TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT

AND GENERAL SUPPORT MAINTENANCE MANUAL

INCLUDING REPAIR PARTS INFORMATION

AND SUPPLEMENTAL

OPERATING, MAINTENANCE AND REPAIR

PARTS INSTRUCTIONS

HEATER, HOT OIL, TRAILER MOUNTED

MODEL 200 STM 77

NSN 3895-01-063-7892

HEADQUARTERS,DEPARTMENT OF THE ARMY

SEPTEMBER 1981

WARNING

ELECTRICAL SHOCK CAN CAUSE SERIOUS INJURY OR DEATH.
Electrical Power Supply 3PH/60HZ/230V.
Control Power Supply 1PH/60HZ/115Volt

Before electric cable is connected, make certain that earth ground rods are in place and ground cables are connected to hot oil heater, front and rear.
Turn off all switches-itches before power is connected
Do not service any electrical equipment while under load
Do not perform Maintenance on control box until external power supply has been disconnected.

WARNING

Do not operate hot oil heater in an enclosed area unless exhaust gases are piped outside. Inhalation of exhaust fumes can cause serious illness or death.

Use gloves if operation of hot oil heater: High operating temperature could cause serious burns. Stand clear of vent pipe during operation of hot oil heater as internal pressures may, cause minor eruptions of fluid may spray the immediate area.

CHANGE

NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., *26 May 1993*

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT
AND GENERAL SUPPORT MAINTENANCE MANUAL
INCLUDING REPAIR PARTS INFORMATION AND
SUPPLEMENTAL OPERATING, MAINTENANCE
AND REPAIR PARTS INSTRUCTIONS

HEATER, HOT OIIL, TRAIILER MOUNTED
MODEL 200 STM 77
NSN 3895-01-063-7892

Current as of 19 February 1993

TM 5-3895-354-14&P dated 15 September 1981, is changed as follows:

1. Remove old pages and insert new pages.

2. New or changed material is indicated by an asterisk or by a vertical bar in the margin of the page.

Remove Pages	**Insert Pages**
5 and 6 (RPSTL Table of Contents)	4.1 and 4.2
5-1 thru Figure 7	5-1 thru Figure 7
8-1 and Figure 9	8-1 and Figure 9
11-1 thru Figure 15	11-1 thru Figure 15
16-1 thru Figure 18	16-1 thru Figure 18
9-1 and Figure 20	19-1 and Figure 20
21-1 thru Figure 24	21-1 thru Figure 24
26-1 thru Figure 28	26-1 thru Figure 28
30-1 thru Figure 32	30-1 thru Figure 32
34-1 and Figure 35	34-1 and Figure 35
36-1 thru Figure 38	36-1 thru Figure 38
I-1 thru 164	I-1 thru 164

3. File this change sheet in front of the publication for reference purposes.

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By Order of the Secretary of the Army:

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General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
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CHANGE
NO.1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D.C., 22 March, 1991

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT
AND GENERAL SUPPORT MAINTENANCE MANUAL
INCLUDING REPAIR PARTS INFORMATION AND
SUPPLEMENTAL OPERATING, MAINTENANCE
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HEATER, HOT OIL, TRAILER MOUNTED
MODEL 200 STM 77
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3 and 4	3 thru 6
121 thru 164	121-125
NONE	FIGURE 1 THRU 1-22
NONE	AND 164

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TECHNICAL MANUAL

No. 53895354-14&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *15 September 1981*

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS INFORMATION AND SUPPLEMENTAL OPERATING MAINTENANCE AND REPAIR PARTS INSTRUCTIONS

HEATER, HOT OIL, TRAILER MOUNTED
2, 100, 000 BTU/HR OUTPUT
Model 200 STM 77
NSN 3895-01-063-7892

REPORTING OF ERRORS

You can improve this manual by recommending improvements using I)A Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 located in the back of this manual and mail the form direct to Commander, US Army Tank-Automotive Command, ATTN: DRSTA-MBS, Warren, MI 48090. A reply will be furnished direct to you.

This technical manual is an authentication of the manufacturer's commercial literature and does not conform with the format and content specified in AR 310-3, Military Publications. This technical manual does, however, contain available information that is essential to the operation and maintenance of the equipment.

PART I

OPERATION MAINTENANCE

AND REPAIR PARTS

FOR

HEATER, HOT OIL
TRAILER MOUNIED

MODEL 200 STM 77

SAFETY PRECAUTIONS

BEFORE OPERATION

Lift and tie down mounted hot oil heater by trailer lifting and tie down attachments only

Do not use a lifting device with a capacity of less than 10, 000 pounds to lift the trailer mounted hot oil heater Do not allow the unit to swing or sway while suspended Failure to observe this warning may result in serious injury or death to personnel

Do not operate the hot oil heater unless the operating Instructions have been thoroughly read and understood.

Do not operate the hot oil heater until it has been grounded. Electrical faults In the power source, load lines, or In the burner and electrical system can cause death by electrocution with an ungrounded system.

DURING OPERATION

Use gloves for operation as the high operating temperature of the hot oil heater could cause serious burns.

