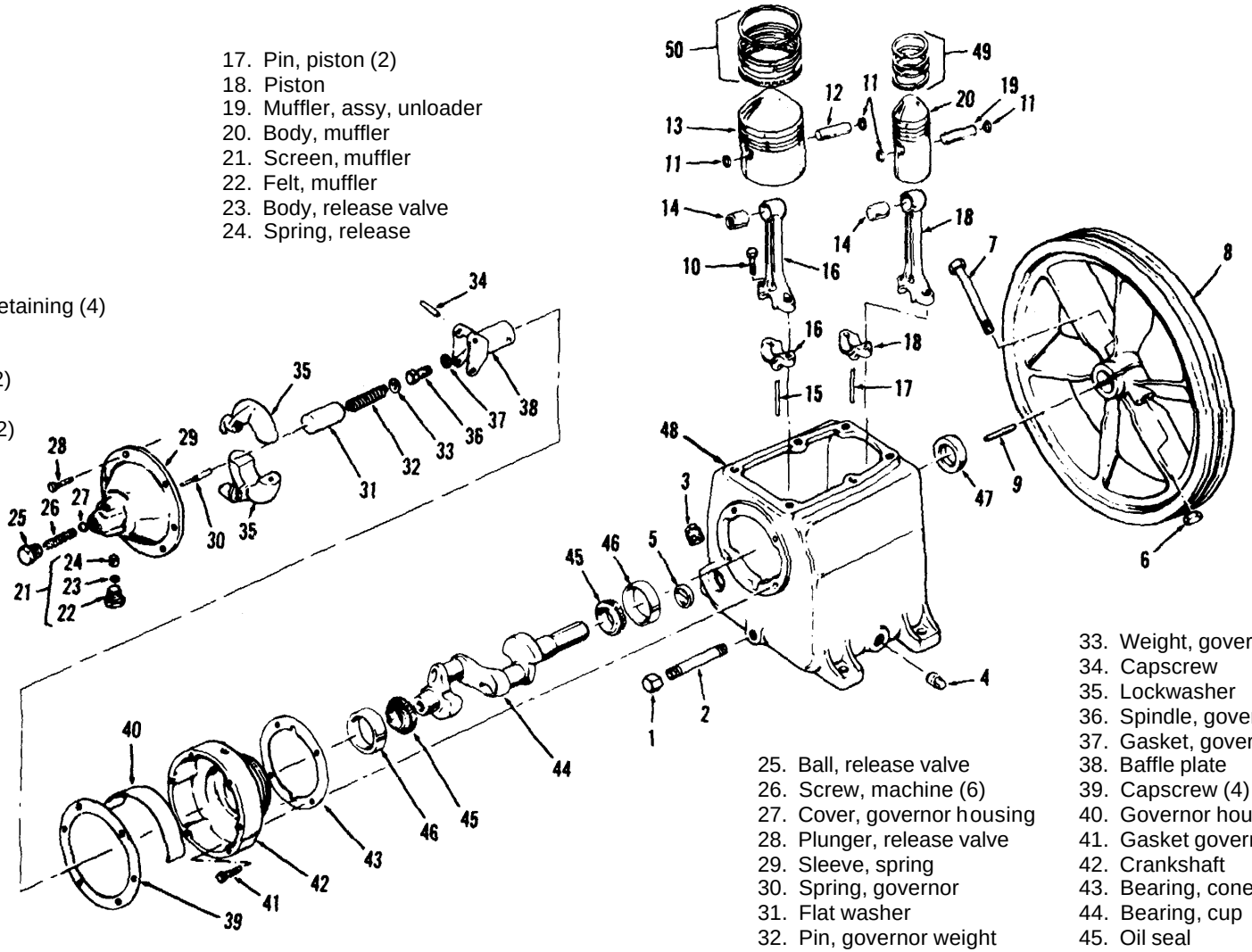
Do not remove piston pin bearings (14) from rods unless replacement is required.

b. Cleaning, Inspection and Repair.

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

(2) Inspect the cylinder block for broken cooling fins and cracks. Inspect the cylinder bore for wear, scoring, pitting or other damage. Replace the block if defective. Refer to Table 5-2 for allowable wear tolerances.

1. Pipe cap
2. Pipe nipple
3. Pipe plug
4. Pipe plug
5. Gauge, oil level
6. Nut
7. Capscrew
S. Fly-wheel
9. Key, flywheel
10. Bolt, connecting
11. Ring, piston pin retaining (4)
12. Pin, piston (2)
13. Piston
14. Bearing, piston (2)
15. Oil dipper t2)
16. Connecting rod (2)
17. Pin, piston (2)
18. Piston
19. Muffler, assy, unloader
20. Body, muffler
21. Screen, muffler
22. Felt, muffler
23. Body, release valve
24. Spring, release



25. Ball, release valve
26. Screw, machine (6)
27. Cover, governor housing
28. Plunger, release valve
29. Sleeve, spring
30. Spring, governor
31. Flat washer
32. Pin, governor weight
46. Crankcase
47. Ring set, piston
48. Ring set, piston
33. Weight, governor
34. Capscrew
35. Lockwasher
36. Spindle, governor
37. Gasket, governor
38. Baffle plate
39. Capscrew (4)
40. Governor housing
41. Gasket governor housing
42. Crankshaft
43. Bearing, cone & roller
44. Bearing, cup
45. Oil seal

Figure 5-9. Crankcase, crankshaft, pistons, connecting rods and related assemblies, exploded view.

