Direct Support, General Support,

and Depot Maintenance Manual

COMPRESSOR, AIR, RECIPROCATING, BASE MOUNTED, 4CFM, 3000 PSI,

ELECTRIC MOTOR DRIVEN, (WALTER KIDDE MODEL 895026.

FSN 4310-460-2184

(BOGUE ELECTRIC MODEL 6703)

FSN 4310-181-8895

This reprint includes all changes in effect at the time of publication; changes 1 and 2.

HEADQUARTERS, DEPARTMENT OF THE ARMY

SEPTEMBER 1970

CHANGE
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *13 September, 1974*

**Direct Support, General Support,
and Depot Maintenance Manual**

**COMPRESSOR, AIR, RECIPROCATING, BASE MOUNTED, 4CFM, 3000 PSI,
ELECTRIC MOTOR DRIVEN, (WALTER KIDDE MODEL 895026
FSN 4310-460-2184
(BOGUE ELECTRIC MODEL 6703)
FSN 4310-181-895**

TM 5431043-35, 21 September 1970 is changed as follows:

Page 5-6. Paragraph 5-6a.(2) is changed to read:

(2) Removal. Disassemble machine screws (66) and remove screws, lock washers (67), flat washers (68) and front fan guard (65) from the rear fan guard (69).

Page 5-7. Paragraph 5-6.a. (7) is changed to read:

(7) Replacement. Replace front fan guard (65), bushing nut (103), cover (104, spring (106) spring lock (105), fan (109), busing (107) and washer (108).

Page 5-8. Paragraph 5-6.a. (8) (e) is changed to read:

(*e*) Mount the front fan guard (65) to the rear fan guard (69), using machine screws (66), lock washes (67) and flat washers (68).

Page 5-9. Paragraph 5-6.g. (2) is changed to read:

(2) Disassemble four pump screws (0) and remove screws, flat washers (71), rear fan guard (69) and oil pump (112) from air compressor.

Page 5-10. Paragraph 5-6.g. (5) is changed to read:

(5) Replacement. Replace tube (92), tube (93), rear fan guard (69) and oil pump (112) if defective. Refer to paragraph 5-8.e for overhaul instructions of the oil pump.

Paragraph 5-6.(6) is changed to read:

(6) Installation. Installation is the reverse of removal, refer to preceding step (2) in this paragraph. Apply torque as applicable, refer to paragraph 5-4.

Page 5-49. *CAUTION*: is changed to read:

***CAUTION*: Performance of the basic compressor tests is accomplished when the basic compressor is completely assembled with intercoolers, aftercoolers, oil supply and oil return tubes, oil sump, brackets, fan, rear and front fan guards, air inlet strainer with filter, etc, and mounted on the Universal Air Compressor Test Stand Part Number 890370-02 or equivalent. During test operations, the compressor oil shall be replaced every three hours until the unit is run-in total of twelve hours; then, the oil will be replaced every six hours until completion of run-in testing.**

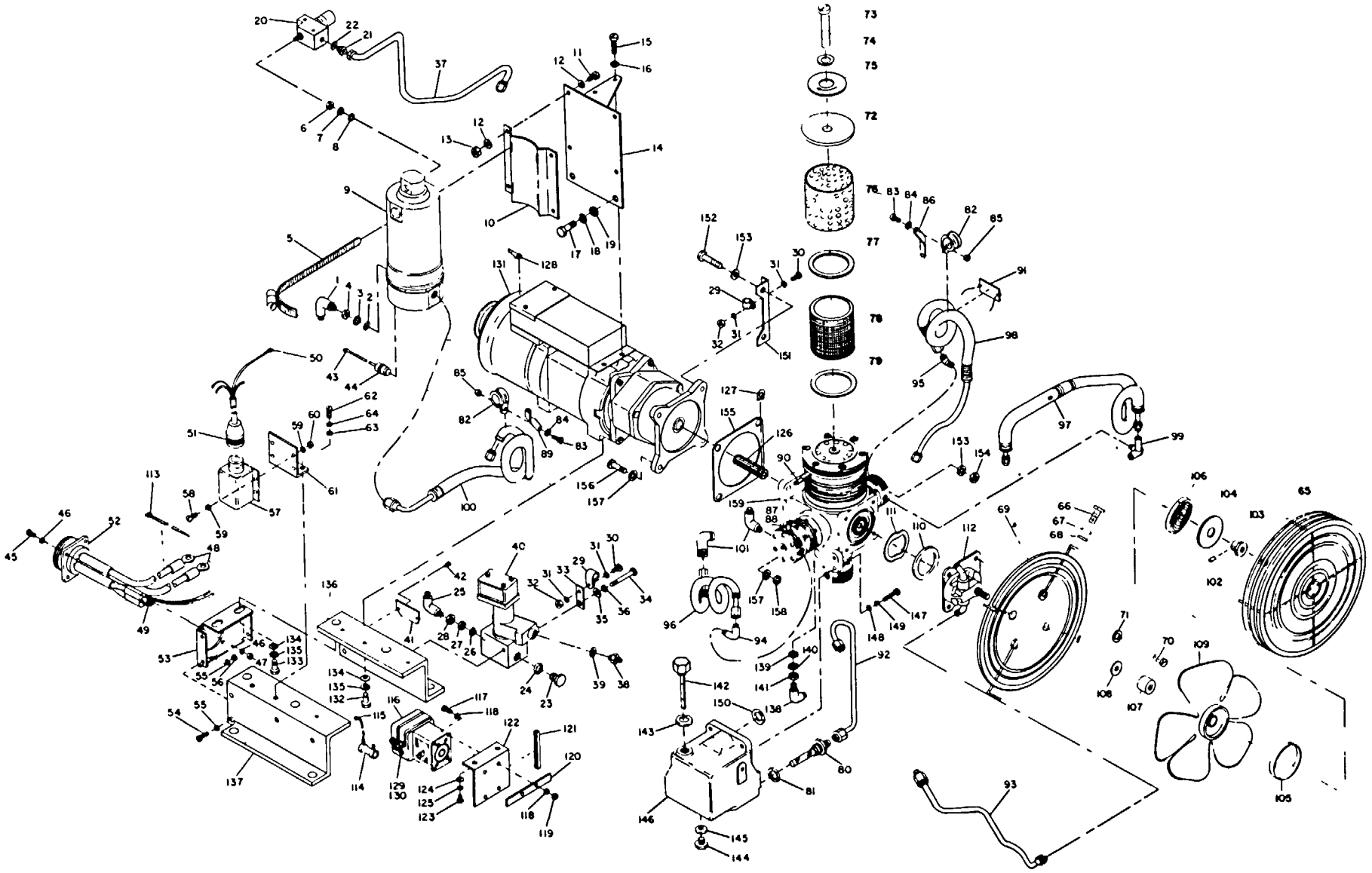

Figure 6-1. Compressor, exploded view

Page 6-6. Fig. & Index Nos 45 to -67 are changed to read as follows:

-65	.GUARD, Fan, front	1
	(ATTACHING PARTS)	
-66	.SCREW, Machine	4
-67	.WASHER, Lock	4

Page 6-7. Fig. & Index Nos -68 through -79 are changed to read as follows:

-6-1-68	.WASHER, Flat	4
	---*---	
-69	.GUARD, Fan, rear	1
	(ATTACHING PARTS)	
-70	.SCREW, Pump	4
-71	.WASHER, Flat	4
	---*---	
-72	.COVER, Filter	1
	(ATTACHING PARTS)	
-73	.SCREW, Machine	1
-74	.WASHER, Flat	1
	---*---	
-75	.DECAL, Rotation	1
-76	.STRAINER, Inlet Air	1
-77	.GASKET, Inlet Air	1
-78	.FILTER, Inlet Air	1
-79	.GASKET, Inlet Air	1

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General United States Army
Chief of Staff

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

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To be distributed in accordance with DA Form 1247A (qty rqr block No. 679) Direct and General Support Maintenance requirements for Armored Reconnaissance Assault Vehicle M551.

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CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
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Direct Support, General Support,

and Depot Maintenance Manual

COMPRESSOR, AIR, RECIPROCATING, BASE MOUNTED, 4CFM, 3000 PSI,

ELECTRIC MOTOR DRIVEN, (WALTER KIDDE MODEL 895026.

FSN 4310-460-2184

(BOGUE ELECTRIC MODEL 6703)

FSN 4310-181-8895

TM 5-4310-43-35, 21 September 1970 is changed as follows:

Cover and title is changed to read as shown above.

General. Delete all reference to FSN 9150-753-4667 throughout the manual and substitute FSN 9150-753-4667 as reference.

Page i, Chapter 4 title is changed to read: "MAINTENANCE AND TROUBLESHOOTING." Paragraph and page numbers are changed to 4-4 and 4-0-1 respectively. Chapter 6 title is changed to read: "ILLUSTRATIONS".

Page 1-3. After paragraph 1-8a(9) add paragraph b. as follows:

b. Major Components (Bogue Electric Model 6703).

(1) Compressor unit

Manufacturer	Water Kidde & Co., Inc.
Part no	894843
Capacity	4.0 SCFM minimum, 3,000 ±5 PSIG at 59°F,.306 LB/MIN at 29.92 IN/HG absolute inlet pressure (sea level).
Lube oil	Per FSN 9150-753-4667. Fill oil sump to level indicated on dip stick.
Max. oil consumption	10 cc/hr.
Check period (oil)	8 hrs. max.
Heat rejection	230 BTU/MIN max. at above conditions.

(2) Back pressure valve

Manufacturer	Walter Kidde & Co., Inc.
Part no	875498
Set pressure	1,700 PSI ± 100 PSI
Proof pressure	5,000 PSIG
Burst pressure	12,000 PSIG
Temperature range	65°F to ± 160°F
Leakage (external)	3 cc/hr. max.

(3) Pressure switch

Manufacturer	Walter Kidde & Co., Inc.
Part no	894544 (Note 1)
Operating pressure	8,000 PSIG
Proof pressure	4,500 PSIG
Burst pressure	7,500 PSIG
Temperature range	-65°F to +160°F
Check valve opening pressure	5-20 PSIG
Relief valve setting	3,950 PSI max. full flow 3,350 PSI min. reseat
Cut-in pressure	2,800 PSIG/MIN.
Cut-out pressure	3,100 to 3,300 PSIG

NOTE

Compression spring, originally supplied with pressure switch 894544, replaced with Bogue Electric Part No. A50130 compression spring.

(4) Moisture separator

Manufacturer	Walter Kidde & Co, Inc.
Part no	894518
Operating pressure	3,300 PSIG
Proof pressure	4,950 PSIG
Minimum burst pressure	8,250 PSIG (with safety plugged)
Electrical rating	28VDC, 4 amps., max.
Heater (prevent freezing)	Hermetically sealed thermostat, closes at 35°F minimum, opens at 85°F maximum
Capacity	13.5 cu. in. minimum
Temperature range	-65°F to +160°F and intermittently to +225°F.
Weight (Dry)	3.8 lbs.
Burst pressure (safety disc)	5,700 to 6,700 PSIG
Air leakage at dump port	3 cc/min. maximum
Air leakage at other points	3 cc/hr
Oil leakage past sensing piston	1 cc/hr throughout 30 to 120 PSIG range.
Mounting position	Within 30% vertical position.

(5) DC motor

Manufacturer	Bogue Electric Mfg. Co.
Part No	MS11DA4-1
Type	Series wound
Input power required	27 VDC, nominal, 150 amps.
RPM (nominal)	3600
Horsepower (output)	4 HP
Duty	Continuous
Insulation	Class F
Number of poles	4
Number of brushes	8
Mounting position	Horizontal
Method of cooling	Self-ventilated
Fungus resistance	Per MIL-F-13927

(6) Timer (K2)

Manufacturer	Tempo Instruments Inc
Part no	92950
Operating voltage	18-30 VDC (27 VDC Nom)
Contact rating	2 amperes
Timing cycle (timer energized)	Contacts closed for 30 minutes ± 4.5 min. Contacts open for 10 seconds ± 1 sec.

(7) Filter assembly (electrical)

Manufacturer	Bogue Electric Mfg. Co.
Part no	B-37389

(8) Filter capacitor (FL-1)

Manufacturer	Cornell Dubilier
Part no	NF10305
Type	Feed-thru (radio noise)
Location	Mounted in control box

(9) Contactor (K3)

Manufacturer	Cutler Hammer
Type	6041H-215
Operating voltage	18-30 VDC (27 VDC Nom)
Specification	MS24171D-1
Location	Mounted in control box

(10) Relay (K1)

Manufacturer	Sigma Instruments Inc.
Operating voltage	18-30 VDC (27 VDC Nom)
Part no	33RJL1200 NC-SIL
Location	Mounted in control box

(11) *Wiring diagram*. (see figure 1-3 for wiring of Walter Kidde Model 895026).

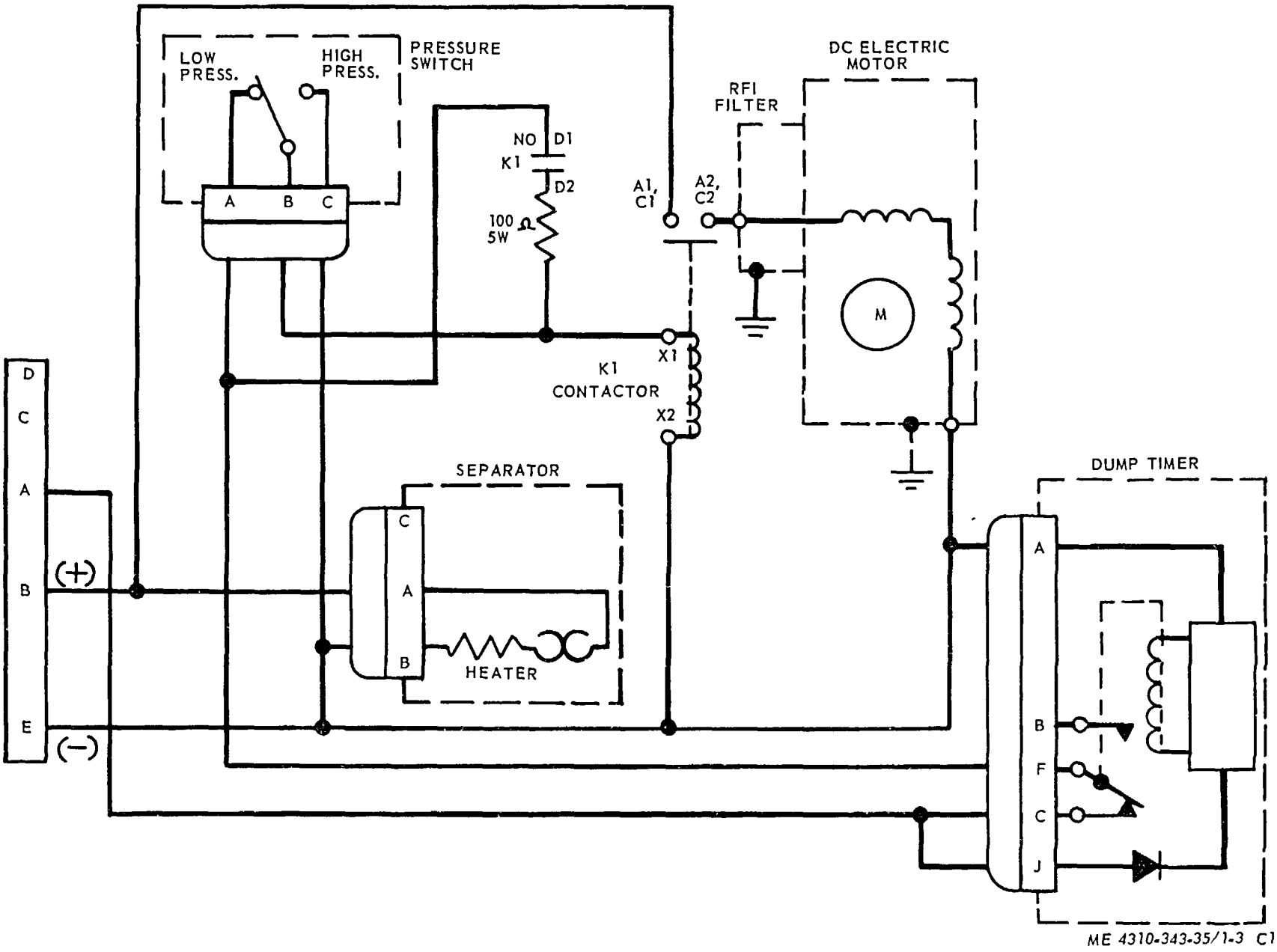

Figure 1-3. Wring diagram, Walter Kidde Model 895026.

Page 4-1. Before page 4-1 insert page 4-0-1 containing the following information

CHAPTER 4

MAINTENANCE AND TROUBLESHOOTING

4-4. Brushes

Inspect brushes on motor after 1,000 hours operation to determine wear factor. Do not permit brushes to become worn shorter than 7/16 inch as damage to the commutator may occur. When replacing brushes, it is most important that they be properly "seated" to the contour of the commutator. Always check to make sure that brushes are free to move in the brush holders and that the brush springs have the proper tension (14-16 oz.)

4-5. Brush Seating

To correctly seat a brush, insert a strip of thin, fine (No. 000) sandpaper, approximately 1 x 12 inches, between the brush and the commutator, with the abrasive side toward the brush. DO NOT USE EMERY. With the brush in the holder and under pressure, withdraw the sandpaper in the direction of rotation of the motor, keeping it close to the contour of the commutator. Release pressure on the brush before returning the sandpaper for the next stroke. Check progress of seating by running the machine several minutes at no load, with brushes riding on the bare commutator and observe the area of seat polished by contact. Continue sanding until at least 80% of the area of the seat shows contact when checked in this manner. Reseating of the brushes is required if brush holders are moved or replaced, or if the commutator is resurface

4-6. Commutator

Under normal operating conditions, the commutator rarely require attention. It should be kept clean and free from dirt or oil. If it becomes slightly rough or grooved due to foreign deposits, it may be polished with fine (No. 000) sandpaper or a commutator polishing stone. DO NOT USE EMERY. If the defects cannot be removed in this manner, the commutator must be turned down in a lathe. Refer to paragraph 5-6.4.

4-7. Bearings

Motor bearings should not require any maintenance during the life of the machine, however, should a bearing become defective producing excessive heating, vibration, or clicking noses, the bearing should be replaced. Refer to paragraph 5-6.3 for method of replacing defective bearings.

4-8. Control Components

Control components such as relays, timer, valves, diodes, capacitors, and resistors employed in the control circuits are considered non-repair items and should be replaced when found defective

Page 4-8. Table 4-1; add the following troubleshooting procedure.

NOTE

This portion of table 4-1 applies to Bogue Electric Model 6703 compressor.

Trouble	*Probable cause*	*Remedy*
Motor fails to start.	Loose connections and/or open wiring.	Check all wiring for continuity.
	Defective timer K2.	Check timer for correct operation. Contact must be closed when 28 VDC is applied across terminals 1 and 9. See figure 6-11(1). Replace a defective timer.
	Defective relay K1 contacts.	Check for continuity across terminal

Trouble	*Probable cause*	*Remedy*
		2 and 8. See figure 6-11(1). If open replace K1.
	Defective Contactor K3.	Check for open coil on contactor. Continuity across terminals A1 and A2 should be obtained when 28 VDC is applied across K3 coil terminals X1 and X2. See figure 6-11(1).
	Defective diode.	Check CR1 and CR3 for open diodes See figure 6-11(1). Replace if defective.
	Defective motor.	If 27 VDC is available across brush terminals, check that brushes are not worn excessively (para. 4-4). Replace worn brushes (para. 4-5).
	Sticking brushes.	Check that brushes are free to move in each respective brush holder and brush spring apply proper tension, (par 4-4).
	Open motor field coils.	Check field coils for opens or shorts (para 5-6.6). Repair or replace coils a required.
	Open armature.	Check armature for opens and grounds (para 5-6.5). Repair replace armature.
	Defective pressure.	Verify that normally open contacts of K4 are not closed. Replace pressure switch if defective. See figure 6-11(1).
Motor-compressor operating pressure fails to build up.	Leaky piping.	Check all pipe fittings for leaks.
Compressor fails to maintain its preset on-off cycle, tat is, 30 minutes ON, 10 seconds OFF.	Defective pressure switch.	Replace K4.
Motor attempts start then stops.	Weak field.	Check field coil for open winding (para 5-6.6). Repair or replace coils as required.
Excessive brush sparking.	Commutator dirty.	Clean commutator (para 4-6). Clean and reset brushes (para 4-5).
	Eccentric or high mica on commutator.	Grind and true commutator. Under-current mica (para 5-6.4).
	Weak or broken brush springs.	Check brush springs and verify correct brush pressure. (para 4-4).
	Brushes too short.	Replace brushes (para 4-5).
Brush chatter or hissing noise.	Loose brushes, insufficient brush spring tension	Check for worn brushes and correct. brush pressure -(para 4-4).
	High mica.	Undercut mica (para 5-6.4).
	Poor brush fit on commutator	Reset brush (para 4-5).

Trouble	*Probable cause*	*Remedy*
	Brushes binding in the brush holders.	Remove and lea brush holders. Remove my irregularities on inside surface of brush holder or brush.
Brushes wear rapidly.	Rough commutator.	Resurface commutator and undercut mica (para -6.4).
Armature overheats.	Defective armature winding.	Check commutator for internal shorts. Remove any metallic particles (para -6.4).
Excessive vibration.	Defective bearings.	Check bearing for defects (para 5-6.3). Replace defective bearing

Page 5-12, After paragraph 5-6n. add the following:

5-6.1. Separation of Motor and Compressor (Bogue Electric Model 6703) (Fig. 6-11)

To separate the compressor assembly from the motor assembly, disconnect the pipe coupling at the sensing port and inlet port located on the moisture separator. Remove four nuts (116), lockwashers (115), and screws (113) from motor-compressor coupling flange and carefully pry apart motor and compressor units (30 and 2).

5-6.2. Disassembly of DC Motor (Bogue Electric Model 6703)

a. Refer to figure 6-11 for the location of all the parts referenced in the following disassembly procedure.

b. Remove control components and associated mounting brackets of components mounted on motor frame such as moisture separator (5), back pressure valve (10), pressure switch (12), filter box (14), timer assembly (17), and interconnecting tubing.

NOTE

Removal of above components are only necessary if the field coils, located on the main pole assembly (32), are to be removed from the motor frame (31).

c. Remove four screws (82) and lockwashers (89) and four side covers (51) to expose the four brush holder assemblies (34).

d Disconnect brush leads. Lift bush spring (42) on each brush holder (35) and remove brush (43).

e. Remove four nuts (111) and lockwashers (110) and remove end cover (56) and four spacers (55). Remove elastic stop nut (54) from motor shaft. Loosen set screw on hub of fan (53) and pull fan off of motor shaft.

f. Make a score mark on bearing bracket (47) and motor frame (31) to insure correct position when reassembled. Remove four locknuts (112) and lockwashers (109) from studs (52) and carefully pry loose bearing bracket (47) from motor frame (31).

g. Carefully pry loose bearing bracket (50) and pull bearing bracket away from motor frame (31). The complete armature assembly (33) should slip out with the bearing bracket. Be careful when removing the armature assembly to prevent scratching the wound armature against the stator pole pieces.

h. Separate the armature assembly. (33) from the bearing bracket (50). It should pull apart easily. Use a suitable bearing puller and remove bearing (45 and 48) from the motor shaft

i If necessary to remove the field coils carefully tag all leads before unsoldering connections to insure exact reconnections. The series connected field coils are removed by removing four countersunk screws (99) on each of the four main field poles.

j. When disassembling the brush holder assembly (34), remember the two negative (-) brush holders which are grounded, are positioned at the top and bottom of the motor assembly. The two positive (+) brush holders

are identical to the negative brush holders except insulating bushings (37) and nylon washers (38) are used in place of spacers (39 and 36), respectively.

NOTE

When reassembled, the positive brush holders must be positioned one on each side of the motor assembly to enable proper connection of field leads.

k. To remove positive brush holders (35) from bearing bracket (56) remove two screws (92) and flat washer (94). To remove negative brush holders (35) remove two screws (93) and flat washers (95).

5-6.3. Ball Bearing Check and Replacement (Bogue Electric Model 6703)

a. Check the bearing by holding the inner race and turning the outer race with the fingers; If it turns hard or sticks in spots, replace the bearing.

b. Before installing a new bearing, remove all dirt and chips from the bearing shaft seat. Oil the shaft so that the bearing maybe seated more easily. The bearing must be started squarely on the shaft to avoid jamming and scoring the shaft seat. Use and arbor press to force the new bearing into position Pressure must bear only against the inner race of the bearing when forcing the bearing into place. Never apply pressure against the outer race. Wrap a clean cloth around the newly installed bearing to prevent entrance of dust and dirt until final assembly of the motor is completed.

5-6.4. Commutator (Bogue Electric Model 6703)

If the commutator is too deeply grooved or pitted to be cleaned with fine sandpaper, the armature must be mounted in a lathe and the commutator turned down. Make sure both center holes are thoroughly dean. Do not cut deeper than necessary to obtain a smooth surface. Minimum diameter to which the commutator may be turned is 1 7/8 inches, maximum eccentricity of .001 inch total indicator reading. After turning, the mica segment separators should be undercut to a depth of 1/32 to 3/64 inch. Be certain mica is removed by undercut. Remove all burns and feather edge mica before polishing commutator with No. 000 sandpaper. DO NOT USE EMERY.

5-6.5. Armature(Bogue Electric-Model 6703)

a. Cleaning. Remove dust and dirt by blowing out with low pressure dry air (25 psi maximum). Inspect insulation for cracks or breaks and repair if necessary with tape and air-dry insulating varnish.

b. Grounded. Check Insulation resistance from commutator to shaft. If a ground is indicated, it must be located and repaired, or replaced with a new armature.

c. Open Circuited. An open circuit in the armature is readily detected by the commutator segments which are badly burned by heavy currents interrupted at the open segment. An open circuit in the armature is generally due to an overload condition which should be investigated. The open usually exists at the soldered junction of the coil to the commutator riser. If the segments are not badly damaged, resolder the affected junctions and refinish the commutator as described in a above. A short circuit in the armature may be detected with a growler.

5-6.6. Field Coils (Bogue Electric Model 6703)

The field coils (stator windings) should be checked with a resistance bridge if an open or shorted coil is suspected. The total resistance of the series connected field coils plus leads should be 0.029 ohms ±20%. Examine insulation carefully, tape and varnish any breaks.

Page 6-2. After paragraph 63 add the following note.

NOTE

Figure 6-11 is not arranged in disassembly order therefore paragraph 63 does not apply.

