

**TECHNICAL MANUAL**  
**OPERATOR, ORGANIZATIONAL, DIRECT AND**  
**GENERAL SUPPORT MAINTENANCE MANUAL**  
**COMPRESSOR, AIR**  
**RECIPROCATING, ELECTRIC MOTOR DRIVEN**  
**RECEIVER MOUNTED, 2 HP, 5 CFM, 175 PSI**  
**INGERSOLL-RAND MODEL CM234F2**  
**(NSN 4310-00-604-4368)**

**This copy is a reprint which includes current  
pages from Change 1.**

**SAFETY PRECAUTIONS**

**WARNING  
COMPRESSED AIR AND ELECTRICITY  
ARE DANGEROUS**

Before performing any maintenance, or adjustments, be sure the electrical supply has been shut-off, and locked out. Also be certain that the internal system of the compressor has been vented of all air - pressure.

**WARNING**

Tag, then disconnect the manual switch. Never rely on the motor starter for complete removal of a power source.

**WARNING**

Dry cleaning solvent P-D-680, used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C) - 138°F (59°C).

CHANGE }  
No. 1 }

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, DC, 12 February 1979

**OPERATOR, ORGANIZATIONAL, DIRECT AND  
GENERAL SUPPORT MAINTENANCE MANUAL**

**COMPRESSOR, AIR  
RECIPROCATING, ELECTRIC MOTOR DRIVEN  
RECEIVER MOUNTED, 2 MP, 5CFM, 175 PSI  
INGERSOLL-RAND MODEL CM234F2  
NSN 4310-00-604-4368**

TM 5-5420-209-20P, 13 February 1976, is changed as follows:

1. Remove old pages and insert new pages as indicated below.

*Remove Pages*

i and ii  
1-1 thru 1-4

*Insert Pages*

i and ii  
1-1 thru 1-4  
C-1 and C-2  
D-1/(D-2 blank)

2. New or changed material is indicated by a vertical bar in the margin of the page.
3. Added or revised illustrations are indicated by a vertical bar adjacent to the identification number.
4. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

Official:

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

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

Distribution:

To be distributed in accordance with DA Form 12-25A, Operator maintenance requirements for Air Compressors, 5 CFM.

**OPERATOR, ORGANIZATIONAL, DIRECT AND  
 GENERAL SUPPORT MAINTENANCE MANUAL**

**COMPRESSOR, AIR  
 RECIPROCATING, ELECTRIC MOTOR DRIVEN  
 RECEIVER MOUNTED, 2 HP, 5CFM, 175 PSI  
 INGERSOLL-RAND MODEL CM234F2  
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**REPORTING OF ERRORS**

You can help to improve this manual by calling attention to errors and by recommending improvements. Your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms) and/or DA Form 2028-2 (Recommended Changes to Equipment Technical Manuals), may be used. Copies of DA Form 2028-2 are attached in the back of the manual for your use. Please mail your recommended changes directly to Commander, U. S. Army Troop Support Command, ATTN: DRSTS-MPP, 4300 Goodfellow Blvd., St. Louis, Missouri 63120. A reply will be furnished directly to you.

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## CHAPTER 1 INTRODUCTION

### Section I. GENERAL

#### 1-1. Scope

This manual is published for use by the personnel responsible for the operation and maintenance of the Air Compressor, Reciprocating, Electric Motor Driven, Receiver Mounted, 2 H. P., 5 CFM, 175 PSI (Ingersoll-Rand Model CM234F2) (Fig. 1-1 and 1-2). It provides all necessary information on operation and maintenance of the equipment, with description and function of main units in relationship to other components.

#### 1-2. Maintenance Forms and Records

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

- a. DA Form 2404 (Equipment Inspection and Maintenance Worksheet).
- b. DA Form 2407 (Maintenance Request Used for Requesting Support Maintenance).
- c. DA Form 2407-1 (Continuation Sheet Used for Requesting Support Maintenance).
- d. For further information, refer to TM 38-750, the Army Maintenance Management System (TAMMS).

##### 1-2.1. Hand Receipt

Hand receipt for the End/Component of End Item (COEI), Basic Issue Items (B11) and Additional Authorization List (AAL) Items are published in a Hand Receipt Manual. The Hand Receipt Manual numerical designation is the same as the related Technical Manual with the letters HR added to the number. These manuals are published to aid in property accountability and are available through: Commander, U. S. Army Adjutant General Publication Center, ATTN: AGDL-OD. 1655 Woodson Road, St. Louis, MO 63114.

#### 1-3. Equipment Serviceability Criteria (ESC)

"This equipment is not covered by an ESC."

#### 1-4. Destruction of Army Equipment to Prevent Enemy Use.

a. Place as many of the following charges as the situation permits and detonate them simultaneously with detonating cord and suitable detonator.

(1) One 1/2-pound (.22 kilogram (kg)) charge between the compressor and the air receiver tank.

##### NOTE

The above step is a minimum requirement for this method.

(2) One 1/2-pound (.22 kg) charge between the engine or motor and the air receiver tank.

b. For further information refer to TM 750-244-3, Procedures for Destruction of Equipment to Prevent Enemy Use.

#### 1-5. Administrative Storage

a. 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. For example, strategically locate recovery vehicles, snowplows, slave units, and similar items, likely to be needed on short notice.

b. 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 the adequate precautions.

c. Establish a fire plan and provided for adequate firefighting equipment and personnel.

d. For further information, refer to TM 740-90-1, Administrative storage.

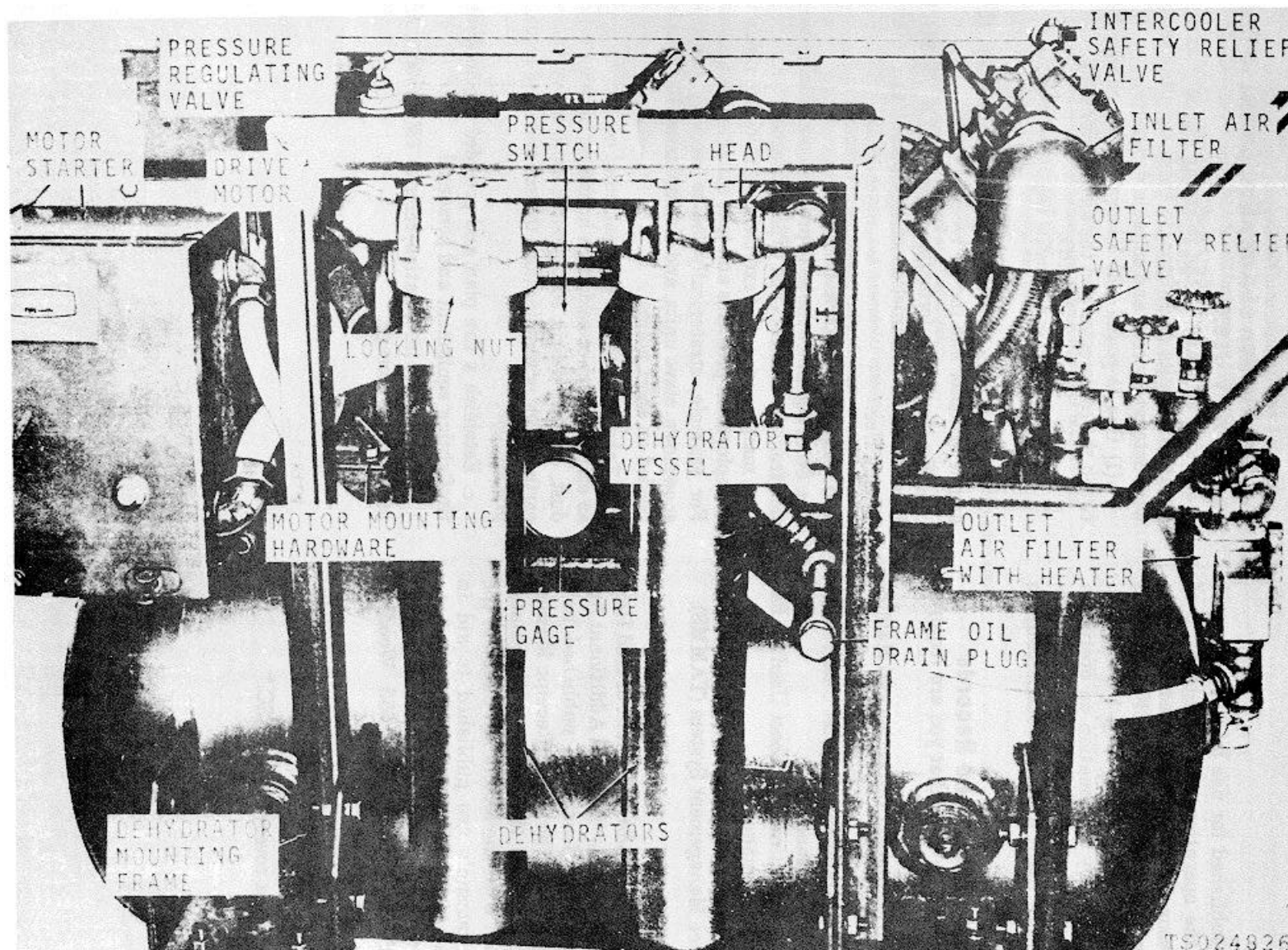


Figure 1-1. Air compressor, front view.

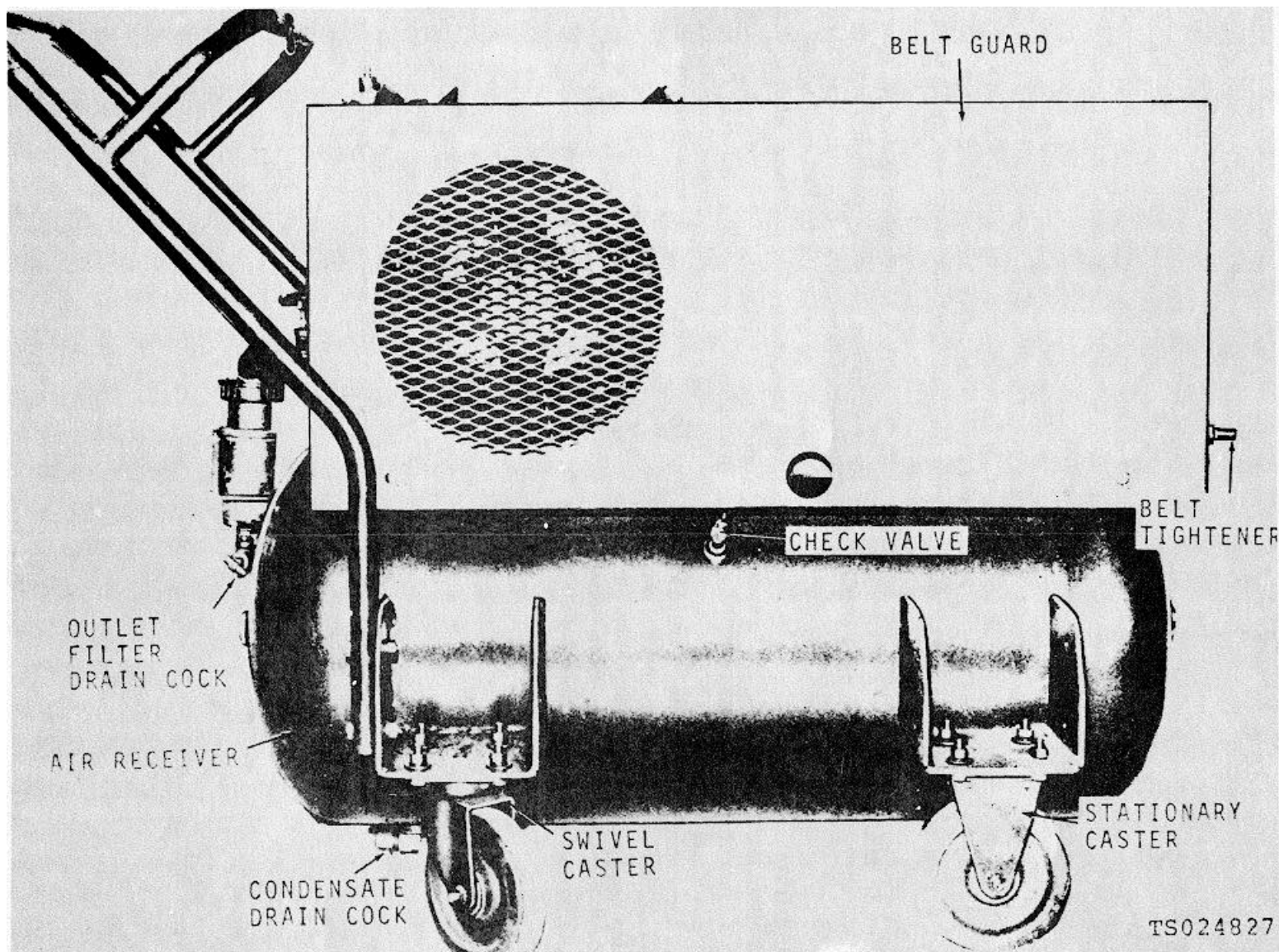


Figure 1-2. Air compressor, rear view.



Section II. DESCRIPTION AND DATA

1-6. Description.

The 2 HP Electric Motor Driven Air Compressor, Model CM234F2, is a two-stage, single acting, air cooled compressor that delivers 5 CFM at 175 PSI. The compressor is equipped with an intercooler of finned tubing between 2nd stage cylinder and the air receiver. The compressed air passing through these tubes is cooled by air drawn in by the fan type spokes of the pulley-flywheel. This causes condensed moisture to form in the receiver, which must be drained manually from the condensate draincock (fig. 1-2) daily. To further dry the compressed air before use, this compressor is equipped with a heated outlet air-filter and two dehydrators in the outlet air line (fig. 1-1). The maintenance paragraphs of this manual contain detailed description of its components.

1-7. Difference in Models

There are no known differences between units of this model.

1-8. Tabulated Data

a. Identification and Instruction Plates. The location and informational content of the six major identification and instruction plates follow:

(1) The U.S. Army identification plate is located at the top center of rear panel of the totally inclosed belt guard, and contains the ownership designation, nomenclature, model number, contract number, serial number, capacity, gross weight, cube, NSN manufacture date, shipping dimensions, motor serial number, and the manufacturer's name.

(2) Instruction plate for operating is located directly below the identification plate described in ((1) above), and contains complete instructions for prestarting maintenance and service.

(3) The manufacturer's identification plate is located on cover of the compressor frame and contains the manufacturer's name, model number, and serial number.

(4) An instruction plate is located on the inlet filter, and concerns cleanliness of the filter pads.

(5) An instruction plate is located at the top left of rear panel of the totally inclosed belt guard, with a red arrow denoting direction of rotation of motor and compressor.

(6) The manufacturer's identification plate for the motor is located on the stator body, and contains the manufacturer's name, model, type, voltage, serial number, and a wiring schematic for hookup of 115/230V ac.

b. Air Compressor, Reciprocating, Electric Motor Driven.

- (1) Manufacturer      Ingersoll-Rand Compressor Division, Campbellsville, Ky.
- Type .....2 stage, single acting
- Model .....CM234F2
- Revolutions per minute... 610 rpm
- Bore:
- First Stage .....3 in. (inch) (7.6 CM) (centimeters)

Second Stage ..... 13/4 in. (4.6 CM)  
 Stroke ..... 3 in. (7.6 CM)  
 Intercooler ..... Tube, air cooled  
 Aftercooler ..... Tube, air cooled  
 Motor Manufacturer ..... Marathon Electric,  
 Wausau, Wisconsin  
 Model ..... 182TCDR7072, Frame  
 182T Constant speed,  
 ball bearing horizontal,  
 drip proof  
 Voltage ..... 115/230V ac (volts  
 alternating current)  
 (115Vac initial setting)  
 Rating/speed ..... 2 hp/1750 rpm

Phase/hertz ..... Single/60  
 (2) Controls  
 Motor Starter Mfg ... Clark Div. of A. O.  
 Smith  
 Pressure Switch .... Mfg. Allen-Bradley  
 Company Milwaukee,  
 Wisconsin  
 Size ..... Bulletin 830-C5  
 Style ..... 900

c. *Mounting.* This compressor is castor mounted, and portable.

d. *Wiring Diagram.* Refer to figure 1-3 for the initial wiring diagram.

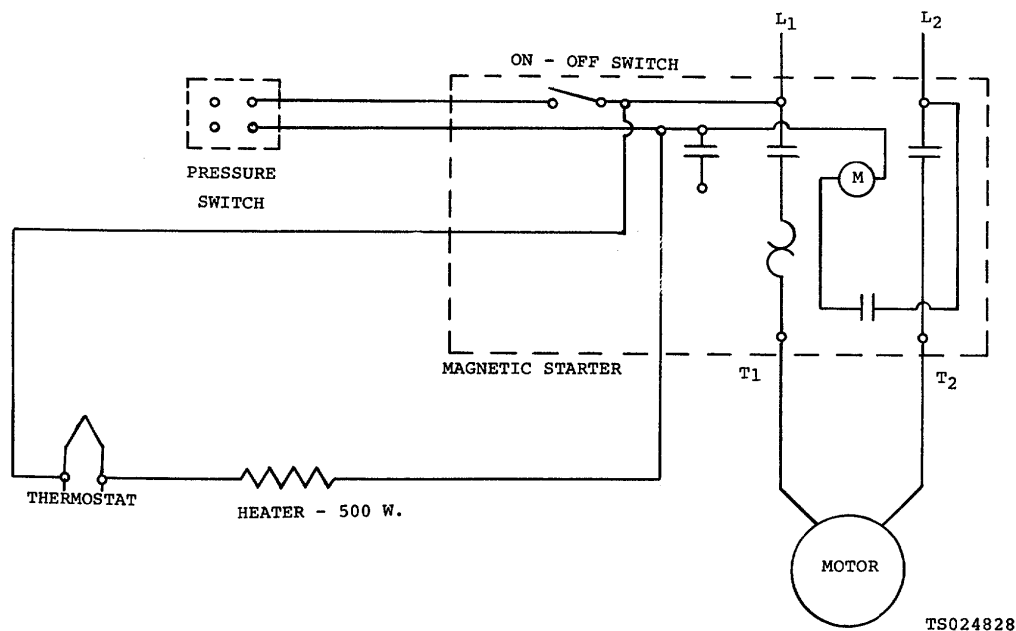


Figure 1-3. Wiring

e. *Torque Application.* Refer to Table 1-1 for the manufacturer's recommended torque values.

Table 1-1. Table of Manufacturer Torque Values

and Pitch	National Coarse			
	Foot pounds		Meter kilograms	
	Minimum	Maximum	Minimum	Maximum
- 20	6	6	0.83	0.97
- 18	12	14	1.66	1.93
- 16	21	24	.90	3.32
- 13	52	59	7.20	8.15
- 11	106	120	14.50	16.60
- 10	170	190	23.50	26.50

Table 1-1. Table of Manufacturer Torque Values-Continued  
National Fine

and Pitch	Foot pounds		Meter kilograms	
	Minimum	Maximum	Minimum	Maximum
- 28	5	6	0.69	0.83
- 24	9	10	1.24	1.38
- 24	14	16	1.93	2.21
- 20	40	42	5.52	5.80
- 18	60	70	8.30	9.55
- 16	100	120	13.80	16.60

f. *Manufacturer Tolerances.* Refer to Table 1-2 for the manufacturer recommended tolerances.