Stand clear of vent pipe on the hot oil heater during operation as internal pressures may cause minor eruptions of hot fluid which may spray the immediate vicinity

Do not perform any service or maintenance of any kind on the hot oil heater or Its electrical system or components during operation, as high operating temperatures and high voltages could cause serious injury or death to personnel

Do not disconnect any couplings, piping, or hoses when asphalt or heat transfer oil temperature is higher than ambient temperatures, as serious burns could result from spilled or sprayed liquids.

Stop the hot oil heater immediately if heat transfer oil exceeds 475 F o as buildup of Internal pressures from this point could cause an explosion resulting in serious or fatal injury to personnel and damage to the equipment

AFTER OPERATION

Do not disconnect any couplings, piping, or hoses when asphalt or heat transfer oil temperature is higher than ambient temperature as serious burns could result from spilled or sprayed liquids

Do not perform maintenance or service to the hot oil heater’s electrical system until the external electrical power service cable has been disconnected

Allow for sufficient cooling after operation before performing service or maintenance on the hot oil heater as serious injury from second and third degree burns could result

Lift and tie down mounted hot oil heater by trailer lifting and tiedown attachments only

Do not use a lifting device with a capacity of less than 10, 000 pounds to lift the trailer mounted hot oil heater Do not allow the unit to swing or sway while suspended Failure to observe this warning may result in serious Injury or death to personnel and damage to equipment

STORAGE DATA

A. Storage of New Volcanic Model 200STM77 Hot Oil Heater

1 The hot oil heater is ready for storage as shipped.

B. Storage of a Used Hot Oil Heater

1. Inspect all equipment on the hot oil heater for damage, rust or other unusual conditions.

2. Clean and dry the hot oil heater by an approved method.

3. Paint all surfaces where the paint is missing by wear or other damage.

4. Pack the tool box with the following.
   a. Four 8 foot, 2 inch flexible hoses
   b. Two ground rods with flexible ground wire (disassembled)
   c. Four 2" steel unions
   d Power adapter cable
   e. Intervehicular cable (12 Volt)
   f Intervehicular cable (24 Volt)

5. Pack the hose box with two 50 foot fuel hoses, drain and roll before packing

6 Install plugs In supply and return line openings.

7. Install plug In fill line.

8. Close all valves except valve to the expansion tank.

9. Cap vent line.

10. Drain fuel pump and fill with P-10 preservative oil; install plugs in fuel line.

11. Tighten fasteners on electrical control panel.

12. Tighten fasteners on nose box.

13. Drain air tank of possible contaminants. Tighten drain cock.

HEATER, HOT OIL, TRAILER MOUNTED
2, 100, 000 BTU/HR RATED OUTPUT
VOLCANIC HEATER INC., MODEL 200STM77

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LIST OF ILLUSTRATIONS CONTINUED

HOT OIL HEATER
CHAPTER 1
INTRODUCTION

Section A. GENERAL

1. Scope

a. These Instructions are published for the use of the personnel to whom the Volcanic Hot Oil Heater, Model 200STM77, is issued. Chapters 1 through 5 provide information on the operation, maintenance of the equipment, accessories, components and attachments This manual provides descriptions of the main units and their functions in relationship to other components.

b. This manual covers only the Volcanic Model 200STM77 Hot Oil Heater.

2. Theory of Operation

a. The Volcanic Model 200STM77 Hot Oil Heater is designed to handle heat transfer liquid. Its coil design permits full control over temperature and flow of heat transfer liquid to external users.

b. Outlet fluid temperature is controlled by an Indicating temperature control which has its capillary element mounted in a well in the heater outlet header pipe. This instrument is set for on-off operation.

c. A high temperature limit control also has Its element Installed in the heater outlet header pipe When this limit control is activated, It will shut down the burner.

d. A low level control Is mounted in the rear of the expansion tank. The liquid fluid level must be above this float control for operation of Hot Oil Heater

e. A pressuretrol is Installed with piping connections to the heater outlet header pipe This switch insures that the pump pressure is adequate during operation and that the liquid is flowing through the heater coil

f. The flame program control provides for automatic Ignition, firing operation, and flame failure alarm of the Hot Oil Heater burner In conjunction with the limits, operating controls and interlocking devices, the flame program control programs the burner-blower motor, Ignition transformer, and the fuel valves.

g. The circulating pump provides the capacity and pressure to circulate the heat transfer liquid through the heater coil and external user. The circulating pump motor is activated by push buttons In the starter cover plate. This pump must be started before the firing sequence can begin.

h. The burner provides the flame to heat the oil. It is activated by the burner switch, which when in the "on" position, completes the limit circuit. When all limits are in the "closed" or operating position, the flame program control will activate for automatic firing sequence.

i. An ultraviolet (UV) scanner monitors the flame at all times during the firing cycle. If a loss of flame occurs, fuel valves will close within 2 to 4 seconds and flame program control will go into alarm condition. Reset must be pushed to reactivate control.

j. General. The hot oil heater operates in conjunction with several other units to accomplish its purpose, which is to supply heat for the heating of liquids. It requires an external power source and external fuel supply. Using the liquid transfer hoses, a closed circulating system must be set up between the hot oil heater and the external system requiring heat to carry the heated transfer oil to the external system and return it to the hot oil heater for reheating. The hot oil heater should be installed and operated on a level site and with adequate ventilation.