Page 6-33. After figure 6-10, add figures 6-11 and 6-12 as follows:

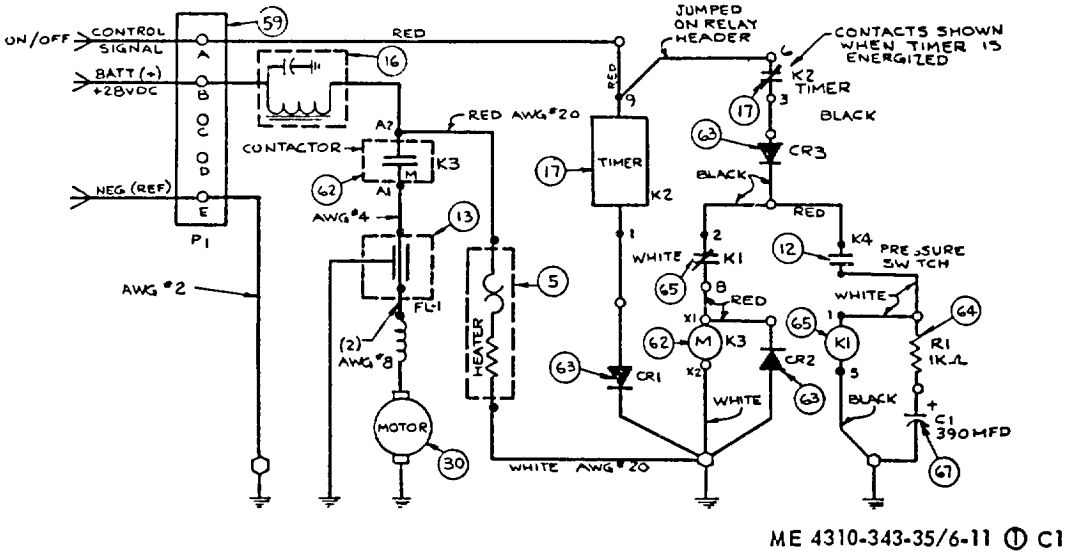

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Figure 6-11. Motor-compressor assembly, Bogue Electric model 6703) (sheet 1 of 5)

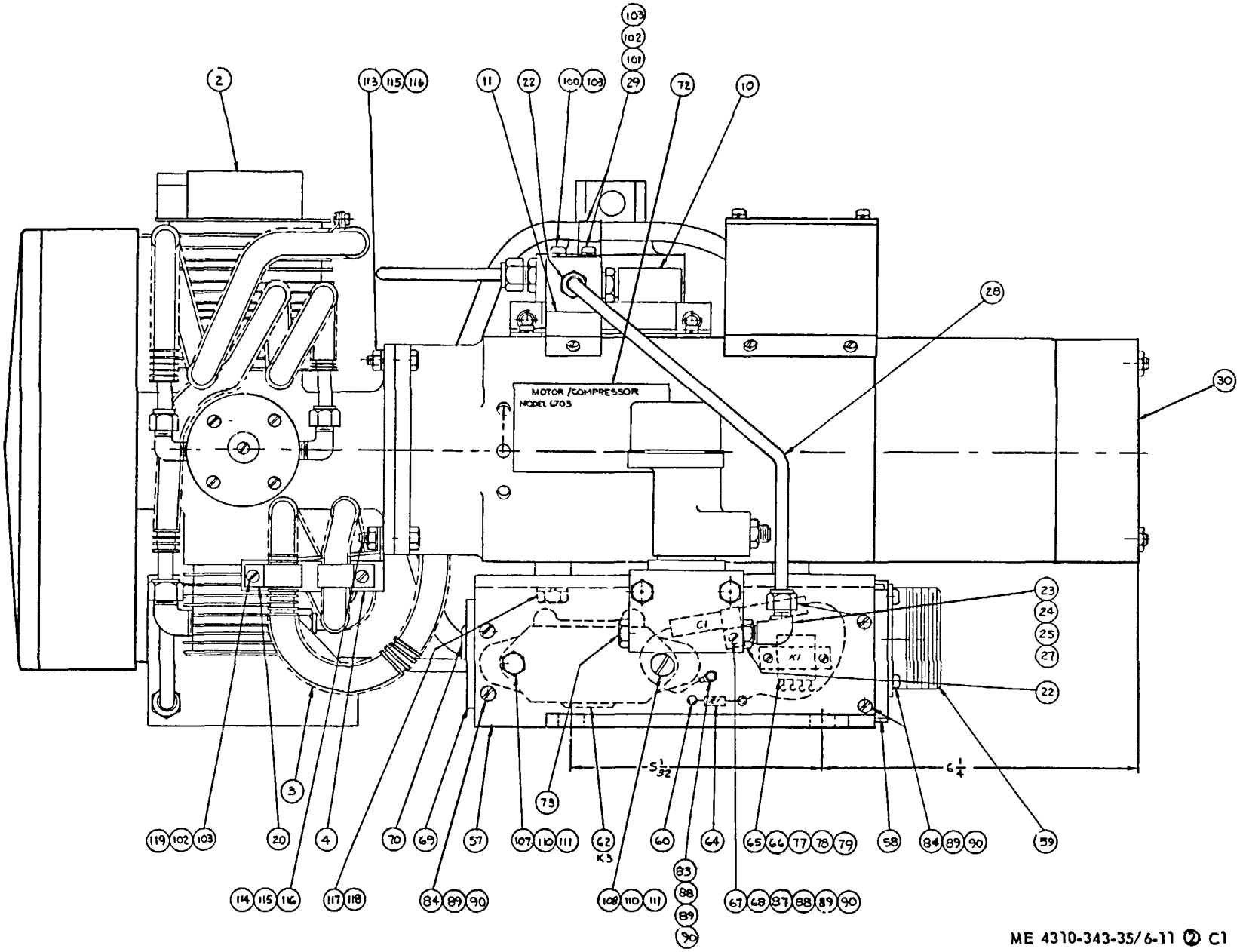


Figure 6-11. Motor-compressor assembly. Bogue Electric model 6703)
(sheet 2 of 5)

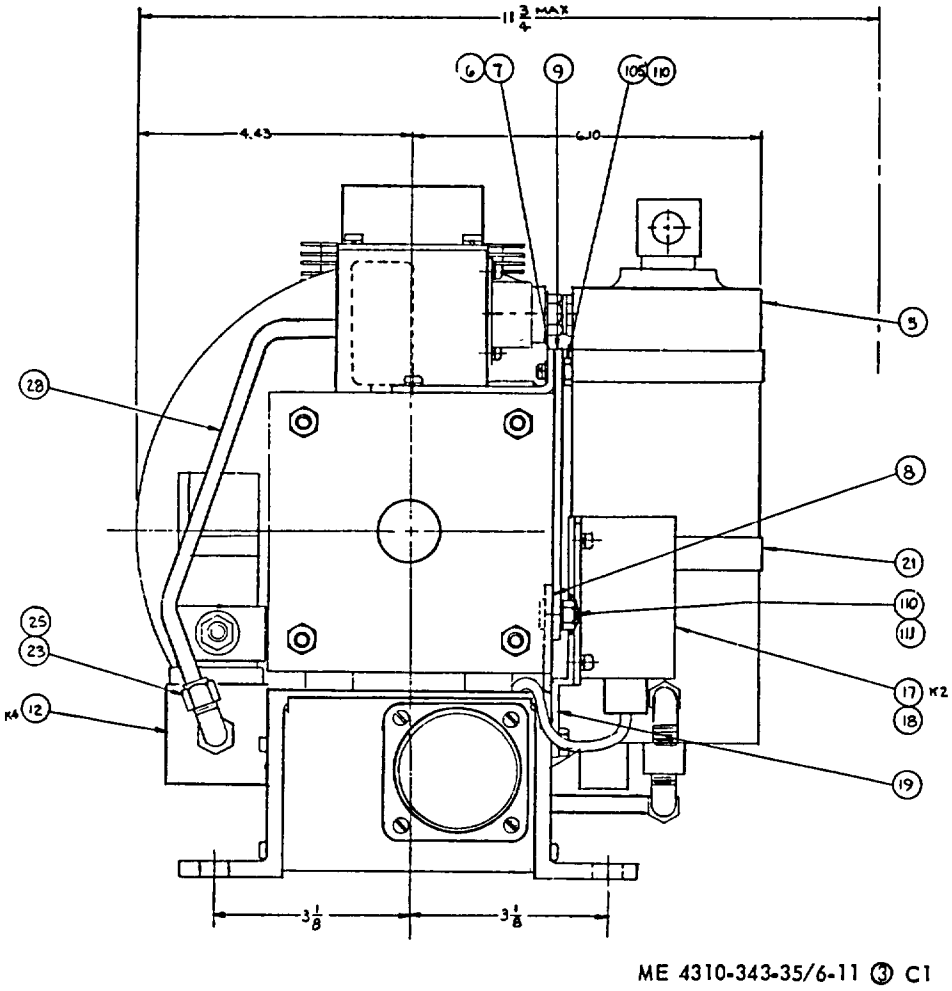


Figure 6-11. Motor-compressor assembly, Bogue Electric model 6703)
(sheet 3 of 5)

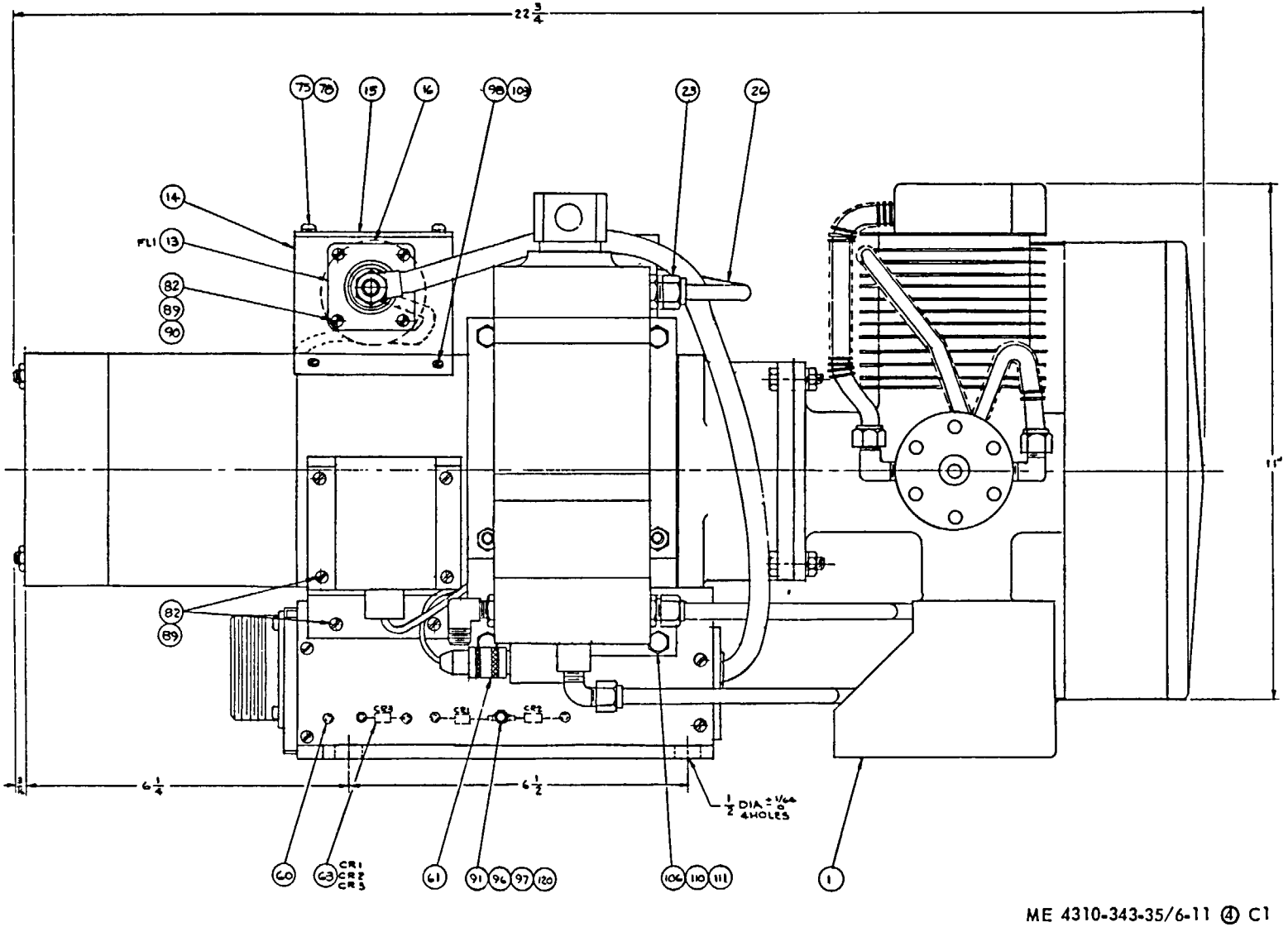


Figure 6-11. Motor-compressor assembly, Bogue Electric model 6703). (sheet 4 of 5)

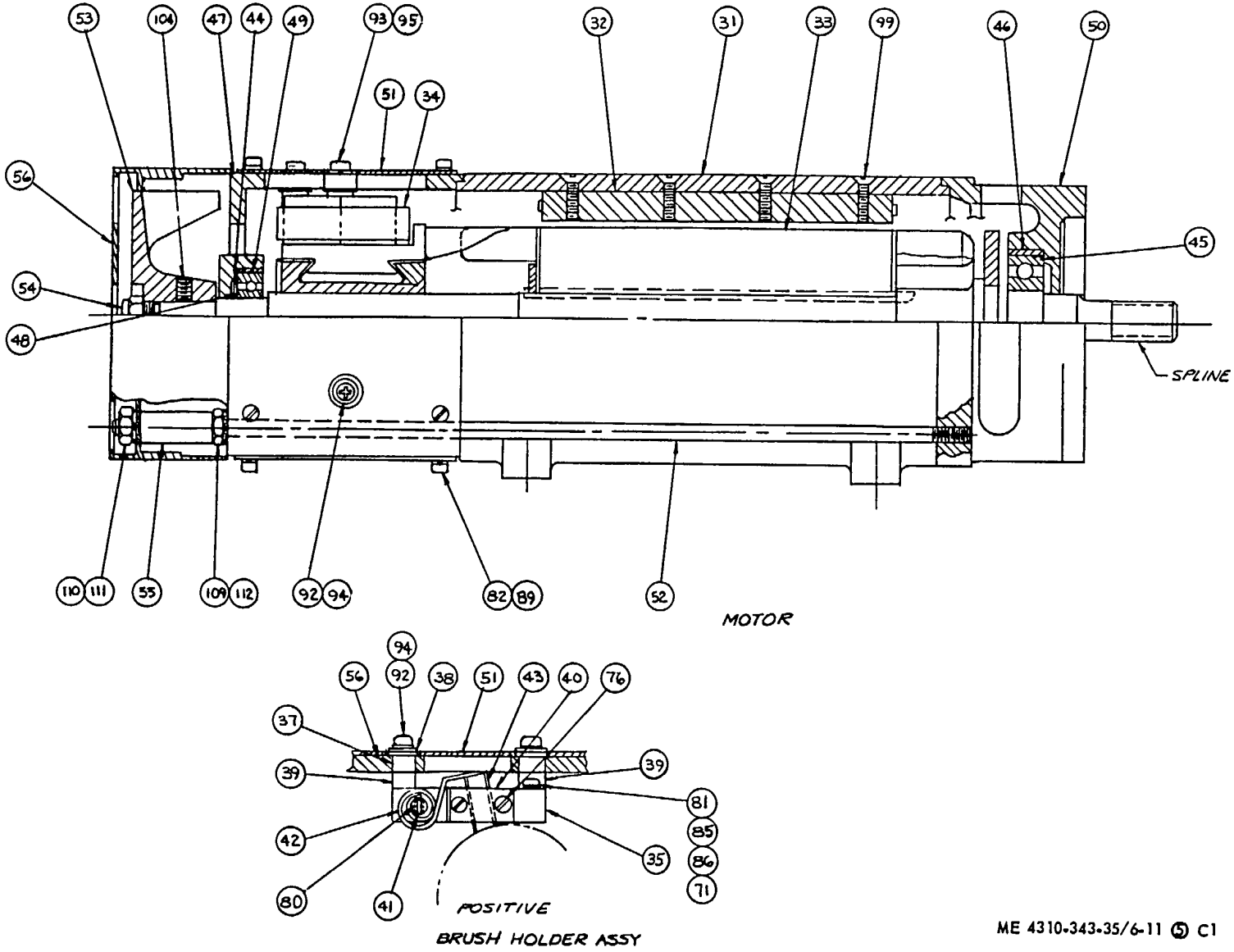


Figure 6-11. Motor-compressor assembly, Bogue Electric model 6703).
(sheet 5 of 5)

1 Compressor assembly
2 Compressor
3 After cooler
4 Bracket
5 Moisture separator
6 Bracket
7 Bracket
8 Bracket
9 Bracket, moisture separator
10 Back pressure valve
11 Bracket
12 Pressure switch (K4)
13 Filter, radio noise (FL1)
14 Filter box
16 Filter cover
16 Inductor assembly
17 Timer assembly
18 Timer
19 Bracket
20 Clamp loop
21 Clamp
22 Flare tube union
23 O ring
24 Elbow
25 Nut
26 Tube assembly
27 Bulk head union
28 Tube assembly
29 Cable damp
30 Motor
31 Frame
32 Mainpole assembly
33 Armature
34 Brush holder assembly
35 Brush holder body
36 Spacer
37 Insulator bushing
38 Nylon washer
39 Spacer
40 Brush retainer
41 Spring stud
42 Spring
43 Brush
44 Load spring
45 Bearing
46 Bearing insert
47 Bearing bracket
48 Bearing
49 Bearing insert
50 Bearing bracket
51 Side cover
52 Stud
53 Fan
54 Elastic stop nut
55 Spacer
56 End cover
57 Base
58 Receptacle support
59 Connector input
60 Terminal standoff
61 Connector
62 Relay contactor (k3)
63 Diode (CR1, 2 and 3)
64 Resistor(R1)
65 Relay (K1)
66 Relay spacer
67 Capacitor (C1)
68 Clamp
69 End plate
70 Grommet
71 Flag terminal
72 Nameplate
73 Plug
74 Not used
75 Screw
76 Screw
77 Screw
78 Lockwasher
79 Nut
80 Screw
81 Screw
82 Screw
83 Grounding stud
84 Screw
85 Washer
86 Lockwasher
87 Screw
88 Washer
89 Lockwasher
90 Nut
91 Ground stud
92 Screw
93 Screw
94 Washer
95 Washer
96 Lockwasher
97 Nut
98 Screw
99 Screw
100 Screw
101 Screw
102 Washer
103 Lockwasher
104 Screw
105 Screw
106 Screw
107 Screw
108 Screw
109 Lockwasher
110 Lockwasher
111 Nut
112 Nut
113 Screw
114 Screw
115 Lockwasher
116 Nut
117 Screw
118 Lockwasher
119 Screw
120 Washer

Figure 6-11. Motor-compressor assembly, Bogue Electric mode 6703.

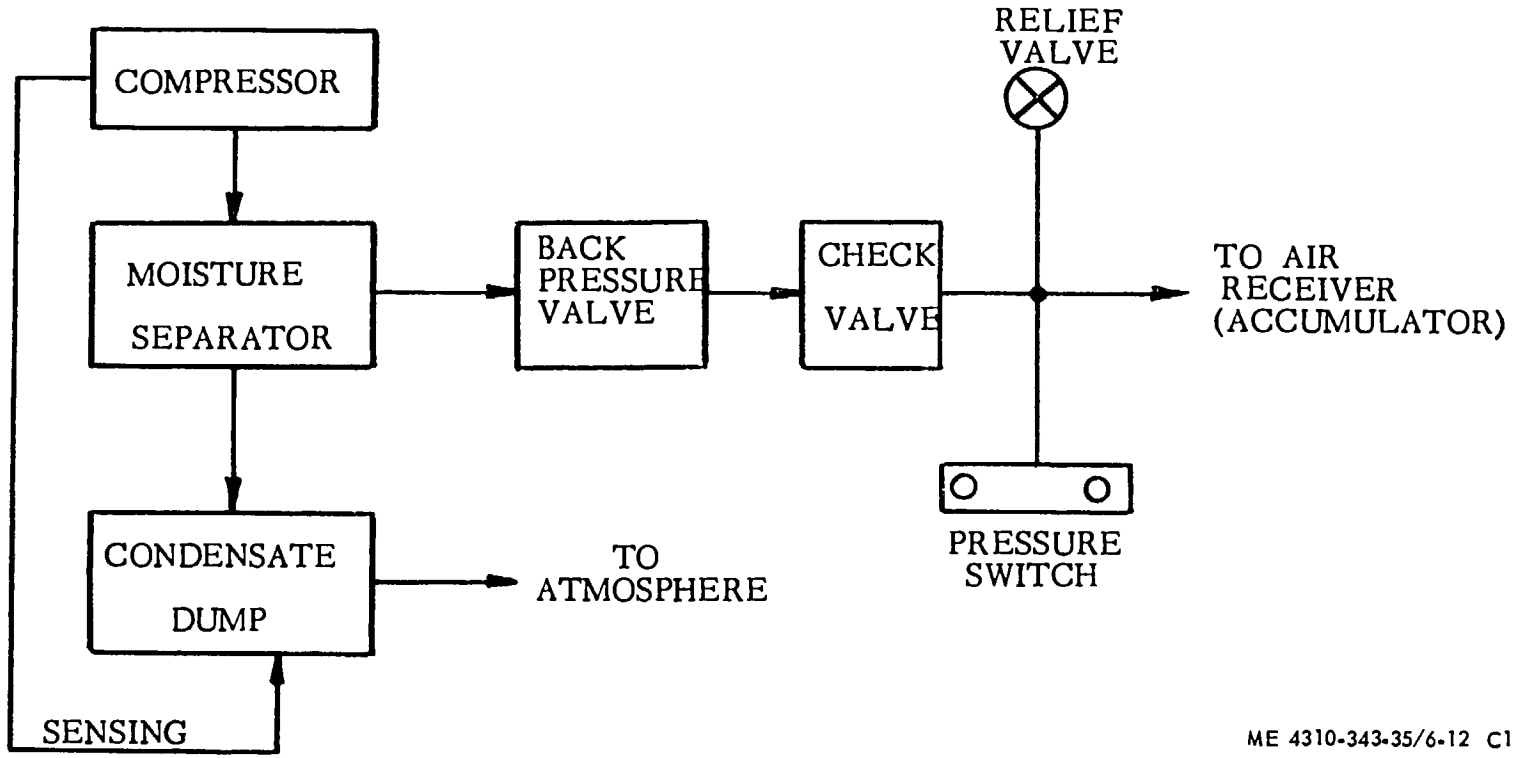


Figure 6-12. Pneumatic flow diagram

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

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

Distribution:

To be distributed in accordance with DA Form 12-37, direct and general support maintenance requirements for Armored Reconnaissance Airborne Assault Vehicle, 152MM, XM551.

WARNING

If gasoline or any other combustible solvent is used in cleaning, dry the inlet strainer thoroughly before installing on compressor.

High pressure air (3000 PSI). Exercise extreme care when working with pneumatic equipment, to prevent injury to personnel and damage to equipment. Perform all testing in an assigned area, cleared of all unauthorized personnel. Before applying air pressure, ensure that all equipment is properly cleared and secured. Clamp all pneumatic equipment being tested firmly in a vise or other suitable testing fixture. Use a heavy metal shield, equipped with suitable glass windows to protect personnel when proof pressure testing.

Do not attempt removal or disassembly of any component while the system is pressurized. Do not tamper with any relief valves.

Do not exceed specified operating limits.

Exercise caution when removing spring-loaded relief valve caps or retainers to prevent injury to personnel.

Do not attempt to disassemble or remove any item without first purging all air pressure from the unit.

When removing and installing compressor fan spring (Fig. 6-1, 106) and spring lock (105) observe all precautions to prevent injury to self as the spring is under tension.

Exercise extreme care when working with high pressure air to prevent injury to personnel or damage to equipment. Do not attempt to tighten any fitting or perform any work on equipment when the system is under pressure. Do not tamper with any pressure relief valves.

TECHNICAL MANUAL

NO. 5-4310-343-35

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 21 September 1970

DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE MANUAL

COMPRESSOR, AIR, RECIPROCATING, BASE MOUNTED, 4 CFM, 3000 PSI, ELECTRIC MOTOR DRIVEN

(WALTER KIDDE MODEL 895026)

FSN 4310-460-2184

NOTE

The maintenance Instructions for operator and organizational maintenance of the end item are covered in TM 9-2350-230-12. The format of this manual is not in accordance with established Department of the Army specifications because of the short lead time involved. Portions of Chapter 1, plus Chapters 2 and 3, and portions of Chapter 4 have been intentionally omitted from this manual. The technical content has been provided by the manufacturer and is adequate for Direct Support, General Support and Depot Maintenance of the compressor.

1-8. Tabulated Data.

a. General.

(1) Compressor specifications

Length, overall	22 in.
Width, overall	10 in.
Height, overall	11.5 in.
Weight, dry (max.)	58.6 lb.

(2) Compressor (basic)

Type	Reciprocating, radial
Stages	4
Cylinders	4
Weight	34.7 lbs. dry
Bores:	
1st stage	2.5000 in.
2nd stage	1.0620 in.
3rd stage	0.4375 in.
4th stage	0.3000 in.
Stroke	0.750 in.
Rotation (facing fan end)	Clockwise
Speed (rated)	3750 rpm max.
Operating Pressure	3,000 psi
Capacity	4.0 scfm with an inlet condition of 29.92 in. mercury absolute, an ambient temperature of +60°F and a speed of 3750 rpm max.
Temperature range	-65°F to +1600°F
Lubrication	Pressure feed

Lubricating oil - ---------- FSN 9150-753-4667, use following formulation only: Formulation 01D manufactured by Lehigh Chemical Products Co., Formulation L245X manufactured by Anderson Oil Company FSN 9150-753-4667

Oil sump capacity- ---------- 3/4 pints approx.

Inlet air filter ---------- 40 micron

(3) Moisture separator

Operating pressure ---------- 3300 psi

Proof pressure - ---------- 4950 psi

Minimum burst pressure---------- 8250 psi

Minimum accumulated water capacity - ---------- 13.5 cu. in.

Temperature range- ---------- -65°F to +160°F

Dump- ----------Automatic at compressor stop ----------and timer controlled

(4) Back pressure valve

Back pressure setting---------- 1700 ±100 psig

Proof pressure ---------- 5000 psig

Burst pressure ----------12000 psig

(5) Oil pump

Lubricant ----------FSN 9150-753-4667

Speed ---------- 4200 rpm (max)

Capacity ---------- 0.3 gpm at 4200 rpm

(6) Relief valve, 2nd stage

Relief pressure - ---------- 550 psig

(7) Dump timer

(8) Pressure switch/relief

Operating pressure ---------- 3000 psig

Proof pressure ---------- 4500 psig
Burst pressure - ---------- 7500 psig
Cut-in pressure ---------- 2800 psig min.
Cut-out pressure ---------- 3100-3300 psig

(9) Electric motor
Operating voltage ---------- 27 vdc
Speed, normal ---------- 3,600 rpm
Current ---------- 115, normal; 130, max.
Horsepower ---------- 3.5 at 3,600 rpm
Rotation ---------- cw - drive end view
Duty ---------- Continuous
Gear ratio ---------- 2.187:1
Weight ---------- 23.87 lbs.

b. Major Components (Bogue Electric Model 6703).

(1) Compressor unit

Manufacturer	Water Kidde & Co., Inc.
Part no	894843
Capacity	4.0 SCFM minimum, 3,000 ±5 PSIG at 59°F,.306 LB/MIN at 29.92 IN/HG absolute inlet pressure (sea level).
Lube oil	Per MIL-L-6085A. Fill oil sump to level indicated on dip stick.
Max. oil consumption	10 cc/hr.
Check period (oil)	8 hrs. max.
Heat rejection	230 BTU/MIN max. at above conditions.

(2) Back pressure valve

Manufacturer	Walter Kidde & Co., Inc.
Part no	875498
Set pressure	1,700 PSI ± 100 PSI
Proof pressure	5,000 PSIG
Burst pressure	12,000 PSIG
Temperature range	65°F to ± 160°F
Leakage (external)	3 cc/hr. max.

(3) Pressure switch

Manufacturer	Walter Kidde & Co., Inc.
Part no	894544 (Note 1)
Operating pressure	8,000 PSIG
Proof pressure	4,500 PSIG
Burst pressure	7,500 PSIG
Temperature range	-65°F to +160°F
Check valve opening pressure	5-20 PSIG
Relief valve setting	3,950 PSI max. full flow 3,350 PSI min. reseat
Cut-in pressure	2,800 PSIG/MIN.
Cut-out pressure	3,100 to 3,300 PSIG

NOTE

Compression spring, originally supplied with pressure switch 894544, replaced with Bogue Electric Part No. A50130 compression spring

(4) Moisture separator

Manufacturer	Walter Kidde & Co, Inc.
Part no	894518
Operating pressure	3,300 PSIG
Proof pressure	4,950 PSIG
Minimum burst pressure	8,250 PSIG (with safety plugged)
Electrical rating	28VDC, 4 amps., max.
Heater (prevent freezing)	Hermetically sealed thermostat, closes at 35°F minimum, opens at 85°F maximum
Capacity	13.5 cu. in. minimum
Temperature range	-65°F to +160°F and intermittently to +225°F.
Weight (Dry)	3.8 lbs.
Burst pressure (safety disc)	5,700 to 6,700 PSIG
Air leakage at dump port	3 cc/min. maximum
Air leakage at other points	3 cc/hr
Oil leakage past sensing piston	1 cc/hr throughout 30 to 120 PSIG range.
Mounting position	Within 30% vertical position.

(5) DC motor

Manufacturer	Bogue Electric Mfg. Co.
Part No	MS11DA4-1
Type	Series wound
Input power required	27 VDC, nominal, 150 amps.
RPM (nominal)	3600
Horsepower (output)	4 HP
Duty	Continuous
Insulation	Class F
Number of poles	4
Number of brushes	8
Mounting position	Horizontal
Method of cooling	Self-ventilated
Fungus resistance	Per MIL-F-13927

(6) Timer (K2)

Manufacturer	Tempo Instruments Inc
Part no	92950
Operating voltage	18-30 VDC (27 VDC Nom)
Contact rating	2 amperes
Timing cycle (timer energized)	Contacts closed for 30 minutes
± 4.5 min.	Contacts open for 10 seconds
± 1 sec.	

(7) Filter assembly (electrical)

Manufacturer	Bogue Electric Mfg. Co.
Part no	B-37389

(8) Filter capacitor (FL-1)

Manufacturer	Cornell Dubilier
Part no	NF10305
Type	Feed-thru (radio noise)
Location	Mounted in control box

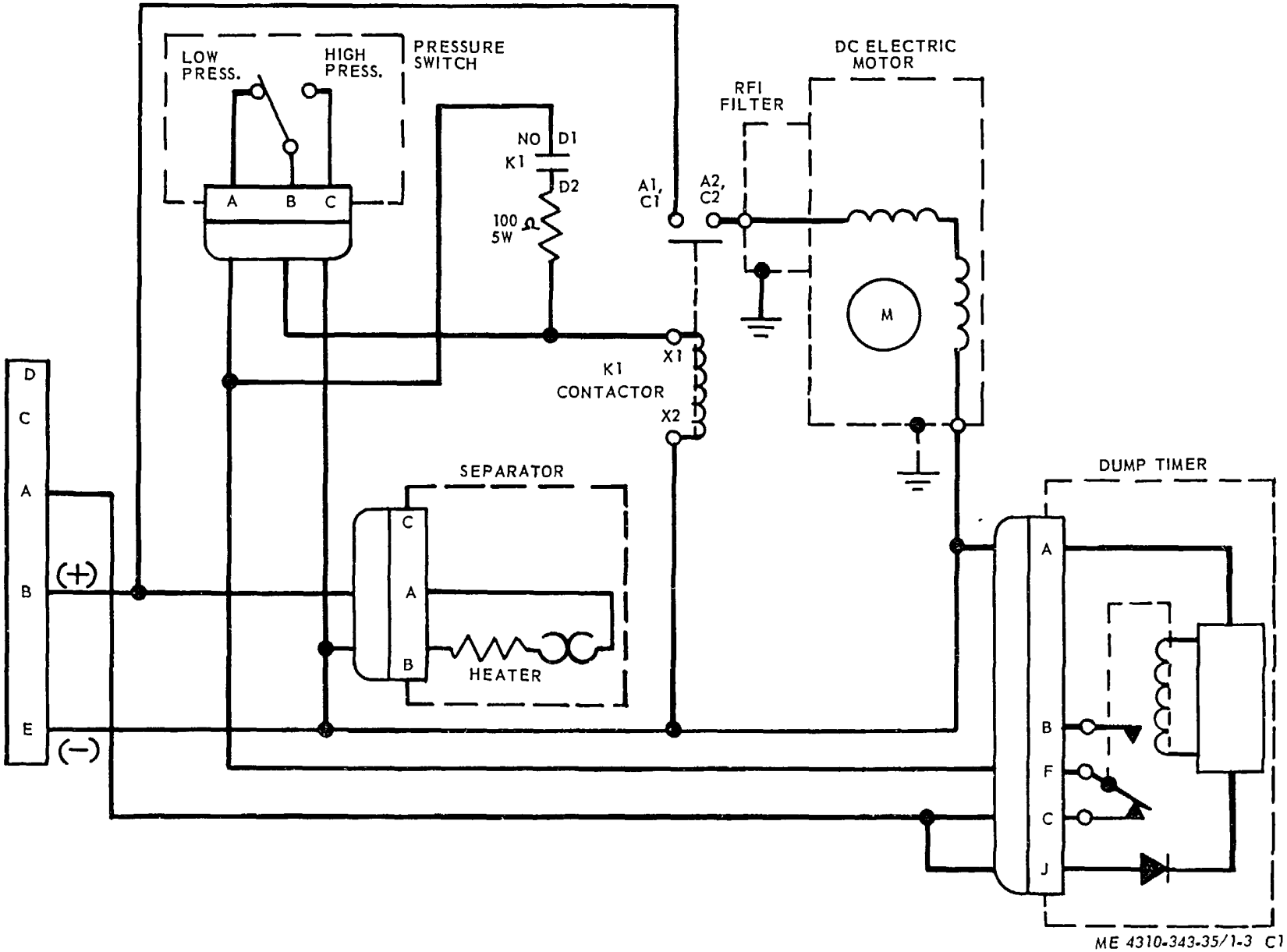
(9) Contactor (K3)

Manufacturer	Cutler Hammer
Type	6041H-215
Operating voltage	18-30 VDC (27 VDC Nom)
Specification	MS24171D-1
Location	Mounted in control box

(10) Relay (K1)

Manufacturer	Sigma Instruments Inc.
Operating voltage	18-30 VDC (27 VDC Nom)
Part no	33RJL1200 NC-SIL
Location	Mounted in control box

(11) *Wiring diagram*. (see figure 1-3 for wiring of Walter Kidde Model 895026).