Table 1-2. Table of Manufacturer Dimensional Tolerances

Model CM234F Item nomenclature	Clearance		Dimension for disposal
	Minimum	Maximum	
Piston to bore: 3 in. Cylinder diameter	0.003 in. (0.0076CM)	0.004 in. (0.0101CM)	0.005 in. (0.0127CM)
1 3/4 in. cylinder diameter	0.0025 in. (0.0063CM)	0.0035 in. (0.0088CM)	0.0045 in. (0.0114CM)
Ring end gap (ring installed in bore) Both Cylinders	0.005 in. (0.0127CM)	0.015 in. (0.0381CM)	0.020 in. (0.0508CM)
Piston pin to piston: Both Cylinders	0.0003 in. (0.00076CM)	0.0009 in. (0.0022CM)	0.0012 in. (0.0030CM)
Piston pin to connecting rod: Both Cylinders	0.0002 in. (0.0005CM)	0.0007 in. (0.0018CM)	0.00095 in. (0.0024CM)
Crank pin bushing to connecting rod: Both rods	0.001 in. (0.0025 CM)	0.002 in. (0.005CM)	0.0025 in. (0.006CM)

## CHAPTER 2 OPERATING INSTRUCTIONS

### Section I. OPERATING PROCEDURES

#### 2-1. Controls and Instruments

a. *General.* This section will describe the various controls and instruments and provide the operator sufficient information to insure proper operation of the air compressor.

b. *Motor Starter.* The motor starter (fig. 1-1) must be connected to a controlled power source of 115 volts alternating current. When that power reaches the motor starter, and the ON-OFF switch is moved to ON,

the motor will drive the compressor until the pressure switch is actuated (c. below).

c. *Pressure Switch.* The pressure switch (sheet 1 of 3, fig. 2-1) is the automatic start and stop control. It makes and breaks the electrical circuit that starts and stops the driving motor. The pressure switch is piped to the air receiver and is actuated by changes of air pressure in the air receiver.

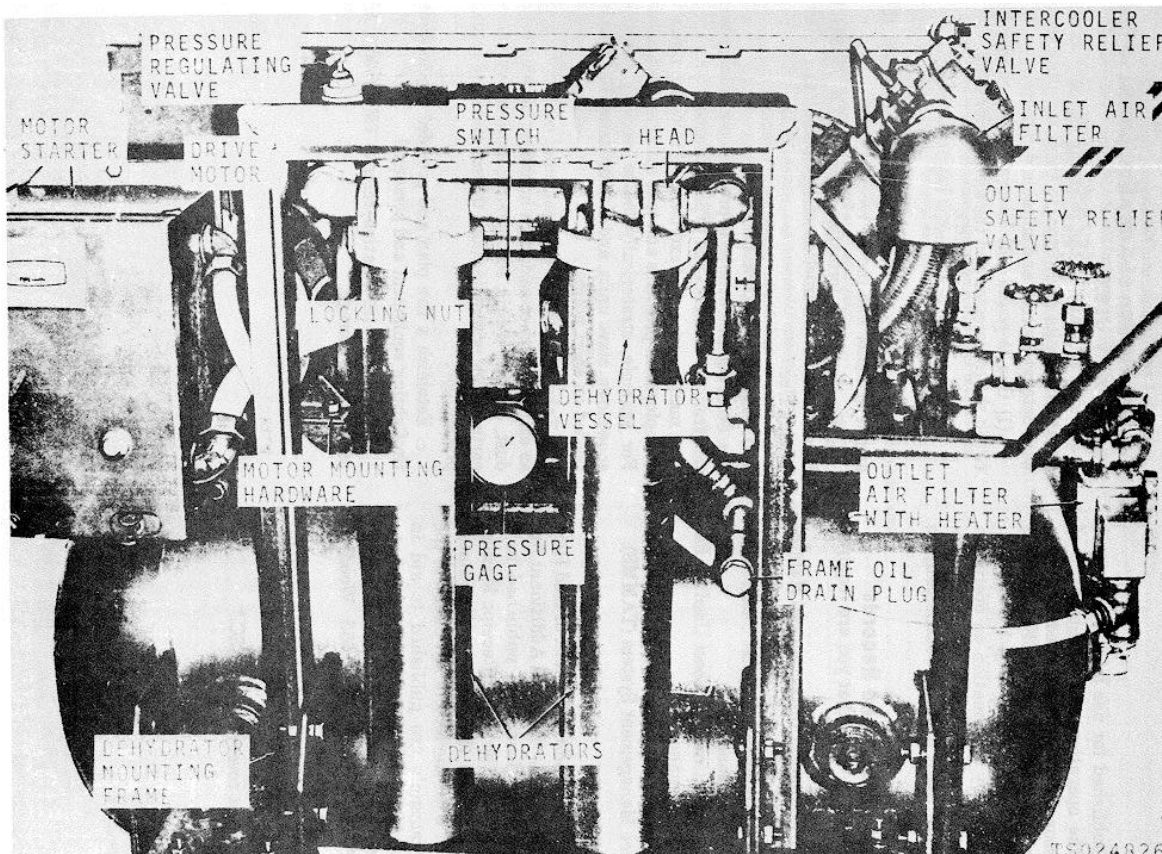


Figure 2-1. Air compressor controls and instruments (Sheet 1 of 3).

d. *Pressure Gage.* The pressure gage (sheet 1 of 3, fig. 2-1), dial is marked with a dotted line at 175 psi, and a solid line at 200 psi. When the gage indicator band indicates 175 psi (or lower) the pressure switch will turn the drive motor ON. When the indicator reaches 200 psi, the pressure switch will turn the drive motor OFF.

e. *Safety Relief Valves.* The two safety relief valves (sheet 2 of 3, fig. 2-1), are set by the factory to blow off at 210 psi. This presents dangerous pressure, should the pressure switch become inoperative.

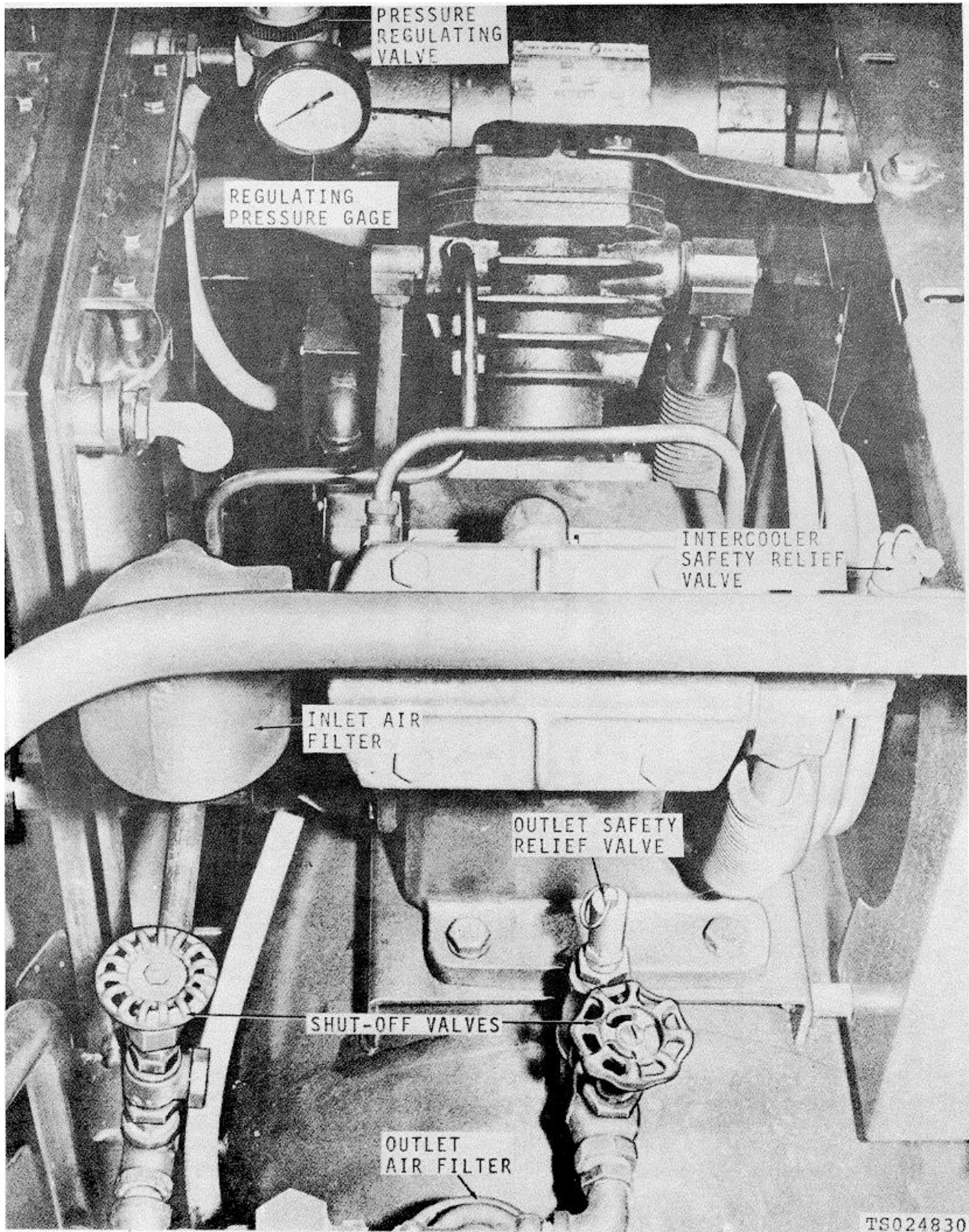


Figure 2-1. Air compressor controls and instruments (Sheet 2 of 3).

f. *Check Valve.* There is a check valve (fig. 1-2) screwed into the air receiver at the point where the after-cooler line enters the air receiver. This check valve prevents air from receiver returning to the compressor after it has stopped, and the unloaded pilot valve has released all pressure inside the air compressor.

g. *Pressure Regulating Valve.* The pressure regulating valve (sheet 1 of 3, fig. 2-1) provides a means of

adjusting the flow of filtered dry air into a reduced pressure when required for instrument repair, or other delicate use.

h. *Pilot Valve (unloader).* The unloader pilot valve (sheet 3 of 3, fig. 2-1) allows pressure to bleed off the cylinders when compressor is stopped, for ease in starting the compressor without tripping the motor overload relay.

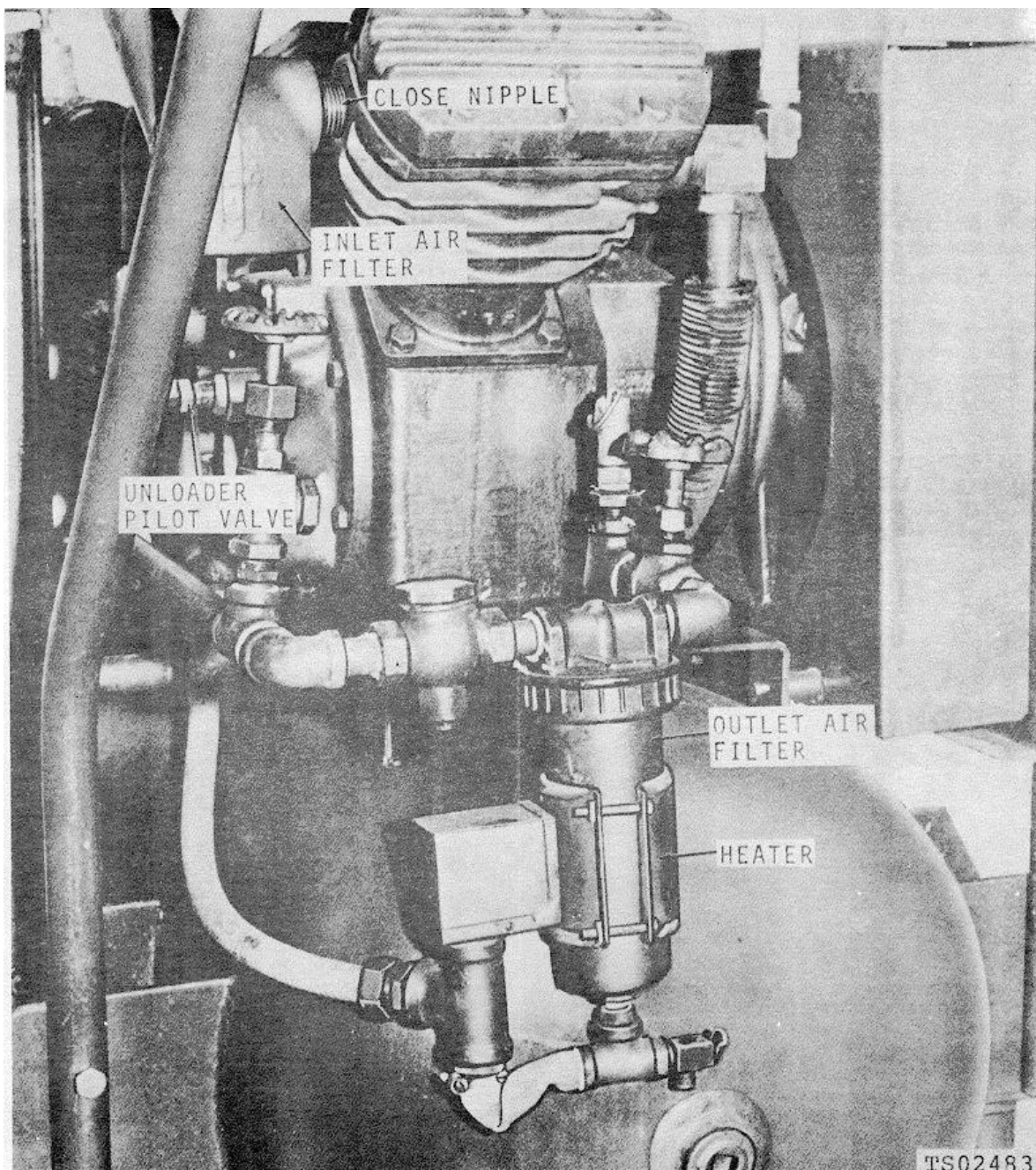


Figure 2-1. Air compressor controls and instruments (Sheet 3 of 3).

**2-2. Operation Under Usual Conditions**

- a. *Preparation for Starting.*
  - (1) Perform the before operation services (Table 3-1).
  - (2) Check that all tools, rags or other foreign objects have been removed from the compressor (receiver) area.
  - (3) With ON-OFF switch on motor starter at OFF, turn on power from source.

**CAUTION**

**When moving ON-OFF switch to ON, be prepared to stop the compressor instantly, if rotation does not match the direction indicated by the red arrow at upper left of belt guard.**

- b. *Starting.* Start the air compressor by moving the motor starter ON-OFF switch to ON.
- c. *Stopping.* Stop the air compressor by moving the motor starter ON-OFF switch to OFF.
- d. *Placing Unit in Stand-by Condition.* Place unit in stand-by condition as follows:
  - (1) Check frame oil level (LO 54310-352-12).
  - (2) Drain condensate from air receiver (para 3-14).
  - (3) Move ON-OFF switch on motor starter to OFF.
- e. *Placing Unit in Shutdown Condition.*
  - (1) Perform steps (1) through (3) of *d.* above.
  - (2) Turn power off at source and lock it out.

**Section II. OPERATION UNDER UNUSUAL CONDITIONS**

**2-3. Operation in Extreme Cold**

- a. *General.* When this compressor is to be used in extremely cold weather, it should be installed in a heated building. When this is impossible (if installed in a truck van), provisions should be taken to warm the crankcase oil before starting.
- b. *Lubrication.* Lubricate the compressor in accordance with LO 5-4310352-12.
- c. *Condensate.*
  - (1) Drain condensate frequently.
  - (2) When the air compressor is to be shut down for several hours, drain the receiver of air and condensate and leave the draincock open. Tag starter switch with notification to close draincock before starting.

**2-4. Operation Under Humid Conditions**

- a. *General.* In area of high humidity water will collect in the frame. If the operation is very intermittent, lack of proper ventilation will cause rusting, oil sludging, and rapid wear of moving parts.
- b. *Ventilation.* Assure that unit is positioned so that air circulates completely around the compressor unit.
- c. *Operation.* Assure that the compressor unit cycles on and off frequently. If necessary because of irregular or insufficient use, drain the air receiver of air and condensate (para 3-14) frequently.
- d. *Lubrication.* Check oil in frame daily to ascertain when water is collecting and change oil (LO 54310-352-12) when water is noticed in frame.

**CHAPTER 3**  
**OPERATOR/CREW MAINTENANCE INSTRUCTIONS**

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**Section I. LUBRICATION INSTRUCTIONS**

**3-1. General**

a. 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 contaminate the lubricants. Keep all lubrication equipment clean.

b. Wipe lubrication points free of dirt before lubricating. Clean lubrication points after lubricating to lessen accumulation of foreign matter.

**3-2. Lubrication Instructions**

Lubricate in accordance with LO 5-431035212.



-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					Intervals given are in hours of normal operation
Compressor Crankcases	7/8 qt	OE/HDO 30	OE/HDO 10	OES	
OES-OIL, Engine, Sub-zero					

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW -10 F. (-23 C). Remove lubricants prescribed in the key for temperatures above -10 F. (-23 C). Relubricate with lubricants specified in the key for temperatures below -10 F. (-23 C).

2. LUBRICANTS. The following is a list of lubricants with the Military Symbols and applicable Specification numbers.  
 OE/HDO MIL-L-2104C      OES MIL-L-10295

DISTRIBUTION: To be distributed in accordance with DA Form 12-23A (sty rev block no. 3) Operator maintenance requirements for Air Compressors.

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:  
 FRED C. WEYLAND  
 General, United States Army  
 Chief of Staff

OFFICIAL:  
 PAUL T. SMITH  
 Major General, United States Army  
 The Adjutant General

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L05-4310-352-12

Figure 3-1. Lubrication order (sheet 1 of 2).

**LUBRICATION**

**ORDER**

# L05-4310-352-12

**COMPRESSOR, AIR, RECIPROCATING, ELECTRIC MOTOR DRIVEN,  
RECEIVER, MOUNTED, 2 HP, 5 CFM, 175 PSI (INGERSOLL-RAND  
MODEL CM234F2) NSN 4310-00-604-4368**

Reference: FEDERAL SUPPLY CATALOG C9100-IL

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

Clean parts with SOLVENT, Dry-cleaning, Type II, (SD-2). Dry before lubricating.

Drain crankcase when hot. Fill and check level.

Relubricate after washing.

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

* TOTAL MAN-HR		* TOTAL MAN-HR	
INTERVAL	MAN-HR	INTERVAL	MAN-HR
10	0.1	500	0.5

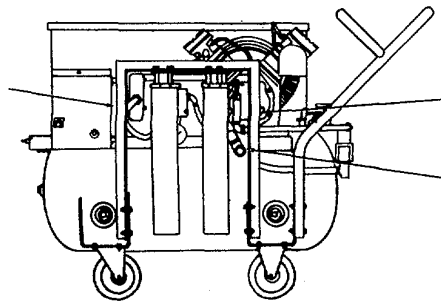
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LUBRICANT ● INTERVAL

INTERVAL ● LUBRICANT

Motor Bearings  
(Sealed bearings no  
lubrication required)



10 Compressor Crankcase OE/HDO  
Fill and Level Plug  
(Check level) (See key)

500 Compressor Crankcase  
Drain Plug  
(Drain and refill)

TS024832

Figure 3-1. Lubrication order (sheet 2 of 2).