(3) Measure the clearance of the piston pin to the piston pin bushing. Check for proper fit. Align or replace connecting rods, if necessary.

(4) Place the piston rings in the cylinder bore with the piston ring square in the cylinder bore about 0.5 inch (12.7 cm) from the top.

(5) If the ring gap is less than the specified width, file across butt ends of the rings to increase the gap to the required tolerance. If the ring gap is greater than required, replace the entire set of rings.

(6) Measure the ring groove in the piston for wear. Replace piston if necessary.

c. Reassembly and Installation.

(1) Refer to figure 5-9 and install piston pin bearings (14) into connecting rods (16) if previously removed. If new piston bearings are to be installed, and are not prefit, ream the bearings. Refer to Table 5-2 for recommended tolerances.

(2) Fit connecting rod into high pressure piston (18) and secure with piston pin (17). Secure piston pin with retaining rings (11). Assemble low pressure piston (13) in a similar manner.

(3) Install piston ring set (48) on the low pressure piston and ring set (47) on the high pressure piston. When installing piston rings expand them carefully and sufficiently to allow the ring to slide freely over the piston to the proper position. Starting with the bottom ring, install piston ring in their proper grooves. Stagger ring gaps so that they are not lined up.

(4) Position of the connecting rod bearing surface to the crankshaft is accomplished from the top of the crankcase by reaching down along side connecting rod to install lower element of connecting rod. Prior to attaching lower element of connecting rods (16) press in oil dipper (15) if they were removed. Use attaching bolts (10) and torque to 25 ft. lbs. torque.

(5) Lubricate each piston and connecting rod assembly with a light coat of engine oil before installing cylinder block. In very cylinder head (37, fig. 5-7) with piston ring clamps secured around the assembled pistons and insert pistons into cylinder.

(6) Carefully assemble the cylinder to the crankcase, after first installing cylinder flange gasket (38). Secure cylinder to crankcase with capscrews (36) torque limits of 45 ft.-lbs. torque.

(7) Normally, the intake (32 and 34) and exhaust (33 and 35) valves are replaced as an assembly if wear or malfunction occurs. In the event the valves were disassembled refer to figure 5-8 for reassembly. When reassembling intake and exhaust valves be sure to seat large diameter of the spring (4, 18, 12 and 26) in the cages (3, 13, 17 and 27) as shown.

(8) Install valves into valve cavities of cylinder. Install manifold assemblies (23, 25, 29 and 31) and tighten capscrews securely.

(9) Assemble intake muffler assembly (12, fig. 5-7) in the reverse order of the reference numbers shown on the exploded figure. Install muffler on low pressure intake manifold (25) and secure with set screw (11).

Table 5-2. Compressor Repair and Replacement Standards

Component	Manufacturer's dimensions and tolerances in U.S. and Metric measurements		Desired clearance		Maximum allowable wear and clearance
	Minimum	Maximum	Minimum	Maximum	
Cylinders					
Bore, low pressure	4.6245 (11.7462)	4.6255 (11.7488)			0.004 (0.6350)
Bore, high pressure	2.4995 (6.3488)	2.5005 (6.3513)			0.002 (0.0008)
Out-of-round					0.001 (0.0025)
Taper					0.001 (0.0025)
Crankshaft					
Journal (rod) size	1.263 (4.1149)	1.625 (4.1275)			
Taper					0.001 (0.0025)
Out-of-round					0.005 (0.0127)
End play			0.000	0.002 (0.0051)	
Pistons and Pins					
Piston, low pressure	4.619 (11.7323)	4.620 (11.7348)	0.003 (0.0076)	0.005 (0.0127)	0.005 (0.0127)
Piston, high-pressure	2.4965 (6.3411)	2.4975	0.0015	0.003 (0.0076)	0.003 (0.0076)
Pin, low pressure	0.8125 (2.0638)	0.8128 (2.0645)	0.0000	0.0005 (0.0013)	
Pin, high-pressure	0.8125 (2.0638)	0.8128 (2.0645)	0.0000	0.0005 (0.0013)	
Bearings Connecting Rod					
Bearing, I.D.	0.8125 (2.0606)	0.8130 (2.0650)	0.001 (0.0025)	0.007 (0.0178)	
Bearing side clearance			0.010 (0.0254)	0.017 (0.0432)	

NOTE

The manufacturer's dimensions and tolerances are given in U.S. and Metric measurements. All Metric units are enclosed in brackets.

(10) Install tubes and fittings using any logical sequence, refer to fig. 5-7 for guidance. Be sure to observe pre-cautions in handing inter-cooler tube (7) so as not to damage cooling fins.

(11) After all tubes and fittings are installed, assemble flywheel (8, fig. 5-9) to end of crankshaft with key (9) in place and secured by bolt (7) and nut (6).

(12) To install compressor assembly on tank refer to paragraph 4-14, b.

5-5. Crankshaft and Crankcase

a. Removal and Disassembly.

(1) Remove cylinder, piston and connecting rod assemblies and flywheel as described in paragraph 5-4, a.

(2) Refer to figure 5-9 and remove release cap valve body (23), lifting cap slowly away from governor housing cover to contain spring (6). Remove spring (6) and ball (25) and plunger (28). Remove governor housing cover (27) slowly from housing (40) to contain spring sleeve (29), main spring (30) and flat washer (31). Remove and discard gasket (37).