LOW PRESS.
HIGH PRESS.
PRESSURE SWITCH
A
B
C
NO
D1
K1
D2
100 Ω 5W
A1, C1
A2, C2
RFI FILTER
DC ELECTRIC MOTOR
M
X1
K1 CONTACTOR
X2
D
C
A
B
E
(+)
(−)
SEPARATOR
C
A
B
HEATER
DUMP TIMER
A
B
F
C
J
ME 4310-343-35/1-3 C1

CHAPTER 4

MAINTENANCE AND TROUBLESHOOTING

4-4. Brushes

Inspect brushes on motor after 1,000 hours operation to determine wear factor. Do not permit brushes to become worn shorter than 7/16 inch as damage to the commutator may occur. When replacing brushes, it is most important that they be properly "seated" to the contour of the commutator. Always check to make sure that brushes are free to move in the brush holders and that the brush springs have the proper tension (14-16 oz.)

4-5. Brush Seating

To correctly seat a brush, insert a strip of thin, fine (No. 000) sandpaper, approximately 1 x 12 inches, between the brush and the commutator, with the abrasive side toward the brush. DO NOT USE EMERY. With the brush in the holder and under pressure, withdraw the sandpaper in the direction of rotation of the motor, keeping it close to the contour of the commutator. Release pressure on the brush before returning the sandpaper for the next stroke. Check progress of seating by running the machine several minutes at no load, with brushes riding on the bare commutator and observe the area of seat polished by contact. Continue sanding until at least 80% of the area of the seat shows contact when checked in this manner. Reseating of the brushes is required if brush holders are moved or replaced, or if the commutator is resurface

4-6. Commutator

Under normal operating conditions, the commutator rarely require attention. It should be kept clean and free from dirt or oil. If it becomes slightly rough or grooved due to foreign deposits, it may be polished with fine (No. 000) sandpaper or a commutator polishing stone. DO NOT USE EMERY. If the defects cannot be removed in this manner, the commutator must be turned down in a lathe. Refer to paragraph 5-6.4.

4-7. Bearings

Motor bearings should not require any maintenance during the life of the machine, however, should a bearing become defective producing excessive heating, vibration, or clicking noses, the bearing should be replaced. Refer to paragraph 5-6.3 for method of replacing defective bearings.

4-8. Control Components

Control components such as relays, timer, valves, diodes, capacitors, and resistors employed in the control circuits are considered non-repair items and should be replaced when found defective

4-9. Troubleshooting

When troubleshooting, it is important to note that the compressor is part of a pneumatic system, which includes the air compressor and motor, the electrical system, and the associated air processing equipment.

4-10. Trouble Analysis

Careful analysis of the precise nature 6f the problem will usually permit the fault to be associated with a particular function or item of equipment within the system. The troubleshooting chart (table 4-1) provides a list of probable causes and remedies to aid in further isolation of the fault.

Table 4-1. Troubleshooting Chart

Trouble	Probable Cause	Remedy
Low flow or long fill time.	Insufficient speed.	See trouble "Insufficient speed" or Inability of compressor to turn over or reach speed.
	Insufficient inlet air to compressor.	Clean air strainer and filter. Check for clogged inlet port.
	Leaky fittings, inter-cooler connections, valves, or any exter-nal air leakage.	Check entire unit for loose connections; re-place faulty valves, leaky gaskets.
	Low interstage pres-sure.	See trouble, "Low in-terstage pressure".
	Leaking or popping of 2nd stage relief valve	See trouble, "High in-terstage pressure".
	Low oil pressure.	See trouble, "Low oil pressure".
	Intake or discharge valves or springs dis-torted.	Replace distorted valves.

Trouble	Probable Cause	Remedy
Low oil pressure.	Faulty packing in oil pump. Improper pressure setting of oil pump by-pass.	Install new packing; Rotate retainer (17, Fig. 6-6) at oil pump inlet to obtain proper pressure setting.
	Loose connection in oil supply tubes. External leakage.	Tighten connections.
	Low oil level in oil sump.	Fill oil sump.
	Oil leakage.	See trouble, "Oil Leakage".
	Excessively worn cam assembly (keystone) or crankshaft Journal.	Measure clearances end replace worn components.
High oil pressure.	Improper pressure setting of by-pass.	Rotate retainer (17, Fig. 6-6) to obtain proper setting.
	Clogged oil strainer.	Clean strainer.
Oil leakage.	Oil seal damaged.	Replace seal.
	Excessive blow-by.	See trouble, "Excessive blow-by".

Trouble	Probable Cause	Remedy
Oil leakage. (continued)	Leaky packing.	Replace packing.
	Unit leaking.	Replace broken or damaged parts.
Low interstage pressure.	Restriction of 1st stage inlet.	Remove restriction.
	Pinched 1st stage intake valve.	Reseat valve.
	Leaky relief valve.	Replace faulty parts.
	Leaky 1st stage gasket.	Replace gasket.
	Leaky valve plate gasket.	
	Pinched 2nd, 3rd or 4th stop gasket.	Replace gasket; tighten screw lock to required torque.
	Incorrect head clearance.	Check and adjust head clearance.
	Worn or scored cylinder or scored plunger or piston assembly causing excessive blow-by.	See trouble, "Excessive blow-by".

Trouble	Probable Cause	Remedy
High interstage pressure.	Heads improperly positioned.	Position head in proper position. Refer to "in" and "out" markings on head.
	Clogged intercoolers.	Clean or replace faulty component.
	Sticking intake or discharge valve. Foreign matter between intake valve and seating surface. Intake or discharge valves improperly lapped.	Clean and if necessary, re-lap valve and seating surface.
	Incorrect heed clearance or valve travel.	Check and adjust head clearances and valve travel.
Excessive blow-by.	Rings, cylinders, plungers, or pistons worn or scored or incorrectly assembled, or poor fit of parts.	Measure blow-by at the port (138, Fig. 6-1) located at the bottom of the drive mounting flange of the crankcase.

Trouble	Probable Cause	Remedy
Excessive blow-by. (continued)		**Note: To isolate the stage responsible for the excessive blow-by, drop the delivery pressure of the compressor from maximum pressure of 3000 psi to the pressure corresponding to the 3rd stage output. If excessive blow-by is still present, drop pressure to correspond to 2nd stage output and then to the first stage output. Note at which stage the excessive blow-by falls off. The faulty stage will probably be the one with the next higher delivery pressure. Replace faulty cylinder or plunger or piston assembly.**

Trouble	Probable Cause	Remedy
Pumping oil through compressor.	Rings, cylinders, plungers, or pistons worn or scored or incorrectly assembled or poor fit of parts.	See trouble, "Excessive blow-by".
High oil throughout.	Excessive cam assembly (keystone) or crankshaft Journal clearance.	Replace worn component.
	High oil pressure.	See trouble, “High oil pressure".
	Faulty picking.	Replace pecking.
Insufficient speed end overheating of compressor unit.	Lack of lubrication.	Check oil level.
	Insufficient ambient cooling air.	Operate unit under prescribed conditions.
	Broken fan spring.	Replace spring.
	Broken oil pump shaft.	Replace shaft.
Inability of compressor unit to turn over or reach speed.	Basic compressor failure or motor failure.	Remove motor from basic compressor and check each for freedom of movement.

Trouble	Probable Cause	Remedy
Inability of compressor unit to turn over or reach speed. (continued)	Broken spline.	Check spline condition.
	Worn motor brushes.	Replace brushes.
	Faulty electrical connections.	Check condition of wiring.

NOTE

This portion of table 4-1 applies to Bogue Electric Model 6703 compressor.

Trouble	*Probable cause*	*Remedy*
Motor fails to start.	Loose connections and/or open wiring.	Check all wiring for continuity.
	Defective timer K2.	Check timer for correct operation. Contact must be closed when 28 VDC is applied across terminals 1 and 9. See figure 6-11(1). Replace a defective timer.
	Defective relay K1 contacts.	Check for continuity across terminal 2 and 8. See figure 6-11(1). If open replace K1.
	Defective Contactor K3.	Check for open coil on contactor. Continuity across terminals A1 and A2 should be obtained when 28 VDC is applied across K3 coil terminals X1 and X2. See figure 6-11(1).
	Defective diode.	Check CR1 and CR3 for open diodes See figure 6-11(1). Replace if defective.
	Defective motor.	If 27 VDC is available across brush terminals, check that brushes are not worn excessively (para. 4-4). Replace worn brushes (para. 4-5).
	Sticking brushes.	Check that brushes are free to move in each respective brush holder and brush spring apply proper tension, (par 4-4).
	Open motor field coils.	Check field coils for opens or shorts (para 5-6.6). Repair or replace coils a required.
	Open armature.	Check armature for opens and grounds (para 5-6.5). Repair replace armature.
	Defective pressure.	Verify that normally open contacts of K4 are not closed. Replace pressure switch if defective. See figure 6-11(1).
Motor-compressor operating pressure fails to build up.	Leaky piping.	Check all pipe fittings for leaks.
Compressor fails to maintain its preset on-off cycle, tat is, 30 minutes ON, 10 seconds OFF.	Defective pressure switch.	Replace K4.
Motor attempts start then stops.	Weak field.	Check field coil for open winding (para 5-6.6). Repair or replace coils as required.
Excessive brush sparking.	Commutator dirty.	Clean commutator (para 4-6). Clean and reset brushes (para 4-5).

Trouble	*Probable cause*	*Remedy*
	Eccentric or high mica on commutator.	Grind and true commutator. Undercurrent mica (para 5-6.4).
	Weak or broken brush springs.	Check brush springs and verify correct brush pressure. (para 4-4).
	Brushes too short.	Replace brushes (para 4-5).
Brush chatter or hissing noise.	Loose brushes, insufficient brush spring tension	Check for worn brushes and correct. brush pressure -(para 4-4).
	High mica.	Undercut mica (para 5-6.4).
	Poor brush fit on commutator	Reset brush (para 4-5).
	Brushes binding in the brush holders.	Remove and lea brush holders. Remove my irregularities on inside surface of brush holder or brush.
Brushes wear rapidly.	Rough commutator.	Resurface commutator and undercut mica (para 6-4).
Armature overheats.	Defective armature winding.	Check commutator for internal shorts. Remove any metallic particles (para 6-4).
Excessive vibration.	Defective bearings.	Check bearing for defects (para 5-6.3). Replace defective bearing

CHAPTER 5

REPAIR AND OVERHAUL

Section I. GENERAL

5-1. Special Tools

Tools that are equal to or better can be used in lieu of the tools listed.

Part Number	Nomenclature	Application
256996	Fixture	3rd and 4th stage valve plate to head
205008	Fixture	2nd stage valve plate to head
209984	Air Spindle	Measuring crankshaft bore in Keystone Assembly
209985	Air Gauge (min.)	Measuring min. reg.
209985	Air Gauge (max.)	Measuring max. reg.
255066	Clamp	Assembly of all stages
256701	Adapter	Inlet and sensing ports of separator
256994	Punch	Keystone Assembly
256995	Torque Adapter	Counterweight lockscrews
256997	Torque Adapter	1st stage assembly

Part Number	Nomenclature	Application
256999	Torque Adapter	1st stage studs
257000	Ring, Comp	Compress rings of basic comp.
257001	Ring, Comp	2nd stage assembly
257002	Torque Adapter	2nd, 3rd and 4th stages
257003	Torque Adapter	4th stage
890854	Holding Fixture	Assembly of fan spring
802943	Spline Tool	Rotate crankshaft
843051	Seat retainer driver	Assemble Retainer
843052	Adjustment cap driver	Assemble Cap
843095	Relief valve port test plug	Test pressure switch and relief module
843096	Inlet port test fitting	Test pressure switch and relief module
871981	Adjustable Holding Fixture	Hold compressor crankcase to power arm

5-2. Special Equipment

Equipment equal to or better can be used in lieu of the equipment listed.

Part Number	Nomenclature	Application
No. 303	Powerarm, Hydraulic Universal Vise	Hold compressor
UG-2B-UTL-2AL	Ultrasonic Cleaner	Cleaning of parts
890370	Universal Compressor Test Stand	Test compressor

5-3. Maintenance

a. Field and depot maintenance personnel are authorized to perform any operation and maintenance authorized to be performed by operational and organizational maintenance personnel. Field and depot maintenance is oriented to the performance of maintenance as required to repair the air compressor.

b. When performing maintenance involving a single component or assembly, determine the group in which the item is included; then, locate the item in the text, applicable exploded view and repair parts list. Remove the item as covered in Section III and perform the required maintenance as indicated, or refer to Section IV for detailed overhaul instructions.

WARNING: HIGH PRESSURE AIR (3000 PSI). EXERCISE EXTREME CARE WHEN WORKING WITH PNEUMATIC EQUIPMENT, TO PREVENT INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT. PERFORM ALL TESTING IN AN ASSIGNED AREA, CLEARED OF ALL UNAUTHORIZED PERSONNEL. BEFORE APPLYING AIR PRESSURE, ENSURE THAT ALL EQUIPMENT IS PROPERLY CLEARED AND SECURED. CLAMP ALL PNEUMATIC EQUIPMENT BEING TESTED FIRMLY IN A VISE OR OTHER SUITABLE TESTING FIXTURE. USE A HEAVY METAL SHIELD, EQUIPPED WITH SUITABLE GLASS WINDOWS TO PROTECT PERSONNEL WHEN PROOF PRESSURE TESTING.

DO NOT ATTEMPT REMOVAL OR DISASSEMBLY OF ANY COMPONENT WHILE THE SYSTEM IS PRESSURIZED. DO NOT TAMPER WITH ANY RELIEF VALVES. DO NOT EXCEED SPECIFIED OPERATING LIMITS.

EXERCISE CAUTION WHEN REMOVING SPRING-LOADED RELIEF VALVE CAPS OR RETAINERS TO PREVENT INJURY TO PERSONNEL.

Section II. TIGHTENING INFORMATION

5-4. Recommended Wrench Torques

A summary of recommended wrench torques which are required for maintenance and overhaul of the air compressor are listed below.

Component	Torque and Tolerance (pound-feet)
Bolt, motor to compressor	8 to 9
Nut, Fan	17
Nut, Flared tube	11 to 12.5
Screw, Fan guard bracket	4 to 5
1st stage intercooler nuts	11 to 12.5
2nd stage intercooler nuts	11 to 12.5
3rd stage Intercooler nuts	11 to 12.5
Aftercooler nuts	11 to 12.5
Screw, Large clamp	4 to 5
Relief and Check valve	3 to 5
Locknut, Elbow	11 to 13
Plug, Drain	4 to 5
Filters, Oil sump	4 to 5
Screw, 1st stage cap	14 to 22 pound-inches
Nut, Tube oil supply	15 to 17

Section III. DISASSEMBLY FOR MAINTENANCE/OVERHAUL

5-5. Description

The overall air compressor may be considered as consisting of two major equipments. These are: the drive mechanism which is an electric motor; and the basic compressor, which develops the compressed air, with its related pneumatic system of tubing and accessories for conveying and controlling the compressed air flow from the basic compressor. Disassembly instructions for maintenance and overhaul are covered in this section; overhaul instructions for the disassembled items are in section IV of this chapter.

5-6. Maintenance

Field and Depot maintenance personnel are cautioned not to disassemble any items until inspection has been performed and replacement is required, or it is necessary to remove one component in order to remove another which is not directly accessible.

WARNING: HIGH PRESSURE AIR (3000 PSI). DO NOT ATTEMPT TO DISASSEMBLE OR REMOVE ANY ITEM WITHOUT FIRST PURGING ALL AIR PRESSURE FROM THE UNIT.

Disassemble items (components or assemblies) in any convenient order as required for maintenance or overhaul. The following disassembly/removal instructions are given as a general guide only.

a. Fan.

(1) Refer to figure 6-1 and proceed as follows.

(2) Removal. Disassemble machine screws (66) and remove screws, lock washers (67), flat washers (68) and front fan guard (65) from the rear fan guard (69).

(3) Remove nut lock (102) and unscrew and remove bushing nut (103), cover (104), spring (106), spring lock (105), and fan (109) from oil pump (112).

WARNING: WHEN REMOVING AND INSTALLING SPRING (106) AND SPRING LOCK (105) OBSERVE ALL PRECAUTIONS TO PREVENT INJURY TO SELF AS THE SPRING IS UNDER TENSION.

(4) Unscrew bushing (107) and remove bushing and back-up washer (108) from oil pump.

(5) Cleaning. Clean fan components by wiping with a lint-free cloth.

(6) Inspection. Check fan components for dents, distortion and damage.

(7) Replacement. Replace front fan guard (65), bushing nut (103), cover (104, spring (106) spring lock (105), fan (109), busing (107) and washer (108).

(8) Installation. Install the fan assembly as follows:

(a) Screw back-up washer (108) and bushing (107) onto oil pump (112).

(b) Insert lock spring (105) into hub of fan (109) using a suitable spring compressor.

(c) To insert spring (106) into lock spring (105), use spring-fan assembly fixture Part Number 890854 or equivalent. Place the spring (106) in the guide and turn the holding fixture handle slowly to tighten spring.' Use the pusher to force the spring into the fan hub until it snaps into place.

(d) Remove the fan from the fixture and attach it to the oil pump (112) with spring cover (104), bushing nut (103) and nut lock (102).

(e) Mount the front fan guard (65) to the rear fan guard (69), using machine screws (66), lock washers (67) and flat washers (68).

b. Intercoolers, Aftercoolers, Oil Tubes and Fittings.

(1) Removal: Refer to figure 6-1 and proceed as follows: (2) Backoff end nuts and remove pressure switch tube (37), with union (21) and preformed packing (22), from back pressure valve (20) and bulk head elbow (25), preformed packing (26), backup ring (27), and nut (28) from pressure switch module (40).

(3) Backoff end nuts and remove bleed tube (93) from outlet port of oil pump (112) and bleed valve elbow of moisture separator (9).

(4) Backoff end nuts and remove oil supply tube (92) with oil strainer (80) and pre formed packing (81), from sump (146), and oil supply tube from inlet port of oil pump (112).

(5) Backoff end nuts of first intercooler (96) and remove with elbow (101) from first stage outlet port and with elbow (94) from second stage inlet port.

(6) Backoff end nuts and remove second intercooler (97) with elbow (101) from second stage outlet port and from relief valve (99).

(7) Backoff end nuts and remove third intercooler (98) from third stage outlet and, with elbow (95), from fourth stage inlet port.

(8) Backoff end nuts and remove aftercooler (100) from fourth stage outlet port and from moisture separator (9).

c. Moisture Separator

(1) Refer to figure 6-1 and proceed as follows.

(2) Removal. Loosen strap clamps (5) on bracket separator (10). Disconnect moisture separator (9) from valve (20) by loosening nut (6). Remove moisture separator (9).

d. Back Pressure Valve

(1) Refer to figure 6-1 and proceed as follows.

(2) Removal. 'Loosen union (21) and nut (6). Remove back pressure valve (20).

e. Pressure Switch Relief Module

(1) Refer to figure 6-1 and proceed as follows.

(2) Removal. Remove two bolts (34), flat washers (35), lock washers (36) from clamp plates (33).

(3) Disconnect wiring and lift off pressure switch relief module (40).

f. 2nd Stage Relief Valve.

(1) Refer to figure 6-1 and proceed as follows.

(2) Removal. Disassemble end nut of second stage intercooler (97); then, unscrew entire relief valve assembly (99) from third stage of basic compressor (159).

g. Oil Pump.

(1) Refer to figure 6-1 and proceed as follows.

(2) Disassemble four pump screws (0) and remove screws, flat washers (71), rear fan guard (69) and oil pump (112) from air compressor.

(3) Cleaning. Clean oil pump and removed components with dry cleaning solvent per Specification P-D-680 and dry thoroughly.

(4) Inspection. Check oil pump and removed component parts for defective threads, dents, cracks, distortion and other damage.

(5) Replacement. Replace tube (92), tube (93), rear fan guard (69) and oil pump (112) if defective. Refer to paragraph 5-8.e for overhaul instructions of the oil pump.

(6) Installation. Installation is the reverse of removal, refer to preceding step (2) in this paragraph. Apply torque as applicable, refer to paragraph 5-4.

h. Oil Sump.

(1) Refer to figure 6-1 and proceed as follows.

(2) Remove dipstick (142) from oil sump (146). Then, remove preformed packing (143) from dipstick.

(3) Unscrew and remove drain plug (144) from oil sump (146). Then, remove preformed packing (145) from drain plug.

(4) Remove four nuts (147), flat washers (148), and lock washers (149) from sump (140) and basic compressor (159). Remove sump (146) and packing ring (150) from crank case.

(5) Cleaning. Clean oil sump and removed component parts with dry cleaning solvent per Specification P-D-680. Dry thoroughly.

(6) Blow compressed air through oil strainer (80) to dislodge any foreign particles from screen.

(7) Inspection. Inspect oil strainer for defective screen and threads.

(8) Inspect all threaded components for defective or damaged threads.

(9) Check all removed components for distortion and damage.

(10) Replacement. Replace preformed packings (102, 143, and 150), dipstick (142), and tube (92).

(11) Installation. Installation is the reverse of removal, refer to preceding steps (through 4). Apply torque as applicable; refer to paragraph 5-4.

l. Dump Timer.

(1) Refer to figure 6-1 and proceed as follows.

(2) Disconnect electrical connections from timer (57).

(3) Unscrew screws (58), washers (59), and nuts (60), and lift off dump timer.

NOTE: Do not attempt to repair dump timer. If dump timer is defective, replace it as a complete assembly.

j. Motor.

(1) Refer to figure 6-1 and proceed as follows.

(2) Removal. Unscrew electrical connection nuts and lift off connection cables.

(3) Remove nuts (158), bolts (156), and flat washers (157) and slide motor out and away from compressor assembly. Remove gasket (155) and shaft (126).

k. Basic Compressor

(1) Refer to paragraph 5-6a. and remove fan.

(2) Refer to paragraph 5-6b. and remove intercoolers, aftercollers, tube assemblies, and fittings.

(3) Refer to paragraph 5-6f. and remove 2nd stage Relief Valve.

(4) Refer to paragraph 5-6g. and remove oil pump.

(5) Refer to paragraph 5-6h. and remove oil sump.

(6) Refer to paragraph 5-6j. and remove motor from basic compressor (159).

l. Cleaning

Clean disassembled items with cleaning solvent Federal specification P-D-680 to facilitate handling and inspection for damage.

m. Inspection

Do not attempt to inspect any item for wear, defects, and damage without having cleaned it first.

n. Installation

After item has been inspected and checked for satisfactory performance, install the item in the reverse order of removal or proceed with overhaul as required. Be sure that all washers, seals, thread tape, and clamps, etc are used wherever they are required.

5-6.1. Separation of Motor and Compressor (Bogue Electric Model 6703) (Fig. 6-11)

To separate the compressor assembly from the motor assembly, disconnect the pipe coupling at the sensing port and inlet port located on the moisture separator. Remove four nuts (116), lockwashers (115), and screws (113) from motor-compressor coupling flange and carefully pry apart motor and compressor units (30 and 2).

5-6.2. Disassembly of DC Motor (Bogue Electric Model 6703)

a. Refer to figure 6-11 for the location of all the parts referenced in the following disassembly procedure.

b. Remove control components and associated mounting brackets of components mounted on motor frame such as moisture separator (5), back pressure valve (10), pressure switch (12), filter box (14), timer assembly (17), and interconnecting tubing.

NOTE

Removal of above components are only necessary if the field coils, located on the main pole assembly (32), are to be removed from the motor frame (31).

c. Remove four screws (82) and lockwashers (89) and four side covers (51) to expose the four brush holder assemblies (34).

d Disconnect brush leads. Lift bush spring (42) on each brush holder (35) and remove brush (43).

e. Remove four nuts (111) and lockwashers (110) and remove end cover (56) and four spacers (55). Remove elastic stop nut (54) from motor shaft. Loosen set screw on hub of fan (53) and pull fan off of motor shaft.

f. Make a score mark on bearing bracket (47) and motor frame (31) to insure correct position when reassembled. Remove four locknuts (112) and lockwashers (109) from studs (52) and carefully pry loose bearing bracket (47) from motor frame (31).

g. Carefully pry loose bearing bracket (50) and pull bearing bracket away from motor frame (31). The complete armature assembly (33) should slip out with the bearing bracket. Be careful when removing the armature assembly to prevent scratching the wound armature against the stator pole pieces.

h. Separate the armature assembly. (33) from the bearing bracket (50). It should pull apart easily. Use a suitable bearing puller and remove bearing (45 and 48) from the motor shaft

i If necessary to remove the field coils carefully tag all leads before unsoldering connections to insure exact reconnections. The series connected field coils are removed by removing four countersunk screws (99) on each of the four main field poles.

j. When disassembling the brush holder assembly (34), remember the two negative (-) brush holders which are grounded, are positioned at the top and bottom of the motor assembly. The two positive (+) brush holders are identical to the negative brush holders except insulating bushings (37) and nylon washers (38) are used in place of spacers (39 and 36), respectively.

NOTE

When reassembled, the positive brush holders must be positioned one on each side of the motor assembly to enable proper connection of field leads.

k. To remove positive brush holders (35) from bearing bracket (56) remove two screws (92) and flat washer (94). To remove negative brush holders (35) remove two screws (93) and flat washers (95).

5-6.3. Ball Bearing Check and Replacement (Bogue Electric Model 6703)

a. Check the bearing by holding the inner race and turning the outer race with the fingers; If it turns hard or sticks in spots, replace the bearing.

b. Before installing a new bearing, remove all dirt and chips from the bearing shaft seat. Oil the shaft so that the bearing maybe seated more easily. The bearing must be started squarely on the shaft to avoid jamming and scoring the shaft seat. Use and arbor press to force the new bearing into position Pressure must bear only against the inner race of the bearing when forcing the bearing into place. Never apply pressure against the outer race. Wrap a clean cloth around the newly installed bearing to prevent entrance of dust and dirt until final assembly of the motor is completed.

5-6.4. Commutator (Bogue Electric Model 6703)

If the commutator is too deeply grooved or pitted to be cleaned with fine sandpaper, the armature must be mounted in a lathe and the commutator turned down. Make sure both center holes are thoroughly dean. Do not cut deeper than necessary to obtain a smooth surface. Minimum diameter to which the commutator may be turned is 1 7/8 inches, maximum eccentricity of .001 inch total indicator reading. After turning, the mica segment separators should be undercut to a depth of 1/32 to 3/64 inch. Be certain mica is removed by undercut. Remove all burns and feather edge mica before polishing commutator with No. 000 sandpaper. DO NOT USE EMERY.

5-6.5. Armature(Bogue Electric-Model 6703)

a. Cleaning. Remove dust and dirt by blowing out with low pressure dry air (25 psi maximum). Inspect insulation for cracks or breaks and repair if necessary with tape and air-dry insulating varnish.

b. Grounded. Check Insulation resistance from commutator to shaft. If a ground is indicated, it must be located and repaired, or replaced with a new armature.

c. Open Circuited. An open circuit in the armature is readily detected by the commutator segments which are badly burned by heavy currents interrupted at the open segment. An open circuit in the armature is generally due to an overload condition which should be investigated. The open usually exists at the soldered junction of the coil to the commutator riser. If the segments are not badly damaged, resolder the affected junctions and refinish the commutator as described in a above. A short circuit in the armature may be detected with a growler.

5-6.6. Field Coils (Bogue Electric Model 6703)

The field coils (stator windings) should be checked with a resistance bridge if an open or shorted coil is suspected. The total resistance of the series connected field coils plus leads should be 0.029 ohms ±20%. Examine insulation carefully, tape and varnish any breaks.

Section IV. OVERHAUL

5-7. General

This section contains overhaul instructions for repairable assemblies of air compressor part no. 895026.

5-8. Disassembly

a. Moisture Separator

(1) Disassembly

(a) Refer to paragraph 5-6.c. for removal instructions.

(b) Refer to figure 6-2 and disassemble moisture separator as follows:

(1) Peel off cap tape (1), unscrew safety plug), and lift off safety disc ring (3), safety disc (4), and safety disc retainer (5).

(2) Unscrew plug (6) with packing O-ring (7) from shell (10).

(3) Loosen lock nut (11) and unscrew body (34) from shell (10).

(4) Remove baffle (8) from Inside shell (10).

(5) Remove locknut (11), back-up ring (13), and packing O-ring (12) from body (34).

(6) Unscrew seat (15) and packing O-ring (16).

(7) Unscrew cylinder bleed valve (18) and lift off seat assembly (19), packing O-ring (20), and spring (21). Inlet tube (14) is secured in place with locktite sealant MIL-S-22473.

(8) Remove mounting block (28) together with thermostat (22) and connector (25), by removing screws (23 and 26). Heater (31) is cemented in position on body (34) with litharge and glycerine cement. Do not remove thermostat (22) or connector (25) from mounting block (8) unless required for replacement of either part.

b. Back Pressure Valve

(a) Refer to paragraph 5-6.d. for removal instructions.

(b) Disassembly or Overhaul of the Back Pressure Valve is not recommended.

(c) Perform testing outlined in paragraph 5-12 (b) (2), if operation is insufficient, discard complete back pressure valve and replace with new operable valve.

c. Pressure Switch Relief Module

(1) Disassembly

(a) Refer to paragraph 5-6.e. for removal instructions.

(b) Refer to figure 6-3 and disassemble pressure switch relief module as follows.

(1) Cut and discard lock wire from jam nut (33). Loosen jam nut.

(2) Cut and discard lock wire from cover screws (4). Then remove cover (3) by removing screws. Discard gasket (6).

(3) Remove two screws (9) to loosen switch bracket (8). Let bracket hang loose.

(4) Hold slotted end of pusher (20) with screwdriver and loosen lock nut (12). Back off nut slowly because parts behind it are spring loaded. Lift off washer (13), compensator (11), hat (14), spring (15).