Section B. DESCRIPTION AND DATA

3. Description

The Volcanic Model 200STM77 Hot Oil Heater (Fig. 1 & 2) is a mobile, heavy duty, high output heater, consisting of the heater unit complete and mounted on a trailer. It normally is used with two asphalt meters operating in parallel or with a heavy duty asphalt plant, and is designed to heat transfer oil and pump this oil to the external systems requiring heat. External electrical power and fuel must be provided for its operation. Power supply should be 15 Kilowatt, 3 Phase, 60 Hertz, 230 Volts capacity.

4. Identification and Tabulated Data

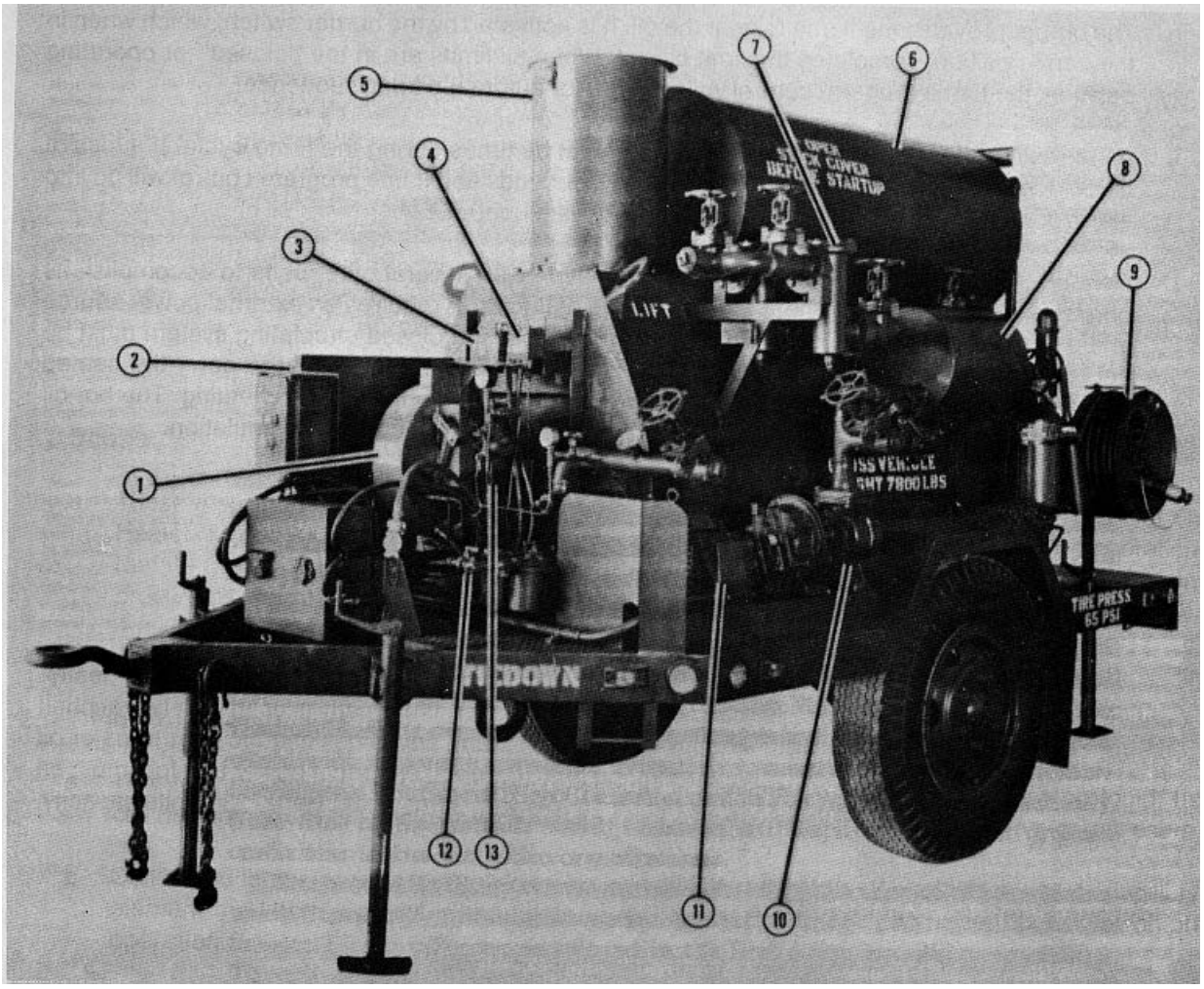
a. Identification. The hot oil heater has six identification plates:

(1) U. S. Army - Located on the hull of the hot oil heater on the left front side. Specifies the nomenclature, serial number, serial number range, manufacturer, model and contract number, and dimensions.