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

**3-3. General**

a. To ensure that the air compressor is ready for operation at all times it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure.

b. The necessary preventive maintenance checks and services to be performed are listed and described in Tables 3-1 and 3-2.

c. Defects discovered during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed which would damage the equip-

ment if operation were continued. All deficiencies and shortcomings will be recorded, together with corrective action taken on DA Form 2404 (Equipment Inspection and Maintenance Worksheet), at the earliest opportunity.

**3-4. Preventive Maintenance Checks and Services**

Because all required inspections are made daily, or more frequently, operator/crew personnel will refer to Tables 3-1 and 3-2 for procedures to be followed during periodic inspection.

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

B-Before Operation  
Time required: 0.1

D-During Operation  
Time required: 0.1

A-After Operation  
Time required:

Interval and sequence No.			Item to be inspected procedure	Work time (M/H)
B	D	A		
1	1		<p><b>NOTE</b></p> <p>Visually inspect for evidence of lubricant leak concurrently with daily service checks. Remove fill plug in frame below pilot relief valve (LO 5-4310352-12)</p> <p><b>OBSERVE PRESSURE GAGE OPERATION</b></p> <p>Watch pressure gage reading when the motor starts, and stops. Motor should start when gage reads 175 psi. Motor should stop when gage reads 200 psi. When gage operation is improper, notify organizational maintenance.</p>	0.1 0.1

Table 3.2. Operator/Crew Preventive Maintenance Checks and Services

D-Daily  
Time required: 0.2

W-Weekly  
Time required: 0.4

Interval and Sequence No.		Item to be inspected procedure	Work time (M/H)
D	W		
	1	<p><b>WARNING</b></p> <p><b>Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100 °F (38°C) - 138°F (59°C).</b></p> <p><b>CAUTION</b></p> <p><b>Use cleaning solvent Fed Spec P-D-680 to wipe away oil or grease from the compressor frame, intercooler, or aftercooler tubes</b></p> <p><b>NOTE</b></p> <p><b>Brushes or vacuum may be used to remove dust from cylinder cooling fins, and cooling tubes.</b></p>	0.1
1		<p><b>CLEANLINESS OF EQUIPMENT</b></p> <p>Inspect the exterior of the air compressor The belt guard, motor, V-belts, compressor and the receiver should be clean and free of dust, dirt, or oil.</p>	0.1
	2	<p><b>CHECK THE FRAME OIL LEVEL AND DRAIN CONDENSATE FROM AIR RECEIVER</b></p> <p>Inspect oil level. Fill to the overflow point if necessary. Open draincock at bottom of air receiver (fig. 1-2) long enough to drain condensate, then close the draincock</p>	0.1
		<p><b>INSPECT HOSES AND FITTINGS</b></p> <p>Inspect for leaks, or loose connections. Notify organizational maintenance of defective fittings.</p>	0.1

Table 3-2. Operator/Crew Preventive Maintenance Checks and Service Continued

D-Daily  
Time required: 0.2

W-Weekly  
Time required: 0.4

Interval and Sequence No		Item to be inspected procedure	Work time (M/H)
D	W		
2		<b>SWITCHES AND CONTROLS</b> Check for loose wires on switches, motor starter, or motor. Notify organizational maintenance of defect.	0.1
	3	<b>DRIVE BELTS</b> Check for wear and proper tension of drive belts. Adjust belts by moving motor away from compressor and tighten mounting nuts.	0.1
	4	<b>SAFETY RELIEF VALVES</b> Check for proper operation, by lifting lever (fig. 2-1, sheet 2 of 3) until air escapes.	0.1

**Section III. TROUBLESHOOTING**

**3-5. General**

a. This section contains troubleshooting information for locating and correcting most of the trouble that may develop in the air compressor. Each malfunction for an individual component is followed by a list of test or inspections which will help you to determine probable causes and corrective actions to take. You should perform the test inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective action, you should notify higher level maintenance.

**3-6. Troubleshooting**

Refer to Table 3-3 below for malfunctions, test or inspection, and corrective actions.

Table 3-3. Troubleshooting

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

**NOTE**

Before you use this Table, be sure you have performed all applicable operating checks. If you have a malfunction which is not listed in this table, notify the next higher level of maintenance.

**1. COMPRESSOR PUMPING OIL**

- Step 1. Check for a clogged inlet filter.
  - (1) Clean body of filter, inspect pads for excessive wear or loss of capacity **to retain dust and dirt.**
  - (2) Replace defective pads.
- Step 2. Check oil level (LO 5-4310352-12).  
**Add oil if necessary.**
- Step 3. Check for leaking or maladjusted pilot valve.  
**Adjust pilot valve (para 3-12).**

**2. KNOCKS OR RATTLES**

- Step 1. Check for loose belt pulley, or motor with excessive end play in shaft.  
**Notify organizational maintenance.**
- Step 2. Check for leaking valves, or restricted air passage.  
**Notify direct support maintenance.**

**3. AIR DELIVERY DROPPING**

- Step 1. Check for clogged inlet filter.  
**Service the inlet filter (para 3-13).**
- Step 2. Check for air leaks in piping.  
**Make a solution** of soapy water and apply at fittings. If leak is found, notify organizational Maintenance.
- Step 3. Check for leaking or maladjusted pilot valve.

Adjust the pilot valve (para 3-12). If leaking, notify organizational maintenance.

**4. MOTOR OVERLOAD RELAY TRIPS**

- Step 1. Check lubricating oil used.  
**Use proper** oil as specified in **lubrication order.**
- Step 2. Check V-belts for too tight adjustment.  
**Adjust V-belts (para 3-8).**
- Step 3. Check for leaking or maladjusted pilot valve.  
**Adjust the pilot valve (para 3-12). If leaking notify organizational maintenance.**

Table 3-3. Troubleshooting Continued

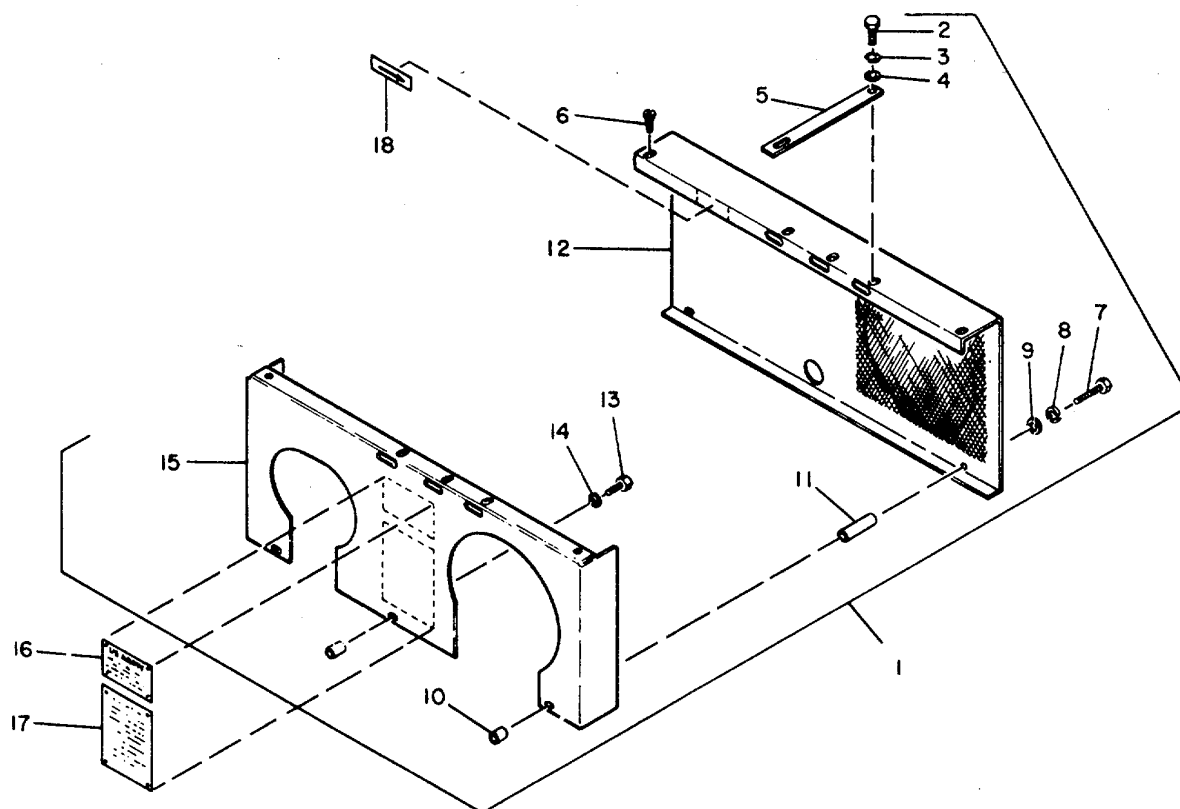
<b>MALFUNCTION</b>	<b>TEST OR INSPECTION</b>	<b>CORRECTIVE ACTION</b>
<b>5. EXCESSIVE STARTING AND STOPPING</b>	<b>Step 1</b>	Check if receiver draincock is open. <b>Close draincock.</b>
	<b>Step 2.</b>	Check for air leaks in <b>pipng.</b> <b>Repeat Step 2 of Paragraph 3 above.</b>
<b>6. COMPRESSOR RUNNING HOT</b>	<b>Step 1.</b>	Check for blockage of air to fan wheel. <b>Move any foreign object that is blocking air passage. Use brushes or vacuum to remove any accumulation of dust or dirt.</b>
	<b>Step 2.</b>	Check for low oil level. <b>Fill to proper level (LO 5-4310-352-12).</b>
	<b>Step 3.</b>	Check for clogged inlet filter. <b>Service the inlet filter (para 3-13).</b>
<b>7. COMPRESSOR RUNNING SLOW</b>	<b>Step 1.</b>	Check motor terminal board for loose connection. <b>Tighten loose terminals.</b>
	<b>Step 2</b>	Check for leaking or maladjusted pilot valve. <b>Adjust the pilot valve (para 3-12). If leaking, notify organizational maintenance.</b>

#### Section IV. MAINTENANCE PROCEDURES

##### 3-7. Belt Guard Assembly

a. *General.* The belt guard assembly (1, fig. 3-2) is a two piece guard that totally encloses the drive belts and pulleys. The front (12) has a mesh screen covering

the wheel fan opening, allowing fan to pull air in for cooling the aftercooler tube.



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- |                             |                          |
|-----------------------------|--------------------------|
| 1. Belt guard assy          | 10. Spacer (3)           |
| 2. Capscrew                 | 11. Spacer               |
| 3. Lockwasher               | 12. Belt guard (front)   |
| 4. Flat washer              | 13. Capscrew             |
| 5. Brace                    | 14. Washer, lock         |
| 6. Thread forming screw (2) | 15. Belt guard (back)    |
| 7. Capscrew (2)             | 16. Instruction plate    |
| 8. Lock washer (2)          | 17. Identification plate |
| 9. Flatwasher (2)           | 18. Direction arrow      |

Figure 3-2. Belt guard assembly, removal and installation.

b. *Inspection.* Inspect for damage to screen, bends, dents, or other damage to belt guard panels. Check for accumulation of grease soaked dust, dirt, or other foreign matter. Remove dirty guard for cleaning. Remove a damaged guard for straightening, or replacement.

c. *Removal.* Turn off power at source and lock it out.

(1) Remove capscrew (2), and lockwasher (3), and flatwasher (4) from brace (5).

(2) Remove two capscrews (7), lockwashers (8), and flatwashers (9). Remove the two spacers (11 and 10) from each capscrew (7).

(3) Remove two thread forming screws (6) and lift front belt guard (12) off the belts.

(4) Remove capscrew (13), lockwasher (14), then lift rear belt guard (15) off the receiver. Do not remove brace (5) from cylinder head unless damaged.

d. *Cleaning and Replacement.*

#### WARNING

Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C) - 138°F (59°C).

(1) Clean belt guard with a rag dipped in cleaning solvent Fed. Spec. P-DA80, then wipe dry.

(2) Smooth out any dents or bends. Replace any damaged part that is beyond repair.

#### e. *Installation.*

(1) Position rear belt guard (15) and secure with lockwasher (14) and capscrew (13).

(2) Install front belt guard (12) and secure with screws (6), spacers (10 and 11), flatwashers (9), lockwashers (8) and capscrews (7).

(3) Position brace (5) and secure with flatwashers (4) lockwashers (3) and capscrews (2).

### 3-8. V-Belts (Matched Pair)

#### a. Inspection.

(1) Make a visual inspection of belt condition to determine if the belts require removal for cleaning and deglazing. If deglazing appears necessary remove the back belt guard (para 3-7).

(2) Loosen belt adjustment screw (fig. 1-2) and nuts securing motor to receiver. Move motor toward compressor, then lift belts off of the pulleys.

#### b. Cleaning.

#### WARNING

**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C) - 138°F (59°C).**

(1) Use a cloth dampened in cleaning solvent Fed. Spec. P-D480 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:

(2) Use a medium grade of grit paper (not emery cloth) and rough up the surfaces with strokes of uneven direction.

(3) Wipe off all grit particles. When surface has been deglazed, install the belts on pulleys.

#### c. Adjustment.

#### NOTE

When installing new belts, never pry the belts over the pulley grooves.

(1) Be sure that the motor has been moved closer to the compressor, by loosening of mounting nuts, coupled with loosening of adjusting nut (fig. 1-2).

(2) Place belts (the matched pair) in proper

grooves, then move motor away from compressor and tighten mounting nuts.

#### NOTE

A quick check for proper belt adjustment is to observe belts while compressor is in operation. If bottom of belt seems to droop slightly below line from pulley to pulley, the belts should be in adjustment.

(3) A measured adjustment, assuring no strain on bearings, is accomplished as follows:

(a) Measure distance between pulley centers.

(b) At center of belt span, apply a force perpendicular to the span, by attaching a spring scale to both belts. The force applied to the spring scale should be sufficient to deflect the belts 1/64 in. for every inch of span. If span is 36 in., the deflection should register 1-7/8 lbs. If scale registers 178s lbs, the belt should be loosened slightly. If scale registers less than 1-1/4 lbs, the belts should be tightened slightly.

#### NOTE

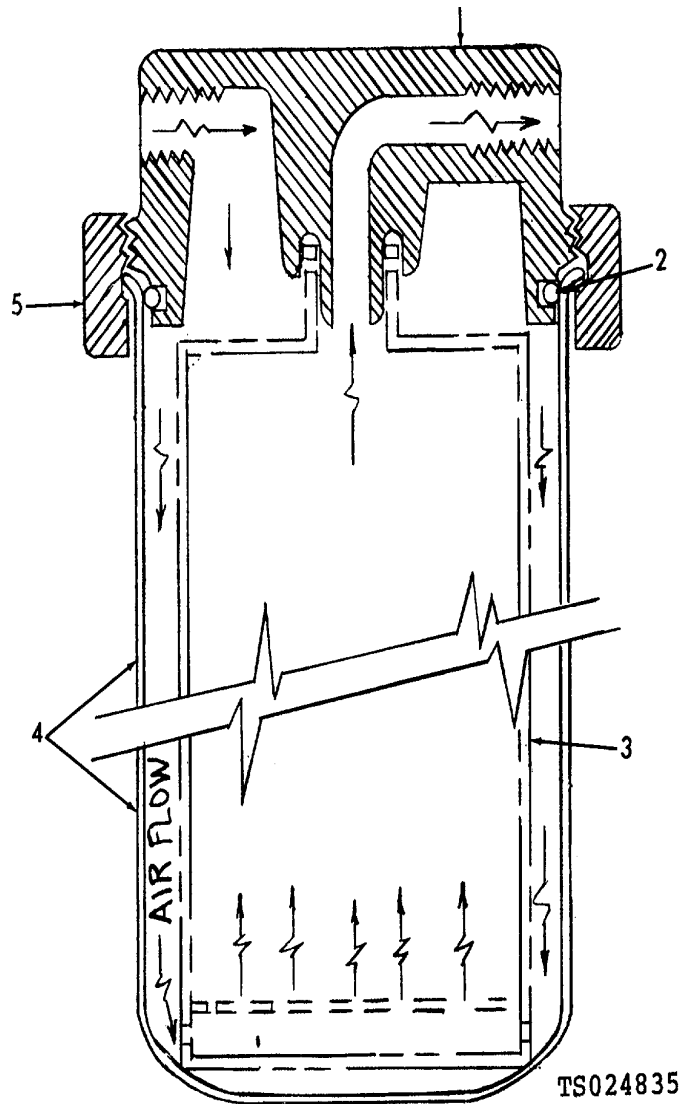
New drive belts may be left a little tight, to take care of stretch during run in.

### 3-9. Dehydrator and Outlet Air Filter

a. *General.* The dehydrators are located at center front of the compressor assembly (fig. 1-1), and remove moisture from outlet (service) air. The outlet air filter (heated) is located at right end of the compressor, and is the primary source of dry service air.

#### b. Dehydrator Inspection and Service

(1) With all power off, use the spanner wrench and remove the locking nut (5, fig. 3-3) and vessel (4). The filter cartridge (3) will drop with the vessel. Remove the preformed packing (2).



1. Head 2. Preformed packing 3. Filter Cartridge 4. Vessel 5. Locking nut

Figure 3-3. Dehydrator

(2) Inspect the filter cartridge (3) entering air holes (at bottom of cartridge) for stoppage. Inspect the preformed packing (2) for deformation by excess compression. Replace a defective cartridge or packing.

(3) Check the interior molecular sieve of the cartridge for free flow of air, by blowing through top of cartridge lightly. Replace a defective cartridge.

**CAUTION**

When installing vessel (4) to head (1), tighten locking nut (5) just enough to compress the preformed packing (2). Excess torque will deform the packing.

- (4) Install cartridge (3) in vessel (4).
- (5) Position preformed packing (2).
- (6) Install vessel in head (1) and tighten lock-

ing nut (5).

(7) Inspect the remaining dehydrator in a similar manner.

**NOTE**

Dehydrator filter cartridges must be replaced after every six (6) operating hours.

(8) Replace filter cartridges every six (6) operating hours, or sooner when defective, as described in steps (1) through (3) above.