(5) Cut and discard safety wire from locking screw (6) on flanged end of outlet housing (32). This is screw which is nearest to cover, remove screw.

(6) Unscrew cap (17) and remove pusher (20), spring 18), and ball (21).

(7) Cut and discard safety wire from locking screw (16) in body of outlet housing, and remove screw.

(8) Unscrew retainer (19).

(9) Coax out piston (22), back-up ring (23), preformed packing (24), body (25), back-up ring (26) preformed packing (27), relief valve seat (28), check spring (29), guide (30), and shuttle (31).

(10) Remove preformed packing (27), and back-up ring (26) from body (25).

(11) Unscrew outlet housing (32) from adapter body (36).

(12) Remove jam nut (33), back-up rings (34), and preformed packing (35) from outlet housing (32).

(13) Remove bushing (10) from outlet housing (32) if electrical parts, either switch (7) or associated wiring, requires replacement.

d. 2nd Stage Relief Valve

(1) Disassembly

(a) Refer to paragraph 5-6.f. for removal instructions.

(b) Disassembly or Overhaul of the 2nd stage relief valve is not recommended.

(c) Perform testing as outlined in paragraph 5-12(d) (2), if 2nd stage relief does not operate satisfactorily, discard and replace with a new valve.

e. Oil Pump

(1) Disassembly

(a) Refer to paragraph 5-6.g. for removal instructions.

(b) Refer to figure 6-4 and disassemble oil pump as follows:

(1) Unscrew outlet elbow (21) and inlet elbow (16). Then remove spring retainer (17), spring (18), guide (19) and by-pass ball (20) from body assembly (28).

(2) Remove retaining ring (1).

(3) Remove screws (6, 7 and 8), with binder gaskets (9) from mounting plate/bearing (5). Since these screws differ in length, be sure to take note of locations for each.

(4) Lift off thrust washer (3) and thrust plate key (2). Take note of position of pointed end of key.

(5) Lift off secondary gear (10) and drive gear (12).

(6) Push out thrust pin (24) and pump shaft key (23) from drive shaft (25).

(7) Remove oil seal (22) from body assembly (28); ring seal (11) from mounting plate/bearing (5); and O-rings (13). Dowel hole plug (4) remains with mounting plate bearing.

f. Motor

(1) Disassembly.

(a) Refer to paragraph 5-6.j. for removal instructions.

(b) Refer to figure 6-5 Exploded view of motor and disassemble in the order of the index numbers. Do not disassemble any more of the motor than is necessary to make required inspections or repairs.

(c) Remove top plate from filter (5), and remove nut (1) and washer (2) from stud (66).

(d) Never remove insulators (15), fans (18) and (47), stud (66), terminals (67) and (68), and plug (61), except to replace them.

(e) Clean all mechanical parts with cleaning solvent, Federal Specification P-D-680, and dry with moisture-free air at approximately 20 PSIG pressure. Wipe electrical parts clean with a lintless cloth moistened with the cleaning solvent.

WARNING: USE SOLVENT in A WELL VENTILATED AREA. AVOID BREATHING FUMES. KEEP AWAY FROM OPEN FLAMES.

(f) Inspection.

(1) ALL PARTS. Must show no signs of damage, corrosion or deterioration. Threaded areas must not be distorted.

(2) MOTOR ARMATURE. Must have no turns out of place. Windings must show no shorts, grounds, or open circuits. Resistance between No. 1 and No. 8 segment bars must be 0.004 -(±10 per cent) ohm at a temperature of 27°C (80°F).

Commutator must not be worn down to segment insulators. Face of commutator must be concentric with shaft to within 0.001 inch total indicator reading. Shaft must be perpendicular with bearing lands to within 0.001 inch total indicator reading.

(3) STATOR. Must have no turns out of place. Windings must show no shorts, grounds, or open circuits. Resistance of shunt winding must be 6.69 (±10 per cent) ohms at temperature of 27°C (80°F). Resistance of series winding must be 0.005 (± 10 per cent) ohm at temperature of 27°C (80°F). Leads and terminals must be securely soldered in place.

(4) RADIO INTERFERENCE FILTER. Resistance between input terminal and ground must be not less than 2 megohms as indicated on a 100-volt megohm meter.

(5) END BELL ASSEMBLY. Brush boxes must be riveted firmly to their support ring, and must show no grounds to end bell. Brush springs must

show no signs of distortion or permanent set, and must provide a load of 1 LB, 7 OZ on the brushes.

(6) FAN (18). Must fit firmly on shaft of armature (42). Must show no signs of misalignment.

(7) FAN (47). Must be securely fastened to hub (48). Hub must fit firmly on the shaft of armature (42).

(8) GEARSHAFT (60, and 62). Must show no signs of wear on teeth, and splines.

(g) Repair or Replacement.

(1) ALL PARTS. Replace any part .which does not meet the requirements outlined in paragraph 5-8.f.(1) (f), or which fails to function as required by tests outlined in paragraph 5-12.f.(2).

(2) ARMATURE. If necessary, turn down the commutator diameter 1/32 inch with a very light lathe cut. Undercut the segment insulators 1/32 inch.

Dress with No. 0000 sandpaper. After turning, the face must be concentric with the shaft to within 0.001 Inch total Indicator reading. Dynamically balance the armature after its fan and ball bearings have been installed.

(3) Re-cement Insulation strip in the cap with adhesive such as commercial "Stabond C111", manufactured by American Latex Products, Hawthorne, California (no known Government specification) or equivalent.

CAUTION

To prevent contamination of parts due to foreign matter, perform all disassembly, assembly and inspection in a clean dust free area. Keep all loose parts in covered container or bag.

g. Basic Compressor.

(1) Disassembly. Secure an adjustable holding fixture, part number 871981 or equivalent to a Powerarm Hydraulic Universal Vise No. 303. Mount basic compressor to fixture utilizing suitable hardware on fixture plate studs. Refer to figure 6-6 and disassemble basic compressor in accordance with sequence of index numbers in exploded view and as follows:

(a) Remove fourth stage assembly (18) from crankcase (47) by removing screws (19), and washers (20). (Refer to figure 6-6).

(b) Disassemble fourth stage in sequence of index numbers as shown in figure 6-10. If either cylinder (2) or plunger (1) is damaged or worn, both must be replaced as they are matched parts. Place all fourth stage parts in a clean container and set aside for cleaning inspection, and overhaul if required.

(c) Press out valve plate (6) from cylinder head (16) only if required by wear or damage.

(d) Remove third stage assembly (13) from crankcase by removing screws (14), and washers (15). (Refer to figure 6-6).

(e) Disassemble third stage in sequence of index numbers as shown in figure 6-9. If either cylinder (2) or plunger (1) is damaged or worn, both must by replaced as they are matched parts. Place all third stage parts in a clean container and set aside for cleaning, inspection, and overhaul if required.

(f) Remove second stage assembly (8) from crankcase by removing screws (9), and washers (10). (Refer to figure 6-6).

(g) Disassemble second stage in sequence of index numbers as shown in figure 6-8. If either cylinder (18) or plunger (17) is damaged or worn, both must be replaced as they are matched parts. Place all second stage parts in a clean container and set aside for cleaning, inspection, and overhaul if required.

(h) Remove first stage assembly (1) from crankcase by removing lock nuts (2) and washers (3) from studs (7). (See figure 6-6).

(i) Disassemble first stage in sequence of index numbers as shown in figure 6-7.

(j) Refer to figure 6-6. Utilizing a suitable size bar stock, rotate crankshaft (36) until piston (29) is on top dead center. Remove retaining rings (27) and piston pin shims (28) and press out piston pin (26) taking care not to damage or score it.

(k) Carefully remove piston (29) and remove piston rings (4).

(l) Remove items 41 through 45 from rear of crankcase.

NOTE: Under ordinary conditions, the remaining parts (23, 24, 25, 30 through 40) should not be disassembled from the crankcase. However, if signs of wear or scoring are evident, these parts should be disassembled. Bearings (30 and 42), if removed, should be discarded and replaced with new parts at reassembly.

(m) Straighten tangs of screw locks (32) and remove four screws (34), locks (32) and washers (35) from counterweights (33). Remove counterweights. Remove crankcase(43) from adjustable holding fixture, Part Number 871981 or equivalent and place crankcase, motor mounting flange up, over arms on nest of disassembly fixture,

utilizing an arbor press in conjunction with the punch of the disassembly fixture, force crankshaft (36) down to free rear bearing (42) from shaft. Remove bearing (42).

Invert crankcase in the nest and force crankshaft down, driving shaft from front bearing (30). Remove front bearing.

(n) Slide the crankshaft (36) o the motor end of the crankcase (43). Carefully rotate the forward end of the shaft up through the first stage opening and remove from the crankcase. Use an arbor press (approximately 1300 pound pressure) and remove the two rollpin assemblies (24). Separate the fork (25) and the wedge (23) which make up the cam assembly and remove them.

5-9. Cleaning.

a. Use Solvasol, MIL-N-15178 and a non-metallic bristle brush to clean metallic parts. Brush out the holes, slots, and apertures and particularly the crankshaft passage openings. Remove carbon deposits in the heads and on the valves. Flush and clean air filter. (Reference 4-7b).

b. Clean all parts except rubber and plastic components and preformed packings in ultrasonic cleaner Model No. UG-2B-UTL-241 (Bendix Aviation Corp., Hamilton, Ohio) or equivalent. Use Bendix Ultrasonic concentrate detergent No. 25-1 or equivalent for the cleaning agent. Air blow dry and apply lubricating oil, FSN 9150-753-4667 to the parts after cleaning. Place parts in clean container and keep in groups with their respective assemblies.

5-10. Inspection.

Inspect all parts visually for obvious signs of damage such as cracks, nicks, burrs, deformation or corrosion. Inspect all threads internal and external. Replace any part having damaged threads. The following parts require specific inspection as indicated:

a. Crankshaft assembly. Measure diameter of shaft; both end bearing diameters must be between 0.98111 and 0.9847 inch and the center diameter must be between 0.8750 and 0.8752 inch. Be sure oil hole and passage through shaft are clear.

b. Cam assembly (keystone). Using air spindle Part Number 209984 or equivalent, minimum and maximum air gages Part Number 209986 or equivalent and inspect diameter of cam assembly. Diameter of cam assembly must be between 0.8759 and 0.8763 inch. Inspect piston pin bore diameter. Diameter of piston pin bore must be between 0.5008 and 0.5012 inch. Inspect plunger bearing surfaces for grooves or ridges and check that all four oil holes are clear.

c. Cylinder head. Inspect for nicks or scratches on gasket seating surfaces.

d. Valves and seats. Inspect valves and seats for nicks, scratches or burrs.

e. Cylinder and plunger assemblies. Inspect for nicks, scratches burrs and carbon deposits. Examine for excessive wear by checking clearance. Maximum permissible clearances are 0.003 inch for the first stage, 0.0016 inch for the second stage, and 0.0003 inch for the third and fourth stages. Because the cylinder and plunger or piston assemblies are matched parts, dimensions alone cannot be used to judge continued usefulness. Blowby and pump time are the important performance characteristics and can be determined only by running in the complete compressor.

5-11. Repair and Replacement.

a. Repair. Repair of the components is limited to polishing bearing surfaces and refinishing graphite coated parts. When worn graphite coated parts are to be recoated, clean thoroughly by immersing them in Tecsolv 204 (Tect Inc., Dumont, N.J.), Pentalene (Sharples Chemicals, Inc., Philadelphia, Pa.) or equivalent. Dry with clean compressed air.

NOTE: A one to one mixture by volume of toluene (specification TT-T-548A) cellosolve acetate (Carbon and Carbide Chemicals Co., New York, N.Y.) may be used in small amounts for thinning Dag. No. 213 (No Military Specification Equivalent) to replace evaporated solvent and also to clean up. Apply graphite coating until a uniform layer of 0.005 to 0.008 inch (on diameter of cylindrical components) thickness is achieved. If piston is sprayed without the rings (items (4), figure 6-8) installed, mask the ring grooves. This masking also applies to plunger (17) if the rings (15 and 16) shown in figure 6-10 are not installed.

b. Replacement. If damaged parts cannot be repaired by recoating with graphite, replace them. Replace all preformed packings, gaskets, and non-metallic components (except those electrical components which have been determined to be in proper operating condition). Replace all valves and springs which are components of the basic compressor (see figures 6-6 through 6-10).

5-12. Reassembly and Testing

a. Moisture Separator

(1) Refer to figure 6-2 and reassemble moisture separator as follows:

(a) Reassemble all parts in reverse order of disassembly. Apply grease MIL-G-4343 to all packing O-rings, back-up ring, and male threads.

(b) Place packing O-ring (20) on seat assembly (19) and install cylinder bleed valve (18), seat assembly, and spring (21) into body (34). Tighten to torque of 50 pound-inches.

(c) Slip on packing O-ring (16) onto slot and screw seat (15) into body (34). Tighten to torque of 50 to 65 pound-inches.

(d) If inlet tube (14) was removed earlier, apply Ioctite sealant MIL-S-22473 to one end of tube, and insert this end into body (34).

(e) Install baffle (8) into shell (10).

(f) Hold shell (10) at shell flats using suitable protected vise or holding fixture; then, install safety plug (2), safety disc ring (3), safety disc (4), and safety disc retainer (5) into shell (10). Tighten safety plug to torque of 1200 pound-inches.

(g) Apply light coating of grease MIL-G-4343 to outside threads of body (34).

Run up lock nut (11) and place back-up ring (13) together with packing O-ring (12) on body.

(h) Apply light coating of grease MIL-G-4343 to inside threads of shell (10) and to inside wall of shell for one inch beyond threads. Screw body (34) into shell until lower face of shell is separated from upper shoulder of body by not more than 0. 344 inch nor closer than 0. 284 inch.

(i) Tighten lock nut (11) to torque of 300 pound-inches.

(j) Slip on packing O-ring (7) onto plug (6) and screw plug into shell (10).

Tighten plug to torque of 200 pounds-inches.

(k) Retighten safety plug (2) to torque of 1200 pound-inches after 24 hours of test. Then wrap mylar cap tape (1) around safety plug.

(l) Wrap teflon tape around threads of elbow (17) and insert into cylinder bleed valve (18). Tighten until end faces the word "INLET' on body.

(2) Test reassembled moisture separator as follows:

(a) Install a suitable metal plug with sealing gasket in the safety outlet port of the shell (10). Proof pressure test the partially assembled moisture separator, in an environmental chamber using clean filtered air and FSN 9150-753-4667 oil.

WARNING: EXERCISE EXTREME CARE WHEN WORKING WITH HIGH PRESSURE AIR TO PREVENT INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT. DO NOT ATTEMPT TO TIGHTEN ANY FITTING OR PERFORM ANY WORK ON EQUIPMENT WHEN THE SYSTEM IS UNDER. PRESSURE. DO NOT TAMPER WITH ANY PRESSURE RELIEF VALVES.

(b) Connect a short length of tubing to drain port and connect a non-recoil fitting to the end of tubing. Apply 4950 - 5000 psig air pressure to inlet port and 60 - 100 psi oil pressure to sensing port (elbow) for one minute, utilizing test adapter. No leakage in excess of 3 cc per hour is permitted except at the dump port.

CAUTION: Hold unit in 30 degree vertical position with safety outlet up.

(c) Relieve inlet pressure and drain will discharge air when inlet pressure has decayed. Examine tested unit; there shall be no indication of permanent deformation.

(d) Check moisture separator for leakage by applying 3000 psi pressure to the inlet port and 40 - 50 psig oil pressure to the sensing port of cylinder. Air leakage shall not exceed 3 cc per minute at the dump port, 3 cc per hour at other points. There shall be no oil leakage.

(e) Install mounting block (28) together with connector (25) and thermostat (22) onto body (34), if these parts were not replaced. If, however, these parts were replaced, then prior to soldering wires slip protective tubing over leads. Back pot

electrical connections with a suitable potting compound. Use a compound composed of litharge and glycerine to fill cavity at wire end of heater (31), and at the mounting block.

(f) Test electrical circuit of moisture separator by checking electrical continuity between two pins of electrical connector (5) with unit at room temperature. An open circuit shall be indicated.

(g) Using a 500 volt dc megger, check resistance between each connector pin and body (34). Resistance shall be 50 megohms minimum. Apply a potential of 800 volts rms at 60 cps between pins shorted together and case grounded. Raise gradually in 10 seconds, maintain for one minute and gradually reduce to zero in 20 seconds. Leakage current shall not exceed 500 microamperes.

(h) Lower temperature of unit to 35°F. Again check electrical continuity between two pins. Resistance shall be 8 to 12 ohms. Slowly increase temperature of unit. Circuit must be open before unit reaches 84°F.

(i) If heater (31) was removed earlier for replacement, apply litharge and glycerine cement to end of heater so that vacant space in body is filled with cement when heater is inserted into body (34).

(j) After testing, and moisture separator is acceptable, safety wire the safety plug to plug, and safety wire two mounting block screws (29) to each other, four connector mounting screws (26) together, and two thermostat mounting screws (23) for each other.

b. Back Pressure Valve

(1) Overhaul of the back pressure valve is not recommended, therefore, reassembly is not applicable. Perform the following tests described in paragraph 5-12(b) (2). If valve does not operate correctly replace with new valve.

(2) Test the back pressure valve as follows:

(a) Plug valve outlet port in body and secure assembled valve for proof pressure test.

(b) Apply proof pressure of 5000 psig.

WARNING: BE EXTREMELY CAREFUL WHEN WORKING WITH HIGH PRESSURE AIR TO PREVENT INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT. DO NOT ATTEMPT TO TIGHTEN ANY FITTING OR PERFORM ANY WORK ON EQUIPMENT WHEN THE SYSTEM IS UNDER PRESSURE. DO NOT TAMPER WITH ANY PRESSURE RELIEF VALVES.

(c) Hold pressure for one minute. Relieve pressure and then remove plug from outlet port.

(d) Inspect for deformation or permanent set. If no change has occurred combine tests.

(e) Connect variable pressure source to inlet fitting and connect outlet port to a non-recoil fitting. Slowly increase pressure until valve opens. This should occur at 1700 ±100 psig.

(f) Check for leakage which should not exceed 3cc per hour.

(g) If pressure is not within required range, relieve test pressure, then loosen nut and turn cap in clockwise direction to raise pressure, turn cap counterclockwise to lower pressure.

(h) If leakage is excessive, relieve test pressure, then disassemble valve and repeat overhaul instructions.

(i) After testing, and valve is acceptable, safety wire nut, cap, and inlet fitting to body.

c. Pressure Switch Relief Module

(1) Refer to figure 6-3 and reassemble pressure switch relief module as follows:

(a) Apply light coating of pneumatic grease MIL-G-4343 to all preformed packings, O-rings and to all threads.

(b) Screw jam nut (33) onto outlet housing (32) until end of threaded section.

(c) Place back-up rings (34) and preformed packing (35) on end of outlet housing (32) and screw it into adapter body (36). Align outlet port of outlet housing so that center line of outlet port is offset 11° in a counterclockwise direction from center line of adapter body, as shown in figure 5-1.

(d) Tighten jam nut (33) to torque of 150 to 170 pound-inches.

(e) Place preformed packing (27) and back-up ring (26) on body (25).

(f) Place preformed packing (24) and back-up ring (23) on piston (22).

(g) Hold outlet port so that adapter body (36) is down, and place shuttle (31), guide (30), check spring (29), relief valve seat (28), body (27), and piston (22) into outlet port. Make sure all parts are aligned and seated correctly, and perform proof pressure test, refer to following step (2) (a) through (2) (d).

(h) Using torque adapter Part Number 843051 or equivalent, screw in retainer (19) and tighten to torque of 5 to 10 pounds-inch.

(i) Hold unit in upright position seat ball (21) in piston (22). Position pusher (20) and spring (18) and insert cap (17).

(j) Using adjustment cap driver Part Number 843052 or equivalent, screw in cap (17) until bottomed on shoulder in outlet housing (32).

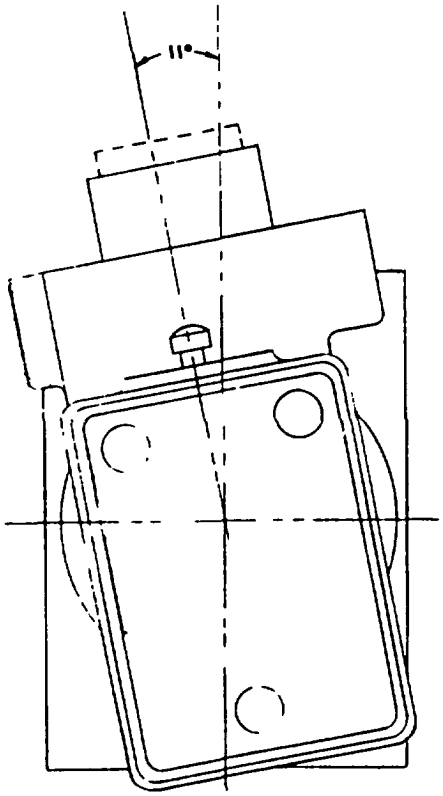


Figure 5-1. Pressure Switch Relief Module, Alignment of Outlet Housing to Adapter Body, End View

(k) Position spring (15), hat (14), compensator (11), and washer (13), on pusher (20), and secure with lock nut (12).

(1) Secure switch bracket (8) with two screws (9).

(2) Test reassembled pressure switch relief module as follows:

(a) Connect the overhauled pressure switch relief module to a suitable test rig for proof pressure testing.

(b) Plug up one inlet port and outlet port then assemble inlet port test fitting Part Number 843096 or equivalent to remaining inlet port and relief valve port test plug Part Number 843095 or equivalent into outlet housing (32) and apply proof pressure of 4500 psig to inlet port fitting.

WARNING: BE EXTREMELY CAREFUL WHEN WORKING WITH HIGH PRESSURE AIR TO PREVENT INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT. DO NOT ATTEMPT TO TIGHTEN ANY FITTING OR PERFORM ANY WORK ON EQUIPMENT WHEN THE SYSTEM IS UNDER PRESSURE. DO NOT TAMPER WITH ANY PRESSURE RELIEF VALVES.

(c) Hold pressure for three minutes. Relieve pressure and then remove test fitting and plugs from inlet port, outlet port and outlet housing (32).

(d) Inspect for deformation or permanent set.

(e) Connect variable pressure source to one inlet fitting and connect one outlet port to a non-recoil fitting. Plug remaining ports for switch operation test.

(f) Slowly increase pressure until switch operation occurs. Pressure switch should open when pressure reaches 3100 to 3300 psig; pressure switch should close when pressure is dropped to 2800 psig.

(g) Relief valve passes 4 scfm at 3900 psig and reseats at 3350 psig minimum. If specified operation does not occur, adjust lock nut (12) to obtain correct pressure switch operation, and using adjustment cap driver Part Number 843052 or equivalent and adjust cap (17) to obtain correct relief valve operation.

WARNING: DO NOT ATTEMPT TO MAKE ADJUSTMENTS UNTIL AIR PRESSURE HAS BEEN PURGED FROM ALL PARTS.

(h) After adjustments are made, retest for correct settings. Then shut down air pressure source. Check valve will open when pressure drops to between 5 to 20 psig.

(i) Purge all air from test rig and remove pressure switch relief module for final assembly.

(j) If switch (7) required replacement, apply locktite sealant between switch and bracket (8), switch mounting screws and put. Tighten screws to torque of 4 to 5 pounds-inch.

(k) If new polyolefin sleeving is required for switch wiring, shrink sleeving by applying heat with air gun to 275°F until tight. Then pass wires through bushing (10).

(l) After mounting switch bracket (8) onto outlet housing with screws (9), and secure screws with lock wire.

(m) Cement cover gasket (6) in position and attach cover (3) with three screws (4) and sealing washers (5). Tighten screws to torque of 1 to 3 pound-inches and secure screws with lock wire.

(n) Insert two locking screws (16). Tighten screws to torque of 10 to 20 pound-inches and secure screws with safety wire.

(o) Secure jam nut (33) to outlet housing with lock wire.

d. 2nd Stage Relief Valve

(1) Overhaul of the 2nd stage relief valve is not recommended, therefore, reassembly is not applicable. Perform the following tests and if valve is unoperable replace with new 2nd stage relief valve.

(2) Test the Relief Valve as follows:

WARNING: HIGH PRESSURE AIR (3000 PSI). EXERCISE EXTREME CARE WHEN WORKING WITH PNEUMATIC EQUIPMENT, TO PREVENT INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT. PERFORM ALL TESTING IN AN ASSIGNED AREA, CLEARED OF ALL UNAUTHORIZED PERSONNEL. ENSURE THAT ALL EQUIPMENT IS PROPERLY CLEARED AND SECURED. CLAMP ALL PNEUMATIC EQUIPMENT BEING TESTED FIRMLY IN A VISE OR OTHER SUITABLE TESTING FIXTURE. USE A HEAVY METAL SHIELD, EQUIPPED WITH SUITABLE GLASS WINDOWS TO PROTECT PERSONNEL WHEN PROOF PRESSURE TESTING. EXERCISE CAUTION WHEN REMOVING SPRING-LOADED RELIEF VALVE CAPS OR RETAINERS TO PREVENT INJURY TO PERSONNEL. DO NOT ATTEMPT REMOVAL OR DISASSEMBLY OF ANY COMPONENT WHILE THE SYSTEM is PRESSURIZED. DO NOT TAMPER WITH ANY RELIEF VALVES. DO NOT EXCEED SPECIFIED OPERATING LIMITS.

(a) Assemble relief valve to test fixture 876701 or equivalent and connect to high pressure pneumatic supply.

(b) Slowly increase air pressure to 550 psig. Valve should pop open.

(c) If valve fails to operate as specified, shut down test pressure supply, purge lines, and then adjust plug and repeat testing procedure until specified setting is obtained.

(d) Reduce air pressure to 400 psig and check for leakage. Maximum permissible leakage is 15 cc per minute.

(e) Insert new cotter pin after completion of test.

e. Oil Pump (1) Refer to figure 6-4 and reassemble oil pump as follows:

(a) Soak new oil seal (22), ring seal (11), and O-rings (13) in oil Specification MIL-L-60851 for one hour prior to assembly.

(b) Reassemble all parts in reverse order of disassembly. Check that parts are correctly aligned after alignment pin (14) is inserted through center plate (15).

(c) Wrap teflon tape MIL-T-27730 around threads and screw in outlet elbow (21). Hold body assembly in position illustrated in figure 6-6, and drop by-pass ball (20) into position. Check that by-pass ball is correctly seated before replacing guide (19), and spring (18).

(d) Screw in spring retainer (17), making sure not to disturb seated by-pass ball (20). Continue until top face of spring retainer is slightly below boss on body assembly (28) so that threads are barely visible.

(e) Wrap teflon tape MIL-T-27730 around threads and screw in inlet elbow (16).

CAUTION

First two threads must be free of tape.

(f) Tighten screws (6), (7), and (8) with uniform pressure so as not to distort the assembled oil pump. Check that each screws goes into its correct location as indicated in figure 5-2.

(6) is 1/2-inch long

(7) is 7/16-inch long

(8) is 5/8-inch long

(g) After screws (6), (7) and (8) are tightened, stake each screw as shown in figure 5-2.

(2) Test reassembled oil pump as follows:

(a) Connect overhauled pump to suitable test bench rig which will permit output flow to pass through drive shaft in the required way and then into a line connected to a 9 to 1 gpm flowmeter. Install a 0 to 200 psi test gage at the pump pressure port and a 50-mesh screen strainer in inlet tubing (a 5/16 inch OD by 6 inch-long maximum tube is recommended). Fill test rig with oil (Specification FSN 9150-753-4667).

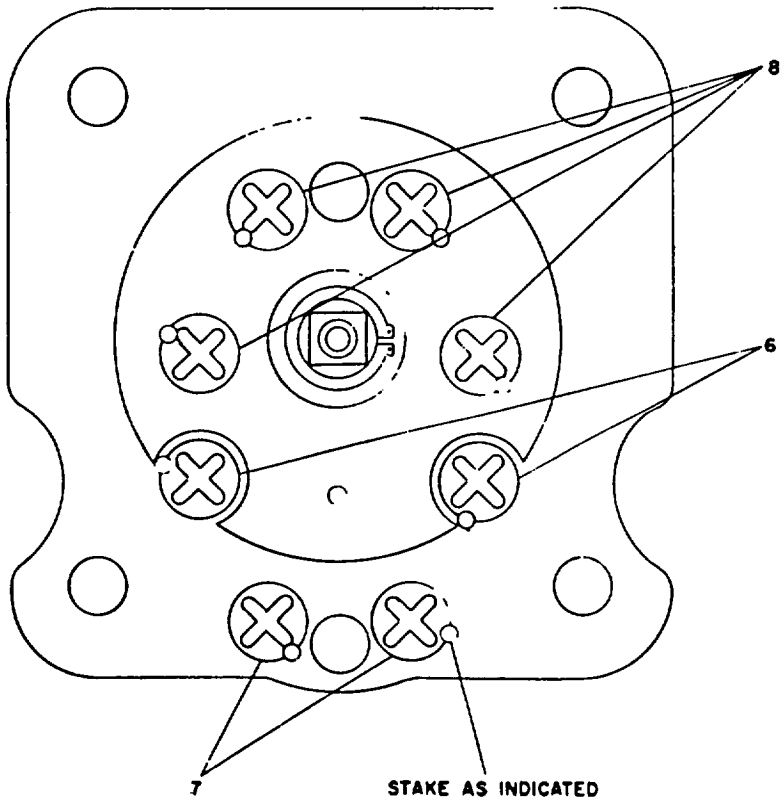


Figure 5-2. Oil Pump, Staking After Reassembly

(b) During testing, do not exceed a pump speed of 4200 rpm; performance capacity at this speed is 0.3 gpm. A 1/10 horsepower motor is required to operate the oil pump under the following conditions: 130 psi oil pressure; 3750 rpm; temperature, 21°C (70°F).

(c) With pump running at 3750 rpm, increase oil pressure slowly until relief valve by-passes to inlet port. The pressure at this point should be between 90 and 110 psi gage. If this pressure limit is not obtained, unscrew inlet elbow (16) and rotate spring retainer (17) to obtain the proper by-pass pressure. After final adjustment of spring retainer, stake retainer to pump body (8) to secure retainer in adjusted position.

(d) Pump capacity at 3750 rpm and at a minimum of 100 psig oil pressure should check out at a minimum oil flow of 525 ±25 cc per minute.

(e) Check for leakage at shaft seal end opposite mounting pad. If any leakage is noted at this location, replace seal J2) and/or preformed packing O-rings (13). Before installing new seal, inspect that the seal is free of nicks.