(3) Remove baffle plate (38). The governor weights (33) do not necessarily have to be removed from the spindle (36) unless damaged. Remove spindle (36) and housing (40). Housing (40) also houses the crankshaft main bearing assembly (43 and 44) and should be removed carefully to avoid damage to the bearing. Remove and discard gasket (41).

CAUTION

Before driving the crankshaft from the crankcase, be sure the connecting rod journals are in an upright position.

(4) Using a suitable puller remove bearing (43) from crankshaft (42). Remove oil seal (45) from crankcase (46) by pressing in from outside the crankcase on the flywheel side of the case.

(5) Do not remove the oil level gage (5) from the crankcase unless the gage is leaking or defective.

b. Cleaning, Inspection and Repair.

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

(2) Inspect the crankcase for cracks, scores, and distortion. Measure the crankcase journals for wear. If the connecting rod journals measure 0.005 inch (0.0127 cm) out-of-round, refer to Table 5-2, replace the crankshaft.

(3) Inspect the crankshaft bearings for rough, pitted, or scored rollers. Replace a defective bearing.

(4) Inspect the crankcase for cracks, breaks or other defects. Replace the crankcase if defective.

c. Reassembly and Installation.

(1) Insert new oil seal (45, fig. 5-9) into flywheel side of crankcase. Be sure seal is seated properly.

(2) Fit main bearing assembly (43 and 44) to flywheel end of crankshaft (42) and to governor end of crankshaft. Be sure both bearings are seated against stop on shaft. Insert flywheel end of crankshaft through the opening on the governor side of crankcase, through oil seal (45). Crankshaft must be inserted far enough for main bearing assembly to seat properly into crankcase bearing cavity.

(3) At this point assemble governor housing (40), to crankcase (46) leaving out the housing gaskets (41) at this time. Attach the housing to the crankcase with one capscrew at the top and one at the bottom. Be sure the main bearing (43 and 44) on the end of the crankshaft fits properly in housing. Set the two attaching screws finger tight. Using a feeler gauge measure the gap between housing and crankcase at top and bottom of the housing. Average the two dimensions and add 0.005-inch (0.0127 cm). This will determine the selection of gaskets (41) to use. A combination of gaskets should equal the total dimension above. Proper adherence to this procedure will minimize crankshaft end play.

(4) Remove housing from crankcase and install housing gaskets as determined above. Install housing and secure with attaching hardware to torque of 25 ft lbs. torque.

(5) Reassemble governor weights (33) to spindle (36) with weight pins (32) if they were removed. Install spindle in the housing (40) with capscrew (34) and lock washer (35).

(6) Insert flat washer (31) into spindle to cover capscrew head. Insert main spring (30) and spring sleeve (29). Assemble baffle (38) inside and at the top of the housing (40), then attach cover gasket (37) and cover (27) with capscrews (26). Be sure

that spring sleeve and spring have not been dislodged. Assemble release valve plunger (28), ball (25), spring (24) and body (23), install into cover (27). Secure by screwing in release valve body (23) into cover (27).

(7) Reassemble and install flywheel, piston and connecting rod assemblies, and cylinder as described in paragraph 5-4 c.

5-6. Electric Motor.

a. Removal and Disassembly.

(1) Refer to paragraph 4-13 and remove the electric motor.

(2) Refer to figure 5-10 and remove setscrew (1), pulley (2), and key (3).

(3) Remove four thru bolts (4), fan guard (8), lockring (9), fan (10), spacer (11), rear end shield assembly (12), bearing (13), front end shield (5), bearing (6), spring (7), rotor and shaft (15), capacitor case (16), capacitor (17) from stator frame and base (23).

b. Cleaning, Inspection and Repair.

(1) Clean all parts except rotor, bearings and stator in an approved cleaning solvent and wipe dry with a lint free cloth.

(2) Use compressed air to clean dust and dirt off rotor, bearings, and stator, then wipe with a cloth dampened in an approved cleaning solvent.

(3) Inspect bearings and rotor shaft for excessive wear, and rough or scored surfaces. Replace defective bearings. Replace a defective rotor shaft.

c. Reassembly and Installation.

(1) Refer to figure 5-10 and install capacitors (17 and 18), capacitor case (16) on stator frame and base (23).

(2) Install rotor and shaft (15), spring (7), bearing (6), front end shield (5), bearing (13), rear end shield assembly (12), spacer (11), fan (10), lockring (9), fan guard (8), and four thru bolts (4).

(3) Refer to paragraph 4-13 and install electric motor assembly.

5-7. Magnetic Starter.

a. Removal and Disassembly.

(1) Refer to figure 5-11 and remove the magnetic starter as shown.

(2) Refer to figure 5-12 and remove contact cap (11), contact kit (12), contact carrier (13), operating coil (14), coil heater (15), overload relay (16), and interlock assembly (17).

b. Cleaning, inspection and Repair.

(1) Use compressed air and remove all dust or dirt from magnetic starter components.

(2) Check continuity of heater coil, operating coil, relay overload, contact carrier and interlock assembly. Replace defective parts.

(3) Check on-off switch continuity and stem action. Replace a defective on-off switch.

c. Reassembly and Installation.

(1) Refer to figure 5-12 and reassemble interlock assembly (17), overload relay (16), coil heater (15), operating coil (14), contact carrier (13), contact kit (12) and contact cap (11).