(2) Transportation Date Plate - Located on the hull of the hot oil heater on the left front side. Indicates location and capacity of lifting and tiedown attachments on the hot oil heater.

(3) Burner Plate - Located on the front of the burner. Specifies the manufacturer, size, type, serial number, motor and control amperage, and firing rate.

(4) Circulating Pump Plate - Located on the circulating pump housing. Specifies manufacturer, serial number, figure number, type and ratio number.

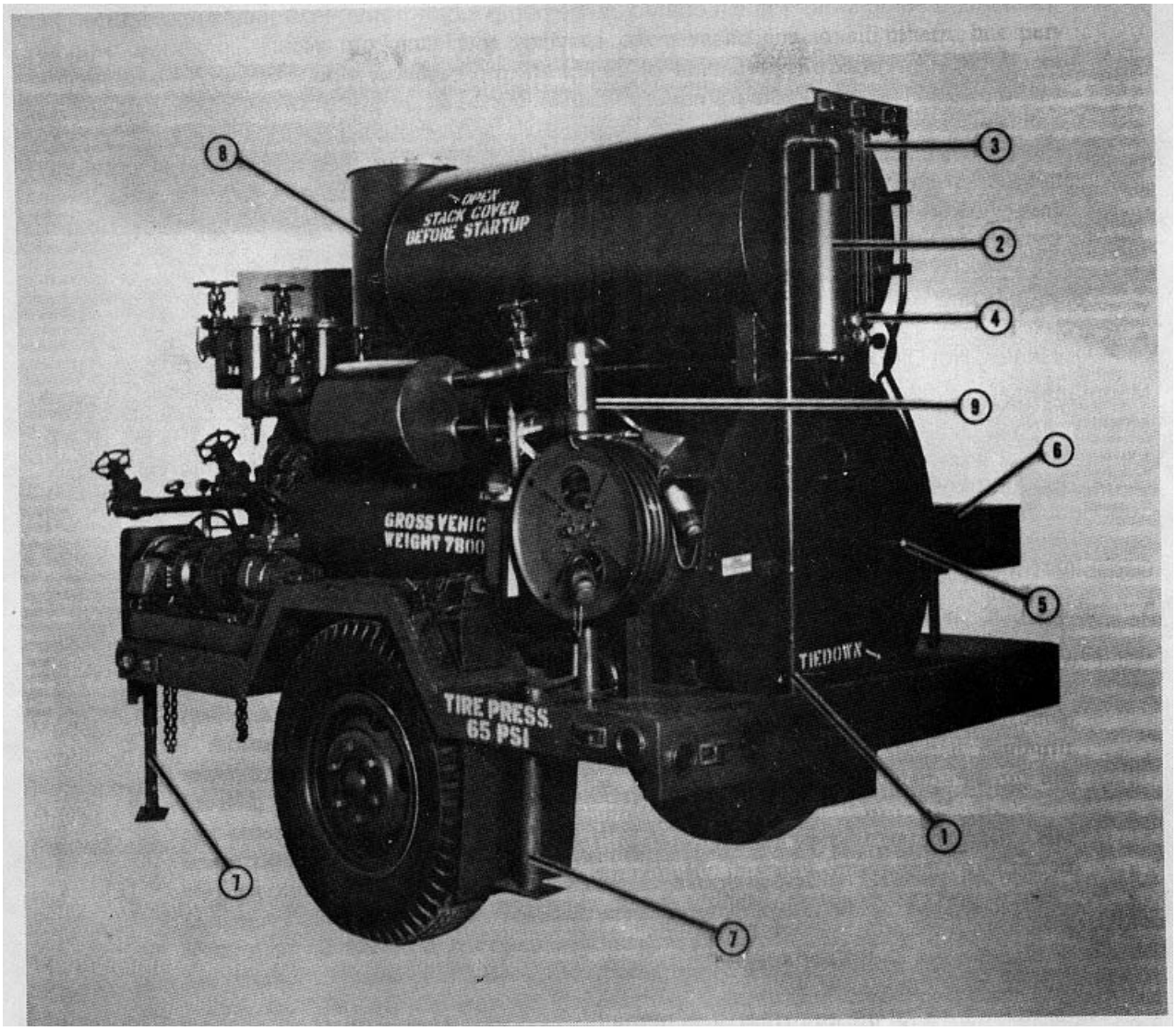


SHIPPING DIMENSIONS
165" LONG
102" HIGH
80" WIDE
780 CUBIC FEET
7800 LBS.

LEGEND FOR FIGURE 1

1. BURNER
2. CONTROL BOX
3. HIGH TEMPERATURE
4. PRESSURETROL
5 EXHAUSE STACK
6 OIL RESEVOIR & EXPANSION TANK
7 DUAL STRAINERS
8 SURGE TANK
9 CABLE REEL & 100 FT CABLE
10 CIRCULATING PUMP
11 MOTOR
12 FUEL OIL SUPPLY CONNECTION
13 FUEL OIL RETURN CONNECTION

Figure 1. HOT OIL HEATER, LEFT FRONT THREE-QUARTER VIEW WITH SHIPPING DIMENSIONS.