(f) After testing, seal oil pump ports and rear end of shaft with tape to exclude dirt.

(g) Oil sump does not require testing. When oil sump is attached to crankcase on final assembly, fill it with oil to specification FSN 9150-753-4667, FSN 9150-75-4667 4667.

f. Motor

(1) Refer to figure 6-5 and reassemble in reverse order of disassembly except as follows:

(a) Press plug (61) into gearshaft (60).

(b) Pack ball bearings (63) with grease Specification MIL-G-6118 and press bearings on each gearshaft (62). Position each bearing so that its flush side

is adjacent to the gear. The shouldered side of the rear bearing faces end bell (59) ; the shouldered side of the front bearing faces housing (64).

(c) Check each gearshaft (62) to see that each bears the same number stamped on the larger gear. These numbers identify the selected set of gearshafts.

(d) Check each gearshaft (62) for its timing mark. One tooth of the larger gear will be marked by a center-punch mark. This tooth must be in alignment with the corresponding tooth on the smaller gear. Mark both teeth with a vegetable gear marking dye, or with a grease pencil, so that the timing mark can be easily seen.

(e) Count the teeth in the gear of gearshaft (60). Divide the circumference of the gear teeth into three equal segments, and mark each dividing tooth in the same manner as gearshaft (62) was marked.

(f) Pack ball bearings with grease, Specification MIL-G-3278. Pack gear housing (64) with grease, Specification MIL-G-6118. Then, install ball bearing (54) in end bell (59). Position the ball bearing so that shouldered side is facing the end bell, and its flush side is facing outward.

(g) Start gearshaft (60) into place. Then start each gearshaft (62) into place, and align the timing marks on gearshafts (62) with the marks on gearshaft (50). Push all four gearshafts into place together.

(h) Pack the end bell and gear housing with a full pack of grease, Specification MIL-G-7118. Install housing (64) on end bell (59). Position the end bell and housing as illustrated, figure 6-5,. Install retaining rings (53, and 52).

(i) Install springs (38) on brush holder assembly (37). Wind the springs to provide a load of 1 LB, 7 OZ on the brushes.

(j) Install the brush holder assembly in end bell (39). Use conducting segments (36) across the grounded brush boxes. Use insulating segments (35) across the positive brush boxes. Install the end bell on stator (65).

(k) Install key (49) on armature (42). Press hub (48) over the key. Install fan (47). Install ring (45). Position the ring with its concave side outward. Press ball bearings (44, and 43) in place. Dynamically balance the armature.

(l) Install the armature in the stator Install load spring (50) and the end bell assembly.

(m) Install retaining plate (25). Install grounding terminal (9).

(n) Make end bell electrical connections. Connect the shunt lead and grounding terminal (19) to the nearest grounded brush box. Connect grounding plate (24) between the shunt lead and the opposite brush box. Use screw (28), and washer (29) in the position illustrated. Connect the series field lead to the nearest positive brush box. Connect one electrical lead (31) between each brush box terminal and the terminal for brush attaching screw (20).

(o) Install fan (18). Position the fan so that setscrews (17) contact the flats on the shaft of armature (42), and so that there is 1/32 inch clearance between the face of the fan and the-heads of screws (27, and 28).

(p) Install insulator (11), base (10), and associated parts.

(2) Test reassembled motor as follows:

(a) No Load Test. Apply 27 volts DC to terminals of motor. Operate motor until brushes are fully seated. Motor shall run smoothly without nose or excessive heat rise and shall not draw more than 30 amperes.

(b) Dielectric Test. While motor is still warm from the no load test, remove the grounded brushes and apply 500 volts, 60 CPS (RMS), between the terminals. There must be no flashover or evidence of breakdown of the insulation.

(c) After no load and dielectric tests, check that all brushes are in place and install radio interference filter (5). Position top nut (3) so that there is no strain on the connecting strap of the filter when nut (1) is tightened.

(d) Install supports (41), and cap (14).

(e) Load Test. Load output shaft with 52.25 pound-inches of torque. Apply 27 volts DC to terminals of motor. The motor must draw no more than 125 amperes, and its speed must be 3, 600 (±5 percent) RPM.

g. Basic Compressor

(1) Reassembly of the basic compressor is essentially the reverse of disassembly. Be sure that all parts are clean prior to reassembling them. Should interruptions occur during assembly, cover all parts to prevent contamination. Apply lubricating oil and pneumatic grease to parts as required. Refer to figure 6-6 and reassemble basic compressor as follows:

(a) Assemble the adjustable holding fixture Part Number 871981 or equivalent to the crankcase mounting flange; then, assemble the adjustable holding fixture to a Model 303 Hydraulic Power Arm vise or equivalent.

(b) Assemble wedge (23) and the fork (25) to crankshaft (36) with spring pins (24). The wedge and fork making up the cam assembly are selective fits and are not interchangeable. Check identification marks stamped on the parts to indicate match. The slots in each pin (24) should be 180° apart. Using an arbor press and punch Part Number 256994 or equivalent install the pins so that slots in outer pins face away from each other. Check that cam assembly rotates freely on crankshaft. Binding may be loosened by tapping cam and shaft with a plastic or rawhide mallet.

(c) Insert assembled cam and crankshaft assembly into crankcase (43) through first stage cylinder bore toward rear bearing hole. Assemble rear bearing (42) into position by pressing on race until flush with bearing retainer. While supporting rear bearing on its inner race, press crankshaft to rear until its shoulder contacts the bearing. Press in forward bearing (30), pressing on both inner and outer races until bearing contacts the shaft shoulder. Insert front preformed packing (31) rear preformed packing (41), oil seal (40), and seal retainer (39). Press the seal to the shoulder in retainer, then install the bevel ring (38).

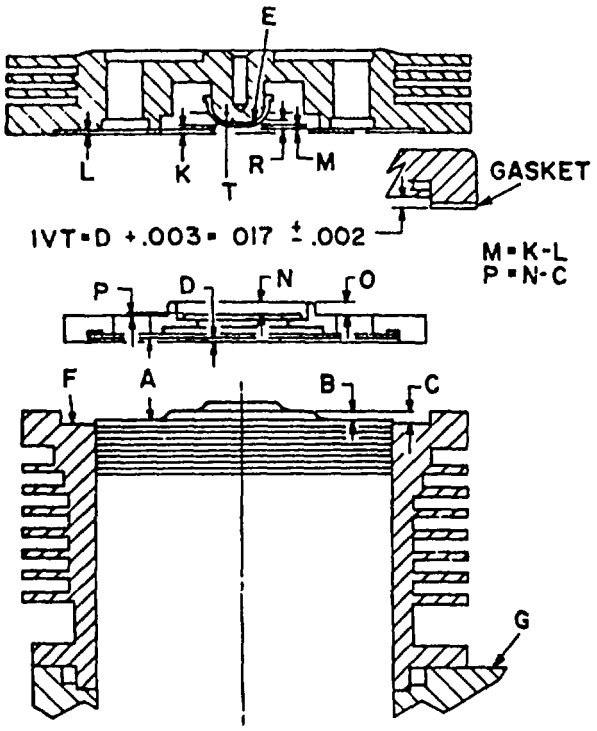
(d) Position counterweights (33) on the crankshaft (40) so that the side with the shortest hole-to-edge distance faces the cam assembly. Drop lockwashers (35) into recesses in counterweights and insert screw locks (32) on top. Insert screws (34) and torque to 30 pound inches using torque adapter, part number 256995 or equivalent. If groove in screw head is not aligned with the groove in counterweight, torque to 55-75 pound-inches to bring into alignment but be certain screws do not bind or bottom. Tap end of the screw lock into groove in screw head to lock in place.

(e) Temporarily assemble piston pin assembly, to determine selection of shims (28). Assemble piston pin (26) to piston (29). Install retaining rings (27). Select the necessary shims (28) to limit the piston pin end play to a minimum while still permitting free rotation. End play should not exceed 0.002 inches. When shims have been selected and installed, disassemble and tag all parts as this is now a select fit assembly.

(f) Assemble the first stage as follows: Mount crankcase in holding fixture with first stage opening on top. Rotate the crankshaft until piston pin hole in the cam assembly is as far out of the crankcase as possible (top, center position). Lead cam out of crankcase while rotating the crankshaft to prevent cam from contacting crankcase which would damage parts. Remove one stud (7, figure 6-6) from both left and right side of first stage mounting flange. Position piston (29) over cam assembly with identification mark "F" facing front of crankcase. Insert piston pin (26) shouldered end first, through one piston opening, through cam assembly opening and into the opposite piston opening. Install preselected shims (28), and retaining rings (27) being sure that sharp edges of retaining rings face out. Exercise care to prevent piston from striking the studs in the crankcase.

(g) Refer to table 5-1 and figure 5-3 and determine the thickness of cylinder shim (5, figure 6-6). in order to provide proper head clearance, figure 5-3 shows how to select the proper valve stop (5, figure 6-7) which limits discharge valve travel. Press proper stop on head (1). With proper shim (2, 3, 4), head clearance should be 0.007 ±0.002 inches.

(h) Refer to figure 6-6 and install cylinder shims (5) and the preformed packing (6) on the crankcase.



DISCHARGE VALVE TRAVEL:

Discharge valve travel must equal 0.018 ±0.003 inch.

To obtain discharge valve travel proceed as follows:

a. Obtain result of P plus R minus T which equals valve travel.
b. Use correct thickness valve stop shims (2, 3 and 4, figure 6-7) to limit valve travel to 0.018 ±. 0.003 inch.

INTAKE VALVE TRAVEL.

Intake valve travel must equal 0.010 ±0.002 inch.

To obtain intake valve travel proceed as follows:

a. dimension D with valve in place against valve seat.
b. To dimension D add gaskets (11, figure 6-7) as necessary to establish required intake valve travel. Add gasket to surface F.

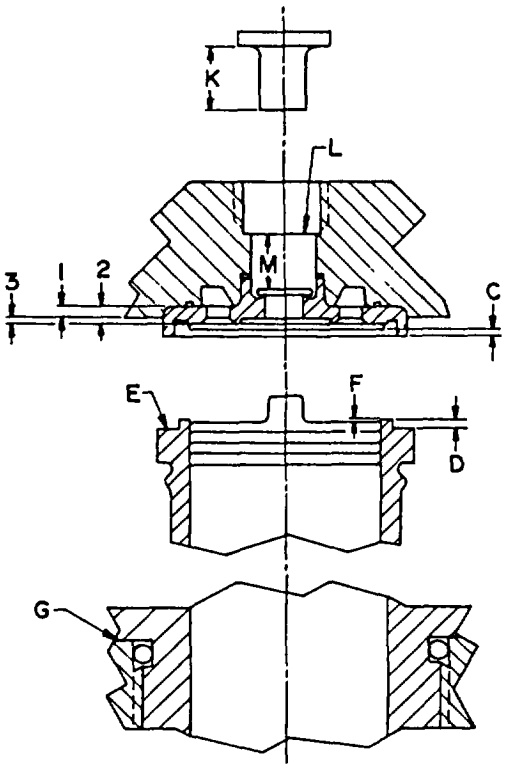
HEAD CLEARANCE:

Piston must be at dead center when establishing dimension B.

Head clearance as follows:

a. Obtain result of C minus B.
b. Subtract this dimension from intake valve travel.
c. Add all or part of shim (5, figure 6-6 to surface G to adjust result obtained in step b. to obtain proper head clearance A.
d. Head clearance must equal 0.007 ±0.002 inch.

Figure 5-3. First Stage Valve Travel and Head Clearance



DISCHARGE VALVE TRAVEL:

Discharge valve travel must equal 0.017 ± 0.002 inch.

To obtain discharge valve travel proceed as follows:

a. Obtain result of M minus K.
b. Adjust this result by adding all or part of gasket (10, figure 6-8) to surface L to obtain proper discharge valve travel.

INTAKE VALVE TRAVEL:

Intake valve travel must equal 0.018 ± 0.003 inch.

To obtain intake valve travel proceed as follows:

a. Obtain result of C minus D.
b. From result obtained in step a, subtract measured thickness of spring (14, figure 6-8)
c. Add all or part of gasket (12, figure 6-8) to surface E to obtain proper intake valve travel .

HEAD CLEARANCE:

Piston must be at top dead center when establishing dimension F.

Head clearance must equal 0.081 ± 0.004 inch.

Obtain head clearance as follows:

a. Add dimension F to intake valve travel.
b. Add all or part of shim (11, figure 6-6) to surface G to obtain proper head clearance.

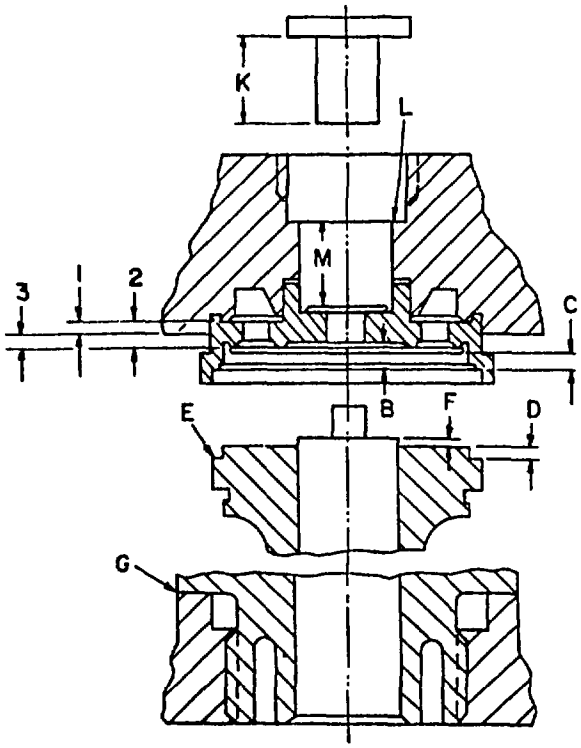
HEAD INSTALLATION:

To insure proper installation of valve plate (11, figure 6-8) to cylinder head (8) the dimensions of 2 minus 1 must equal 3 within 0.001 inch.

To obtain proper measurements proceed as follows:

a. Measure from edge of head (8) to seating surface of valve plate (11).
b. Measure the thickness of valve plate (11).
c. Measure from edge of head (8) to seating surface of intake valve (13).

Figure 5-4. Second Stage Valve Travel and Head Clearance



DISCHARGE VALVE TRAVEL:

Discharge valve travel must equal 0.019 ± 0.002 inch.

To obtain discharge valve travel proceed as follows:

a. Obtain result of M minus K.
b. Adjust this result by adding spacers (13), (14), (15) figure 6-9 to surface L to obtain proper discharge valve travel.

INTAKE VALVE TRAVEL:

Intake valve travel must equal 0.025 ± 0.002 inch.

To obtain intake valve travel proceed as follows:

a. Obtain result of C minus D.
b. From result obtain in step a, subtract measured thickness of spring (4, figure 6-9).
c. Add all or part of gasket (3), to surface E to obtain proper intake valve travel.

HEAD CLEARANCE:

Plunger must be at top dead center when establishing dimension F.

Head clearance must be equal to 0.013 ± 0.002 inch.

Obtain head clearance as follows:

a. Obtain result of B minus D plus thickness of gasket (7, figure 6-9).

b. From result obtained in step a, subtract dimension F.

c. Add all or part of shim (16) figure 6-6, to surface G to obtain proper head clearance.

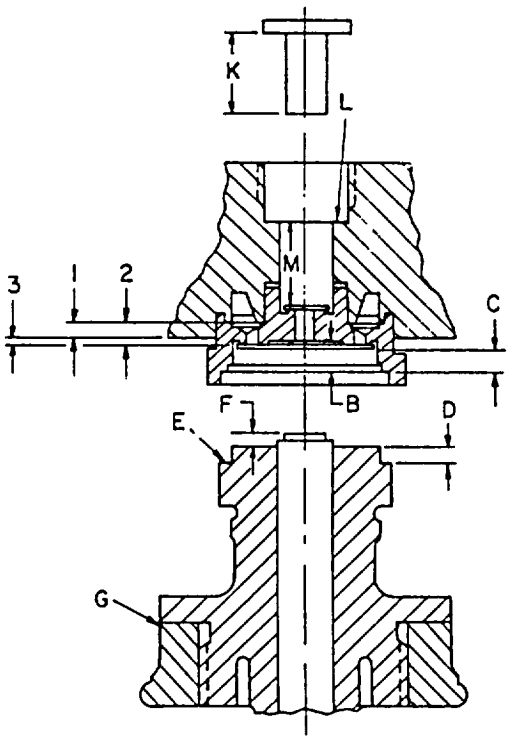
HEAD INSTALLATION:

To insure proper installation of valve plate (6, figure 6-9) to cylinder head (16) the dimension of 2 minus 1 must equal 3 within 0.001 inch.

To obtain measurement proceed as follows:

a. Measure from edge of cylinder head (16) to seating surface of valve plate (6).
b. Measure the thickness of valve plate (6).
c. Measure the edge of cylinder head (16) to seating surface of Intake valve (5).

Figure 5-5. Third Stage Valve Travel and Head Clearance



DISCHARGE VALVE TRAVEL:

Discharge valve travel must equal 0.019 ± 0.002 inch.

To obtain discharge valve travel proceed as follows:

a. Obtain result of M minus K.
b. Adjust this result by adding spacers (12), (13) (14) figure 6-10) to surface L to obtain proper discharge valve travel.

INTAKE VALVE TRAVEL:.

Intake valve travel must equal 0.013 ± 0.002 inch.

To obtain intake valve travel proceed as follows:

a. Obtain result of C minus D.
b. From result obtained in step a, subtract measured thickness of spring (15, figure 6-10).
c. Add all or part of gasket (7) to surface E to obtain proper intake valve travel.

HEAD CLEARANCE:

Plunger must be at top dead center when establishing dimension F.

Head clearance must equal 0.008 ± 0.002 inch.

Obtain head clearance as follows:

a. Obtain result of B minus D plus thickness of gasket (7, figure 6-10).
b. From result obtained in step a, subtract F.
c. Add all or part of shim (21) figure 6-6, to surface G to obtain proper head clearance.

HEAD INSTALLATION:

To insure proper installation of valve plate (6, figure 6-10) to cylinder head (16) the dimensions of 2 minus 1 must be equal to 3 within 0.002 inch.

To obtain measurement proceed as follows:

a. Measure from edge of cylinder head (16) to seating surface of valve plate (6).
b. Measure the thickness of valve plate (6).
c. Measure from edge of cylinder head (16) to seating surface of intake valve (5).

Figure 5-6. Fourth Stage Valve Travel and Head Clearance

Table 5-1. Summary of Clearances and Torques

CLEARANCE				TORQUE	
Stage	Discharge Valve Travel (inches)	Intake Valve Travel (inches)	Head Clearance (inches)	Item	Value (Pound-(inches)
First	0.018 ± 0.003	0.010 ± 0.002	0.007 ± 0.002	Studs	40
				Nuts	30
Second	0.017 ± 0.002	0.018 ± 0.003	0.081 ± 0.004	Screws	40
Third	0.019 ± 0.002	0.025 ± 0.002	0.013 ± 0.002	Screws	40
Fourth	0.019 ± 0.002	0.013 ± 0.002	0.008 ± 0.002	Screws	40

(i) Recheck head clearance; refer to figure 5-3 and 6-7. Apply oil, FSN 9150-753-4667 to gasket (11) and valve (10) and install in cylinder (12). Position valve (10) by inserting a finger through the discharge hole and rotating the valve while pressing down on the valve plate. Assemble the stop (5), the discharge valve spring (6), the discharge valve (7), the head gasket (8), the shims (2, 3, 4), and the valve plate (9) to the cylinder head (1). Position this assembly on the cylinder (12) with the discharge port facing rearward over the drive flange. Secure with two clamps, part number 255066 or equivalent 5386-0007, and screws 1692-0624. Torque screws to 10 pound-inches.

(j) Assembly four piston rings (4, figure 6-6) on piston (29). Position rings with gaps 90° apart. With piston at top of stroke place cylinder on top of piston and compress rings with suitable ring compressor part number 257000 or equivalent. Apply lubricating oil FSN 9150-753-4667 liberally and carefully push cylinder over rings. Remove ring compressor and

clamps. Line up cylinder openings with studs, and with letter "F" facing front, push cylinder onto crankcase. Secure with six studs (7) washers (3) and locknuts (2). Torque studs to 40 pound-inches, using torque adapter, part number 256999 or equivalent and locknuts (2) to 30 pound-inches, using torque adapter, part number 256997 or equivalent.

(k) Refer to table 5-1 and figure 6-8 and assemble the second stage as follows: Remove mounting bolts from rear of crankcase. Rotate the crankcase 90° cw to bring the second stage up to top. Remount in this position. Refer to figure 6-8 an assemble valve plate (11), gasket (10), seal plate (9), and cylinder head (8). Use fixture No. 205088 or equivalent to press valve plate into the head. Coat the plunger (17) with oil, FSN 9150-753-4667. scraper ring (16) and install in the lowest groove on plunger. Expand three compression rings (15) in order and install in their proper grooves. Insert the plunger assembly liberally coated with oil into the cylinder (18) using a suitable ring compressor, part number 257001 or equiv alent. Refer to figure 5-4 and calculate the thickness of shim (11, figure 6-6) to establish the required head clearance. Peel the shim to required thickness.

(l) Install preformed packing (12) and shim (11).

(m) Apply oil, MIL-L-60851 to the intake valve seat of the valve plate (11, figure 6-8) and place the lapped face on the intake valve (13) against the seat. The valve should adhere to the seat when the valve plate is inverted. Place the head (8) with intake valve (13) and valve spring (14) in place, (spring installed with legs down against valve) over the head of the cylinder (18). Position the intake and discharge ports parallel to the crankshaft with the discharge port facing rear. Install the discharge valve (7) with lapped face against the valve seat. Drop the spring (3) into place. Refer to figure 5-4 and determine the thickness of

gasket (10) to allow proper discharge valve travel. Peel the gasket to required thickness assuring a smooth leaded surface on both sides with no brass showing. Install the gasket, stop valve (2) and lock screw (1) in place and torque to 150 pound-inches.

(n) Secure the second stage assembly with two clamps, part number 255066 or equivalent, and two screws (9, figure 6-6) and lockwashers (10). Torque screws to 10 pound-inches.

(o) Install second stage assembly (8, figure 6-6) to crankcase (43) with four screws (9) and lockwashers (10).

(p) Remove clamps installed in step (n) and replace screws (9) and lockwashers (10). Torque the six screws (9) to 40 pound-inches using torque adapter, part number 257002 or equivalent.

(q) Refer to table 5-1 and figure 6-9 and assemble the third stage as follows: Rotate the crankcase 180° ccw from the second stage assembly position to bring the third stage up into position. Refer to "head installation" in figure 5-5 and assemble the valve plate (6), gasket (7), seal plate (8) and the cylinder head (16). Use fixture No. 256996 or equivalent to press the valve plate into the head. Refer to figure 5-5 and calculate the thickness of shim (16, figure 6-6) to establish proper head clearance. Peel the shim to required thickness. Install the preformed packing (17, figure 6-6) and shim (16).

(r) Install the intake valve (5, figure 6-9) with lapped face against the valve seat in the valve plate (6). Position the spring (4) with legs down against valve. Place the head assembly with intake valve and spring in place over the head of the cylinder (2) and gasket (3). Orient intake and discharge ports parallel to the crankshaft with discharge port in rear. Insert plunger (1) and secure assembly with two clamps, part number 255066 or equivalent,

washers 5386-0007, and screws 1692-0624. Secure assembly to crankcase with two capscrews (14, figure 6-6) and lockwashers (15) and torque to 10 pound-inches. Remove clamp securing head assembly and install two additional capscrews (14) and lockwashers (15). Apply oil to the discharge valve (9, figure 6-9) and position in head with lapped face against the valve seat. Refer to figure 5-5 and calculate the spacer thickness to establish discharge valve travel. Insert valve (9), spring (10), spacer (13, 14, 15), stop (12) and lockscrew (11). Torque screw to 150 pound-inches. Torque capscrews (14, figure 6-6) to 40 pound-inches, using torque adapter, part number 257002 or equivalent

(s) Refer to table 5-1 and figure 6-10 and assemble the fourth stage as follows: Rotate the crankcase 90° cw from the third stage assembly position to bring the fourth stage up into position. Assembly the valve plate (6), gasket (7), seal plate (8), valve (9), and cylinder head (16). Use fixture No. 256996 or equivalent to press the valve plate into the head. Refer to figure 5-6 and calculate the thickness of shim (21) figure 6-6, to establish head clearance. Peel the shim to required thickness. Install the preformed packing (22) shim (21).

(t) Install the intake valve (5) figure 6-10, with lapped face against the valve seat in the valve plate (6). Position the spring (4) with legs down against the valve. Place the head assembly (16) with intake valve (5) and spring (4) in place over the head of the cylinder (2). Orient intake and discharge ports parallel to the crankshaft with discharge port to rear. Secure the unit with two clamps, part number 255066 or equivalent, washers 5337-0600, and screws, 1692-0624. Apply oil FSN 9150-753-4667 to the discharge valve (9) figure 6-10, and position in head with lapped face against the valve seat. Refer to figure 5-6 and calculate the spacer thickness to establish discharge valve travel. Insert the spring (15), spacers (12) (13) (14), stop (11) and lockscrew (10). Torque screw to 150 pound-inches.

(u) Secure assembly to crankcase (43, figure 0-6) with two capscrews (19) and lockwashers (20). Remove clamp installed in step (t) and insert two additional capscrews (19) and lockwashers (20). Torque the four capscrews (19) to 40 pound-inches using torque adapter, part number 257003 or equivalent.

(2) Testing of the basic compressor is dependent upon the scope of replacement performed during repair and overhaul of the unit.

CAUTION: **Performance of the basic compressor tests is accomplished when the basic compressor is completely assembled with intercoolers, aftercoolers, oil supply and oil return tubes, oil sump, brackets, fan, rear and front fan guards, air inlet strainer with filter, etc, and mounted on the Universal Air Compressor Test Stand Part Number 890370-02 or equivalent. During test operations, the compressor oil shall be replaced every three hours until the unit is run-in total of twelve hours; then, the oil will be replaced every six hours until completion of run-in testing.**

WARNING: **EXERCISE EXTREME CARE WHEN WORKING WITH PNEUMATIC EQUIPMENT TO PREVENT INJURY TO PERSONNEL AND DAMAGE TO PROPERTY RESULTING PROM CARELESS HANDLING OR POSSIBLE EQUIPMENT FAILURE. PERFORM ALL TESTING IN AN ASSIGNED AREA, CLEARED OF ALL UNAUTHORIZED PERSONNEL. MAKE SURE ALL EQUIPMENT IS PROPERLY CLEARED AND SECURED. CLAMP ALL PNEUMATIC EQUIPMENT BEING TESTED FIRMLY IN A VISE OR SUITABLE TEXT FIXTURE. USE A HEAVY METAL SHIELD, WITH SUITABLE SAFETY GLASS WINDOWS WHEN PROOF PRESSURE TESTING. DO NOT ATTEMPT TO ADJUST OR DISASSEMBLE PRESSURIZED EQUIPMENT.**

(3) Basic compressor assembly prior to run-in testing is performed as follows:

(a) Replace sump, refer to paragraph 5-6.h.

(b) Replace oil pump, refer to paragraph 5-6.g.

(c) Replace 2nd stage relief valve, paragraph 5-6.f.

(d) Replace intercoolers, aftercoolers and oil tubes, refer to paragraph 5-6.b. steps 4 through 8.

(e) Replace fan, refer to paragraph 5-6.a.

NOTE: Tie in compressor assembly to test stand in preparation for testing as indicated in the test stand operation instructions.

(4) Compressor Run-in Test.

NOTE: The lubricating oil shall be FSN 9150-753-4667, FSN 9150-753-4667.

(a) Basic compressors which have had a first stage piston, or cylinder, a Second stage plunger or cylinder, a piston pin, cam crankshaft or bearings replaced, require a break-in run for a period of 4 hours in accordance with the following schedule:

4 Hour Break-In Run

Start (Hours)	Speed (RPM)	Delivery Pressure (psig)	Change (Hours)
0	1750	400-600	2:00
2:00	2500	1900-2100	3:00
3:00	3500 ± 100	3100-3300	4:00

(b) Replacement of first or second stage rings requires one hour minimum run at 2500 rpm and 1900 to 2100 psi delivery pressure or until blow-by is .3 cfm or less.

(c) Replacement of third or fourth stage cylinder and plunger assemblies requires a 12-hour run-in accordance with the following schedule:

12 Hour Break-In Run

Start (Hours)	Speed (RPM)	Delivery Pressure (psig)	Change (Hours)
0	1750	400-600	6:00
6:00	2500	1900-2100	10:00
10:00	3500 ± 100	3100-3200	12:00

(d) Replacement of any other compressor part requires a one-hour minimum run and a visual check.

(5) Interstage pressure test.

CAUTION: Fill sump to capacity with lubricating oil MI-L-6085A. Adjust shaft speed of compressor to 3750 RPM. Adjust delivery pressure from the compressor to 3000 spi. Run the compressor for one hour. The following interstage pressures should not be exceeded: 1st stage, 105 psi; 2nd stage, 460 psi; 3rd stage, 1,100 psi. If the pressure at any stage exceeds these limits, the compressor should be checked for head clearance and valve travel per figures 5-3, 5-4, 5-5 and 5-6.

(6) Blow-by test. Connect a 0 to 0.5 cfm flowmeter to the blow-by port on the crankcase. With the compressor unit operating at 3000 psi, check that indicated blow-by is not greater than 0.30 cfm.

(7) Oil consumption run. Oil pressure shall be measured as 80 to 120 psig during this test

(a) Fill oil sump with 200 cc of filtered oil (specification FSN 9150-753-4667).

(b) Pump up pressure to 3000 psi in back-up pressure-regulating system of universal compressor test stand, part No. 890370 or equivalent.

(c) Run compressor unit at 3750 ± 50 rpm.

(d) Shut down compressor unit, drain oil from sump, then refill oil sump with 350 cc of filtered oil (Specification FSN 9150-753-4667).

(e) Start compressor unit and run free breathing at 3750 ± 50 rpm with 3000 psi back pressure. Run for 16 hours and record temperature and case drain leakage. Temperature shall be between 100 and 130°F. Case drain leakage shall not exceed 160 cc per minute at any time during test. At conclusion of 16th hour, the case drain leakage shall not exceed a 60 cc increase from amount recorded at first hour.

(f) Shut down compressor, drain oil sump and measure quantity of remaining oil. Oil consumption should not have exceeded 7 cc per hour.