(2) Refer to figure 5-11 and install the magnetic starter in reverse order of the removal procedure.

5-8. Air Pressure Switch.

a. Removal and Disassembly.

(1) Refer to figure 5-13 and remove the pressure switch as shown.

(2) Remove cover (1, fig. 5-14), pressure adjusting screw (4), differential adjusting screw and nut (5), top bar (6), equalizer spring (8), main spring (9), conical spring (3), contact board assembly (7), toggle spring (10), toggle (11), lever (12), diaphragm plate (13) and diaphragm (2) from frame assembly (14).

b. Cleaning, Inspection and Repair.

(1) Use compressed air and remove all dust and dirt from pressure switch components, then wipe with a cloth dampened in an approved cleaning solvent.

(2) Inspect the contact board contacts for pitting or burning.

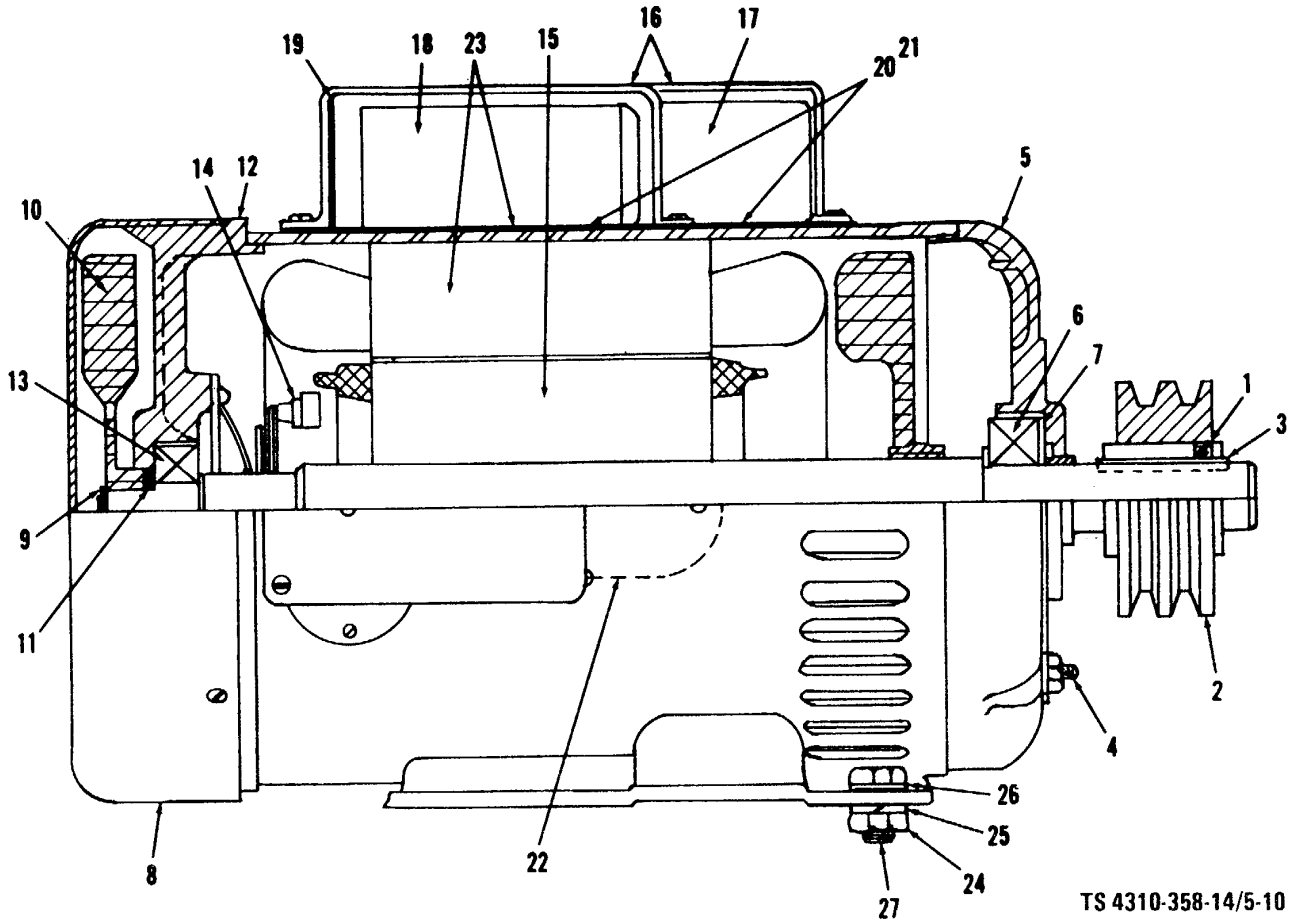
(3) Inspect diaphragm for cracks or breaks and general condition.

(4) Inspect all threaded parts for damaged or defective threads.

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

c. Reassembly and Installation.