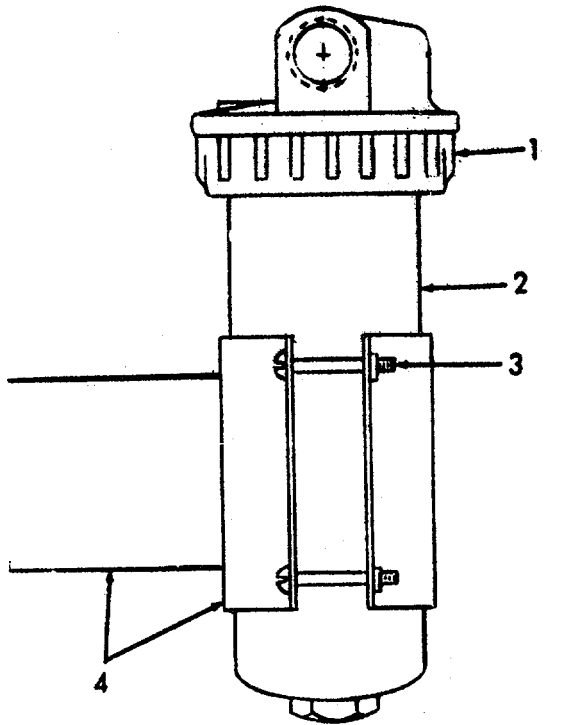
c. *Outlet Air Filter Inspection and Service.*

(1) With all power off, use a spanner wrench and loosen bowl locking nut (1, fig. 3-4), then loosen clamp retaining tube to outlet filter draincock (fig. 1-2).

(2) Loosen screws (3) and remove bowl (2, fig. 3-3) from heater and junction box (4).



**open flame or excessive heat. Flash point of solvent is 100°F (38°C) - 138°F (50°C).**



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1. Locking nut
2. Bowl
3. Screws
4. Heater with junction box

Figure 3-4. Outlet air filter.

(3) Inspect holes in filter element for clogging, replace defective bowl gasket filter element or defective baffles

(4) Use proper parts kit to replace defective items.

(5) Install bowl (2) in heater and junction box (4) and secure with screws (8).

(6) Tighten clamp retaining tube to outlet filter draincock (fig. 1-2).

(7) Tighten bowl locking nut (1, fig. 3-4) with a spanner wrench.

(8) Report defective outlet air filter to direct support maintenance for replacement.

### 3-10. Motor (and Related Parts)

a. *General.* Crew/operator maintenance of the motor consists of cleaning, and inspection of rotor and motor starter.

b. *Cleaning.*

#### **WARNING**

**Dry cleaning solvent, P-D40, used to clean parts is potentially dangerous to personnel and property. Do not use near**

(1) Remove dust and dirt from motor with brushes or vacuum. Use a cloth dampened in cleaning solvent, Fed. Spec P-D480 to wipe off the stator frame.

(2) Use the same method of cleaning on end covers and the motor starter.

c. *Inspection of Rotor.*

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

(2) Notify organizational maintenance of a defective rotor, for motor replacement.

d. *Inspection of Motor Starter.*

(1) Inspect inside cover for loose wires, or other defect.

(2) Report defective motor starter to direct support maintenance.

### 3-11. Air Compressor

a. *General.* The compressor unit part of the assembly, kept clean and lubricated, should be relatively free of maintenance. However, if the on-off cycles are too frequent because of heavy use, and accumulations of dust and dirt occur covering the frame, intercooler, or aftercooler, the compressor will run hot. Excessive heat consumes compressor oil. Low oil causes ring wear, or cylinder scoring. Therefore, frequent inspections are necessary.

b. *Inspection.*

(1) Visually inspect for excess accumulations of dust, dirt or film of oil.

(2) Test for heat by touching intercooler tube, aftercooler tube, or cylinder head.

(3) Check pilot valve for signs of leaking.

(4) Listen for excessive start-stop cycling.

(5) Listen carefully for a knock or rattle that might signify internal damage.

(6) When any of these inspections disclose abnormal conditions, refer to Table 3-3 above.

### 3-12. Pilot Valve

a. *General.* The pilot valve is a part of the compressor unloading system. As the compressor stops the thrust pin moves outward, which unseats the valve core and allows pressure to bleed off cylinders through the pilot valve tube line and gaps between pilot valve body and its boss. Without this unloading procedure, starting the compressor would likely cause the overload relay to trip and excessive wear on the belts and motor bearing. A leaking, or maladjusted pilot valve will keep the compressor from unloading when stopped.

b. *Adjustment.* To adjust the outside exhaust pilot valve, refer to figure 3-5 and proceed as follows:

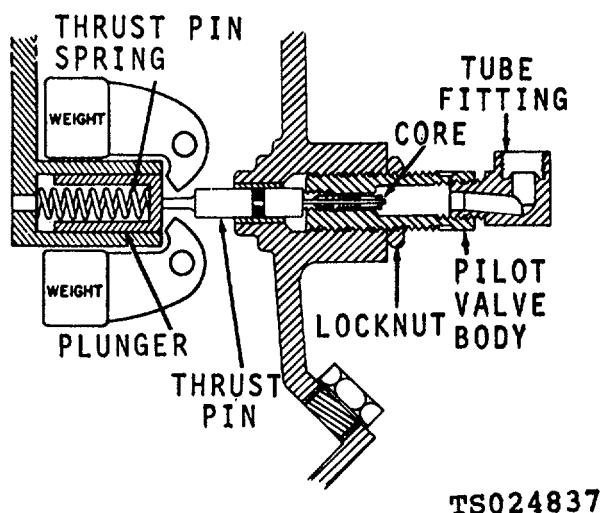


Figure 3-5. Pilot Valve adjustment.

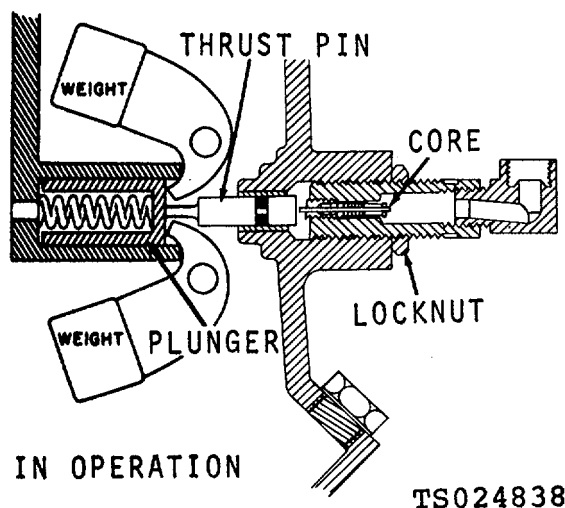


Figure 3-6. Position of weights and core when compressor is operating.

- (1) Stop the compressor, remove tube fitting (fig. 3-5) from the pilot valve body. Loosen locknut and remove the pilot valve body.
- (2) Screw the pilot valve assembly into the frame cover until the thrust pin is felt, then advance valve another  $\frac{1}{4}$  to  $\frac{1}{2}$  turn and tighten locknut.
- (3) Install tube fitting into valve body, then re-connect tubing.
- (4) Start the compressor, then place hand over pilot valve tube to atmosphere (fig. 3-6).

- (5) If there is no flow of air, pilot valve is properly adjusted. When air flow is evident, readjust valve starting with step (1).

### 3-13. Inlet Filter

a. General. The inlet filter is designed to clean the air entering the first stage cylinder. Should the operating area be exceptionally dusty, it must be serviced more frequently so the pads will collect more of the dust and minimize cylinder wear. A clogged intake filter reduces the efficiency of the compressor.

#### b. Cleaning and Inspection.

- (1) Wipe off the outside and mouth of the body (2, fig. 3-7) then remove one disc (3) and four pads (4)

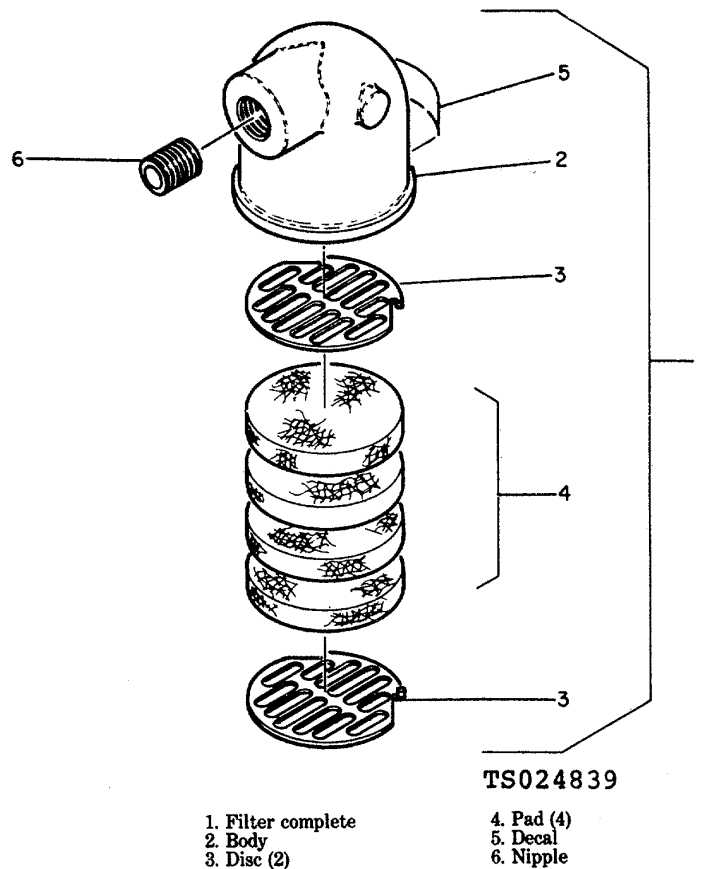


Figure 3-7. Inlet filter, exploded view.

(2) Remove the remaining disc (3).

**WARNING**

**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C) - 138°F (59°C).**

(3) Wash inside of filter body (2) and wipe dry. Wash pads (4) and disc (3), dry with low pressure (25 psi) compressed air.

(4) Inspect pads for excessive wear or loss of capacity to retain dust and dirt. Replace defective pads.

(5) Position one disc (3) in body (2), then stack the four pads (4) in body. Secure pads in body with the remaining disc (3).

**3-14. Air Receiver**

a. *General.* The air receiver stores compressed air at a pressure between 175 and 200 psi. Compressed air, moving from first stage to second stage of the compressor through the intercooler tube, then through the after-cooler tube to the air receiver, carries moisture

(condensate) into the receiver. Frequent inspection and service is necessary.

b. *Inspection and Cleaning.*

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

(2) Check air lines and the service line for leaking joints or damaged lines. Tighten loose fittings, replace a damaged line.

(3) Use brushes or vacuum to dust off the receiver and all components mounted thereon. Wipe off all oil spots, then dry, to avoid further accumulations.

c. *Draining Condensate from Air Receiver.*

(1) Turn ON-OFF switch to OFF.

(2) Open draincock at bottom of the air receiver (fig. 1-2) under the service line.

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

(4) Close draincock.

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

**CHAPTER 4  
ORGANIZATIONAL MAINTENANCE INSTRUCTIONS**

**Section I. SERVICE UPON RECEIPT OF MATERIEL**

**4-1. Inspecting and Servicing the Equipment**

*a. General.* The compressor may have come from storage in a new or used condition. In either case, a pre-operative check must be made to assure that the equipment and its components are ready for operation without danger to equipment or personnel.

*b. Inspecting the Equipment.*

(1) Inspect the motor identification plate for current and voltage specifications, and compare with the electric service available. Check that the motor is correctly wired. Be particular about checking the wiring and voltage of a dual voltage motor.

(2) Inspect the assembly for any obviously missing parts, or damages that may have occurred during transit.

(3) Check for all parts that may have been removed and packaged separately for shipment.

(4) Inspect the drive V-belts (a matched pair). Check the adjustment (para 3-8), then turn the compressor drive wheel through several revolutions by hand. This will assure that everything is free and in working order.

*c. Servicing the Equipment.* Service the compressor frame with compressor oil (LO 5-4310-352-12).

**NOTE**

The motor driving this compressor has ball bearings lubricated for life. It has no grease fitting, or plugs near the bearings, and requires no lubrication.

**4-2. Installation.**

*a. General.* This unit is portable (on casters) and may be positioned on any relatively level floor or base.

*b. Location.* Choose a clean, relatively cool location if possible, and provide ample space for cooling and general accessibility. Position belt wheel side towards a wall, leaving at least 15 inches (38 centimeters) for air circulation to the belt wheel fan.

*c. Installation.* To lessen vibration, blocks may be placed in front and rear of all casters.

*d. Power.* When the available power supply is equal to that required by motor (para 4-lb. above), and no other electrical equipment is on the circuit, number 8 AWG wire connected to a feeder not more than 100 feet (254 centimeters) away, will carry the load.

**Section II. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT**

**4-3. Special Tools and Equipment**

There are no special tools or equipment required to perform maintenance on the air compressor.

**4-4. Maintenance Repair Parts.**

Repair parts and equipment are listed and illustrated in the "Repair parts and special tools list" TM 5-4310-352-24P.

**Section III. 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.

*Table 4-1. Organizational Preventive Maintenance Checks and Services*

Q-Quarterly

Total man-hours required 0.5

Sequence Number	ITEM TO BE INSPECTED PROCEDURE	Work time (M/H)
1	COMPRESSOR FRAME OIL Refer to LO5-4310352-12 for type, then drain and change oil.	0.2
2	CAPSCREWS, SCREWS, AND BOLTS Check that all capscrews, screws, and bolts are tight. Use a torque wrench and tighten to the value shown in table 1-1	0.3

**Section IV. TROUBLESHOOTING**

**4-5. General**

*a.* This section contains troubleshooting information for locating and correcting most of the trouble that may develop in the air compressor. Each malfunction for an individual components is followed by a list of tests or

inspections which will help you to determine probable causes and corrective actions to take. You should perform the tests/inspections and suggested corrective action for you to remedy the malfunction.

b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective action, notify higher level maintenance.

Table 4-2 lists the common malfunctions 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.

**4-6. Troubleshooting**

*Table 4-2. Troubleshooting*

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION	NOTE
<p>Before you use this Table be sure you have performed normal operational checks. If you have a malfunction which is not listed in this table, notify the next higher level of maintenance.</p>			
<b>1. COMPRESSOR PUMPING OIL</b>			
	<i>Step 1.</i>	Check for a leaking pilot valve. Replace a leaking pilot valve (para 4-11).	
	<i>Step 2.</i>	Check for a hot cylinder head. If one seems hotter than the other, there could be damaged rings on piston. Notify direct support maintenance.	
<b>2. KNOCKS OR RATTLES</b>			
	<i>Step 1.</i>	Check for loose belt wheel or motor pulley. Replace motor if pulley is loose (para 4-9).	
	<i>Step 2.</i>	Check for leaking pilot valve, or restrictions in piping system. Replace a leaking pilot valve (para 4-11). Report restricted piping to direct support maintenance.	
<b>3. AIR DELIVERY DROPPING</b>			
	<i>Step 1.</i>	Check for air leaks in piping. Make a soapy solution with warm water. Paint on fittings and watch for signs of air leaks. Report leaking fittings, if tightening does not stop the bubbles, to direct support maintenance.	
	<i>Step 2.</i>	Check for a leaking pilot valve. Replace a defective pilot valve (para 4-11),	
	<i>Step 3.</i>	Check for restricted air passages, or leaking or broken valves. Notify direct support maintenance.	
<b>4. MOTOR OVERLOAD RELAY TRIPS</b>			
	<i>Step 1.</i>	Check line voltage or motor terminals loose connections, or defective starter heaters. Notify direct support maintenance.	
<b>6. EXCESSIVE STARTING OR STOPPING</b>			
	<i>Step 1.</i>	Check receiver for condensate. Open draincock at bottom of air receiver, when all air has escaped close draincock.	
	<i>Step 2.</i>	Check for leaking, broken, or worn pressure switch (fig. 2-1). Notify direct support maintenance.	
<b>6. COMPRESSOR RUNNING HOT</b>			
	<i>Step 1.</i>	Check that air passage is not blocked at fan wheel. Move any foreign object that may block ventilation.	
	<i>Step 2.</i>	Test for a leaking check valve. Report a defective check valve to direct support maintenance.	
<b>7. COMPRESSOR RUNNING SLOW</b>			
	<i>Step 1.</i>	Check for low line voltage or a defective motor starter heater. Tighten loose terminals. If still running slow, notify direct support maintenance.	
	<i>Step 2.</i>	Check for leaking or mal-adjusted pilot unloader valve. Tighten fittings. Adjust pilot valve (para 3-12).	
<b>8. LIGHTS FLICKER WHEN COMPRESSOR RUNS</b>			
		Check terminals of motor. If bad connections cannot be rectified, notify direct support maintenance.	

**Section V. MAINTENANCE OF THE AIR COMPRESSOR**

**4-7. General.**

a. *Motor.* The motor is a 115/230 vac, single phase 60 hertz, induction motor, with initial connections for 115 vac.

b. *V-Bets.* The V-belt drive of the air compressor consists of a matched pair of belts, and pulleys of a size designed for changing the motor speed of 1,750 rpm to a compressor speed of 610 rpm.

c. *Air Compressor.* The air compressor is a two-stage, two cylinder compressor mounted on top of the air receiver. It is air cooled, by an intercooler between 1st and 2nd stage cylinders, and an aftercooler between 2nd stage and the receiver. It has an unloader and pilot valve to relieve internal pressure when the compressor is stopped. There is a breather tube between compressor frame and the inlet filter (inboard side). This connection permits pulsations, created by the reciprocating action of the pistons, to be vented to the atmosphere. This eliminates any pressure build up within the frame.

d. *Pilot Valve.* When the pilot valve core is unseated by action of the centrifugal unloader, it permits pressure to bleed from the compressor and discharge line. The cylinders and the intercooler are also relieved of all pressure while the compressor is stopped.

e. *Inlet Filter.* The inlet filter cleans the air entering the first stage cylinder. Frequent cleaning, the time period depending on environment, is necessary to insure capacity output of the compressor.

**4-8. V-Belt (Matched Pair)**

a. *Removal.*

- (1) Turn off compressor power at source, and lock it out.
- (2) Remove front belt guard (para 3-7).
- (3) Loosen nuts on motor mounting capscrews (fig. 1-1). Loosen belt adjusting screw, then move the motor toward the compressor.
- (4) Lift belts off the pulleys.

b. *Installation.*

**NOTE**

Never pry new belts over edges of pulley grooves. Be sure motor has been moved toward compressor so that belts fit easily over the pulleys.

- (1) Clean grooves in belt pulleys to be sure no

oil or dust remains to damage new belts.

(2) Place belts in their proper grooves, then move motor away from compressor until belts are nominally tight. Tighten mounting nuts.

(3) Visually check bottom line of belts for a slight droop between pulley centers. If this droop is there, belts should be in adjustment.

(4) If no droop is seen, the belts may be too tight. Adjust the measurement and scale method described in paragraph 3-6.

(5) When belts are adjusted reinstall the front belt guard (para 3-7).

(6) Unlock and turn on power at source.

**4-9. Motor**

a. *Removal*

- (1) Remove V-belts (para 4-8).
- (2) Tag and disconnect electrical leads in conduit from motor starter at motor.
- (3) Remove motor mounting hardware.
- (4) Lift motor from mounting brackets on the air receiver.