(8) Air Flow Check. Check that the compressor unit delivers 4.0 scfm minimum at sea level inlet conditions. The compressor unit should be operating at 3750 ± 50 rpm with 3000 psi delivery pressure; and atmospheric conditions should be 30.6 inches mercury absolute and 70° to 90°F ambient air temperature.

(9) Pump-Up Test. With compressor unit operating as indicated in paragraph (7), a 200 cubic inch system connected to the compressor discharge port should be filled from 0 to 3000 psi in 6.74 minutes maximum.

(10) Bleed Valve and Moisture Separator Blow-Down.

(a) When compressor stops, check that bleed valve blows down. This "blow down" is the unloading of he pressure in the 4th stage and the aftercooler and results in an audible blast of air (from the bleed valve under the compressor) approximately one minute after compressor stops.

(b) When compressor stops, check that moisture separator blows down. This "blow down" follows that of the bleed valve, and is the unloading of the air pressure from the check valve back to the separator. The accumulated moisture in the separator discharges with the escaping air with an audible blast from a port just under the moisture separator.

(11) Leakage Check. With compressor stopped, check for system leakage.

(12) High pressure Regulator Check.

(a) Set high pressure regulator to deliver 2000 psi.

(b) Open discharge line bleed valve and bleed off reservoir pressure. The charging line pressure gauge should read 2000 psi until the pressure in reservoir reaches 2000 psi at which time the charging line pressure gauge and reservoir pressure gauge should continue to drop off at the same rate.

(13) Low Pressure Regulator Check.

(a) Set low pressure regulator to deliver 100 psi.

(b) Open discharge line bleed valve and bleed off reservoir pressure. The charging line pressure gauge should read 100 psi until the pressure in the reservoir reaches approximately 100 psi.

(14) On completion of basic compressor testing, remove compressor assembly from the test stand and remove test stand. Ancillary equipment required for testing.

h. Compressor Assembly. Assemble the balance of the compressor following the disassembly procedures in reverse order as noted below paying special attention to the following.

(1) Install the motor, refer to paragraph 5-6.j.

(2) Install the dump timer, refer to paragraph 5-6.i.

(3) Install the pressure switch relief module, refer to paragraph 5-6.e.

(4) Install the back pressure valve, refer to paragraph 5-6.d.

(5) Install the moisture separator, refer to paragraph 5-6.c.

(6) Install the bleed tube and pressure switch tube, refer to paragraph 5-6.b., steps 2 and 3.

CHAPTER 6

ILLUSTRATED BREAKDOWN

6-1. SCOPE

This chapter provides a list of illustrated breakdown of the Air Compressor to be used by maintenance personnel.

6-2. Explanation of Columns.

a. Figure and Index Number.

Numbers are assigned to each part to facilitate Indexing and referencing. The first number Indicates the figure in which the component appears. The number after the hyphen refers to the component callout number in the figure.

b. Part Number. **(Not Applicable)**

c. Description.

The item name is listed in upper case (capital) letters. Modifiers necessary for proper identification appear in lower case letters.

d. Quantity per Unit.

Quantities listed in this column represent the actual quantity of the repair part used per unit or assembly. If more than one assembly is used, multiply specified quantity by the quantity of assemblies used.

6-3. Arrangement.

The illustrations In this section as well as the accompanying parts lists are arranged in disassembly order, i.e., starting with the largest assembly and breaking each down to its component parts. As an example the compressor/cooler assembly will be first removed, then disassembled to the basic compressor which Is then In turn disassembled to Its smallest removable components.

NOTE

Figure 6-11 is not arranged in disassembly order therefore paragraph 6-3 does not apply.

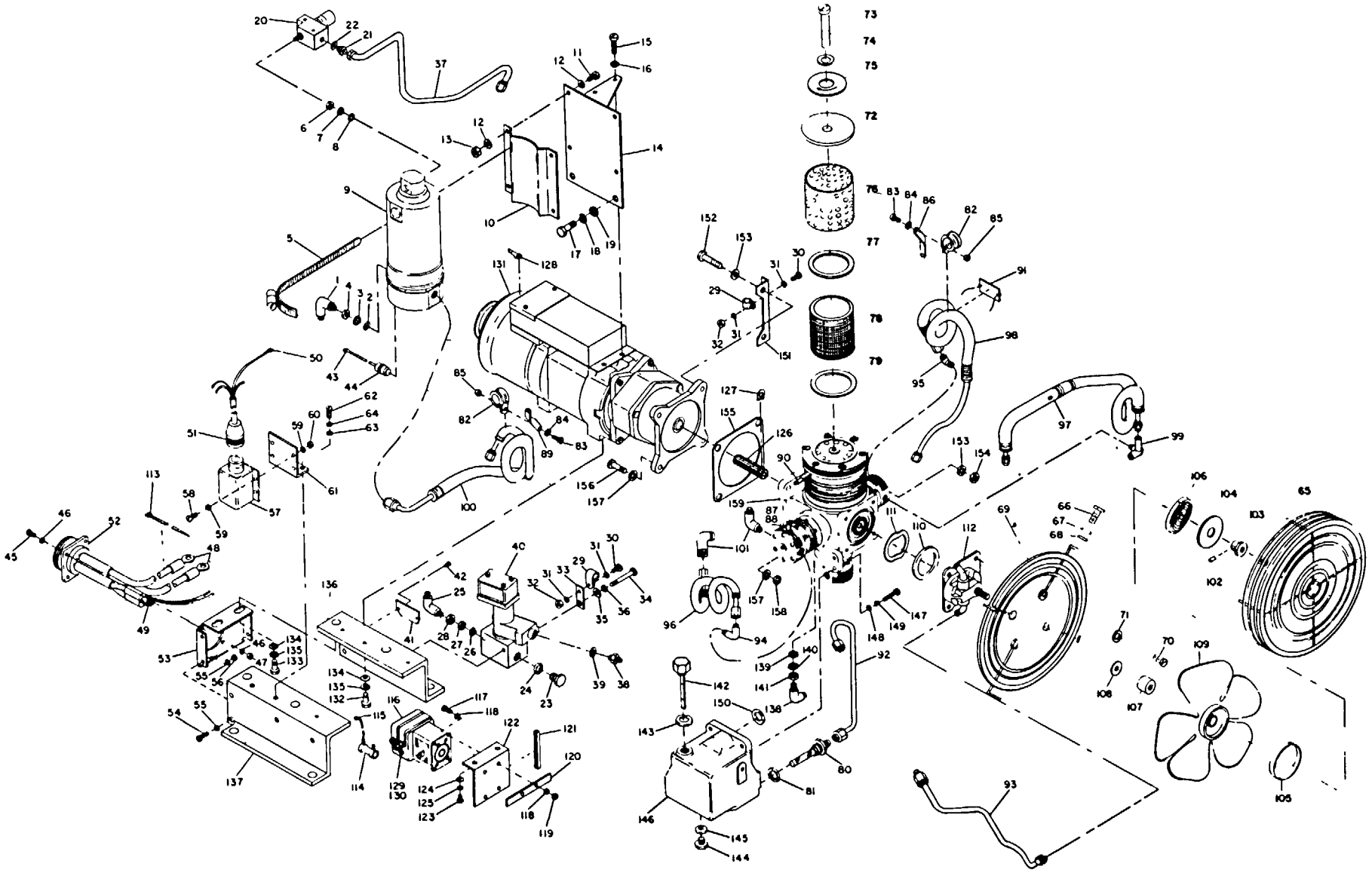


Figure 6-1. Compressor, exploded view.

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-1-		. COMPRESSOR, Air	1
-1		. ELBOW, Pipe	1
-2		. PACKING, Preformed	1
-3		. RING, Back-up	1
-4		. NUT, Plain, hexagon	1
-5		. CLAMP, Separator mounting	2
-6		. NUT, Plain, hexagon	1
-7		. PACKING, Preformed	1
-8		. RING, Back-up	1
-9		. SEPARATOR, Moisture(Ref. Fig. 6-2)	1
-10		. BRACKET, Separator	1
		(ATTACHING PARTS)	
-11		. BOLT, Machine, hex head	4
-12		. WASHER, Flat	8
-13		. NUT, Self-locking, hexagon	4
		---*---	
-14		. BRACKET ASSEMBLY	1
		(ATTACHING PARTS)	
-15		. SCREW, Machine, fil h	2
-16		. WASHER, Flat	2
-17		. BOLT, Machine, hex head	2
-18		. WASHER, Flat	2
-19		. WASHER, Lock	2
		---*---	
-20		. VALVE, Back pressure	1
-21		. UNION, Pipe	2
-22		. PACKING, Preformed	2
-23		. PLUG, Pipe	1
-24		. PACKING, Preformed	1
-25		. ELBOW, Pipe	1

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-1-26		. PACKING, Preformed	1
-27		. RING, Back-up	1
-28		. NUT, Plain, hexagon	1
-29		. CLAMP, Tube	4
		(ATTACHING PARTS)	
-30		. SCREW, Machine, bind. hd	4
-31		. WASHER, Flat	8
-32		. NUT, Self-locking, hexagon	4
		---*---	
-33		. PLATE, Clamp	2
		(ATTACHING PARTS)	
-34		. BOLT, Machine, hex head	2
-35		. WASHER, Flat	2
-36		. WASHER, Lock	2
		---*---	
-37		. TUBE, Pressure switch	1
-38		. UNION, Pipe	1
-39		. PACKING, Preformed	1
-40		. SWITCH MODULE, Pressure/relief (fig. 6-3)	1
-41		. PLATE, Identification	1
		(ATTACHING PARTS)	
-42		. SCREW, Drive	2
		---*---	
		. CABLE ASSEMBLY	1
-43		. . TERMINAL, Lug	1
-44		. . CONNECTOR, Plug, electrical	1
		. CABLE ASSEMBLY	1
		(ATTACHING PARTS)	
-45		. SCREW, Machine, bind. hd	4
-46		. WASHER, Flat 8	
-47		. NUT, Self-locking, hexagon	4
		---*---	

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-1-48		. . TERMINAL, Lug	2
-49		. . TERMINAL, Lug	2
-50		. . TERMINAL, Lug	1
-51		. . CONNECTOR, Plug, electrical	1
-52		. . CONNECTOR, Receptacle, elect.	1
-53		. BRACKET, Connector	1
		(ATTACHING PARTS)	
-54		. SCREW, Machine, bind. hd	4
-55		. WASHER, Flat	8
-56		. NUT, Self-locking, hexagon	4
		---*---	
-57		. TIMER, Dump	1
-58		(ATTACHING PARTS)	
-58		. SCREW, Machine, bind. hd	4
-59		. WASHER, Flat	8
-60		. NUT, Self-locking, hexagon	4
		---*---	
-61		. BRACKET, Timer	1
		(ATTACHING PARTS)	
-62		. SCREW, Machine, bind. hd	2
-63		. WASHER, Flat	2
-64		. WASHER, Lock	2
-65		. GUARD, Fan front	1
		(ATTACHING PARTS)	
-66		. SCREW, Machine	4
-67		. WASHER, Lock	4
		---*---	

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-1-68		. WASHER, Flat	4
		---*---	
-69		. GUARD, Fan, rear	1
		(ATTACHING PARTS)	
-70		. SCREW, Pump	4
-71		. WASHER, Flat	4
		---*---	
-72		. COVER, Filter	1
		(ATTACHING PARTS)	
-73		. SCREW, Machine	1
-74		. WASHER, Flat	1
		---*---	
-75		. DECAL, Rotation	1
-76		. STRAINER, Inlet Air	1
-77		. GASKET, Inlet Air	1
		---*---	
-78		. FILTER, Inlet Air	1
-79		. GASKET, Inlet Air	1
-80		. STRAINER ASSEMBLY Oil	1
-81		. PACKING, Preformed	1
-82		. CLAMP, Loop	9
		(ATTACHING PARTS)	
-83		. SCREW, Machine, fi h	6
-84		. WASHER, Flat	6
-85		. NUT, Self-locking, hexagon	6
		---*---	
-86		. BRACKET, Intercooler Third stage	1
-87		. BRACKET, Intercooler, Second stage	2
-88		. WASHER, Bracket	1
-89		. BRACKET, Aftercooler	2
-90		. BRACKET, Intercooler; First stage	1
-91		. PLATE, Instruction	1
-92		. TUBE, Oil supply	1

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-1-93		. TUBE, Bleed	1
-94		. ELBOW, Pipe, second stage	1
-95		. ELBOW, Pipe, third stage	3
-96		. INTERCOOLER, First	1
-97		. INTERCOOLER, Second	1
-98		. INTERCOOLER, Third	1
-99		. VALVE, Relief, second	1
-100		. AFTERCOOLER	1
-101		. ELBOW, Pipe, long	2
-102		. LOCK, Nut Fan	1
-103		. NUT, Bushing Fan	1
-104		. COVER, Spring Fan	1
-105		. SPRING LOCK, Fan	1
-106		. SPRING, Fan	1
-107		. BUSHING, Fan	1
-108		. WASHER	1
-109		. FAN ASSEMBLY	1
-110		. PACKING, Preformed Oil Pump	1
-111		. WASHER, Wave oil Pump	1
-112		. PUMP, 011 compressor (Refer. Fig. 6-4)	1
-113		. CLAMP, Wire Cable	6
-114		. RESISTOR, Fixed, wire wound	1
-115		. TERMINAL, Lug	1
-116		. RELAY, Armature	1
		(ATTACHING PARTS)	
-117		. SCREW, Machine, bind. hd	4
-118		. WASHER, Flat	8
-119		. NUT, Self-locking, hexagon	4
		---*---	
-120		. BARRIER, Wire	1
-121		. GROMMET	2

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-1-122		. BRACKET, Relay	1
		(ATTACHING PARTS)	
-123		. SCREW, Machine, bind. Hd	2
-124		. WASHER, Flat	2
-125		. WASHER, Lock	2
		---*---	
-126		. SHAFT, Spline	1
		(ATTACHING PARTS)	
-127		. RING, Retaining	1
		---*---	
-128		. TERMINAL, Lug	1
-129		. TERMINAL, Lug	2
-130		. TERMINAL, Lug	2
-131		. MOTOR, DC (Refer Fig. 6-5)	1
		(ATTACHING PARTS)	
-132		. BOLT, Machine, hex hd	2
-133		. BOLT, Machine, hex hd	2
-134		. WASHER, Flat	4
-135		. WASHER, Lock	4
		---*---	
-136		. SUPPORT, Short	1
-137		. SUPPORT, Long	1
-138		. ELBOW, Pipe	1
-139		. PACKING, Preformed	1
-140		. RING, Back-up	1
-141		. NUT, Plain, hexagon	1
-142		. DIPSTICK	1
-143		. PACKING, Preformed	1
-144		. PLUG, Pipe	1
-145		. PACKING, Preformed	1
-146		. SUMP	1
		(ATTACHING PARTS)	
-147		. SCREW, Cap, socket head	4
-148		. WASHER, Flat	4
-149		. WASHER, Lock	4
		---*---	

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-1-150		. PACKING, Preformed	1
-151		. BRACKET, Clamp	1
		(ATTACHING PARTS)	
-152		. BOLT, Machine, hex hd	2
-153		. WASHER, Flat	4
-154		. NUT, Self-locking, hexagon	2
		---*---	
-155		. GASKET, Asbestos	1
		(ATTACHING PARTS)	
-156		. BOLT, Machine, hex head	2
-157		. WASHER, Flat	4
-158		. NUT, Self-locking, hexagon	2
		---*---	
-159		. COMPRESSOR, Basic (Refer fig. 6-6)	1

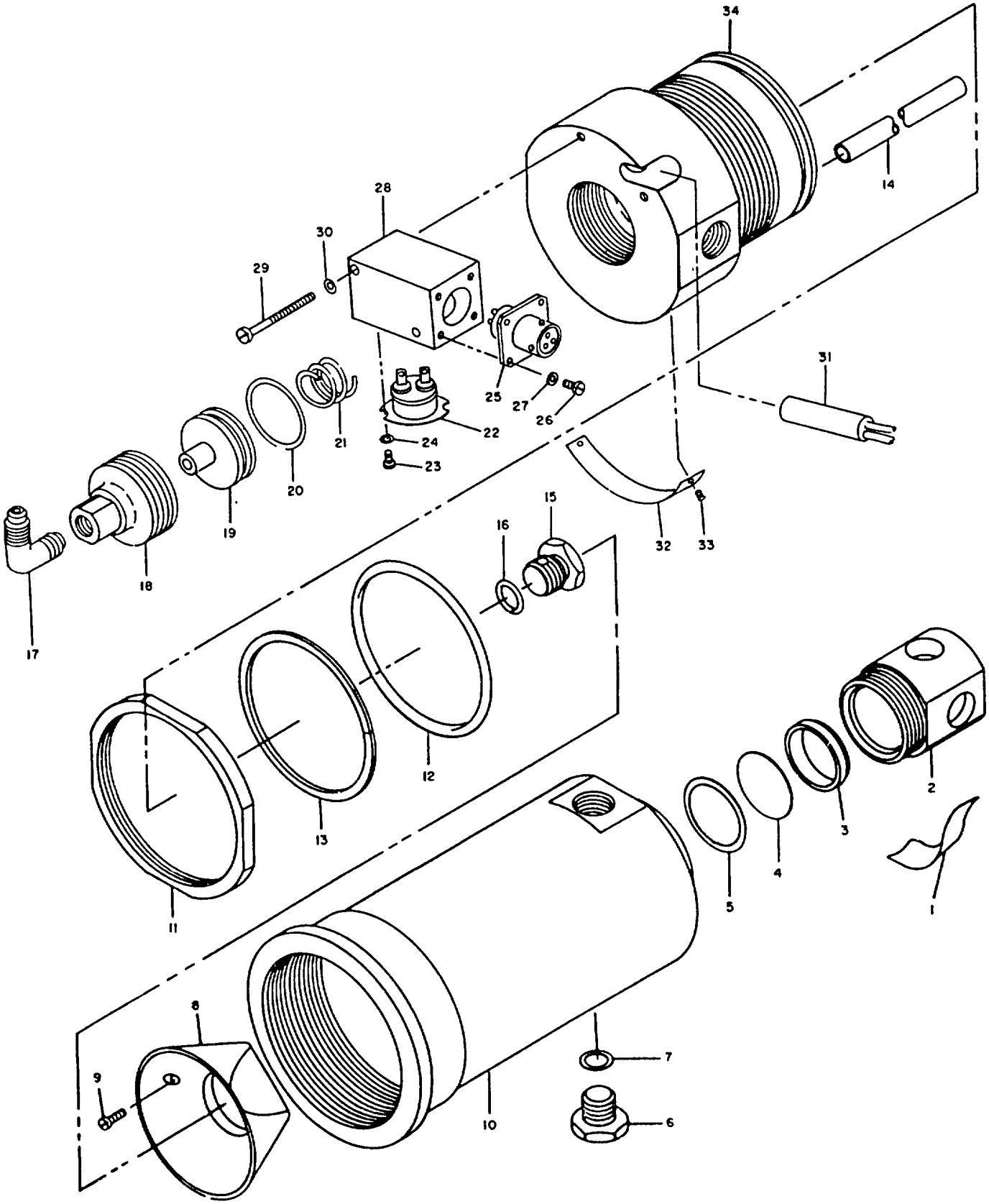


Figure 6-2. Moisture Separator

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-2-		SEPARATOR, Moisture	1
-1		. TAPE, Cap	AR
-2		. PLUG, Safety	1
-3		. RING, Safety disc	1
-4		. DISC, Safety	1
-5		. RETAINER, Safety disc	1
-6		. PLUG	1
-7		. PACKING, Preformed	1
-8		. BAFFLE	1
		(ATTACHING PARTS)	
-9		. SCREW, Machine, fl h	2
		---*---	
-10		. SHELL	1
-11		. NUT, Lock	1
-12		. PACKING, Preformed	1
-13		. RING, Back-up	1
-14		. TUBE, Inlet	1
-15		. SEAT	1
-16		. PACKING, Preformed	1
-17		. ELBOW, Pipe	1
-18		. CYLINDER	1
-19		. SEAT ASSEMBLY	1
-20		. PACKING, Preformed	1
-21		. SPRING, Helical, compression	1
-22		. THERMOSTAT	1
		(ATTACHING PARTS)	
23		. SCREW, Machine, fl h	2
-24		. WASHER, Flat	2
		---*---	
-25		. CONNECTOR, Receptacle, electrical	1
		(ATTACHING PARTS)	
-26		. SCREW, Machine, fit h	4
-27		. WASHER, Flat	4
		---*---	

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-2-28		. BLOCK, Mounting	1
		(ATTACHING PARTS)	
-29		. SCREW, Machine, fi h	2
-30		. WASHER, Flat	2
		---*---	
-31		. HEATER	1
-32		. PLATE, Identification	1
		(ATTACHING PARTS)	
-33		. SCREW, Drive	2
		---*---	
-34		. BODY	1

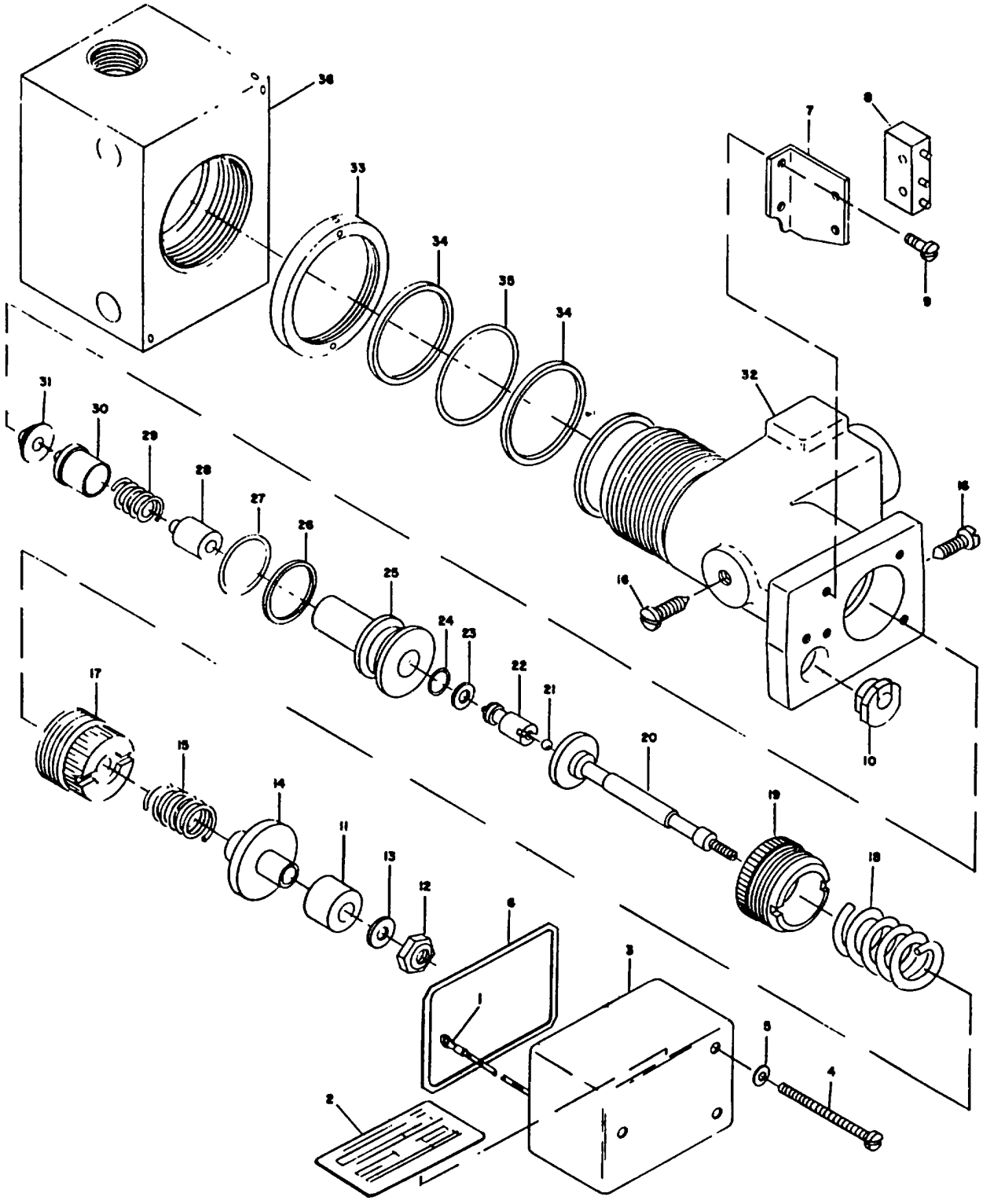


Figure 6-3. Pressure/Relief Switch Module

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-3-		SWITCH MODULE, Pressure/relief	1
-1		. TERMINAL, Lug	1
-2		. PLATE, Identification	1
-3		. COVER, Switch	1
		(ATTACHING PARTS)	
-4		. SCREW, Machine, fl h	3
-5		. WASHER, Sealing	3
		---*---	
-6		. GASKET, Cover	1
-7		. BRACKET, Switch	1
-8		. SWITCH, Sensitive	1
		(ATTACHING PARTS)	
-9		. SCREW, Machine, fil h	2
		---*---	
-10		. BUSHING, Feed-thru	1
-11		. COMPENSATOR, Pusher	1
		(ATTACHING PARTS)	
-12		. NUT, Lock	1
-13		. WASHER, FIat	1
		---*---	
-14		. HAT, Compensator	1
-15		. SPRING, Helical, compression	1
-16		. SCREW, Lock	2
-17		. CAP, Pusher	1
-18		. SPRING, Helical, compression	1
-19		. RETAINER, Spring	1
-20		. PUSHER, Switch	1
-21		. BALL, Piston	1
-22		. PISTON, Valve	1
-23		. RING, Back-up	1
-24		. PACKING, Preformed	1
-25		. BODY, Valve	1

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-3-26		. RING, Back-up	1
-27		. PACKING, Preformed	1
-28		. SEAT, Relief valve	1
-29		. SPRING, Helical, compression	1
-30		. GUIDE, Valve	1
-31		. SHUTTLE, Valve	1
-32		. HOUSING, Outlet	1
-33		. NUT, Jam	1
-34		. RING, Back-up	2
-35		. PACKING, Preformed	1
-36		. ADAPTER, Body	1

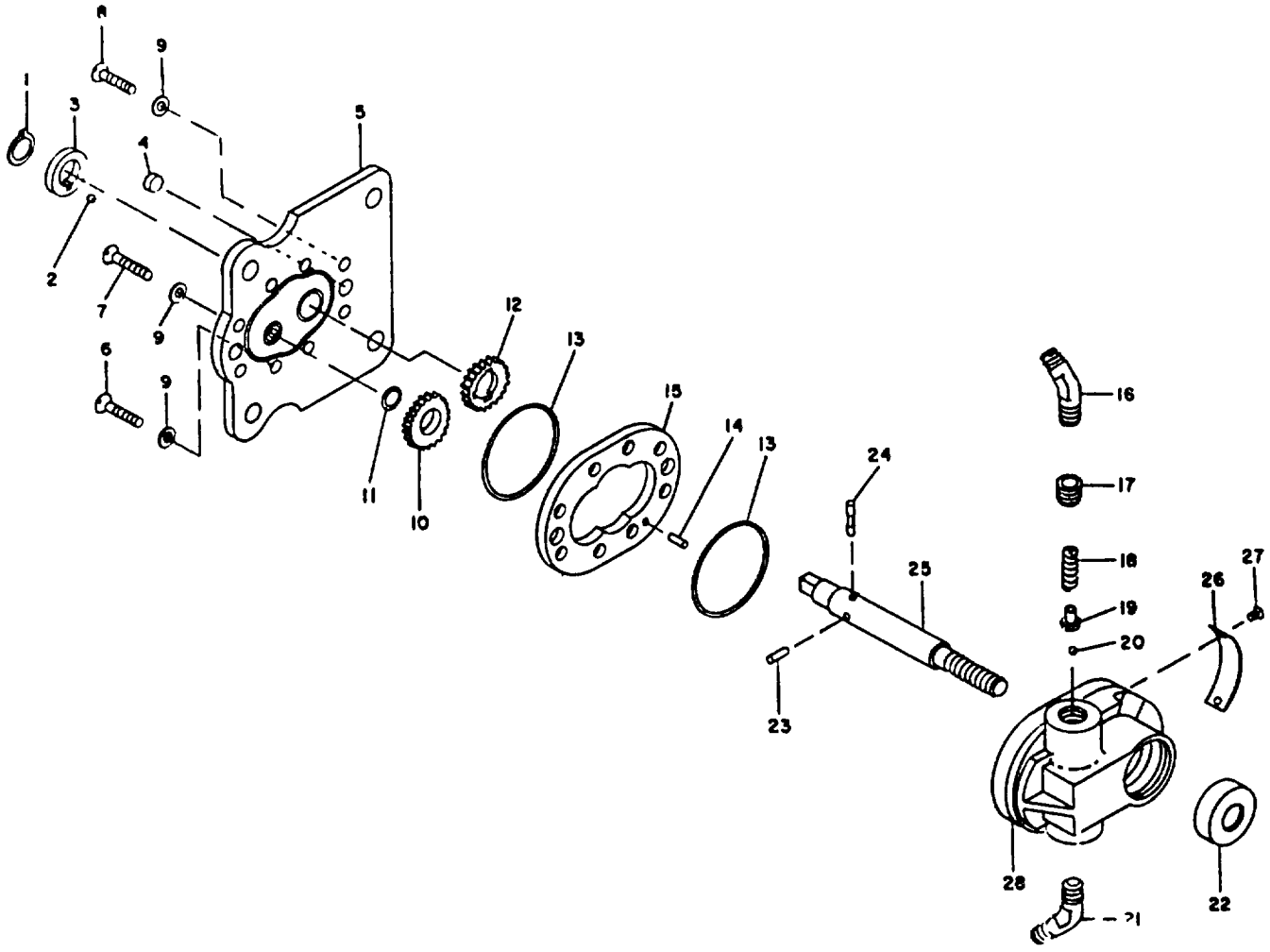


Figure 6-4. Oil Compressor Pump

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-4-		PUMP, Oil compressor	1
-1		. RING, Retaining	1
-2		. KEY, Thrust plate	1
-3		. WASHER, Thrust	1
-4		. PLUG, Dowel	1
-5		. PLATE, Mounting	1
		(ATTACHING PARTS)	
-6		. SCREW, Machine, flat hd	2
-7		. SCREW, Machine, flat hd	2
-8		. SCREW, Machine, flat hd	4
-9		. GASKET, Screw	8
		---*---	
-10		. GEAR, Spur	1
-11		. PACKING, Preformed	1
-12		. GEAR, Spur	1
-13		. PACKING, Preformed	2
-14		. PIN, Alignment	1
-15		. PLATE, Center	1
-16		. ELBOW, Pipe	1
-17		. RETAINER, Spring	1
-18		. SPRING, Helical, compression	1
-19		. GUIDE	1
-20		. BALL, Bypass	1
-21		. ELBOW, Pipe	1
-22		. SEAL, Oil	1
-23		. KEY, Pump Shaft	1
-24		. PIN, Thrust	1
-26		. DRIVE SHAFT1	
-26		. PLATE, Identification	1
		(ATTACHING PARTS)	
-27		. SCREW, Drive	2
		---*---	
-28		. BODY ASSEMBLY	1