(1) Refer to figure 5-14 and reassemble diaphragm (2), diaphragm plate (13), lever (12), toggle (11), toggle spring (10), contact board assembly



1. Set screw, socket
2. Pulley
3. Key
4. Thru bolt
5. End shield, front
6. Bearing
7. Spring
8. Fan guard
9. Lockring
10. Fan
11. Spacer
12. End shield assy, rear
13. Bearing
14. Rotary switch
15. Rotor and shaft assembly
16. Capacitor case
17. Capacitor
18. Capacitor
19. Insulation
20. Gasket
21. Gasket
22. Name plate
23. Stator frame and base
24. Hex nut
25. Lockwasher
26. Flat washer
27. Capscrew

Figure 5-10. Electric motor assembly

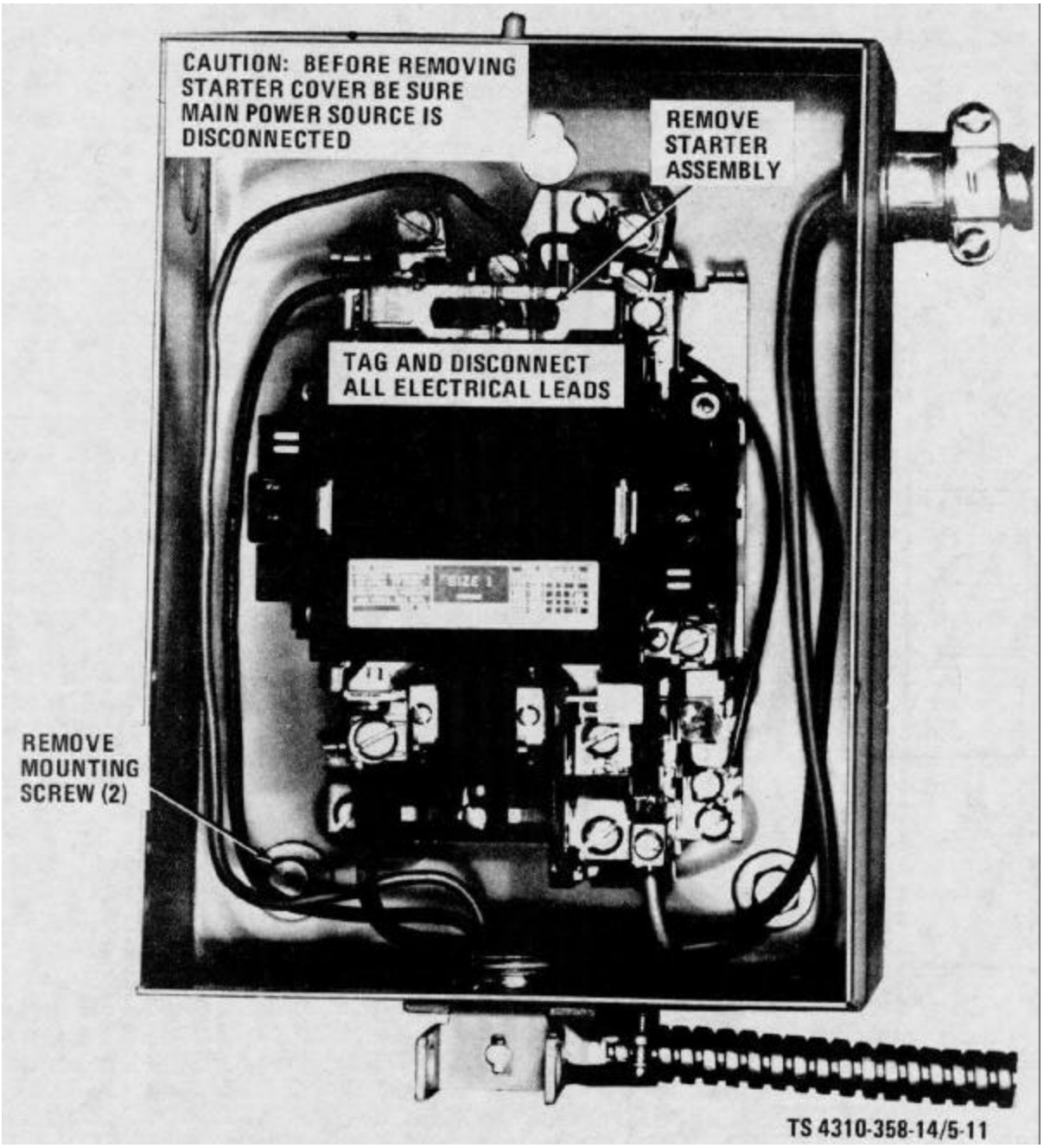
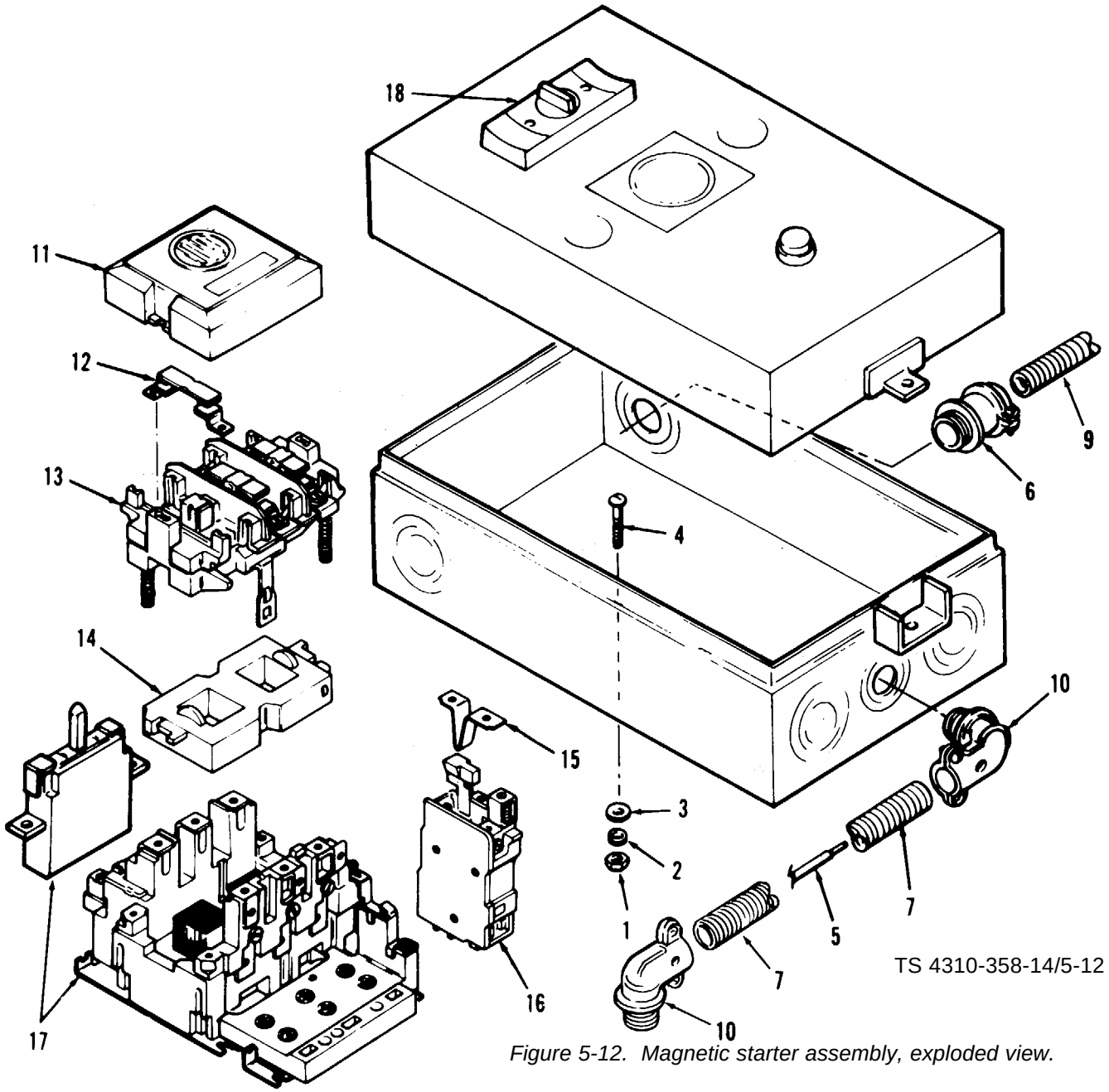