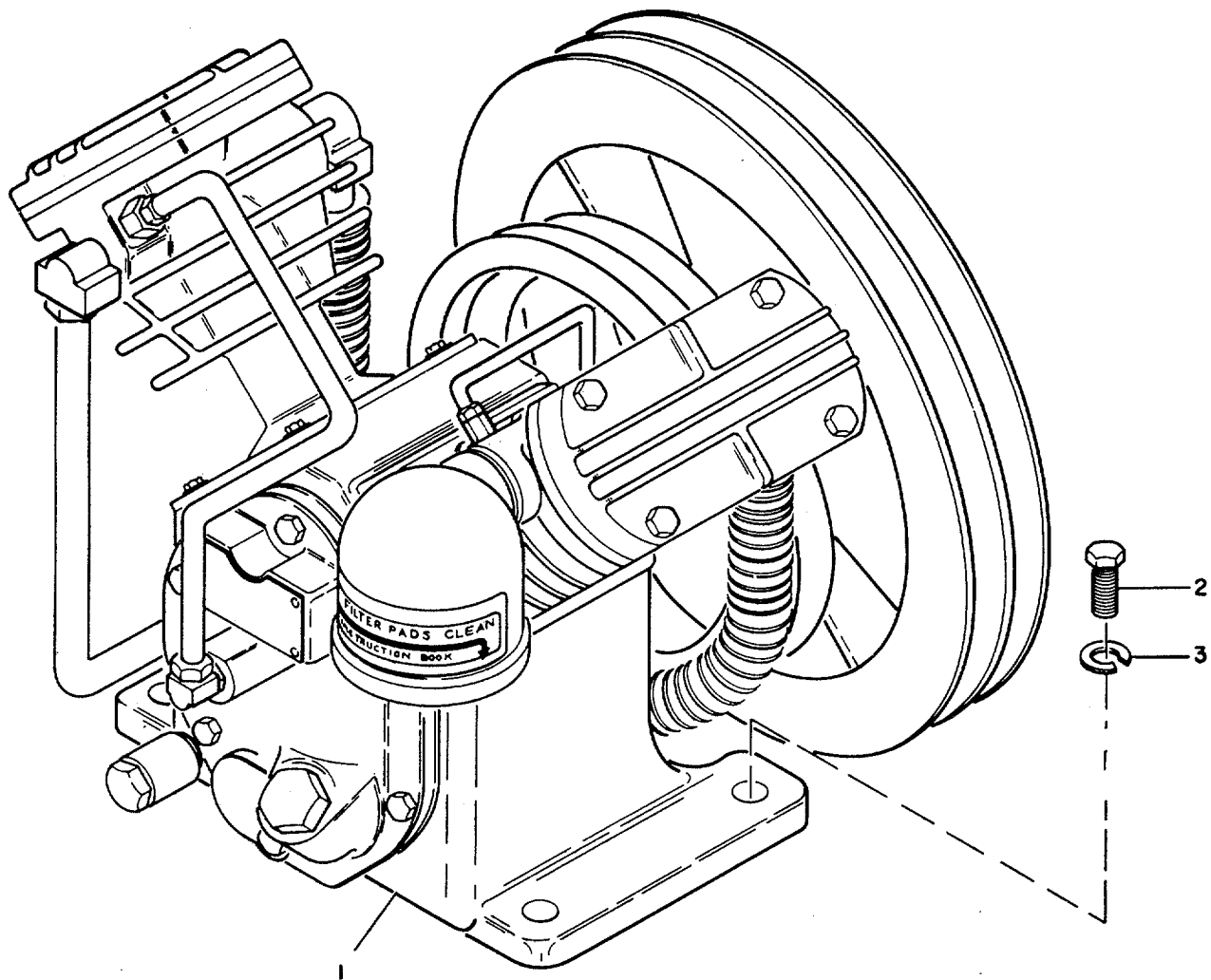
b. *Installation.*

- (1) Install motor on the mounting brackets and secure with motor mounting hardware.
- (2) Connect electrical leads.
- (3) Install V-Belts (para 4-8).

**4-10. Air Compressor**

a. *Removal.*

- (1) Turn power off at source and lock it out.
- (2) Remove belt guard (para 3-7), belts (para 4-8), then close air line shutoff valve (fig. 2-1, sheet 2 of 3) and remove the service line. Disconnect aftercooler from check valve in the air receiver.
- (3) Remove 4 capscrews (2, fig. 4-1) and lock-washers (3).



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- 1. Air compressor
- 2. Capscrews (4)
- 3. Lockwasher (4)

Figure 4-1. Air compressor. removal and installation.

(4) Lift the air compressor (1) off the air receiver.

*b. Installation.*

(1) Check that the air compressor is completely assembled and that fan wheel is properly installed.

(2) Position compressor on the air receiver.

(3) Install lockwashers (3) and capscrews (2) in base of compressor. Tighten the four mounting cap

screws to the torque value given in Table 1-1. Connect aftercooler to check valve in air receiver (fig. 1-2).

(4) Install V-belts (para 4-8).

(5) Install belt guard (para 3-7).

**4-11. Pilot Valve**

*a. Removal.*

(1) Disconnect tube (fig. 4-2).

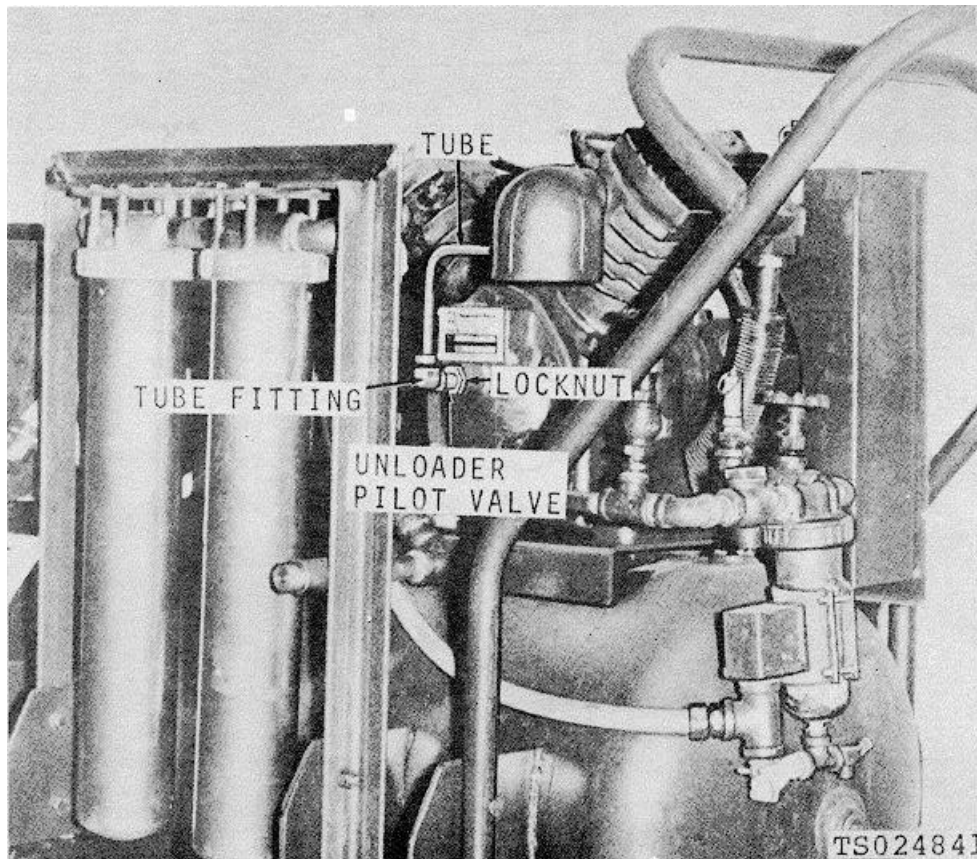


Figure 4-2. Pilot valve replacement.

(2) Remove tube fitting from pilot valve.

(3) Loosen locknut securing pilot valve and remove pilot valve from frame cover.

b. *Installation.* Adjusting of the pilot valve is performed during installation, therefore, refer to paragraph 3-12 for adjusting and installing the pilot valve.

#### 4-12. Inlet Filter

a. *Removal.* Unscrew the inlet filter assembly (fig. 2-1, sheet 3 of 3) from the close nipple. Replace a defective inlet filter.

b. *Installation.* Position the inlet filter assembly on the close nipple and turn clockwise to tighten.

#### 4-13. Crankshaft

a. *General.* The compressor crankshaft is occasionally diagnosed as a trouble area. When this occurs, it must be inspected before further damage may occur.

b. *Crankshaft Inspection.*

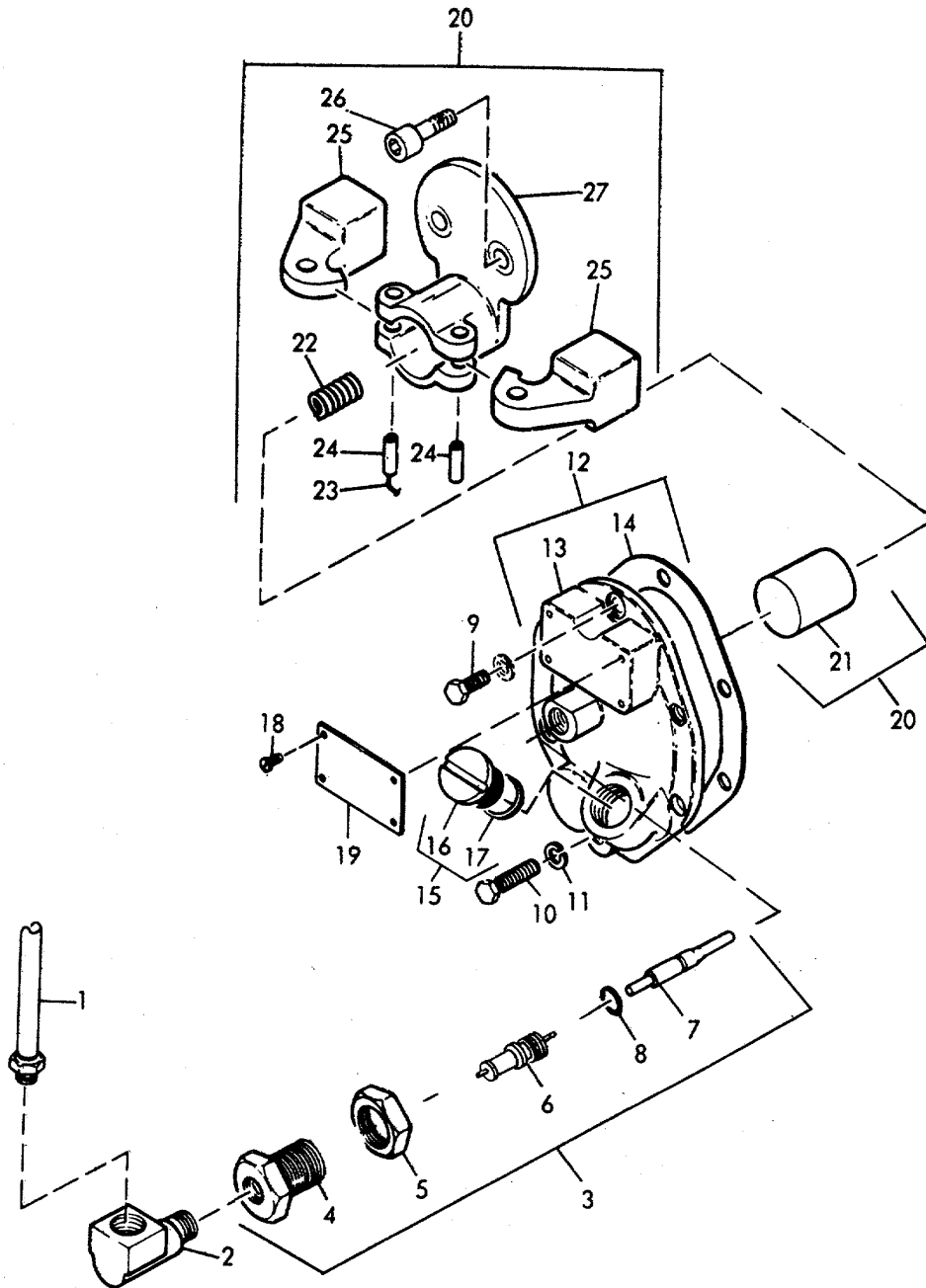
(1) Stop the compressor.

(2) Remove the pilot valve (para 3-12).

(3) Drain oil from frame (L05-4310352-12).

(4) Remove cover from frame by removing the six capscrews (9, fig. 4-3.)





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- 1. Pilot valve tube
- 2. Tube elbow
- 3. Pilot valve assembly
- 4. Pilot valve body
- 5. Lock nut
- 6. Pilot valve seat
- 7. Thrust pin
- 8. Packing
- 9. Capscrew

- 10. Capscrew
- 11. Washer
- 12. Frame end cover assembly
- 13. Frame end cover
- 14. Cover gasket
- 15. Oil filter plug assembly
- 16. Filler plug
- 17. Packing
- 18. Drive screw

- 19. Identification plate
- 20. Pin cap crank
- 21. Plunger
- 22. Spring
- 23. Lock wire
- 24. Pin
- 25. Weight
- 26. Hex socket screw
- 27. Crank pin

Figure 4-3. Pilot valve, centrifugal unloader, and frame end covers, exploded view.

(5) Remove centrifugal unloader (20 thru 27 fig. 4-3) from end of crankshaft.

(6) Check the connecting rod bearings for end play by pressing them to rear as you turn the belt pulley through 1 or 2 revolutions. Also check for roughness as

the shaft turns in the mainbearings.

(7) If crankshaft checks satisfactorily, replace removed parts in reverse order of removal.

(8) When end play, or roughness is found, report defects to direct support maintenance.

**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 5-4310-352-24P.

**Section II. TROUBLESHOOTING**

**5-3. General**

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

b. This manual cannot list all malfunctions that

may occur, not all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by the listed corrective action, notify your Supervisor.

**5-4. Troubleshooting**

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

*Table 5-1. Troubleshooting*

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

**NOTE**

Before you use this Table, be sure you have performed all normal operational checks. If you have a malfunction which is not listed in this Table notify your supervisor.

**1. COMPRESSOR PUMPING OIL**

*Step 1.* Check cylinders or piston for wear, scratches or scoring.  
Replace defective cylinder or piston (para 6-6).

*Step 2.* Check for piston rings broken, or not seated in.  
Replace piston rings (para 6-6).

**2. KNOCKS OR RATTLES**

*Step 1.* Check for carbon on top of piston.  
Remove air heads and check piston (para 6-6).

*Step 2.* Check for loose, broken or carbonized air finger valves.  
Separate air heads from spacers and look finger valves over carefully (para 6-6). Replace defective finger valves (para 6-6).

*Step 3.* Check for worn or scored connecting rod, piston pin, or crank pin bushings.  
Replace defective parts (para 6-6).

**3. AIR DELIVERY DROPPING**

*Step 1.* Check for leaking, broken, carbonized or loose finger valves.  
Tighten or clean leaking or carbonized valves. Replace defective valves (para 6-6).

*Step 2.* Check for scratched, worn or scored cylinders or pistons.  
Replace defective cylinder or piston (para 6-6).

*Step 3.* Check for piston rings broken or not seated in.  
Replace damaged piston rings (para 6-6).

**4. MOTOR OVERLOAD RELAY TRIPS**

*Step 1.* Check line voltage.  
Tighten loose connections. Replace defective fuses.

*Step 2.* Check for leaking, broken, or carbonized valves, or restricted air passages.  
Remove restriction from air passages. Repeat Step 1 of paragraph 3 above.

Table 5-1. Troubleshooting-Continued

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
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**5. EXCESSIVE STARTING OR STOPPING**

- Step 1. Check the receiver check valve for defect.  
Remove check valve, disassemble and remove any dirt, dust or blockage from seat. Replace a defective check valve (para 6-7).
- Step 2. Check pressure switch for wear.  
Replace a defective pressure switch (para 64).

**6. COMPRESSOR RUNNING HOT**

- Step 1. Check for blockage of air to fanwheel.  
Remove any restriction to flow of air to fanwheel.
- Step 2. Check for defective check valve in receiver.  
Repeat Step 1 of paragraph 4 above.
- Step 3. Check for leaking, broken, carbonized, or loose valves.  
Repeat Step 2 of paragraph 4 above.
- Step 4. Check for motor rotation.  
Look at directional arrow at upper left of belt guard and see that belts are moving in that direction.

**7. COMPRESSOR RUNNING SLOW**

- Step 1. Check for low line voltage, or a defective starter heater.  
Tighten loose connections. Replace a defective motor starter or heater (para 6-3).
- Step 2. Check for leaking or maladjusted centrifugal unloader pilot valve.  
Tighten a loose, leaking valve seat. Replace a defective pilot valve (para 4-11).

**Section III. GENERAL MAINTENANCE**

There are no requirements for listing in this section.

**Section IV. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS**

The major components of this air compressor assembly are removed and installed at lower levels of maintenance.

## CHAPTER 6 REPAIR INSTRUCTIONS

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### Section I. ELECTRIC MOTOR AND COMPONENTS

#### 6-1. General

The drive unit is a two horse power, 1,750 rpm, 115/230 volt ac, single phase, 60 hertz induction motor for horizontal mounting, with a type 182T frame and a drip proof enclosure. It is controlled by a motor starter with heater and overload relay, plus a pressure switch nominally set to turn motor ON at 175 psi, and OFF at 200 psi plus or minus 5 psi. The motor is equipped with a two groove belt pulley. This pulley is matched to the fanwheel pulley of compressor, and turns the compressor at 610 rpm.

#### 6-2. Electric Motor

a. *Removal.* Refer to paragraph 4-9 and remove the motor.

b. *Disassembly.*

(1) Remove setscrew (1, fig. 6-1) from motor pulley (2) and slide pulley from rotor shaft (10).

(2) Remove key (4) from key way of rotor shaft.

(3) Remove nuts (5) from studs (6) and remove studs.

(4) Remove rear bracket (7) from stator body (23).

(5) Remove rear baffle (8) and bearing (9) from the rear bracket.