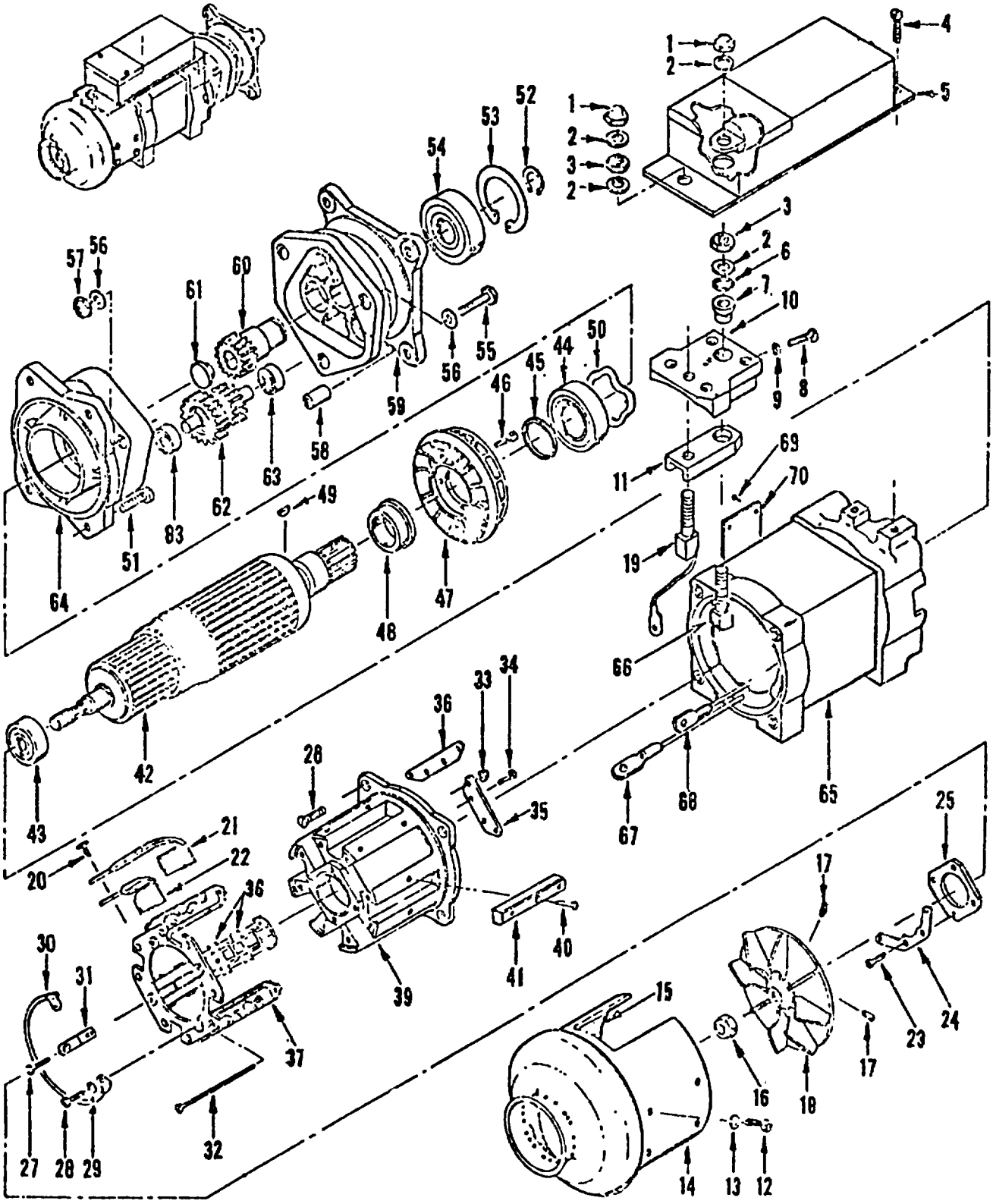


Figure 6-5. Direct Current Motor Assembly

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-5-		MOTOR ASSEMBLY, Direct current	1
-1		. NUT, Self-locking, hexagon	2
-2		. WASHER, Flat	5
-3		. NUT, Plain, hex, brass, cad. pl, 3/8-24 by 3/16 in. lg	2
-4		. SCREW, Machine, fil h	2
-5		. FILTER, RF	1
-6		. WASHER, Spacer	1
-7		. INSULATOR	1
-8		. SCREW, Machine, flat hd	4
-9		. WASHER, Lock	4
-10		. BASE, Terminal	1
-11		. INSULATOR	1
-12		. SCREW, Machine, fil h	8
-13		. WASHER, Flat	8
-14		. CAP, End bell	1
-15		. INSULATOR, Cap	4
-16		. NUT, Self-locking, hexagon	1
-17		. SETSCREW, Steel, cup point, 8-32 by 1/4 in. lg	2
-18		. FAN, Electrical rotating equipment	1
-19		. TERMINAL, Grounding	1
-20		. SCREW, Machine, bind. hd, stl, cad. Pl, 6-32 by 3/8 in. lg	4
-21		. BRUSH ASSEMBLY	4
-22		. BRUSH ASSEMBLY	4
-23		. SCREW, Cap, socket hd	4
-24		. PLATE, Electrical grounding	1
-25		. PLATE, Retaining	1
-26		. SCREW, Machine, flat hd	4
		. END BELL ASSEMBLY, Electrical rotating equipment	1

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-5-27		. . SCREW, Machine, bind. hd, stl, cad. pl, 8-32 by 5/8 in. lg	3
-28		. . SCREW, Machine, bind. hd, stl, cad. pl, 8-32 by 3/4 in. lg	1
-29		. . WASHER	1
-30		. . LEAD, Electrical	1
-31		. . LEAD, Electrical	4
-32		. . SCREW, Machine, flat hd	8
-33		. . NUT, Self-locking, hexagon	8
-34		. . SCREW, Machine, fil h	8
-35		. . SEGMENT, Front support insulating	2
-36		. . SEGMENT, Front support conducting	2
-37		. . HOLDER ASSEMBLY, Electrical contact brush	1
-38		. . . SPRING, Spiral, torsion	8
-39		. . END BELL, Electrical rotating equipment	1
-40		. SCREW, Machine, flat hd	4
-41		. SUPPORT, Cap	4
-42		. ARMATURE, Motor	1
-43		. . BEARING, Ball, annular	1
-44		. . BEARING, Ball, annular	1
-45		. . RING, Bearing, shoulder	1
-46		. . SCREW, Machine, fil h	4
-47		. . FAN, Electrical rotating equipment	1
-48		. . HUB, Fan	1
-49		. . KEY, Woodruff	1
-50		. SPRING, Bearing, load	1
-51		. SCREW, Machine, fl h	4
		. END BELL ASSEMBLY, Electrical rotating equipment	1

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-5-52		. . RING, Retaining	1
-53		. . RING, Retaining	1
-54		. . BEARING, Ball, annular	1
-55		. . BOLT, Machine, hexagon hd	3
-56		. . WASHER, Flat	6
-57		. . NUT, Self-locking, hexagon	3
-58		. . DOWEL, Gear box	3
-59		. . END BELL, Electrical rotating equipment	1
-60		. . GEARSHAFT, Spur	1
-61		. . PLUG, Spline	1
		. . SHAFT ASSEMBLY, Counter	3
-62		. . . GEARSHAFT, Spur	1
-63		. . . BEARING, Ball, annular	2
-64		. . HOUSING, Motor end gear	1
-65		. STATOR	1
-66		. . STUD, Shouldered	1
-67		. . TERMINAL, Lug	1
-68		. . TERMINAL, Lug	1
-69		. SCREW, Drive	4
-70		. PLATE, Identification	1

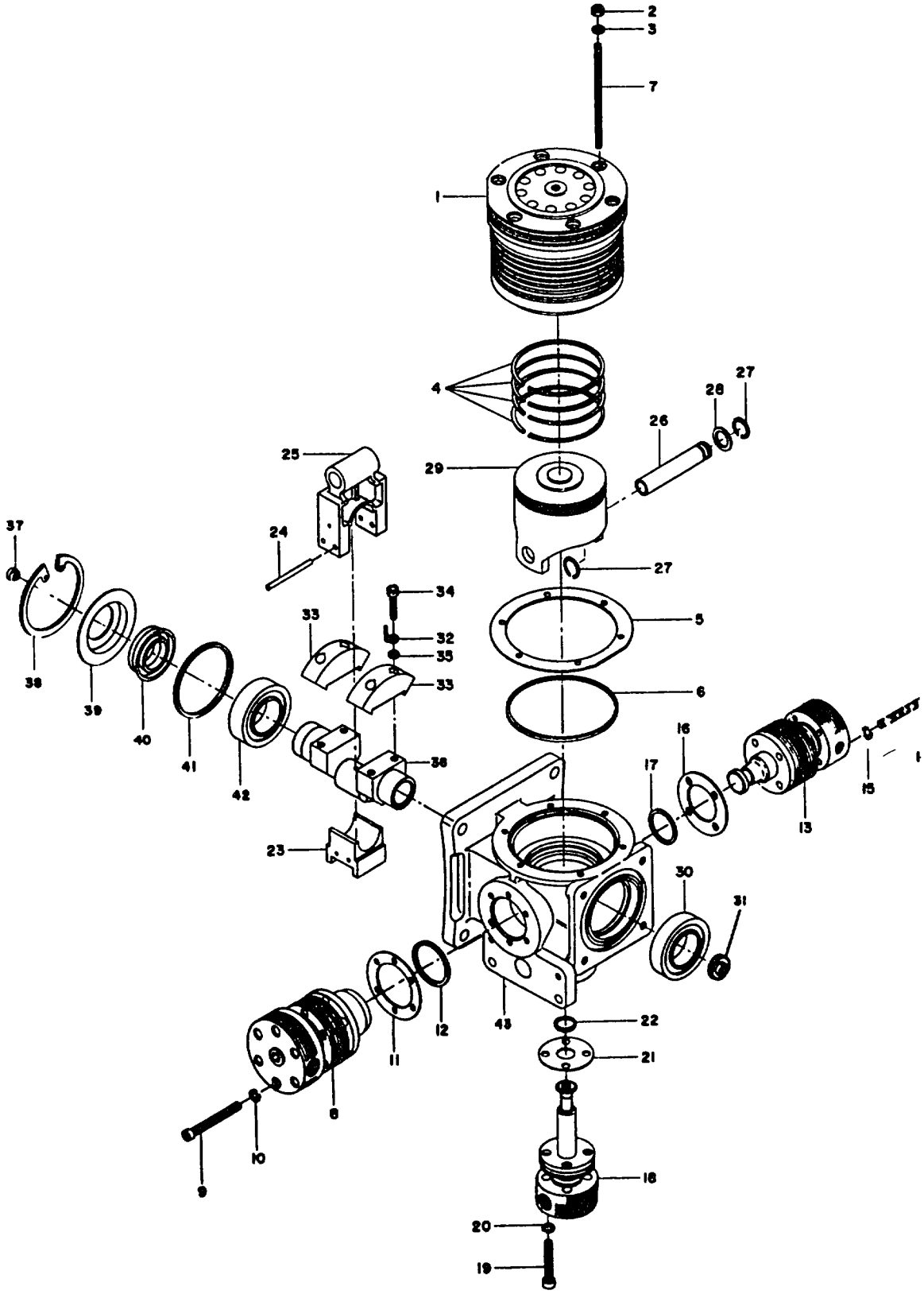


Figure 6-6. Basic Compressor

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6 -6-		COMPRESSOR, Basic	1
-1		. FIRST STAGE ASSEMBLY (Ref Fig. 6-7) (ATTACHING PARTS)	1
-2		. NUT, Self-locking, hexagon	6
-3		. WASHER, Flat	6
		---*---	
-4		. RING, Piston	4
-5		. SHIM, 0.003 in. thk	AR
		. SHIM, 0.005 in. thk	
		. SHIM, 0.010 in. thk	A
-6		. PACKING, Preformed	1
-7		. STUD, Threaded	6
-8		. SECOND STAGE ASSEMBLY (Ref Fig. 6-8) (ATTACHING PARTS)	1
-9		. SCREW, Cap, socket hd	6
-10		. WASHER, Lock	6
		---*---	
-11		. SHIM, 0.005 in. thk	AR
		. SHIM, 0.010 In. thk	AR
		. SHIM, 0.020 in. thk	AR
-12		PACKING, Preformed	1
-13		. THIRD STAGE ASSEMBLY (Ref fig. 6-9) (ATTACHING PARTS)	1
-14		. SCREW, Cap, socket hd	4
-15		. WASHER, Lock	4
		---*---	
-16		. SHIM, 0.003 In. thk	AR
		. SHIM, 0.005 in. thk	AR
		. SHIM, 0,010 In. thk	AR
-17		. PACKING, Preformed	1
-18		. FOURTH STAGE ASSEMBLY (Ref fig. 6-10) (ATTACHING PARTS)	1
-19		. SCREW, Cap, socket hd	4
-20		. WASHER, Lock	4
		---*---	

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-6-21		. SHIM, 0.003 In. thk	AR
-21		. SHIM, 0.005 in. thk	AR
-21		. SHIM, 0.010 in. thk	AR
-22		. PACKING, Preformed	1
		. KEYSTONE, Balanced	1
-23		. . WEDGE, Keystone	1
		(ATTACHING PARTS)	
-24		. . PIN, Spring	2
		---*---	
-25		. . FORK, Keystone	1
-26		. PIN, Piston	1
		(ATTACHING PARTS)	
-27		. RING, Retaining	2
		---*---	
-28		. SHIM, Piston pin	AR
-29		. PISTON, First stage	1
-30		. BEARING, Ball, thrust	1
-31		. PACKING, Preformed	1
-32		. LOCK, Counterweight	4
-33		. COUNTERWEIGHT, Crankshaft	2
		(ATTACHING PARTS)	
-34		. SCREW, Counterweight	4
-35		. WASHER, Look	4
		---*---	
-36		. CRANKSHAFT ASSEMBLY	1
-37		. PLUG, Orifice	1
-38		. RING, Bevel	1
-39		. RETAINER, Seal	1
-40		. SEAL, Oil	1
-41		. PACKING, Preformed	1
-42		. BEARING, Ball, thrust	1
-43		. CRANKCASE ASSEMBLY	

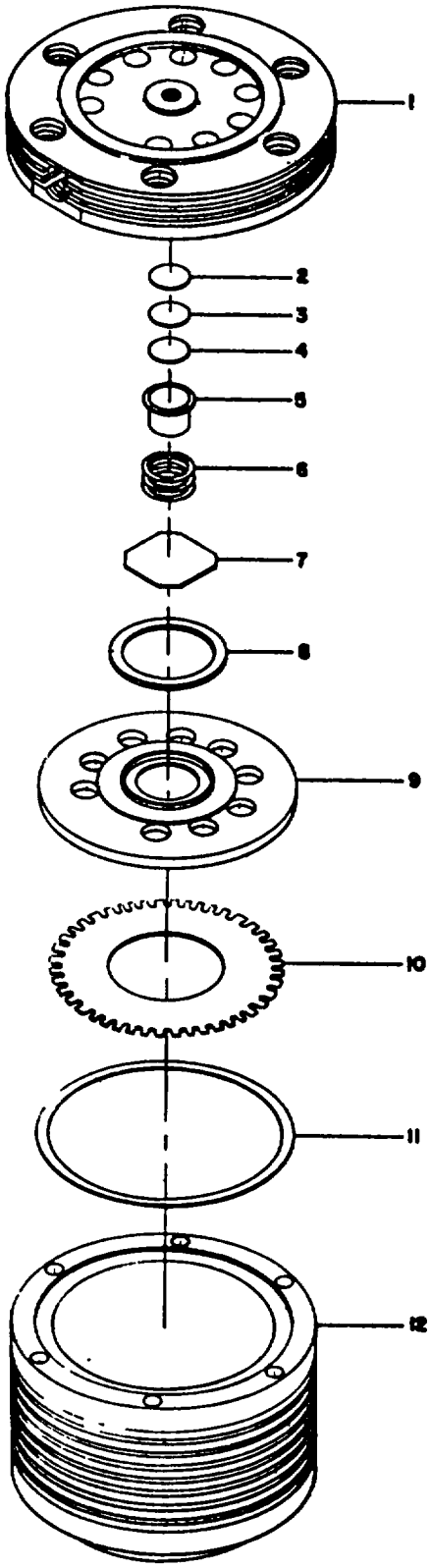


Figure 6-7. First Stage Assembly

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-7-		FIRST STAGE ASSEMBLY	1
-1		. HEAD, Cylinder	1
-2		. SHIM	AR
-3		. SHIM	1
-4		. SHIM	1
-5		. STOP, Disc valve	1
-6		. SPRING, Helical, compression	1
-7		. VALVE, Outlet	1
-8		. GASKET, Head	1
-9		. PLATE AND PIN ASSEMBLY	1
-10		. VALVE, Intake	1
-11		. GASKET, Plate	1
-12		. CYLINDER	1

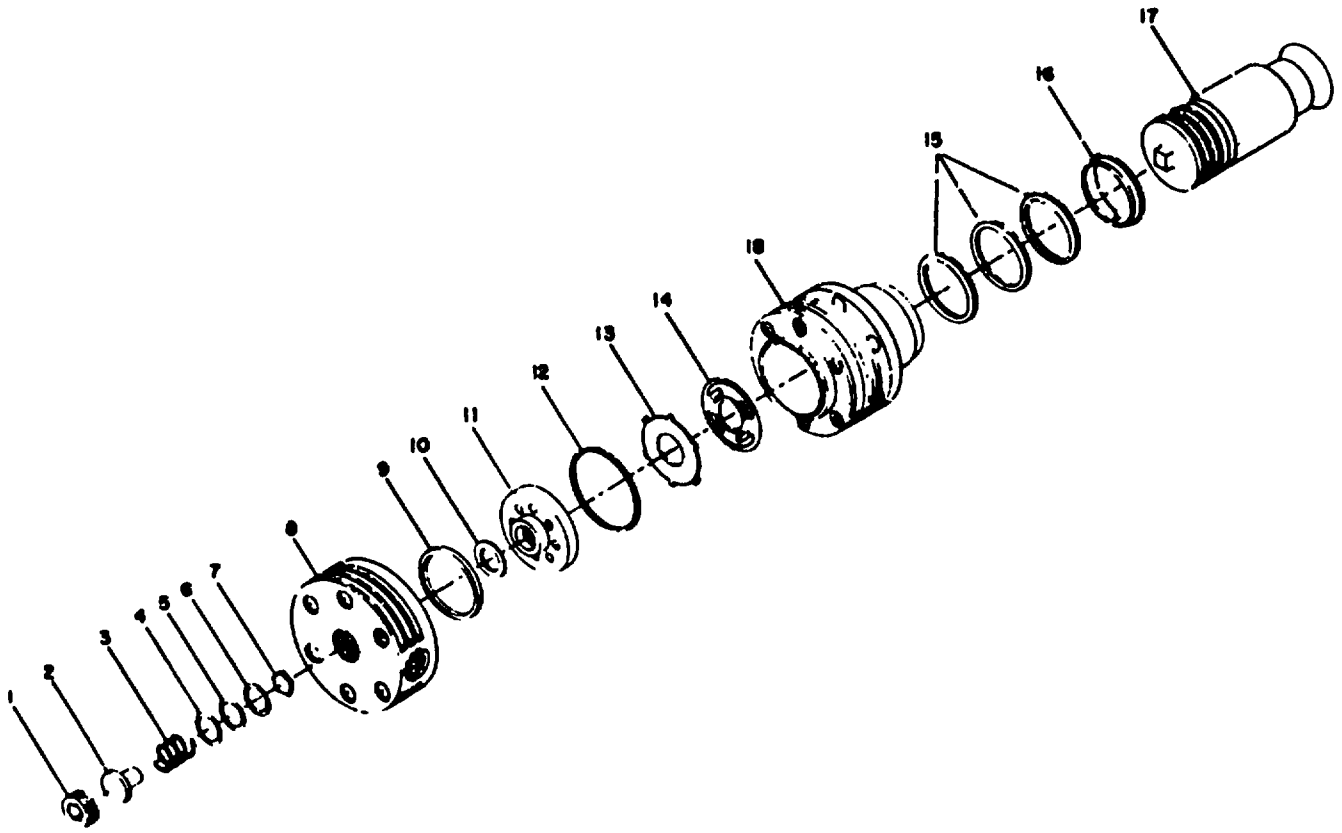


Figure 6-8. Second Stage Assembly

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-8-		SECOND STAGE ASSEMBLY	1
-1		. SCREW, Lock	1
-2		. STOP, Valve	1
-3		. SPRING, Helical, compression	1
-4		. SPACER	1
-5		. SPACER	1
-6		. SPACER	1
-7		. VALVE, Discharge	1
-8		. HEAD, Cylinder	1
-9		. SEAL, Plate	1
-10		. GASKET, Valve plate	1
-11		. PLATE, Valve	1
-12		. GASKET, Head	1
-13		. VALVE, Intake	1
-14		. SPRING, Valve, Intake	1
		. PLUNGER ASSEMBLY	1
-15		. . RING, Compression	3
-16		. . RING, Scraper	1
-17		. . PLUNGER	1
-18		. CYLINDER, Second stage	1

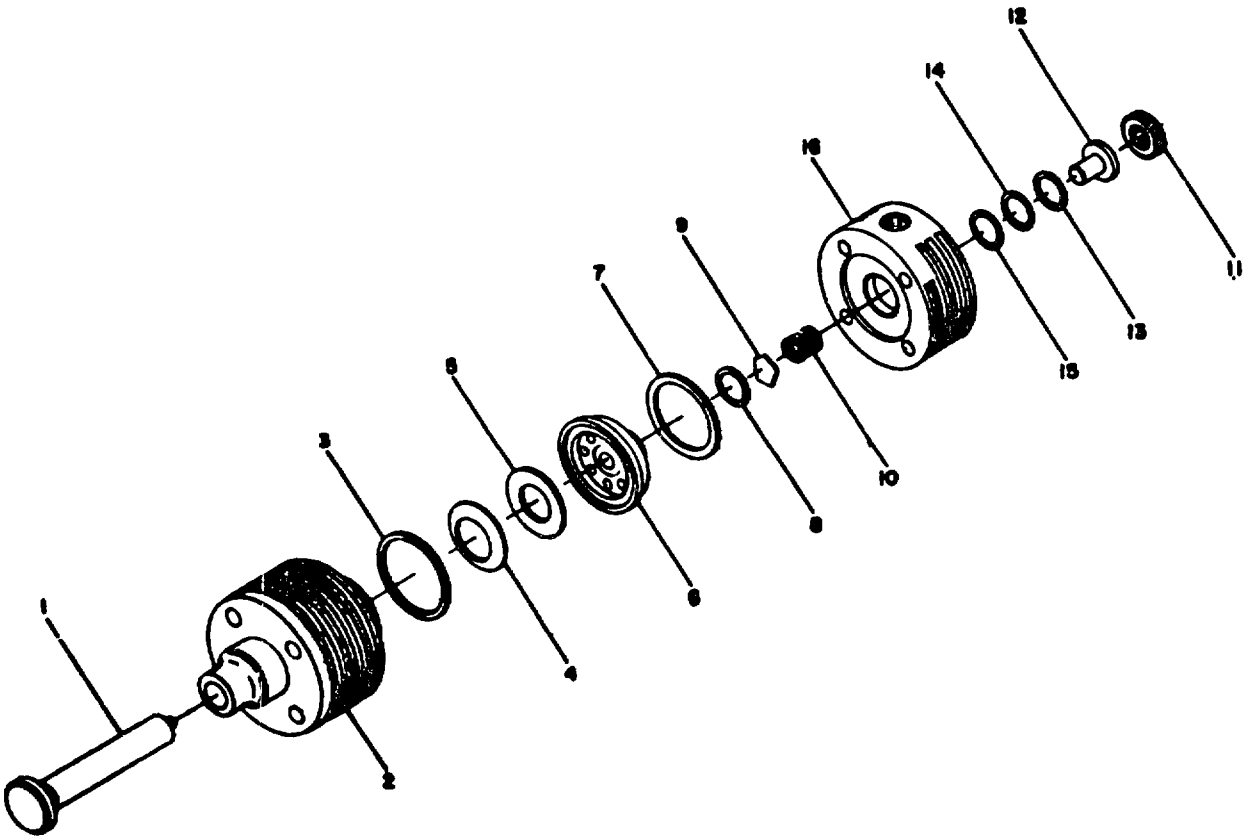


Figure 6-9. Third Stage Assembly

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-9-		THIRD STAGE ASSEMBLY	1
		. CYLINDER AND PLUNGER ASSEMBLY	1
-1		. . PLUNGER	1
-2		. . CYLINDER	1
-3		. GASKET, Head	1
-4		. SPRING, Valve	1
-5		. VALVE, Intake	1
-6		. PLATE, Valve	1
-7		. GASKET, Plate	1
-8		. SEAL, Plate	1
-9		. VALVE, Discharge	1
-10		. SPRING, Helical, compression	1
-11		. SCREW, Lock	1
-12		. STOP, Valve	1
-13		. SPACER	1
-14		. SPACER	1
-15		. SPACER	1
-16		. HEAD, Cylinder	1

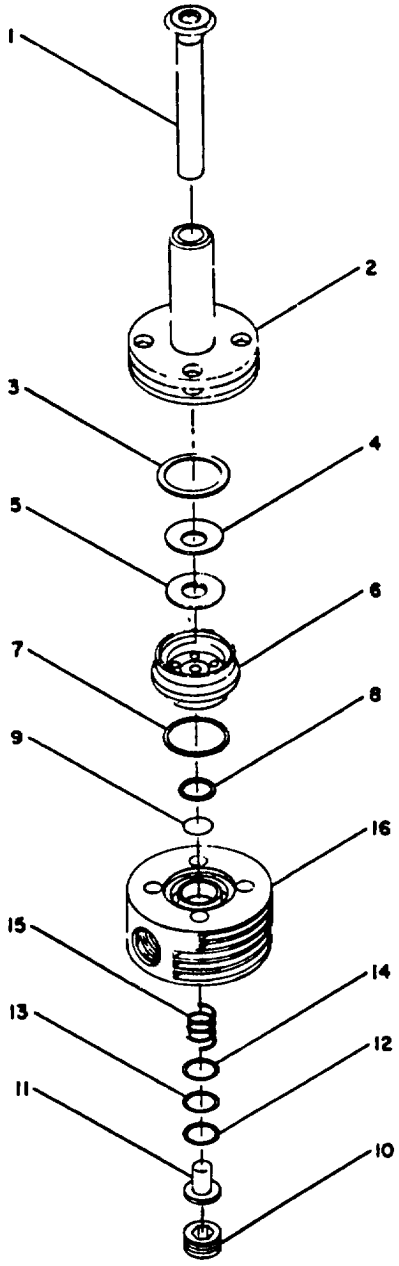


Figure 6-10. Fourth Stage Assembly

FIG. & INDEX NO.		DESCRIPTION 1 2 3 4 5 6 7	QTY PER UNIT
6-10-		FOURTH STAGE ASSEMBLY	1
		. CYLINDER AND PLUNGER ASSEMBLY	1
-1		. . PLUNGER	1
-2		. . CYLINDER	1
-3		. . GASKET, Head	1
-4		. SPRING, Inlet	1
-5		. VALVE, Intake	1
-6		. PLATE, Valve	1
-7		. GASKET, Valve plate	1
-8		. SEAL, Plate	1
-9		. VALVE, Discharge	1
-10		. SCREW, Lock	1
-11		. STOP, Valve	1
-12		. SPACER	AR
-13		. SPACER	AR
-14		. SPACER	AR
-15		. SPRING, Helical, compression	1
-16		. HEAD, Cylinder	1

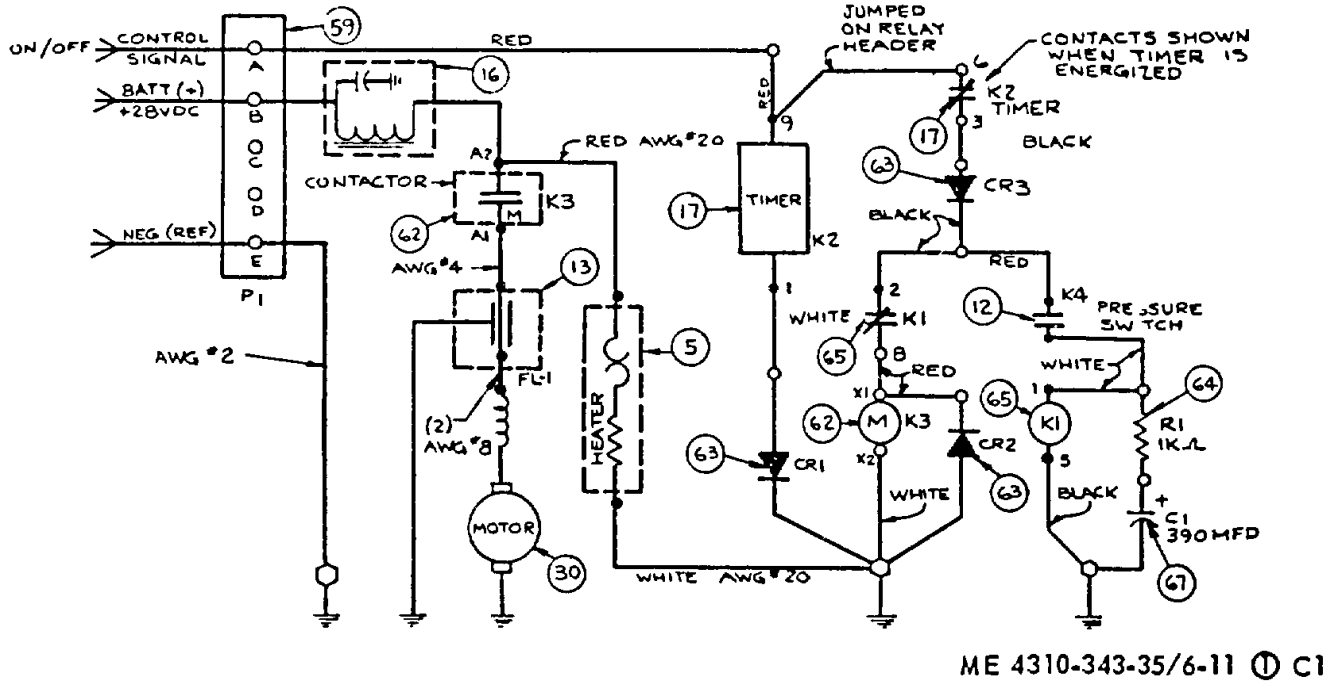


Figure 6-11. Motor-compressor assembly, Bogue Electric model 6703)
(sheet 1 of 5)