Figure 5-11. Magnetic starter, removal and installation (shown with cover removed).



1. Nut (2)
2. Lockwasher (2)
3. Flat washer (2)
4. Capscrew (2)
5. Wire
6. Connector
7. Conduit, electrical
8. Wire
9. Conduit, electrical
10. Connector (2)
11. Cap, contact cover
12. Contact kit
13. Carrier assy.
14. Coil, operating
15. Coil, heater
16. Relay, overload
17. Interlock assembly
18. Switch, selector
19. Connector

Figure 5-12. Magnetic starter assembly, exploded view.

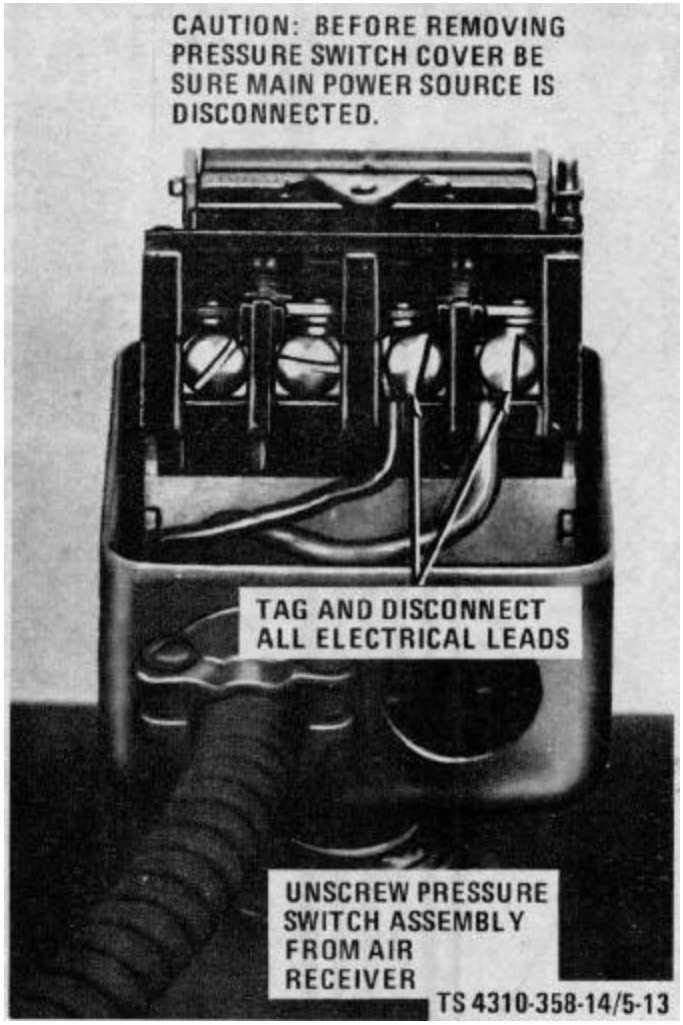
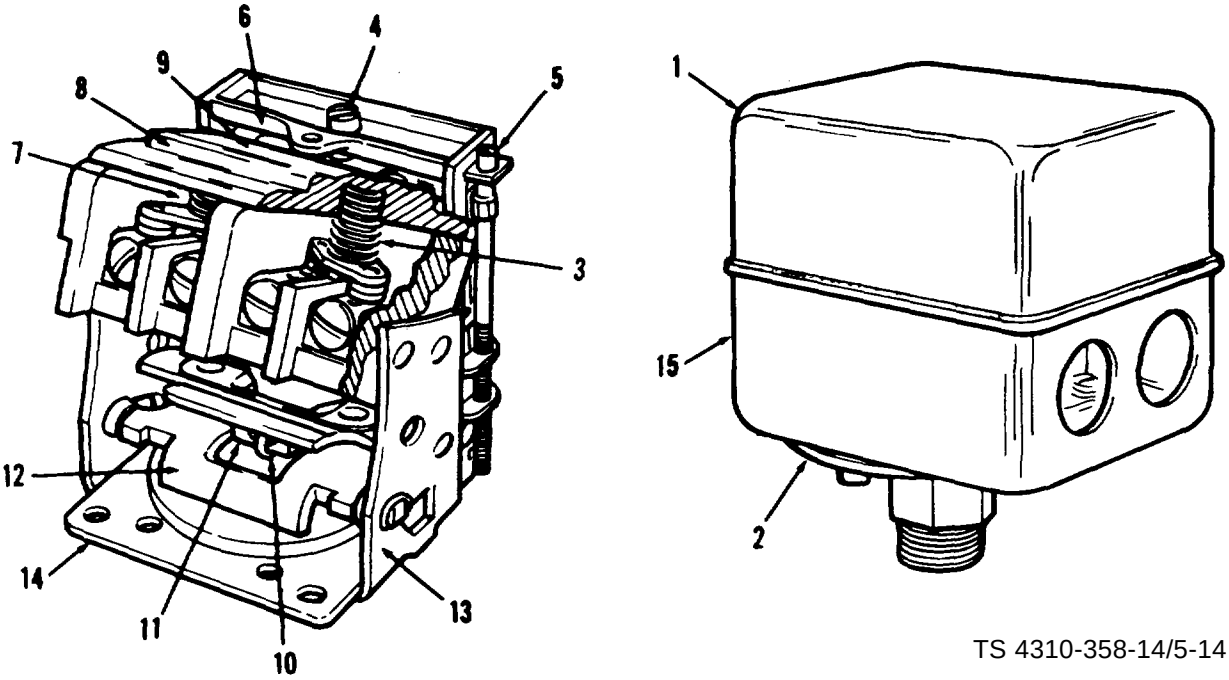


Figure 5-13. Pressure switch assembly, removal and installation (shown with cover removed).



1. Cover
2. Diaphragm
3. Spring, conical
4. Screw, pressure adjusting
5. Screw and nut, differential adjusting
6. Bar, top
7. Contact board assy
8. Spring, equalizer
9. Spring, main
10. Spring, toggle
11. Toggle
12. Lever
13. Plate, diaphragm
14. Frame assembly
15. Enclosure

Figure 5-14. Pressure switch assembly.

(7), conical spring (3), main spring (9), equalizer spring (8), top bar (6), in frame assembly (14), securing with differential adjusting screw and nut (5), and pressure adjusting screw (4). Install cover (1).

(2) Refer to figure 5-13 and install pressure switch reversing the removal procedure.

(3) Set air pressure adjustment as described in paragraph 5-9.

5-9. Air Pressure Adjustment.

a. Start the air compressor (para 2-2) to determine adjustment. The pressure switch is preset by manufacturer at 165 psi CUT-IN, and 190 psi CUT-OUT setting. If adjustment is necessary, shut off the outside power source.

b. Remove cover from pressure switch.

c. To raise the CUT-IN and CUT-OUT pressure turn the pressure adjusting screw clockwise. Refer to figure 5-15.

d. To increase the difference between the CUT-IN and CUT-OUT pressure turn the differential screw clockwise. Refer to figure 5-15.

e. To decrease the difference between the CUT-IN and CUT-OUT pressure, turn the differential screw counter-clockwise. Refer to figure 5-15.

CAUTION

When adjusting the differential screw, do not turn it farther than it will turn easily.

f. To increase the differential and maintain the same CUT-OUT pressure, turn the differential screw clockwise and, at the same time, turn the pressure adjusting screw counterclockwise.

NOTE

If the differential is increased only by turning the differential screw clockwise, the CUT-IN pressure changes only slightly, and the CUT-OUT pressure rises.

g. Turn on the outside power source to check the adjustment. To check the CUT-IN pressure, open the drain cock and allow air pressure to fall below 165 psi. Close the drain cock, and the compressor should start immediately.

h. Install the cover on the pressure switch.

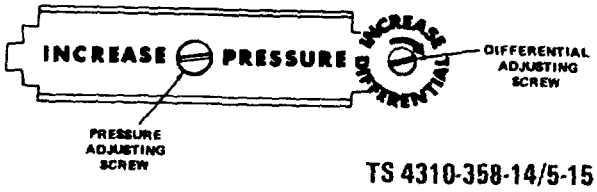


Figure 5-15. Pressure switch adjusting and differential screws.