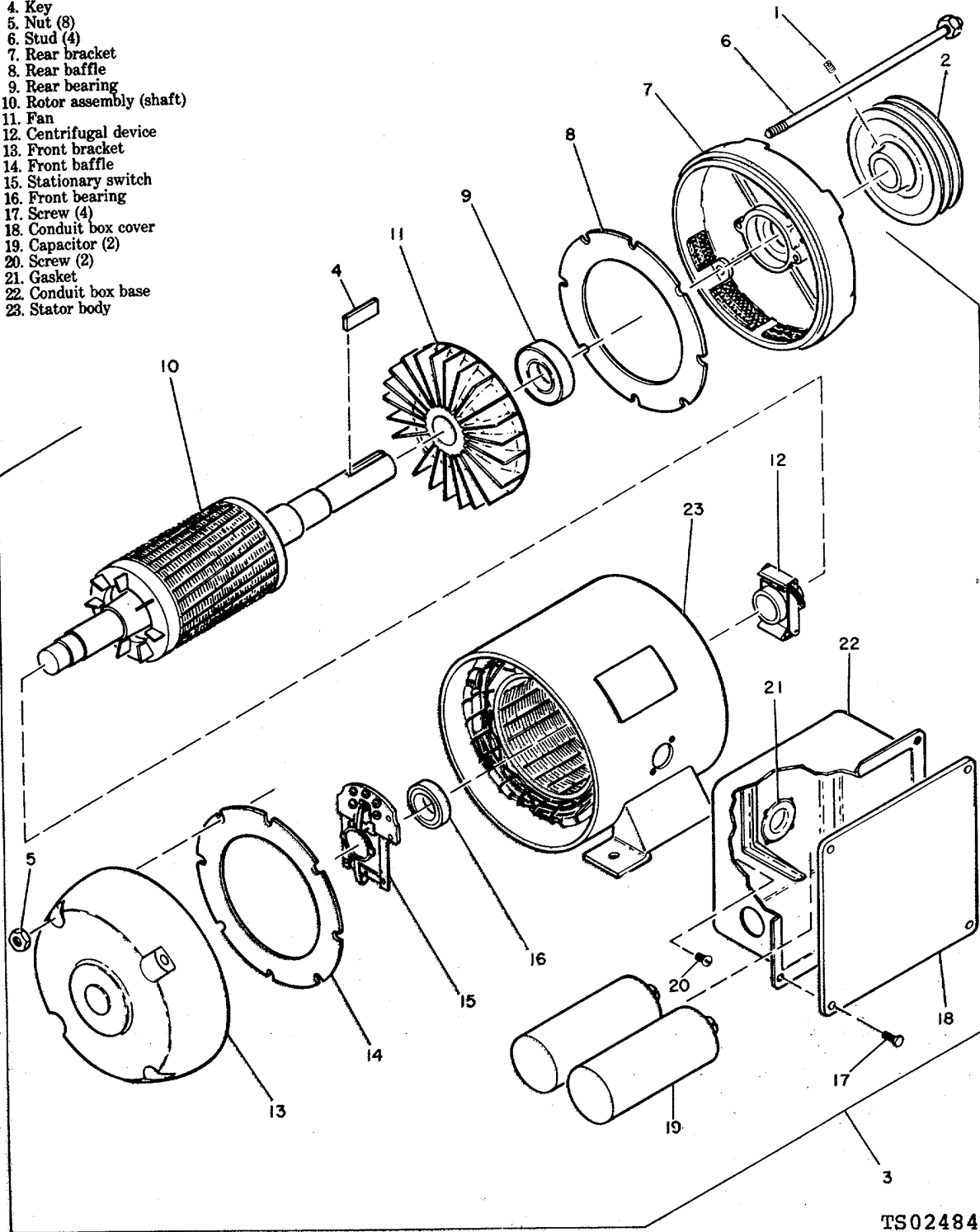
(6) Remove rotor assembly (10) from stator and remove fan (11) and centrifugal device (12).

(7) Remove front bracket (13) from the stator and remove the front baffle (14), stationary switch (15) and bearing (16).

(8) Remove screws (17), conduit box cover (18) and capacitors (19) from conduit box base (22).

(9) Remove gasket (21), screws (20) and remove the conduit box base from the stator body assembly.

1. Setscrew
2. Pulley
3. Motor complete
4. Key
5. Nut (8)
6. Stud (4)
7. Rear bracket
8. Rear baffle
9. Rear bearing
10. Rotor assembly (shaft)
11. Fan
12. Centrifugal device
13. Front bracket
14. Front baffle
15. Stationary switch
16. Front bearing
17. Screw (4)
18. Conduit box cover
19. Capacitor (2)
20. Screw (2)
21. Gasket
22. Conduit box base
23. Stator body



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Figure 6-1. Electric motor, exploded view.

c. *Cleaning, Inspection and Repair.*

**WARNING**

**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C) - 138°F (59°C).**

(1) Clean all parts except rotor, bearings and stator in cleaning solvent Fed. Spec. P-D-80 and wipe dry with a lint free cloth.

(2) Use low pressure (25 psi) compressed air to clean dust and dirt off rotor, bearings and stator, then wipe with a cloth dampened in solvent Fed Spec PD-680.

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

d. *Reassembly.*

(1) Install gasket (21) in conduit box base (22) and secure base to stator body (23) with screws (20).

(2) Install capacitors (19) in conduit box base.

(3) Position cover (18) over base opening and

secure with screws (17).

(4) Install front baffle (14), stationary switch (15) and bearing (16) in front bracket (13) and position front bracket on stator body (23).

(5) Install fan (11) and the centrifugal device (12) on shaft of rotor assembly (10) and position rotor assembly in stator body.

(6) Install bearing (9) and baffle (8) in rear bracket (7).

(7) Position rear bracket on stator body aligning holes in front and rear brackets and secure with studs (6) and Nuts (5).

(8) Install key (4) in keyway of rotor shaft.

(9) Align keyway in pulley (2) and slide pulley over rotor shaft and secure with setscrew (1).

e. *Installation.* Refer to paragraph 4-9 and install the motor.

**6-3. Motor Starter**

a. *Removal.*

(1) Stop compressor, turn off power, and lock it out. Refer to figure 6-2 and open cover of motor starter.

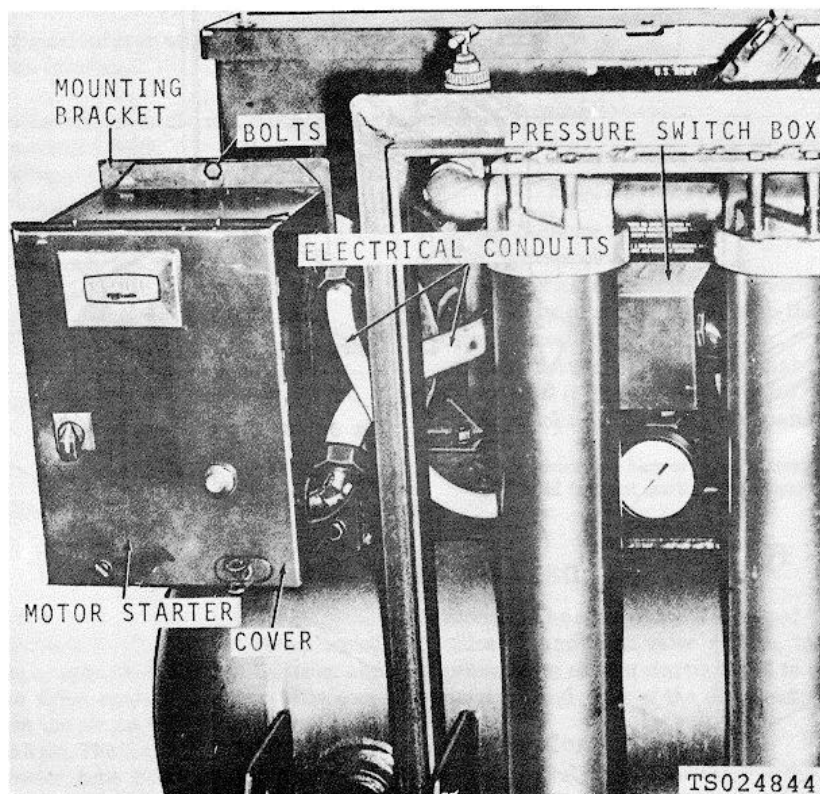


Figure 6-2. Motor starter, removal and installation.

- (2) Tag and disconnect all electrical leads.
- (3) Disconnect the electrical conduits from

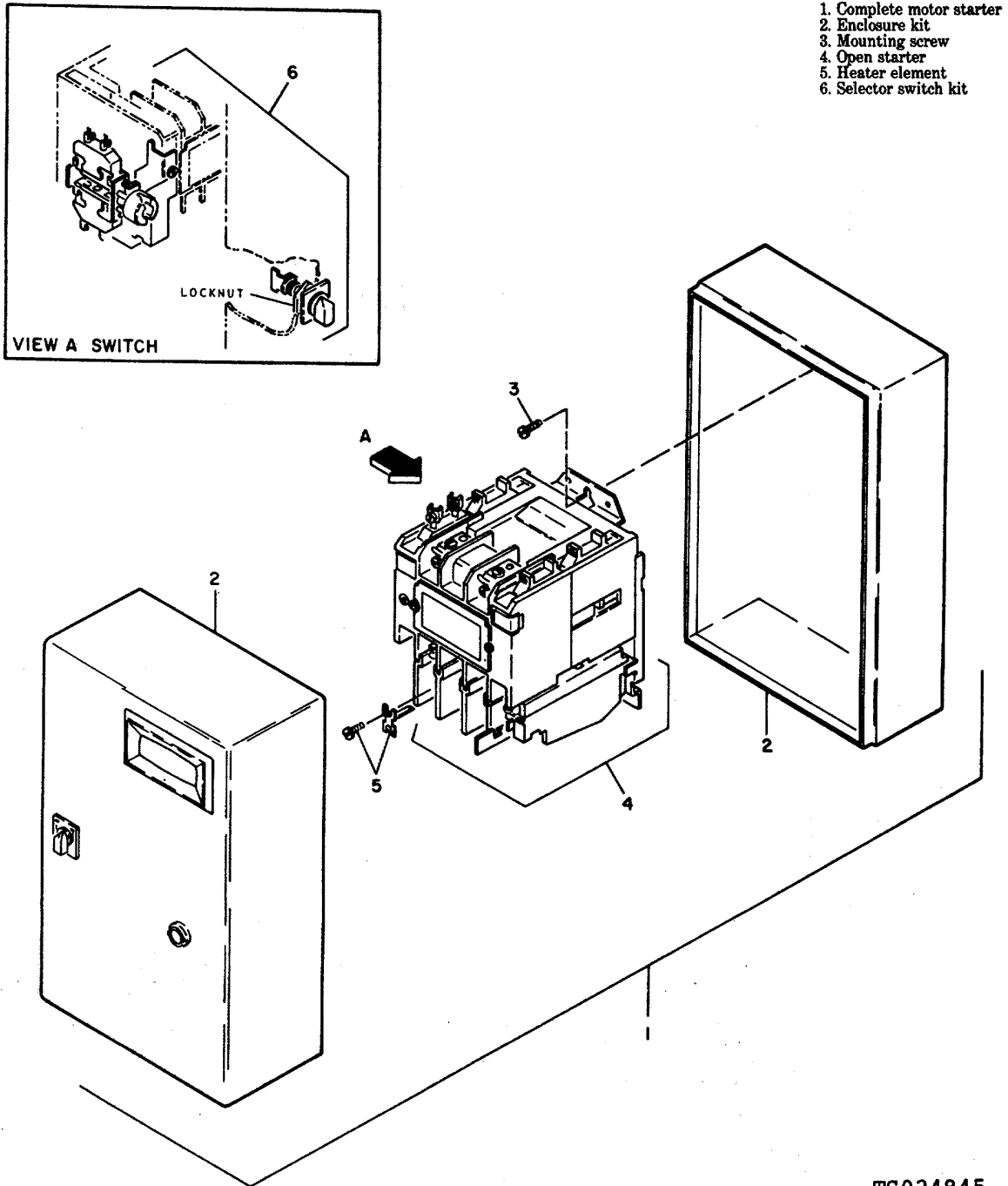
the

motor starter.

(4) Remove the bolts securing motor starter to its mounting bracket, then lift the motor starter off the mounting bracket.

b. Disassembly.

(1) Tag and disconnect electrical leads from the selector switch (6, fig. 6-3), then remove switch A from the kit enclosure (2) and open starter (4).



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Figure 6-3. Motor starter, exploded view.



(2) Loosen screw and remove heater element (5) from the open starter (4).

(3) Remove mounting screw (3), then lift the open starter (4) from the enclosure (2).

(4) Remove locknut from stem of selector switch knob, then remove knob from kit enclosure cover (2).

*c. Cleaning, Inspection, and Replacement.*

(1) Use low pressure (25 psi) compressed air and remove all dust or dirt from motor starter components.

(2) Check continuity of heater element and the open starter. Replace a defective open starter or heater element.

(3) Check selector switch continuity and stem action. Replace a defective selector switch.

*d. Reassembly.*

(1) Install locknut on stem of selector switch knob. Position knob on kit enclosure cover (2) and secure by tightening locknut.

(2) Position open starter (4) on enclosure (2) and secure with mounting screws (3).

(3) Install heater element (5) on open starter and secure with heater mounting screw.

(4) Install switch A on kit enclosure (2) and open starter (4).

(5) Install electrical leads on selector switch (6) and tighten connections securely.

*e. Installation.*

(1) Position motor starter on the mounting bracket and secure with mounting bolts.

(2) Install electrical conduits to motor starter and connect all electrical leads.

(3) Replace motor starter cover.

**6-4. Pressure Switch**

*a. Removal.*

(1) Release pressure from the air receiver.

(2) Remove electrical conduit from pressure switch box (fig. 6-2), then disconnect and tag the electrical leads from pressure switch.

(3) Unscrew pressure switch box from the air receiver.

*b. Installation.*

(1) Install pressure switch box on the air receiver.

(2) Install electrical conduit to pressure switch box (fig. 6-2).

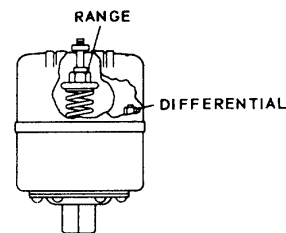
(3) Connect tagged electrical leads to pressure switch.

*c. Adjustment.* The pressure switch has a cut-out adjustment and a differential adjustment. The cut-out is the pressure at which the switch contacts open, and the differential is the span between the cut-in and cut-out settings.

**NOTE**

There is interaction between these two adjustments. If the cut-out is increased, so will the differential increase. Or, if the differential is reduced, the cut-out will be reduced. This factor must be considered, and compensated for when adjusting.

(1) Increase the cut-out point by turning the range nut (fig. 6-4) clockwise.



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Figure 6-4. Pressure switch adjustment.

(2) Decrease the cut-out point by turning the range nut counterclockwise.

(3) Note the pressure gage readings at which the motor starts or stops. Reestablish the differential setting if necessary.

(4) Increase the differential by turning the differential (fig. 6-4) nut clockwise. Turning the nut counterclockwise decreases the span.

**NOTE**

It is advisable to have as wide a differential as possible to avoid frequent starting and stopping of the compressor.

**Section II. AIR COMPRESSOR**

**6-5. General**

The air compressor is a 2-cylinder, 2-stage air cooled compressor. It has a capacity of 5 cfm at 610 rpm, and the electric motor drive cuts-in at 175 psi. The compressor stops when the air pressure gage indicates 200 psi, plus or minus 5 psi. The compressed air is cooled by a finned inter-cooler tube between the first stage cylinder and the second stage cylinder. The second stage compression is cooled by an aftercooler tube on its way to the air receiver. These tubes remove most of the heat of compression before the air reaches the receiver. The compressor is equipped with a centrifugal unloader and pilot valve system, to unload internal pressure for ease in

starting, and to minimize wear on bearings and shaft of the drive motor.

**6-6. Air Compressor**

*a. Removal.* Refer to paragraph 4-10 and remove the air compressor.

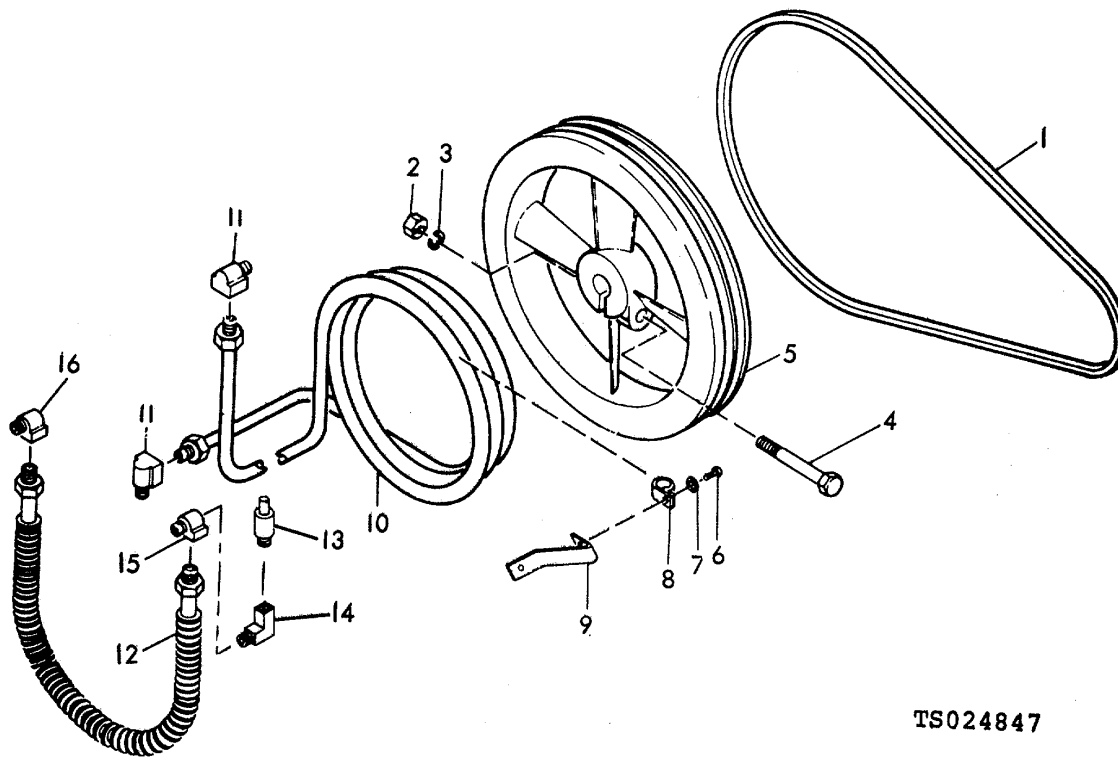
*b. Disassembly.*

(1) Disconnect tube and remove tube fitting from pilot valve (fig. 4-2). Loosen locknut and remove pilot

valve from frame cover.

- (2) Unscrew inlet air filter (fig. 2-1, sheet 3) from the close nipple.
- (3) Drain oil from the frame (LO 5-4310-2-12).
- (4) Remove frame end cover by removing six capscrews (9, fig. 4-3).
- (5) Remove centrifugal unloaded (20 thru 27, fig. 4-3) from end of crankshaft.
- (6) Remove nut (2, fig. 6-5), lockwashers (3), capscrew (4) from fanwheel (5) and remove fanwheel.
- (7) Remove capscrew (6), lockwasher (7) from

- brace(9) and remove clamp (8) from aftercooler tube (10)
- (8) Loosen fittings on each end of the aftercooler tube from elbows (11) and remove aftercooler tube and elbows.
- (9) Loosen fittings on each end of the intercooler tube (12) from elbows (15 and 16).
- (10) Remove safety valve (13) from elbow (14) and remove elbow (14) from elbow (15).
- (11) Remove elbow (15 and 16) from compressor.



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- |               |                            |                      |                   |
|---------------|----------------------------|----------------------|-------------------|
| 1. Belt       | 5. Fanwheel                | 9. Brace             | 13. Valve, safety |
| 2. Nut        | 6. Capscrew                | 10. Aftercooler tube | 14. Elbow, street |
| 3. Lockwasher | 7. Internal lockwasher (2) | 11. Elbow, tube (2)  | 15. Elbow, tube   |
| 4. Capscrew   | 8. Clamp (3)               | 12. Intercooler tube | 16. Elbow, tube   |

Figure 6-5. Fanwheel, aftercooler, and intercooler removal.

- (12) Remove tube connector (28, fig. 6-6).
- (13) Remove capscrew (14) and washer (15) from complete cylinder (16) and remove cylinder and gasket (18) from compressor frame (17, fig. 6-8).
- (14) Remove capscrew (1, fig. 6-6) from complete air head (2).
- (15) Remove air head (3) and gasket (4) from cylinder (17).
- (16) Remove spacer (8) from cylinder.
- (17) Remove four nuts (10), lockwashers (11) from screw (12) and remove screw and valves (13) from spacer (8).
- (18) Remove gasket (9) from top of cylinder.
- (19) Remove rings (24, 25 and 26) from piston (28)
- (20) Remove lockrings (21), pin (22) and connecting rod (27) from piston (23).