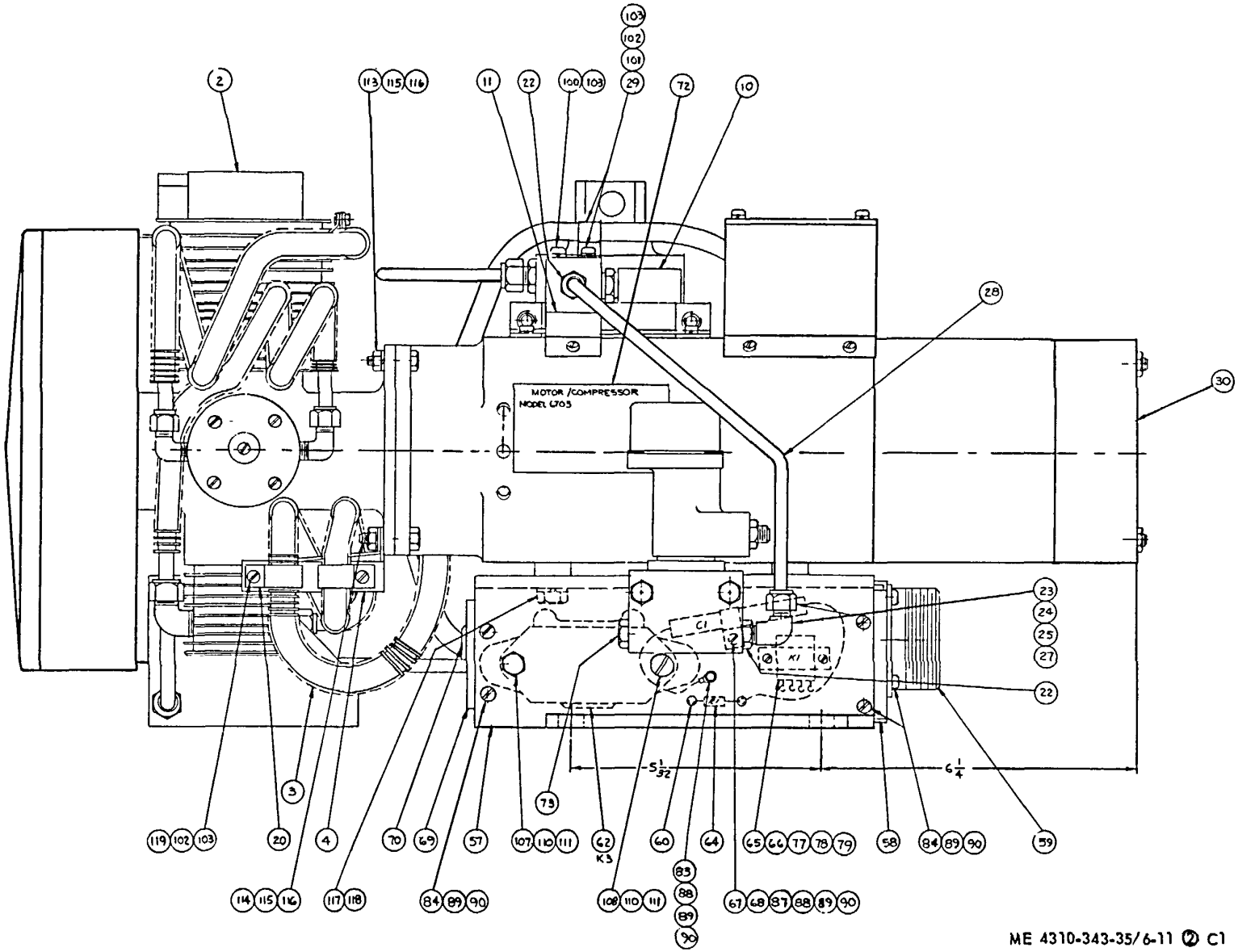


Figure 6-11. Motor-compressor assembly. Bogue Electric model 6703)
(sheet 2 of 5)

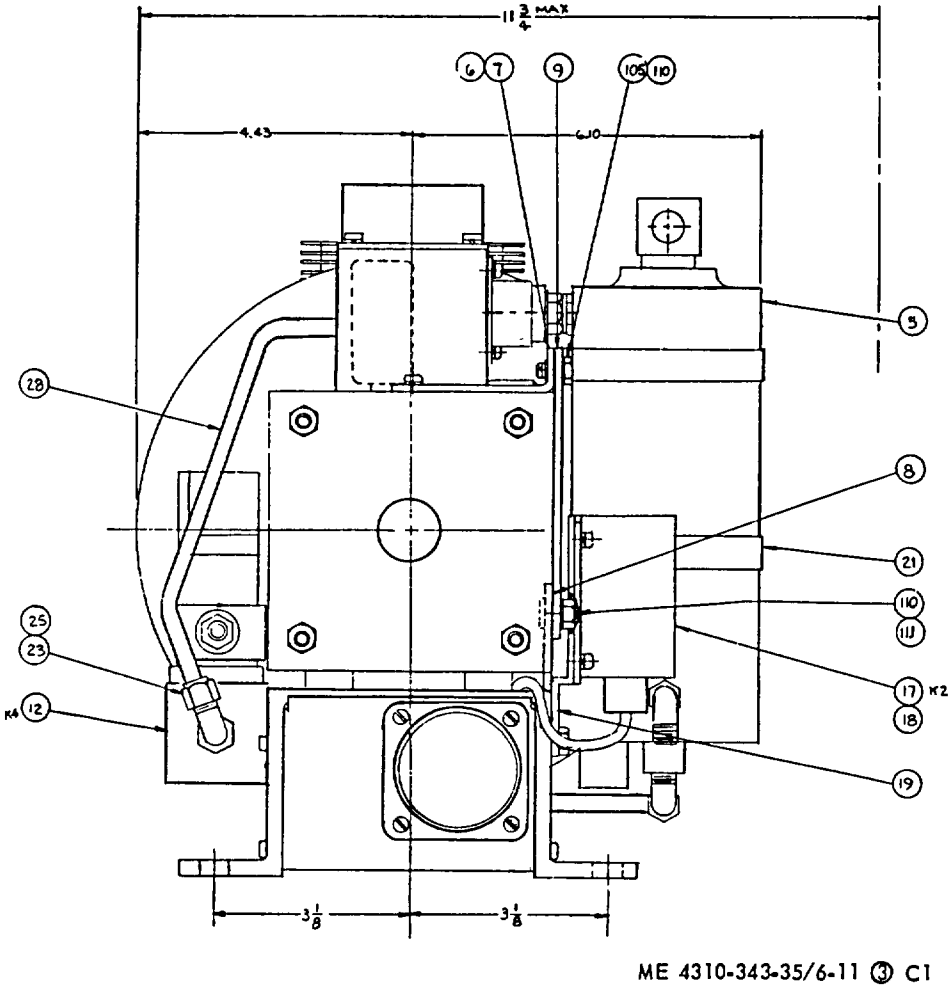


Figure 6-11. Motor-compressor assembly, Bogue Electric model 6703)
(sheet 3 of 5)

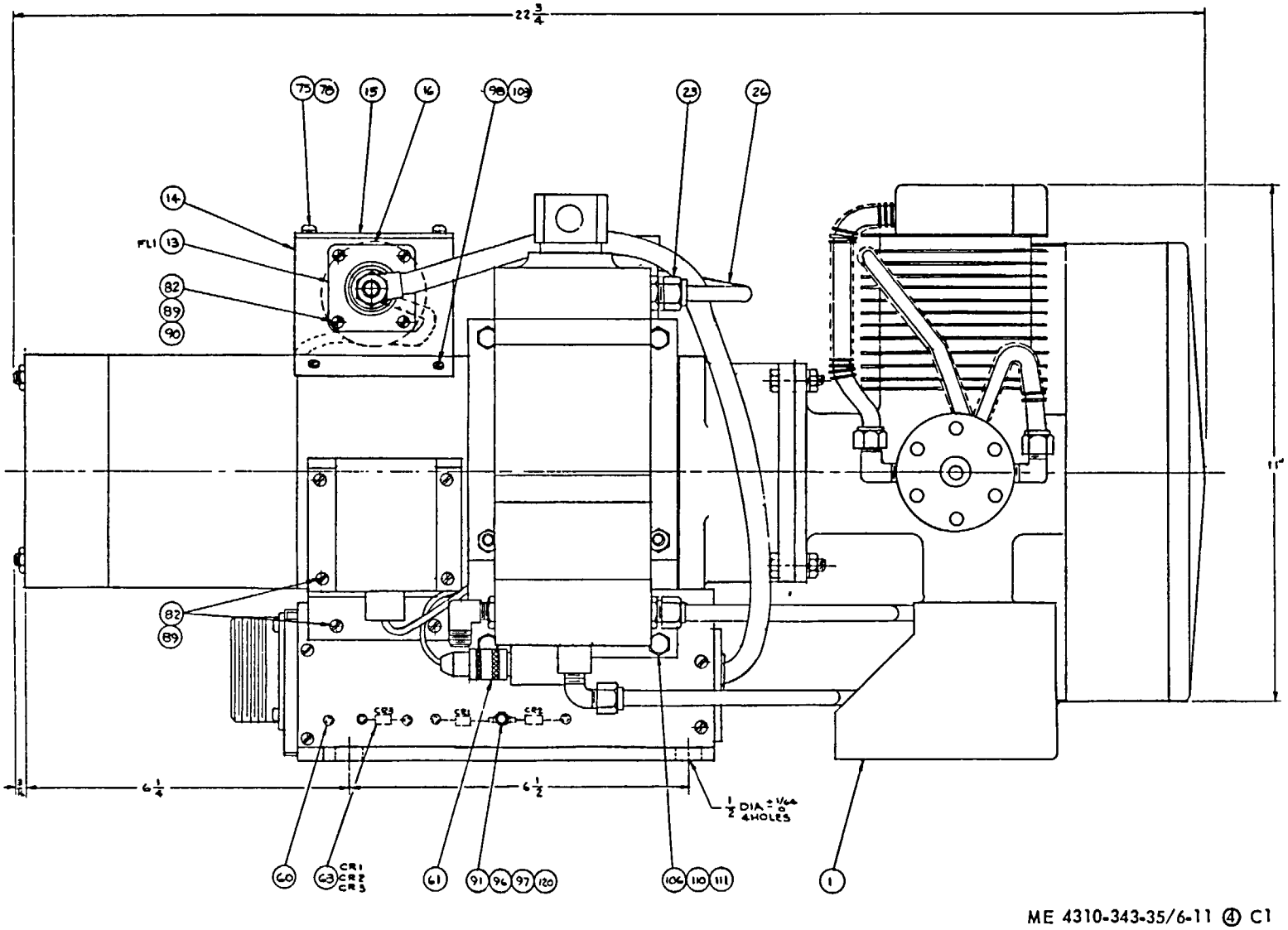


Figure 6-11. Motor-compressor assembly, Bogue Electric model 6703). (sheet 4 of 5)

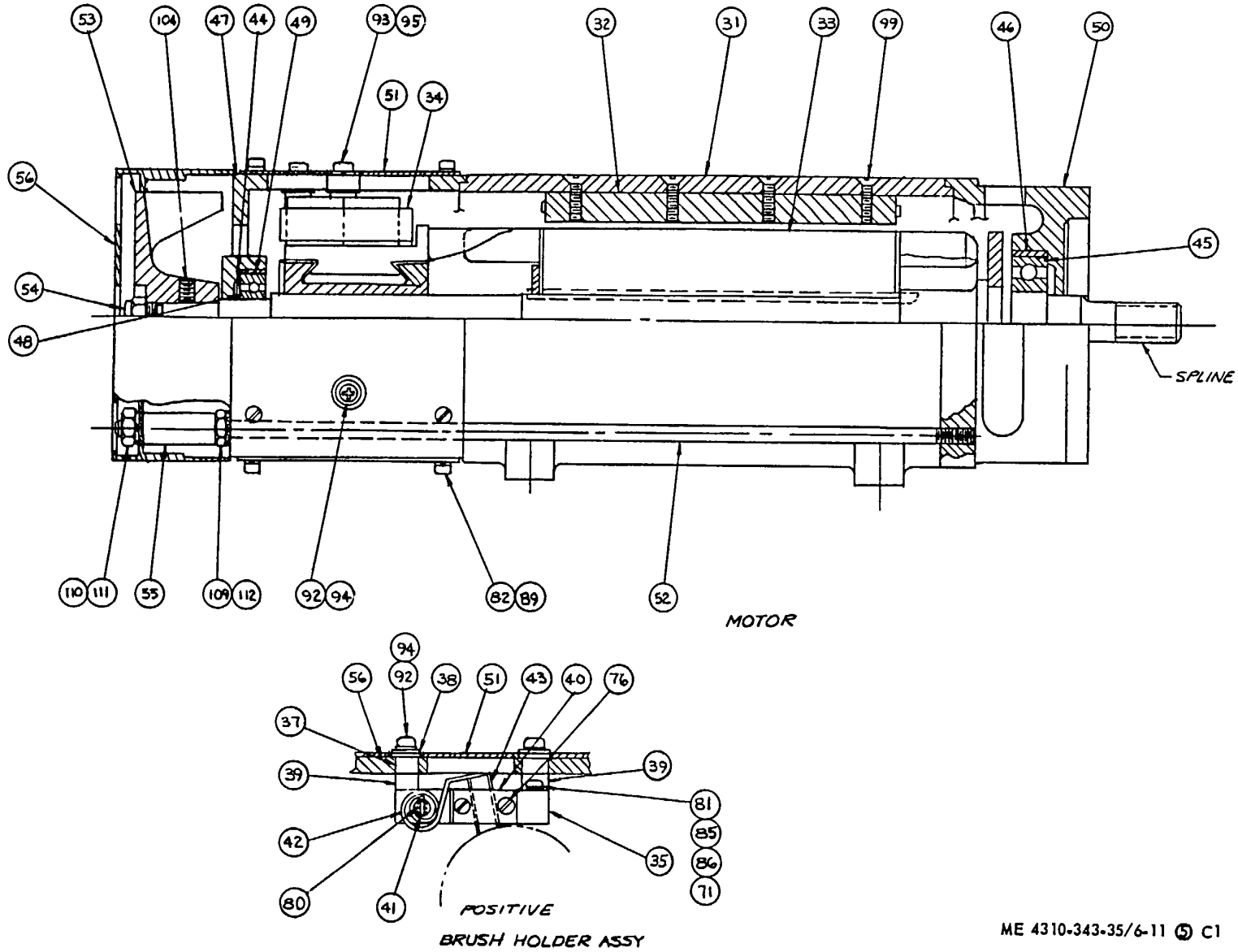


Figure 6-11. Motor-compressor assembly, Bogue Electric model 6703).
(sheet 5 of 5)

1 Compressor assembly
2 Compressor
3 After cooler
4 Bracket
5 Moisture separator
6 Bracket
7 Bracket
8 Bracket
9 Bracket, moisture separator
10 Back pressure valve
11 Bracket
12 Pressure switch (K4)
13 Filter, radio noise (FL1)
14 Filter box
16 Filter cover
16 Inductor assembly
17 Timer assembly
18 Timer
19 Bracket
20 Clamp loop
21 Clamp
22 Flare tube union
23 O ring
24 Elbow
25 Nut
26 Tube assembly
27 Bulk head union
28 Tube assembly
29 Cable damp
30 Motor
31 Frame
32 Mainpole assembly
33 Armature
34 Brush holder assembly
35 Brush holder body
36 Spacer
37 Insulator bushing
38 Nylon washer
39 Spacer
40 Brush retainer
41 Spring stud
42 Spring
43 Brush
44 Load spring
45 Bearing
46 Bearing insert
47 Bearing bracket
48 Bearing
49 Bearing insert
50 Bearing bracket
51 Side cover
52 Stud
53 Fan
54 Elastic stop nut
55 Spacer
56 End cover
57 Base
58 Receptacle support
59 Connector input
60 Terminal standoff
61 Connector
62 Relay contactor (k3)
63 Diode (CR1, 2 and 3)
64 Resistor(R1)
65 Relay (K1)
66 Relay spacer
67 Capacitor (C1)
68 Clamp
69 End plate
70 Grommet
71 Flag terminal
72 Nameplate
73 Plug
74 Not used
75 Screw
76 Screw
77 Screw
78 Lockwasher
79 Nut
80 Screw
81 Screw
82 Screw
83 Grounding stud
84 Screw
85 Washer
86 Lockwasher
87 Screw
88 Washer
89 Lockwasher
90 Nut
91 Ground stud
92 Screw
93 Screw
94 Washer
95 Washer
96 Lockwasher
97 Nut
98 Screw
99 Screw
100 Screw
101 Screw
102 Washer
103 Lockwasher
104 Screw
105 Screw
106 Screw
107 Screw
108 Screw
109 Lockwasher
110 Lockwasher
111 Nut
112 Nut
113 Screw
114 Screw
115 Lockwasher
116 Nut
117 Screw
118 Lockwasher
119 Screw
120 Washer

Figure 6-11. Motor-compressor assembly, Bogue Electric mode 6703.

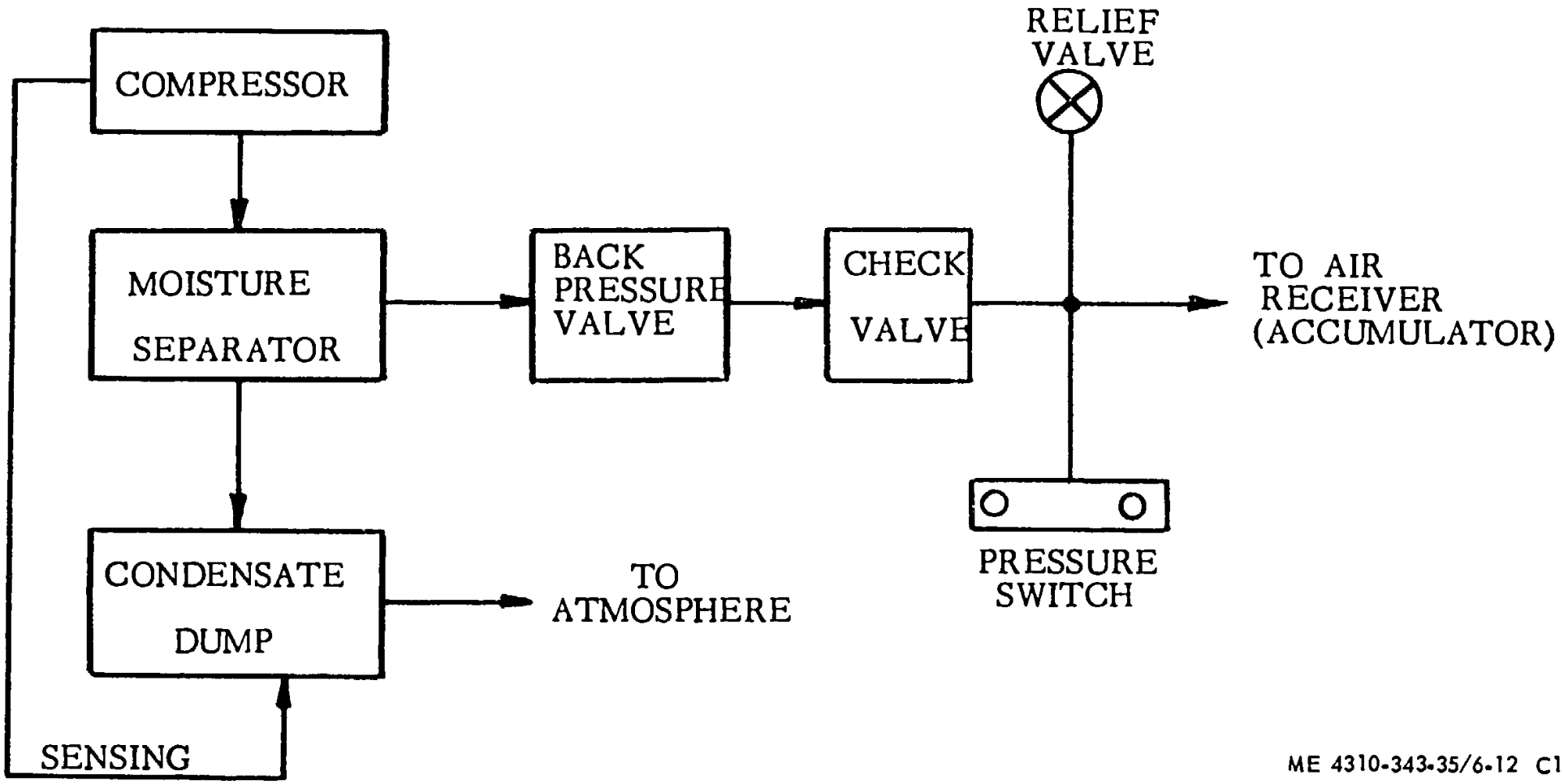


Figure 6-12. Pneumatic flow diagram

CHAPTER 7

SPECIAL TOOLS LIST

7-1. Special Tools used in overhaul are listed below cross-referenced to an illustration item number. Tools that are equal to or better can be used in lieu of the tools listed.

Part Number	Nomenclature	Item Number
256996	Fixture	1
205008	Fixture	2
209984	Air Spindle	3
209985	Air Gauge (min.)	4
209986	Air Gauge (max.)	5
255066	Clamp	6
256701	Adapter	7
256994	Punch	8
256995	Torque Adapter	9
256997	Torque Adapter	10

Part Number	Nomenclature	Item Number
256999	Torque Adapter	11
257000	Ring, Comp	12
257001	Ring, Comp	13
257002	Torque Adapter	14
257003	Torque Adapter	15
890854	Holding Fixture	16
802943	Spline Tool	17
843051	Seat retainer driver	18
843052	Adjustment cap driver	19
843095	Relief valve port test plug	20
843096	Inlet port test fitting	21
871981	Adjustable Holding Fixture	22

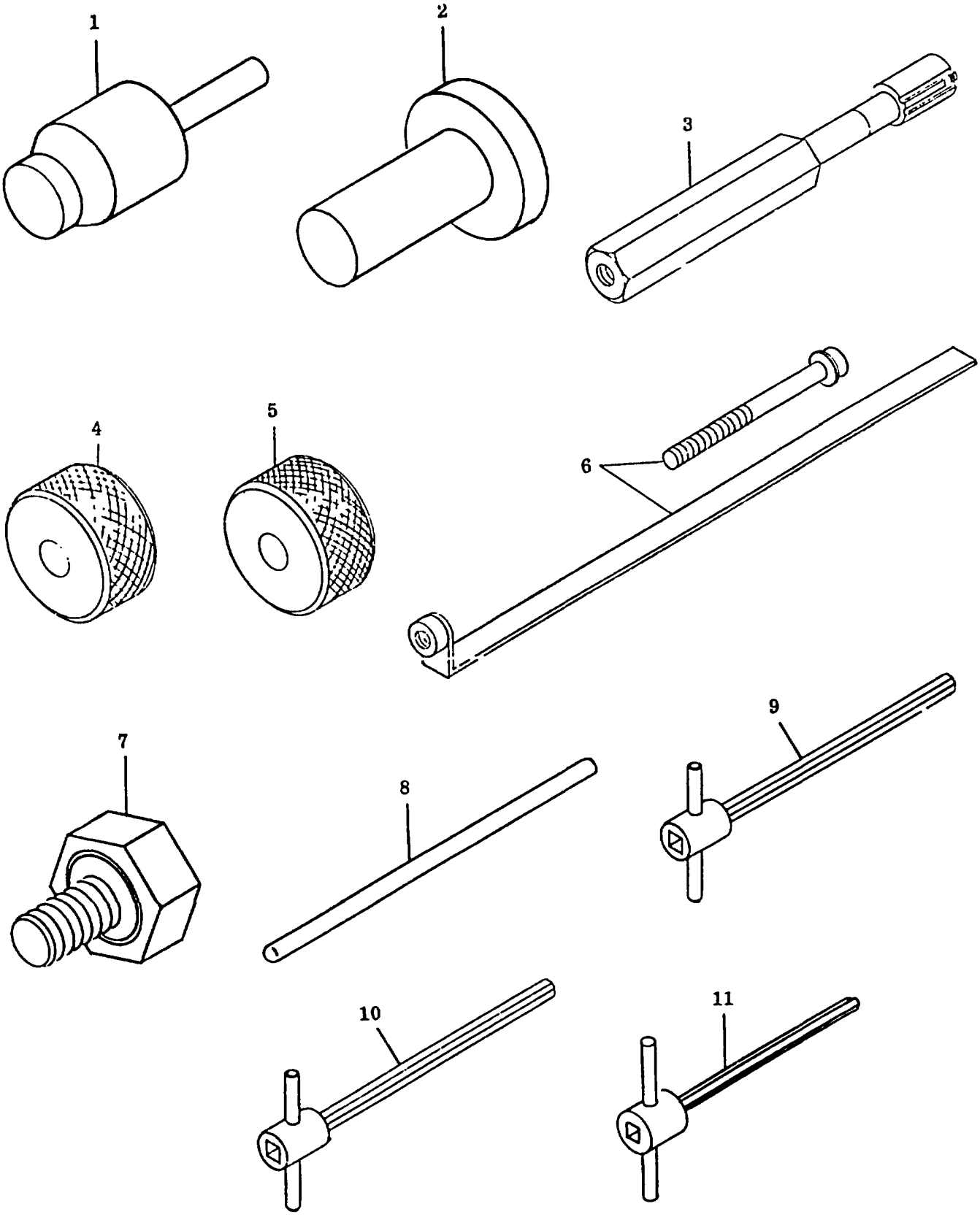


Figure 7-1. Illustrated Special Tools

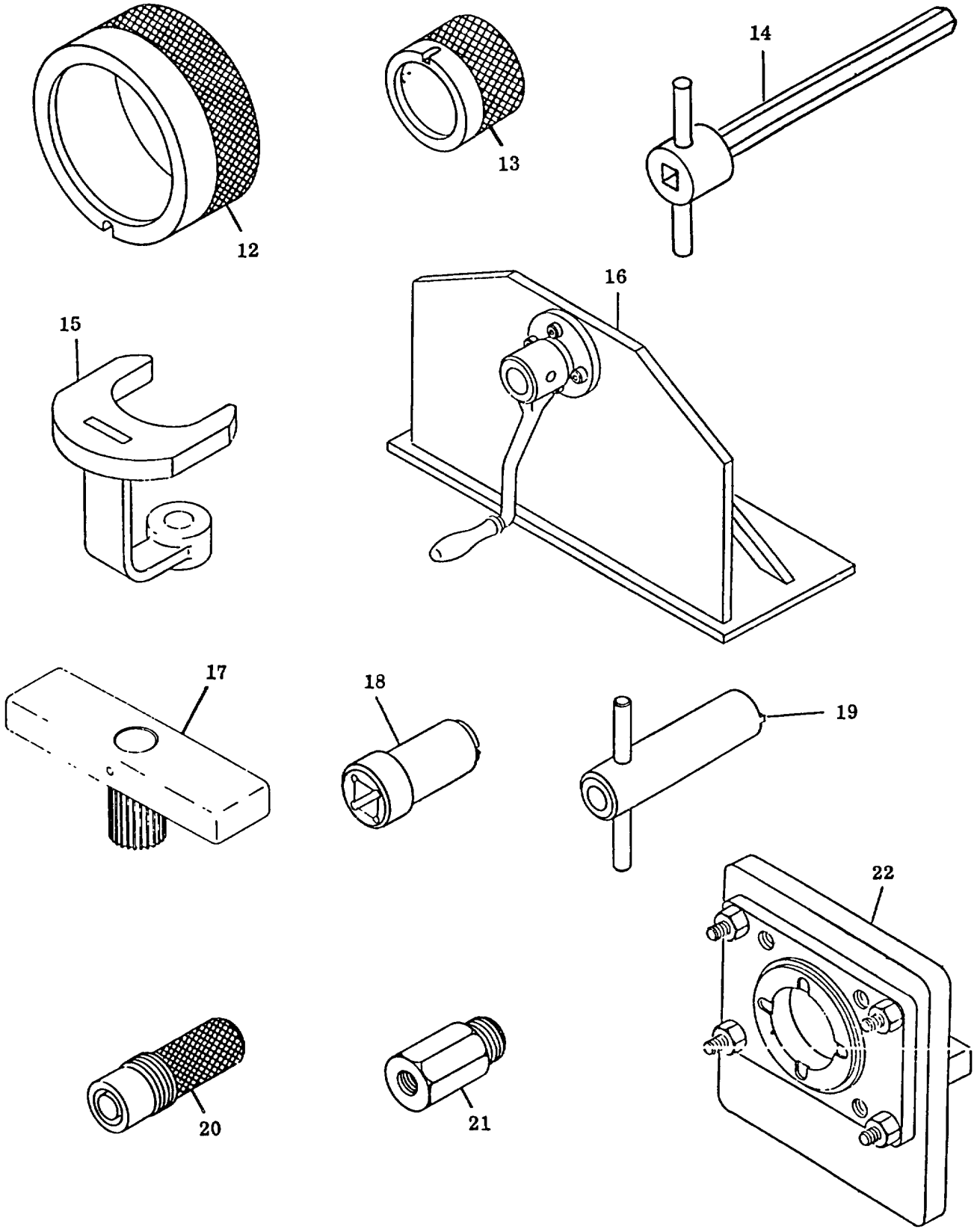


Figure 7-1. Illustrated Special Tools (Cont)

APPENDIX A

REFERENCES

TM 9-2350-230-12	Operator and Organizational Maintenance Manual. Armored Reconnaissance Airborne Assault Vehicle, Full Tracked, 152-MM, M551, FSN 2350-873-5408.

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