LEGEND FOR FIGURE 2

1. VENT PIPE
2. COLD SEAL TANK
3. SIGHT GAUGE
4. LOW LEVEL CONTROL
5. FLAME VIEW SIGHT
6. HOSE CONTAINER
7. LOAD JACKS
8. EXHAUST STACK
   HOT OIL RELIEF VALVE

Figure 2. HOT OIL HEATER, LEFT REAR, THREE-QUARTER VIEW

(5) Circulating Pump Motor Plate. Located on the pump motor frame Specifies manufacturer, l.D model number, horsepower, phase, voltage, cycles, revolutions per minute, amperage, heat rise in centigrade, service factor, type of design, frame number, type, code and bearing parts numbers and connecting diagrams

(6) Blower Motor Plate. Located on the blower motor frame. Specifies manufacturer, catalogue number, frame type, voltage, spec. number, series number, phase, insulation class, code, horsepower, amperage, service factor, revolutions per minute, cycles, operating heat range in centigrade and connecting diagram. b.

b. Tabulated Data

(1) Heater, Hot Oil

Manufacturer ..... Volcanic Heater, Inc.82370
Model 200STM77
Type ..... oil-fired, electric driven, trailer
Power Requirement ..... 15 Kilowatts, 3 Ph., 60 Hertz 230 Volt
Fuel Requirement ..... 16-25 Gallons per Hour
Surge Tank and Expansion Tank
Capacity (Transfer Oil) ..... 240 Gallons
Hot Oil Heater Output ..... 2, 100, 000 British Thermal Units per Hour *(BTU*/H*R.)*
Hot Oil Heater Operating Temperature 4500F
Hot Oil Heater Maximum Temperature ..... 475°F
Hot Oil Heater Fuel Pump Output ..... 30 GPM
Circulating Pump Output ..... 113 8 GPM (gallon3 per min)
Blower Output ..... .900 CFM (cubic feet per min)
Fuel Strainer Output ..... 100 GPM
Hot Oil Strainer Output ..... 180 GPM
Hot Oil Heater Travel Speeds:
Highways ..... up to 35 miles per hour
Cross Country ..... up to 10 miles per hour
Hot Oil Heater Ground Clearance ..... 16 inches
Air Hydraulic Brake Schematic
Refer to Figure 3 for the air hydraulic schematic
Trailer Wiring Diagram
Refer to Figure 4 for the clearance lights and trailer practical wiring diagram
Hot Oil Heater Wiring Diagram
Refer to Figure 5 for the hot oil heater practical wiring ..... diagram

(2) Burner

Manufacturer & Code No	Power-Flame Div., Inc30069
	A Subsidiary of Combustion
	Equipment Assoc., Parsons, Ks.
Model	CR2-OB
Type	Oil Fired, Electric Ignition
Air Requirement	900 CFM (cubic feet per minute)
Ignition Requirement	10, 000 volts A.C.

(3) Circulating Pump

Manufacturer & Code No	Roper Pump Co.58923
	Commerce, GA
Model	3622GH BF
Type	Positive Displacement
Horsepower	5.5 BHP
Drive	Direct coupling to electric motor
Operating Speed	545 RPM (revolutions per minute)
Operating Pressure	55 psi (pounds per sq. in.)

(4) Circulating Pump Motor

Manufacturer & Code No.	Reliance Electric Co.50380
	Cleveland, OH
Model	TEFC
Type	Induction
Horsepower	7.5
Drive	Electric 1750 RPM
Power Requirement	230/460 V., 3 Phase, 60 Cycle

(5) Fuel Pump

Manufacturer & Code No	Webster Electric Co.64294
	Racine, WI
Model	22R221D
Type	Two stage gear
Drive	3450 RPM
Operating Pressure	300 psi
Adjustment	Pressure Adjusting Screw

(6) Blower Motor

Manufacturer & Code No.	Baldor Electric Co.05472
	Fort Smith, AR
Model	VM3550
Type .	SC two pole, induction
Horsepower.	1.5
Drive	Electric 3450 RPM
Power Requirements	230/460 V., 3 Phase, 60 Cycle

(7) Program Controller

Manufacturer & Code No ..... Electronics Corp. 99680
..... of America, Cambridge, MA

Model UVM-2A-30
Operating Sequence ..... Preselected and Preset
Type ..... UV-Solid State
Accessory Requirement ..... Rectifying UV Detector
Power Requirement ..... 110 volt, 60 cycle, 1 phase

(8) Fuses

Manufacturer & Code No ..... Bussman Mfg. Co., 71400
Div. of McGraw Edison
..... St. Louis, MO
Model XP-55
Rating ..... 6 Amps (amperes)

(9) Scanner

Manufacturer & Code No ..... Electronics Corp. 99680
of America, Cambridge, MA
Model UV-1A3