APPENDIX A
REFERENCES

A-1. Fire Protection

TB 5-4200-200-10	Hand Portable Fire Extinguishers for Army Users.

A-2. Lubrication

C91001L	Fuels, Lubrication, Oil and Waxes,

A-3. Painting

TM 9-213	Painting Instructions for Field Use.

A-4. Cleaning

C6800IL	Cleaning and Chemical Products.

A-5. Maintenance

TM 5-4310-358-24P	Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools List. Compressor, Air, Reciprocating Electric Motor Driven, Receiver Mounted, 5 CFM at 175PSI Model HR 2-6M-2 NSN 4310-01-054-6647.
TM 38-750	The Army Maintenance Management System.

A-6. Shipment and Storage

TB 740-93-2	Preservation of USAMEC Mechanical Equipment for Shipment and Storage.
TM 38-230-1	Preservation and Packing of Military Equipment.

A-7. Destruction of Material to Prevent Enemy Use

TM 750-244-3	Destruction of Material 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 levels.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions on explanatory notes for a particular maintenance function.

B-2. Maintenance Functions.

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, or replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), and item, or system.

j. Overhaul. That maintenance effort (services/actions) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipments/components.

B-3. Column Entries Used in the MAC.

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the names of components, assemblies,

subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. (For detailed explanation of these functions, see paragraph B-2.)

d. Column 4, Maintenance Level. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s); the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform the maintenance function at the indicated level of maintenance. If the number of complexity of the tasks within the listed maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each level. The number of man-hours specified by the work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance levels are as follows:

C ..... Operator or crew
O ..... Organization maintenance
F ..... Direct support maintenance
H ..... General support maintenance
D ..... Depot maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. Column 6, Remarks. This column shall contain a letter code in alphabetical order which shall be keyed to the remarks contained in Section IV.

B-4. Column Entries Used in Tool and Test Equipment Requirements.

a. Column 1, Tools or Test Equipment Reference Code. The tool and test equipment reference code correlates with a maintenance function on the identified end item or component.

b. Column 2, Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National/NATO Stock Number. The National or NATO stock number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

B-5. Explanation of Columns in Section IV.

a. Reference Code. The code scheme recorded in column 6, Section II.

b. Remarks. This column lists information pertinent to the maintenance function being performed as indicated on the MAC, Section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
01	Guard								
0101	Belt Guard	Inspect	0.1						
		Replace	0.5						
	V Belts	Inspect	0.1						
		Adjust	0.8						
		Replace		0.9					
02	Electric Motor & Related Parts								
0201	Electric Motor	Service	0.3						
		Replace		1.0					
		Repair			4.0				
		Inspect		0.1					
0202	Rotor Assy	Inspect	0.1						
		Replace			2.0				
0203	Stator Assy	Inspect			0.1				
		Repair				12.0			
		Replace			2.0				
0204	Motor Starter Assy	Inspect	0.1						
		Repair			1.0				
		Replace			2.0				
0205	Pressure Switch Assy	Adjust		0.5					
		Replace			0.8				
		Repair			1.0				
03	Air Compressor Assy								
0301	Air Compressor	Inspect	0.3						
		Replace		1.5					
		Repair			4.0				
		Overhaul				8.0			
0302	Unloader Assy	Inspect		0.2					
		Repair			1.0				
		Replace		1.0					
0303	Inlet Filter	Service	0.2						
		Replace	0.3						
0304	Valve Assemblies Intake & Exhaust	Inspect		0.5					
		Repair			1.0				
		Replace			1.5				
0305	Rod Assembly	Inspect			0.3				
		Replace			3.0				
0306	Crankshaft Assy	Inspect			0.3				
		Replace			3.0				

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
04	Air Receiver								
0401	Air Receiver Assy	Inspect	0.2						
		Test			1.0				
		Replace			4.0				
		Repair			1.0				
0402	Air Pressure Gauge	Inspect	0.1						
		Test		0.3					
		Replace		0.5					
0403	Valve, Safety Relief	Test			0.1				
		Replace			0.3				
0404	Valve, Check Assy	Test			0.3				
		Repair			0.5				
		Replace		1.0					
0405	Valve, Globe	Inspect	0.1						
		Replace		0.5					
0406	Hose, Air, Assy	Inspect	0.1						
		Repair		0.5					
		Replace		0.3					

ALPHABETICAL INDEX

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DATE

PUBLICATION NUMBER	DATE	TITLE
TM 5-4310-358-14	31 Dec 79	Compressor, Air, Reciprocating 5 CFM at 175 PSI Model No. HR2-6M-2 NSN 4310-01-054-6647

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.
6	2-1 a		
81		4-3	
125	line 20		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders.

Callout 16 on figure 4-3 is pointing at a bolt. In the key to fig. 4-3, item 16 is called a shim. Please correct one or the other.

I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered so the NSN is wrong. Please give me a good NSN.

SAMPLE

TYPED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
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SIGN HERE:
John Doe

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REVERSE OF DA FORM 2028-2

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 Meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = 0.35 ounce
1 dekagram = 10 Grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fluid ounce
1 deciliter = 10 centiliters = 3.38 fluid ounces
1 liter = 10 deciliters = 33.81 fluid ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 27.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 125.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. decimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	To	Multiply by	To change	To	Multiply by
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pounds-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit Temperature	5/9 (after subtracting 32)	Celsius Temperature	°C