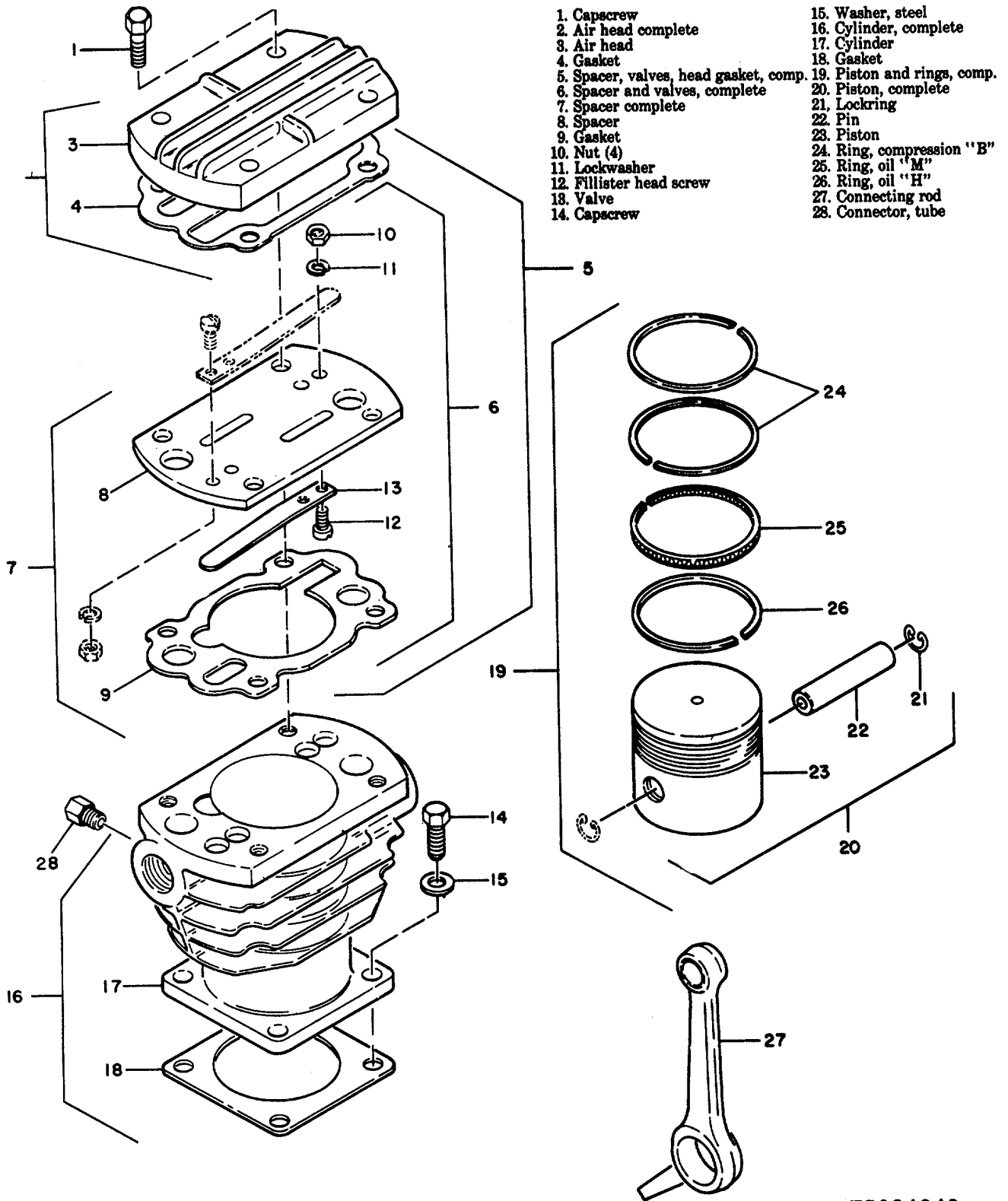


Figure 6-6. Low pressure cylinder, piston, rod and rings removal.

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(21) Remove tube connector (25, fig. 6-7) from cylinder (14).

(22) Remove capscrew (11), washer (12) and remove cylinder (14) and gasket (15) from compressor frame (17, fig. 6-8).

(23) Remove capscrew (1, fig. 6-7) from air head (3).

(24) Remove gaskets (4), valve plate (10), spacer (9) and gasket (8) from cylinder (14).

(25) Remove rings (21, 22 and 23) from piston (20).

(26) Remove lockrings (18), pin (19) and connecting rod (24) from piston (20).

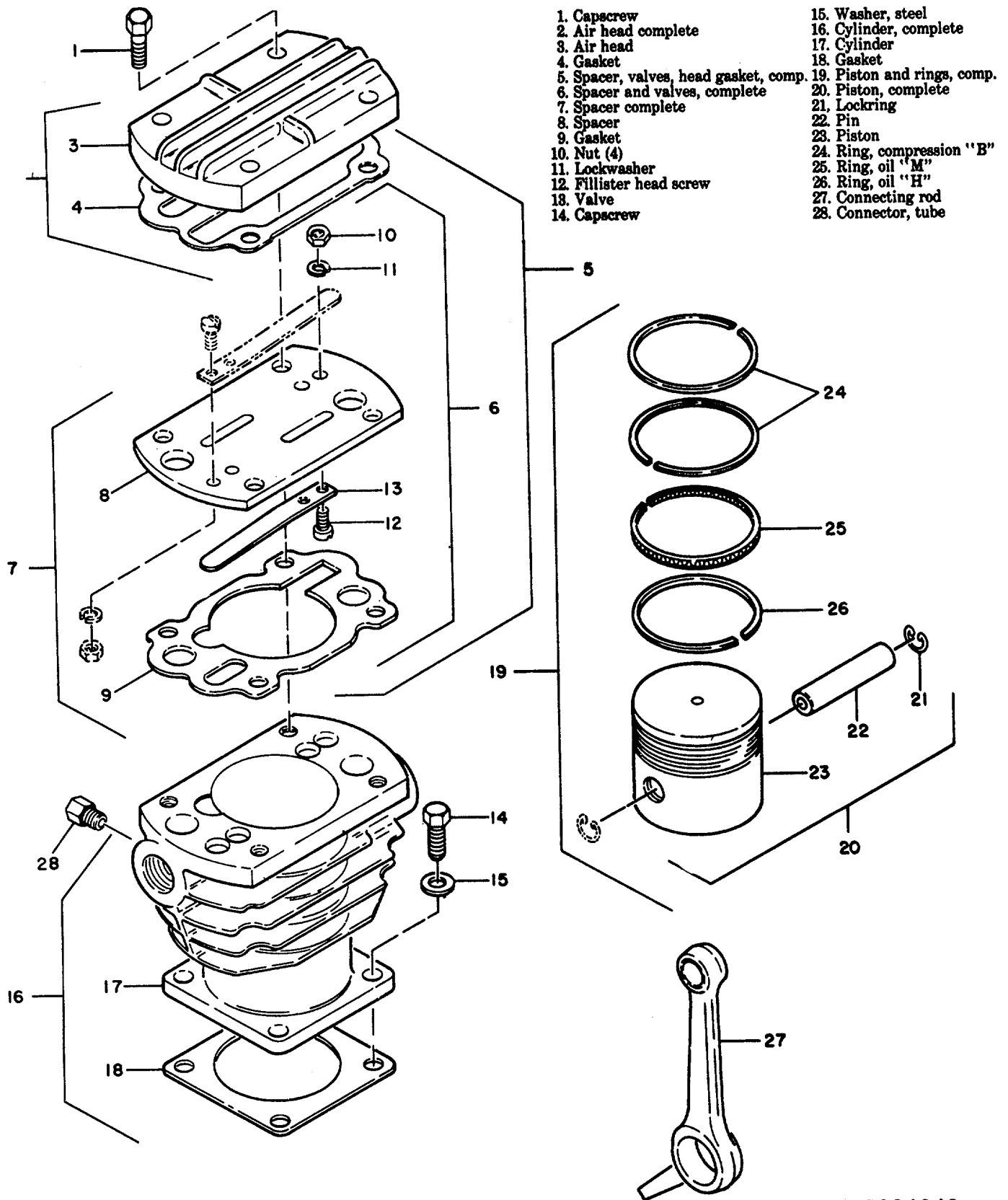


Figure 6-7. High pressure cylinder, piston, rod, and rings removal.

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(27) Remove pipe plug (5, fig. 6-8), coupling (6), pipe nipple (19), elbows (18) and two pipe nipples (7) from compressor frame (17).

(28) Remove breather tube (9) and tube connector (10) from compressor frame.

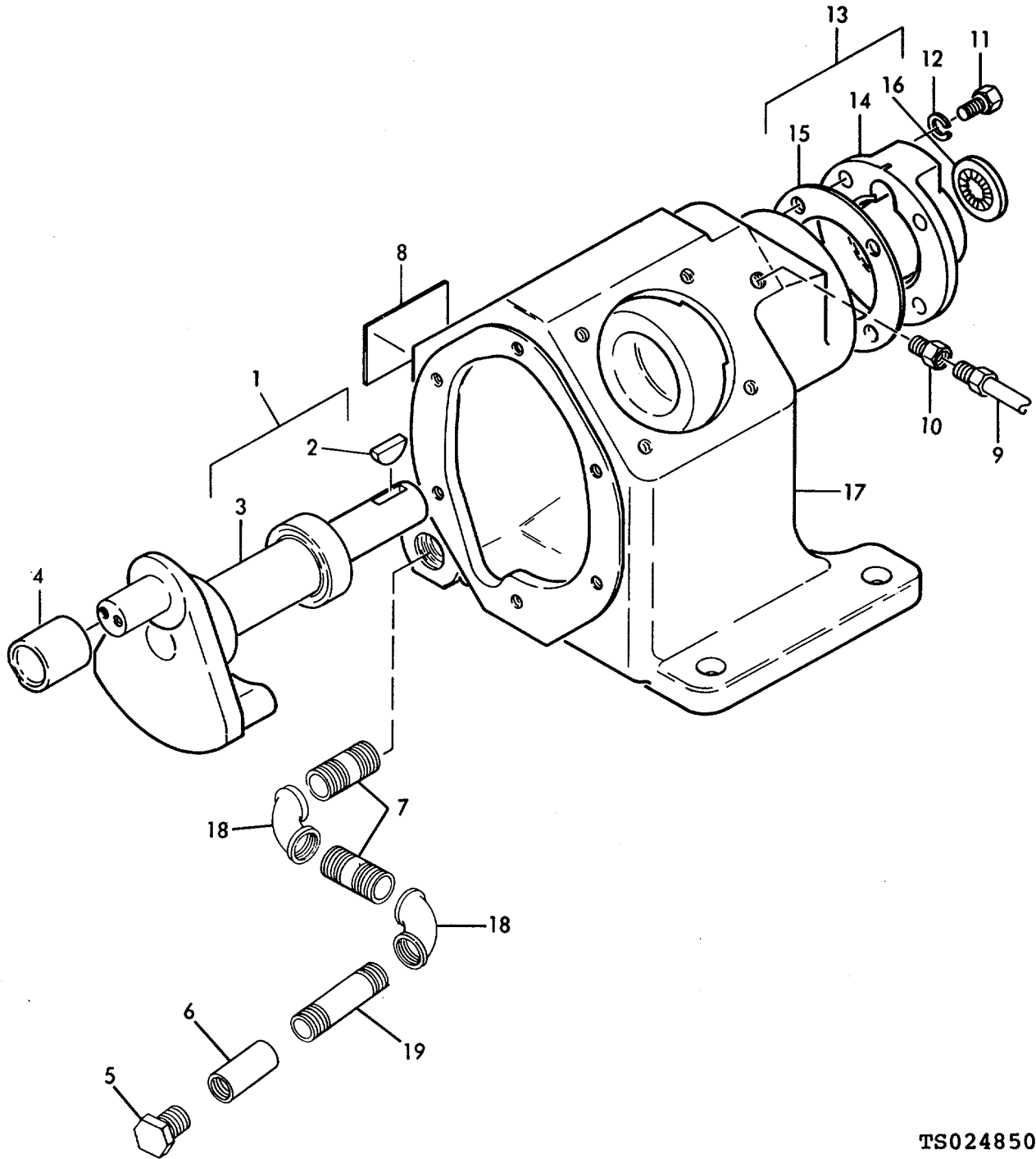
(29) Remove retaining ring and woodruff key (2) from keyway in crankshaft (3) and remove crankshaft

from compressor frame.

(30) Remove crankpin bushing (4) from crankshaft.

(31) Remove capscrews (11), lockwashers (12) and remove the complete shaft end cover (13).

(32) Remove gasket (15) and shaft end oil seal (16) from the end shaft cover (14).



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- 1. Crankshaft, complete
- 2. Woodruff key
- 3. Crankshaft assembly
- 4. Bushing, crankpin
- 5. Plug, pipe, hex head

- 6. Coupling, pipe
- 7. Nipple, pipe
- 8. Decal, instruction
- 9. Breather tube
- 10. Connector, tube

- 11. Capscrew
- 12. Washer, steel
- 13. Cover, shaft end, comp.
- 14. Cover, shaft end
- 15. Gasket

- 16. Seal, shaft end oil
- 17. Frame, compressor
- 18. Elbow, pipe
- 19. Nipple, pipe

Figure 6-8. Crankshaft assembly, removal.

*c Cleaning, Inspection and Repair.*

(1) Thoroughly clean the air heads by brushing or scraping lightly to remove accumulations of carbon deposits, being careful not to damage gasket surfaces. Be sure the gasket surface is free of all gasket particles.

**WARNING**

**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent, is 100°F (38°C) - 138°F (59°C).**

(2) Use solvent Fed Spec P-D-680 and wash away all accumulated oil. Be sure bore of cylinder is clean, and that all gasket particles are removed from surfaces to be gasketed.

(3) Wash pistons in P-D-680 solvent and remove all accumulated oil or carbon. Pay particular attention to the ring grooves. Be sure that oil return holes in the oil control wiper ring grooves are open, and that grooves themselves are absolutely clean.

(4) Inspect the cylinder bore for any signs of scoring or scuffing. If the cylinder bore shows signs of wear or scoring, as indicated by visible ridging at the end of ring travel, it must be replaced (see (6) below).

(5) Inspect the piston for signs of scoring, or for any indication of cracked or broken lands. If these signs are found, replace the piston. If piston shows no signs of scoring, or cracked or broken lands, check the condition of ring grooves for signs of excessive wear. A tapered ring groove would result in excessive clearance, and that piston should be replaced.

**NOTE**

If new ring sets are to be installed on pistons, and the old cylinder is going to be reused, the cylinder walls must be deglazed, or slightly roughened to provide a proper seating-in surface for the new piston rings.

(6) Cylinders that passed inspection in (4) above, and are to be reused, must be deglazed as follows:

**WARNING**

**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C) - 138°F (59°C).**

(a) Use a No. 80 grit abrasive cloth dampened in oleum spirits, or solvent Fed. Spec. P-D-680, and move it over the surface of the bore in a rotating and reciprocating motion with a very light pressure.

(b) After deglazing, the cylinder wall should be thoroughly cleaned with a hot soapy solution, using a good stiff bristle (not wire) brush. Rinse thoroughly with hot water then check cleanliness of the bore by wiping with a soft white paper cloth. If the paper shows more

than a slight discoloring, the cylinder has not been properly cleaned.

(7) Wash the oil reservoir portion of the frame, being sure that accumulations of oil and sludge are removed. Clean gasket surfaces for cylinders and end covers. Be sure no particles of old gaskets remain on the surfaces.

**WARNING**

**Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C) - 138°F (59°C).**

(8) Clean the air valves in solvent Fed. Spec. P-D-680. Clean both valve and seat by brushing with a stiff bristle (not wire) brush. Should it be necessary to scrape carbon or sludge, do so lightly, with something soft, like a square edge piece of hardwood. This will prevent marring of valve or seating surface.

(9) Clean thoroughly, then inspect bearings for signs of wear, or roughness. If bearings are worn, rough, or have other damage, replace the crankshaft assembly.

(10) Clean the unloader parts (fig. 4-3) thoroughly, then inspect weights and pins for a free fit.

*d. Reassembly.* Position the compressor frame (crankcase) on workbench. Fasten it down so it will not tip over when weight is added by assembly.

**NOTE**

Install new gaskets in all positions at reassembly, and a new oil seal in the shaft end cover.

(1) Slide the crankshaft (3, fig. 6-8) through the end cover opening until bearings seat in compressor frame.

(2) Tap journal end of shaft with a soft faced hammer until the retaining ring groove extends approximately 1/6 inch (0.04 cm) out of housing.

(3) Insert retaining ring in its groove, then tap the keyway end of the shaft with a soft faced hammer, until the retaining ring is tight against the housing.

**CAUTION**

**Install oil seal with the sealing lip facing inside of the shaft end cover, then press into position. If a vise is used to press the seal, be sure serrated jaws, if any, are covered to protect seal from distortion.**

(4) Install the shaft end oil seal (16) (see Caution above) in housing (14).

**CAUTION**

**Protect lip of the seal from cutting by the threads on end of crankshaft by wrapping a sheet of 0.003 inch brass shim stock around threads, then slipping shaft end cover and seal in position on frame.**

(5) Place gasket (15) in position around shaft, then



install shaft end cover and seal as described in caution above. Secure cover with four steel washers (12) and capscrews (11). Tighten capscrews to the torque value given for their size in Table 1-1. Install connector (10) and breather tube (9) in frame (17), then install nipples (7) elbows (18), nipples (19), coupling (6), and plug (5).

(6) Install connector (25, fig. 6-7) and connecting rod (24). Check clearance between crank pin bushing and connecting rod. It should be between 0.001 and 0.002 in. (0.001 to 0.005 cm). If clearance is 0.0025 in. (0.006 cm) replace bushing and connecting rod.

(7) Measure the clearance between piston pin (19) and piston (20). This is a very close tolerance. It should be between 0.0003 in. and 0.0009 in. (0.0007 and 0.002 cm). If clearance is as much as 0.0012 in. (0.003 cm) replace pin and piston. Install pin (19) through rod (24) and piston (20), and secure with the lockrings (18).

**NOTE**

Place piston rings in cylinder bore to measure end gap before installation in rings grooves. Also measure piston to bore clearance. If ring end gap is between 0.005 and 0.015 in. (0.013 and 0.039 cm), they are satisfactory. If piston clearance in bore of high pressure cylinder (134" dial) is between 0.0025 and 0.0035 in. (0.006 and 0.008 cm) the clearance is satisfactory. Piston pin to connecting rod clearance should be between 0.0002 and 0.0007 in. (0.0005 and 0.001 cm). If in this range, they are satisfactory.

(8) Before installing rings, see that all ring grooves re lubricated with compressor lubricating oil.

(9) Install ring (23) in bottom groove of piston (20). Install the expander in groove first, before ring (22), in the second groove from bottom of piston, then install rings (21) in the second groove from top, and the top groove of piston (20). Move end gap at all rings of set until they are staggered at 90° to each other.