(10) Low Fluid Level Cutoff

Manufacturer & Code No ..... McDonnell-Miller, ITT 39305
Chicago, IL
Model 69
Type ..... AC
Power Requirement ..... 110 volt, 60 cycle, 1 phase

(11) Temperature Controller

Manufacturer & Code No ..... Partlow Corp. 45809
New Hartford, NY
Model MF-27
Type ..... AC
Power Requirements ..... 110 volt, 60 cycle, 1 phase

(12) Pressuretrol

Manufacturer & Code No ..... Allen-Bradley 01121
..... Milwaukee, WI
Model 836T-T252J
Type ..... AC, NEMA IV

(13) Temperature Gauges

Manufacturer & Code No ..... Dresser Industries 38056
Stratford, CT
Model 20-6360BHT-04R-025
Model 30-6360BHT-04R-025
Range ..... 50-550°F

(14) Pressure Gauge, Fuel

Manufacturer & Code No.....Marsh Instrument Co 81966
Skokie, IL
Model J7164

(15) Liquid Level Sight Gauge

Manufacturer & Code No.....Essex Brass Corp. 20969
Detroit, MI
Model No. 9S

(16) Circulating Pump Motor Starter

Manufacturer & Code No.....Furnas Electric Co. 23826
Batavia, IL
Model 14DF33FAA
Primary Voltage .....230 Volts, 60 cycles, 3 phase

(17) Ignition Transformer

Manufacturer & Code No .....Webster Electric Co. 64294
Racine, WI
Model 31 2-25AB0418
Power Requirement.....1.10 Volts, 60 Cycles, 1 phase
Type .....Ignition
Operating Voltages:
Primary .....110 Volts
Secondary .....10, 000 Volts

(18) Blower Motor Starter

Manufacturer & Code No .....Furnas Electric Co. 23826
Batavia, IL
Model 14BF32AAA

(19) High Temperature Limit

Manufacturer & Code No.....Partlow, Inc. 45809
New Hartford, NY
Model 02
Power Requirement.....110 Volt, 60 cycle, 1 phase

(20) Burner Oil Valves (3)

Manufacturer & Code No.....General Controls ITT 82086
Burbank, CA
Model S311 AM02V2AC9
Manufacturer & Code No.....General Controls ITT 82086
Burbank, CA
Model 3-way Solenoid S313AM02V2AV1

(21) Pump Switch

Manufacturer & Code No ..... Furnas Electric Co 23826
Batavia, IL
Model ..... 50D54688-1 Start-Stop
Pushbutton Adapter Kit with
two 50D54688F Pushbuttons

(22) Burner Switch

Manufacturer & Code No ..... Furnas Electric Co. 23826
Batavia, IL
Model ..... BKSIA-BJK
Selector Operator-Contact Block

23) Control Transformer

Manufacturer & Code No ..... General Electric Co. 24446
Schenectady, NY
Rating ..... 375 VA
Primary Voltage 230 Volt, 60 cycle, 1 phase

(24) Liquid Transfer Hose

Manufacturer & Code No ..... Pennflex, Inc. 77218
Frazer, PA
Model MIL-H-18160
Diameter ..... 2 inches, inside diameter
Length ..... 8 feet
Number 4

(25) Fuel Oil Strainer

Manufacturer & Code No ..... General Filters, Inc. 72692
Novi, MI
Model of Fuel Oil Strainer 2A-700A
Model of Filter Element 2A-710
Number 2

(26) Hot Fluid Strainer

Manufacturer & Code No ..... Volcanic Heater, Inc. 82370
Alliance, OH
Model of Hot Fluid Strainer A-215
Model of Basket Strainer A-218
Number 2

(27 Tires (Trailer)

Manufacturer & Code No	Goodyear Tire 73842 Akron, OH
Size	900x20 SHM TT NV
Specification	12 Ply Rating
Tube Specification	AN77-12388 900x20

(28) Brakes (Trailer)

Manufacturer & Code No	Wagner Electric 63477 St. Louis, MO
Size	15" x 3
Model	LH-FF19577
Model	RH-FF19578

(29) Spring Assembly (Trailer)

Manufacturer & Code No	Prototype Development, Inc.22938 Cleveland, OH
Model	1642
Number	2
Capacity	12, 000 lb/pair

(30) Axle Assembly (Trailer)

Manufacturer & Code No	Prototype Development, Inc.22938 Cleveland, OH
Model	1-7394
Number	1
Capacity	12, 000bs.

(31) **Hub and Drum Assembly**

Manufacturer & Code No	Prototype Development, Inc.22938 Cleveland, OH
Mode	51-614
Number	2

(32) Wheel Bearings

Manufacturer & Code No	Timken Roller Bearing 60038 Canton, OH
Bearing - Outer	462
Bearing - Inner	3982
Number	2 ea.