(10) Position cylinder gasket (15) on frame, then position cylinder (14) over piston (20) and press in on rings until they slip into the tapered bottom of the cylinder. It is recommended that a ring compressor be used at this time to avoid distorting or breaking the rings. Seat cylinder on gasket, then install steel washers (12) and cap-screw (11). Tighten to a torque value for size given in table 1-1.

(11) Install gasket (8), spacer (9) and valve plate (10). Install two gaskets (4) and air head (3), then install capscrews (1) and tighten to a torque value given for the size in table 1-1.

(12) Install connecting rod (27, fig. 6-6) on crankshaft crank pin bushing. Check that clearance is between 0.001 and 0.002 in. (0.002 and 0.005 cm) (table 1-2). After checking clearance between pin (22) and rod (27), a close tolerance of between 0.0002 and 0.007 in. (0.0005 and 0.001 cm) if satisfactory install pin (22) through rod (27) and piston (23), then secure pin with lockrings (21).

(13) Fill oil ring grooves of piston (23) with compressor lubricating oil. Place ring set in cylinder (17)

bore, then measure end gap. It should measure between 0.005 and 0.015 in. (0.01 and 0.03 cm). If satisfactory, install ring (26) in bottom groove of piston (23). Install ring (25) in the second groove from the bottom. Install one ring (24) in the second groove from the top, and the other ring (24) in the top groove. Turn end gaps of rings until they are 90° from each other.

(14) Lubricate bore of cylinder (17); position gasket (18) over rod (27) to fit on frame. Position cylinder (17) over piston and rings, press in on rings until they slip into the tapered skirt of the bore. It is recommended that a ring compressor be used for this purpose to avoid distorting or breaking the rings. Install steel washers (15) and capscrews (14). Tighten to a torque value given for the size in table 1-1.

(15) Install valves (13) and secure with fillister head screws (12), lockwashers (11), and nuts (10). Install gasket (9), spacer and valves complete (6), gasket (4), and air head (3). Secure with four capscrews (1). Tighten to a torque value for the size given in table 1-1. Install connector (28) in cylinder (17).

(16) Install elbows (15 and 16, fig. 6-5), in cylinder, then install intercooler tube (12) into the elbows.

(17) Install elbow (14) in end of elbow (15) and install safety valve (13) into elbow (14).

(18) Install 2 elbows (11). Install aftercooler tube (10) in elbows (11). Install 3 clamps (8), and brace (9) on aftercooler (10) and secure with internal lockwashers (7) and capscrow (6). Tighten to a torque value given for size in table 1-1.

(19) Install fanwheel (5) on crankshaft and secure with capscrew (4), lockwasher (3) and nut (2). Tighten to a torque value given for size in table 1-1.

e. *Installation.* Refer to paragraph 4-10 and install the air compressor.

**6-7. Dehydrator and Outlet Air Filter Replacement**

a. *General.* Complete replacement of the dehydrators or outlet air filter should never be necessary. Repairs, by replacing components found defective, should be all that is required. However, when a defective receiver must be replaced, the dehydrator bracket, dehydrators, and outlet air filter must be removed and reinstalled.

b. *Removal and Installation of Dehydrators.*

(1) Shut off all power at source and lock it out.

(2) Drain the air receiver (para 3-14).

(3) Disconnect the outlet air piping to dehydrators, remove mounting hardware and remove the dehydrators with bracket (fig. 6-9).

(4) Position bracket with dehydrators on receiver and secure with mounting hardware.

(5) Connect air line components to dehydrators.

(6) Close air receiver drain.

(7) Energize power source.

c. *Removal and Installation of Outlet Air Filter.*

(1) Shut off all power at source, and lock it out.

(2) Refer to figure 6-9, break the outlet air line at union, then remove air line components back to the out- let air filter.

(3) Tag and disconnect electrical leads to junction box of heater.

**NOTE**

The filter bowl may require removal from head before the head can be unscrewed from the air line.

- (4) Remove the outlet air filter from the air line.
- (5) Install air filter to air line.
- (6) Connect electrical leads to heater junction box.
- (7) Connect air line components from air filter to union.

(8) Energize power source.

**6-8. Air Receiver Replacement**

*a. General.* When a defective receiver must be replaced, follow a procedure similar to that described below, after disconnecting all power.

*b. Removal.*

- (1) Remove the motor (para 4-9).
- (2) Remove the air compressor (para 4-10).
- (3) Remove the motor starter (para 6-3).
- (4) Remove the pressure switch (para 6-4).
- (5) Remove dehydrator with bracket (para 6-7).
- (6) Disconnect and remove all external piping and components of the outlet airline, brackets and casters.

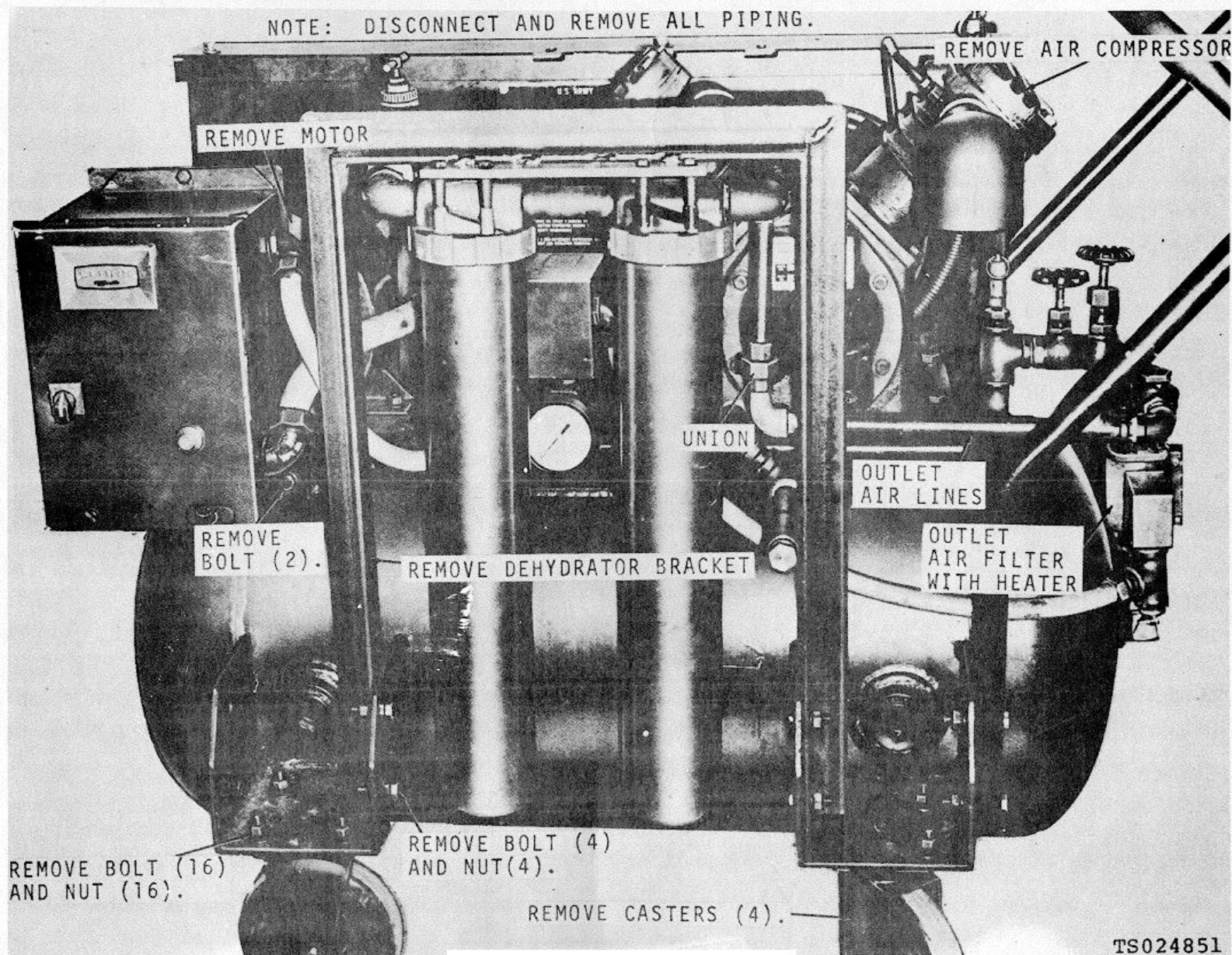


Figure 6-9. Air receiver, removal and installation.

c. *Installation.*

- (1) Install casters and brackets to the air receiver.
- (2) Connect all external piping and components of the outlet air lines.
- (3) Install dehydrator with bracket (para 6-7).

- (4) Install pressure switch (para 6-4).
- (5) Install motor starter (para 6-3).
- (6) Install air compressor (para 4-10).
- (7) Install motor (para 4-9).
- (8) Energize power source.

**APPENDIX A  
REFERENCES**

---

**A-1. Fire Protection**

TB 54200-200-10

Hand Portable Fire Extinguishers for Army Users

**A-2. Lubrication**

LO 5-431035212

C9100IL

Lubrication Order Fuel, Lubricants, Oils and Waxes

**A-3. Painting**

TM 43-0139

Painting Instructions for Field Use

**A-4. Maintenance**

TM 38-750

TB 742-93-1

TM 5-4310-352-24P

The Army Maintenance Management System (TAMMS)

Inspection and Test of Air and Other Gas Compressors

Organizational, Direct Support and General Support Maintenance Repair  
Parts and Special Tools Lists for Compressor, Air, Reciprocating, Electric  
Motor Driven, Receiver Mounted, 2HP, 5CFM, 175PSI (Ingersoll-Rand  
Model CM234F2) NSN 43104)0342-4562**A-5. Shipment and Storage**

TM 740-90-1

Administrative Storage of Equipment.

**A-6. Destruction of Army Materiel**

TM 750-244-3

Procedures for Destruction of Equipment to Prevent Enemy Use.

## APPENDIX B MAINTENANCE ALLOCATION CHART

### Section I. INTRODUCTION

#### B-1. General

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II, designates overall responsibility for the performance of maintenance functions on the identified end item or component and the work measurement time required to perform the functions by the designated maintenance level. 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 tools and test equipment required for each maintenance function as referenced from Section II.

#### B-2. Explanation of Columns in Section II

a. *Column (1), Group Number.* Column 1 lists group numbers to identify related components, assemblies, subassemblies, and modules with their next higher assembly. The applicable groups are listed in the MAC in disassembly sequence beginning with the first group removed.

b. *Column (2), Component/Assembly.* This column contains the noun names of components, assemblies, subassemblies and modules for which maintenance is authorized.

c. *Column (3), Maintenance Functions.* This column lists the functions to be performed on the item listed in Column 2. The maintenance functions are defined as follows:

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

(2) *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.

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

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

(5) *Align.* To adjust specified variable elements of an item to bring about optimum or desired performance.

(6) *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 comparison 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.

(7) *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.

(8) *Replace.* The act of substituting a serviceable like type part, sub-assembly, or module (component or assembly) for an unserviceable counterpart.

(9) *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, sub-assembly, module (component or assembly), end item, or system.

(10) *Overhaul.* That maintenance effort (service/action) 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 a like new condition.

(11) *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 equipment/components.

d. *Column (4), Maintenance Category.* This column is made up of sub-columns for each category of maintenance. Work time figures are listed in these sub-columns for the lowest level of maintenance authorized to perform the function listed in Column 3. These figures indicate the average active time required to perform the maintenance function at the indicated category of maintenance under typical field operating conditions.

e. *Column (5), Tools and Equipment.* This column is provided for referencing by code, the common tool sets (not individual tools) special tools, test and support equipment required to perform the designated function.

**B-3. Explanation of Columns in Section III**

a. *Column (1), Reference Code.* This column consists of an arabic number listed in sequence from Column 5 of Section II. The number references the common tool sets, special tools and test equipment requirements.

b. *Column (2), Maintenance Category.* This column shows the lowest category of maintenance authorized to use the special tools or test equipment.

c. *Column (3), Nomenclature.* This column lists the name or identification of the common tool sets, special tools or test equipment.

d. *Column (4), National/NATO Stock No. (NSN).* This column is provided for the NSN of common tool sets special tools and test equipment listed in the nomenclature column.

e. *Column (5), Tool Number.* This column lists the manufacturer's code and part number of tools and test equipment.

**Section II. MAINTENANCE ALLOCATION CHART**

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENTS
			C	O	F	H	D	
0101	01 GROUP, GUARD Beltguard  V-Belts	Inspect Replace  Inspect Adjust Replace	0.1 0.5  0.5 0.8	   0.9				
0201	02 GROUP, DEHYDRATOR Dehydrator	Inspect Service Repair Replace	0.1 0.3		1.0 1.0			Spanner Wrench (1)
0202	Outlet Air Filter	Inspect Service Replace	0.1 0.2		0.4			
0301	03 GROUP, ELECTRIC MOTOR AND RELATED PARTS Electric Motor	Service Replace Repair	0.3	1.0	4.0			
0302	Rotor	Inspect Replace	0.1		2.0			
0303	Motor Starter	Inspect Replace	0.1		2.0			
0304	Pressure Switch	Adjust Replace			0.5 0.8			
0401	04 GROUP, AIR COMPRESSOR ASSEMBLY AirCompressor	Inspect Install Replace Repair Overhaul	0.3	0.4 1.5	4.0	8.0		
0402	Pilot Valve	Adjust Replace	0.3	0.5				
0403	Inlet Filter	Service Replace	0.3	0.2				
0404	Rod Assembly	Inspect Replace			0.3 3.0			
0405	Crankshaft	Inspect Replace		0.2	3.0			
0501	05 GROUP, AIR RECEIVER Air Receiver and Related Parts	Inspect Service Replace	0.2 0.2			8.0		

•SUBCOLUMNS ARE AS FOLLOWS:  
F- DIRECT SUPPORT;  
•INDICATES WT/MH REQUIRED

C - OPERATOR CREW;  
H - GENERAL SUPPORT;

O - ORGANIZATIONAL;  
D-DEPOT

**Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS**

Reference code	Maintenance category	Nomenclature	National stock number (NSN)	Tool number
1	C	Spanner Wrench: for removal of locking nut holding the dehydrator vessel and the outlet air filter bowl to their heads		



**APPENDIX C  
COMPONENTS OF END ITEMS LIST**

---

**SECTION I. INTRODUCTION**

**C-1. SCOPE.**

This appendix lists Integral Components of and Basic Issue Items (BII) for the Air Compressor to help you inventory items required for safe and efficient operation.

**C-2. GENERAL.**

The components of end item list are divided into the following sections:

*a. Section II. Integral Components of the End Item.* These items, when assembled, comprise the Air Compressor and must accompany it whenever it is transferred or turned in. These illustrations will help you identify these items.

*b. Section III. Basic Issue Items.* These are minimum essential items required to place the Air Compressor in operation, to operate it and to perform emergency repairs. Although shipped separately packed, they must accompany the Air Compressor during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement BII based on Table(s) of Organization and Equipment (TOE)/Modification Table of Organization and Equipment (MTOE) authorization of the end item.

**C-3. EXPLANATION OF COLUMNS.**

*a. Illustration:* This column is divided as follows:

(1) *Figure Number.* Indicates the figure number of the illustration on which the item is shown (if applicable). other site.

(2) *Item Number.* The number used to identify item called out in the illustration.

*b. National Stock Number (NSN):* Indicates the national stock number assigned to the end item which will be used for requisitioning.

*c. Part Number (P/N):* Indicates the primary number used by the manufacturer which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards and inspection requirements to identify an item or range of items.

*d. Description:* Indicates the federal item name and, if required, a minimum description to identify the item.

*e. Location:* The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

*f. Usable on Code:* (Not Applicable)

*g. Quantity Required (Qty Read):* This column lists the quantity of each item required for a complete major item.

*h. Quantity:* This column is left blank for use during inventory. Under the received column, list the quantity you actually receive on your major item. The date columns are for use when you inventory the major item at a later date, such as for shipment to an

**Section II.  
COMPONENTS OF END ITEM**

(1)	(2)	(3)	(4)	(5)	(6)	(7)	
ILLUSTRATION (a) FIGURE NO.	(b) ITEM NO.	NATIONAL STOCK NUMBER	PART NO. & FSCM	DESCRIPTION	LOCATION	USABLE ON CODE	QTY REQD
1	4910-00-030-2365	3W114439(51436)		INFLATOR ASSEMBLY			1
1	4720-00-879-3179	3W95993(88663)		HOSE ASSEMBLY			1

**Section III.  
BASIC ISSUE ITEMS**

(1)	(2)	(3)	(4)	(5)	(6)	(7)	
ILLUSTRATION (a) FIGURE NO.	(b) ITEM NO.	NATIONAL STOCK NUMBER	PART NO. & FSCM	DESCRIPTION	LOCATION	USABLE ON CODE	QTY REQD

TM 5-4310-352-141  
DA Maintenance Manual

**APPENDIX D.  
ADDITIONAL AUTHORIZATION LIST**

---

**Section I. INTRODUCTION**

**D-1. SCOPE..**

This appendix lists additional items you are authorized for the support of the Air Compressor.

turned in with it. These items are authorized to you by CTA, MTOE, TDA or JTA.

**D-2. GENERAL.**

This list identifies items that do not have to accompany the Air Compressor and that do not have to be

**D-3. EXPLANATION OF LISTING**

(Not Applicable)

**Section II. ADDITIONAL AUTHORIZATION LIST**

---

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION	(3)	(4)
	PART NUMBER & FSCM	USABLE ON CODE	QTY U/M AUTH
4210-00-555-8837	EXTINGUISHER, FIRE		1

---

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By Order of the Secretary of the Army:

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RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

 <p style="text-align: center;"><i>THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.</i></p>		SOMETHING WRONG WITH PUBLICATION		
		FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)		
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PUBLICATION NUMBER		PUBLICATION DATE	PUBLICATION TITLE	
BE EXACT PIN-POINT WHERE IT IS				
PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.	<p style="text-align: center; font-weight: bold;">IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT.</p>
PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER			SIGN HERE	

## The Metric System and Equivalents

### *Linear Measure*

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

### *Weights*

1 centigram = 10 milligrams = .15 grain  
 1 decigram = 10 centigrams = 1.54 grains  
 1 gram = 10 decigram = .035 ounce  
 1 decagram = 10 grams = .35 ounce  
 acres  
 1 hectogram = 10 decagrams = 3.52 ounces  
 1 kilogram = 10 hectograms = 2.2 pounds  
 1 quintal = 100 kilograms = 220.46 pounds  
 1 metric ton = 10 quintals = 1.1 short tons

### *Liquid Measure*

1 centiliter = 10 milliliters = .34 fl. ounce  
 1 deciliter = 10 centiliters = 3.38 fl. ounces  
 1 liter = 10 deciliters = 33.81 fl. ounces  
 1 dekaliter = 10 liters = 2.64 gallons  
 1 hectoliter = 10 dekaliters = 26.42 gallons  
 1 kiloliter = 10 hectoliters = 264.18 gallons

### *Square Measure*

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch  
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches  
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet  
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet  
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47  
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

### *Cubic Measure*

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

### Approximate Conversion Factors

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

### Temperature (Exact)

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