(33) Circulating Pump Coupling

Manufacturer & Code No	Lovejoy Haseg Corp.75665 Downers Grove, IL
Model	AL-100

Section C. NORMAL INSTRUMENT READING AND GAUGES

5. Instruments and Readings

a. High temperature limit control - set at 4500F.

b. Fuel oil pressure gauge, 0-600 PSI range - normal reading 300 PSI

c. Pressuretrol - 0-75 PSI range - set at 15 PSI

d. Hot oil pressure gauge, 0-200 PSI range - normal reading 35 PSI

e. Hot oil temperature gauge - 50-550° F normal reading same as temperature control setting

f. Temperature control - 100-550°F set at required temperature

6. Gauges

There are five gauges mounted on the hot oil heater. Four gauges are used to indicate actual operating conditions. The fifth is used to indicate the liquid level of thermal oil in the hot oil heater. The hot oil temperature gauge and hot oil pressure gauge indicate actual operating pressure and temperature of the transfer oil. The cold seal tank temperature gauge Indicates the temperature of the cold seal tank. The fuel oil pressure gauge indicates the pressure of the fuel oil out of the fuel pump. The liquid level sight gauge indicates that the expansion tank is full or nearly full at a safe operating level or that the hot oil heater is approaching shut down because of insufficient heat transfer oil

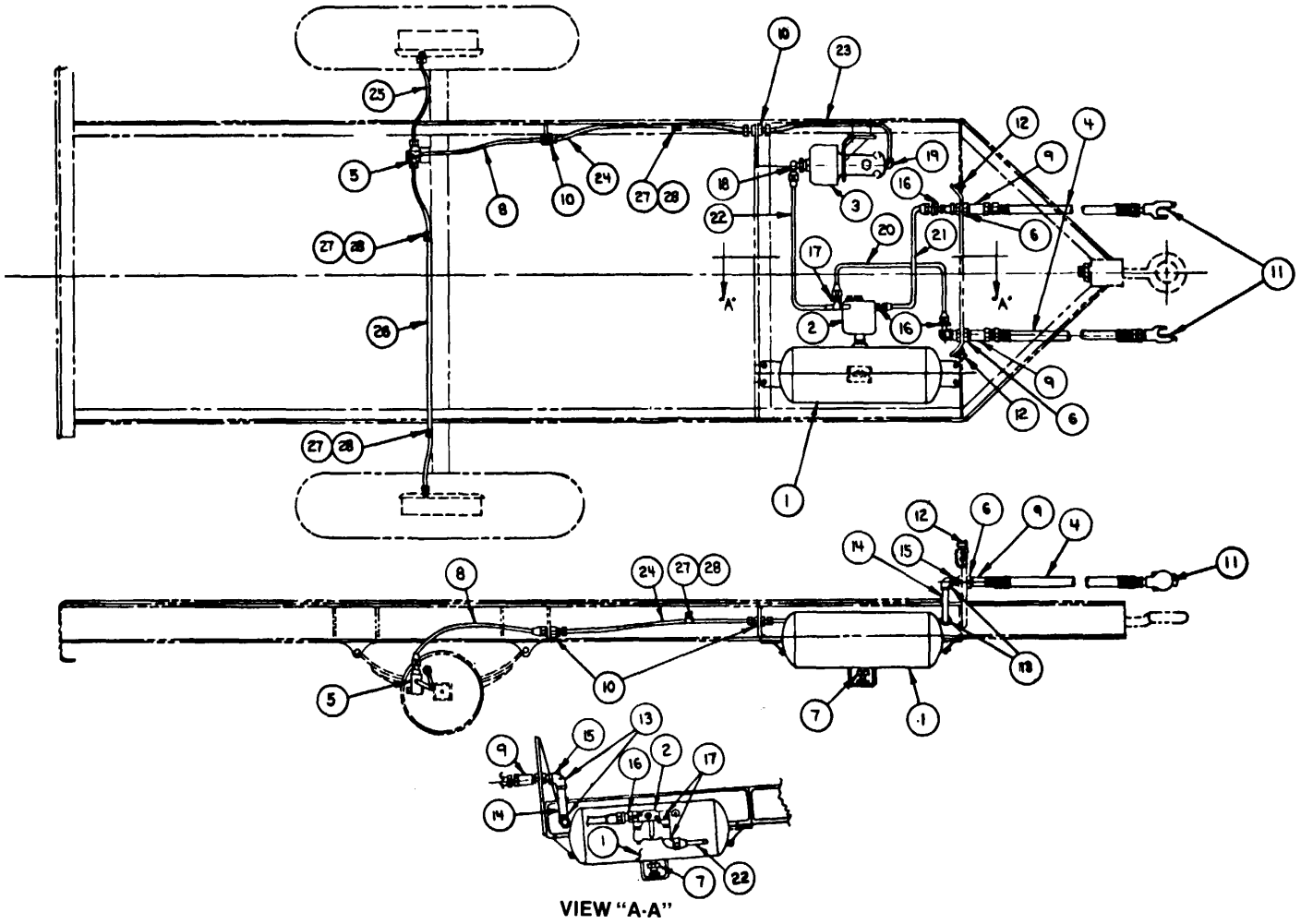
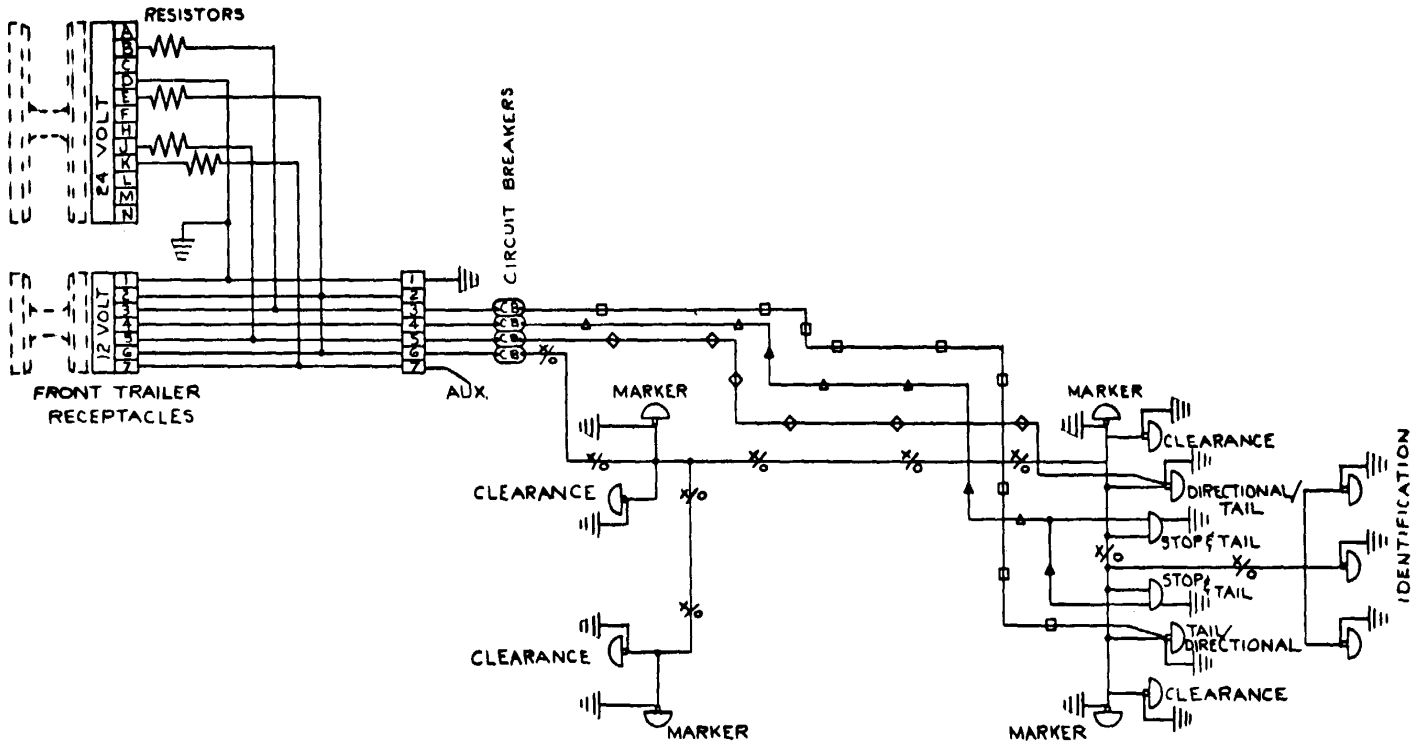


Figure 3. AIR-HYDRAULIC TRAILER

NOMENCLATURE FOR FIGURE 3

ITEM	NO REQ'D	DESCRIPTION
1	1	Air Tank
2	1	Relay
3	1	Power Cluster
4	2	Hose Assembly- 7'0" Lg.
5	1	Frame Tee
6	2	Thru Frame Connector
7	1	Shut Off Cock
8	1	Hose Assembly (1/4 " x 24" Lg.)
9	2	Pipe Coupling 1/2" NPT x 2" Lg. - 300#
10	2	Thru Frame Connector for /4 " Tubing
11	2	Hose Coupler (Glad Hand) 1-Service, 1-Emergency
12	2	Dummy Coupler for Glad Hand
13	4	Pipe Ell /4 ' NPT x 90°
14	2	Pipe Nipple 1/4 ' NPT x 6"
15	2	Pipe Nipple 1/4 'NPTx 11/2"
16	3	Male Connector 3/8" Tube to /4 " Pipe Thread
17	2	Male Elbow 3/8" Tube to 1/4 " Pipe Thread
18	1	Male Elbow 3/8" Tube to 1/2 Pipe Thread
19	1	Male Elbow 1/4" Tube to 1/8" - NPT
20	1	Tubing 3/8" O.D. x 30" Lg. W/Female Fitting Each End
21	1	Copper Tubing 3/8" O.D. x 22" Lg. W/Female Fitting Each End
22	1	Tubing 3/8' O.D. x 24" Lg. W/Female Fitting Each End
23	1	Steel Tubing /4 O.D. x 24" Lg. W/Female Fitting Each End
24	1	Tubing 1/4 O.D. x 30' Lg. W/Female Fitting Each End
25	1	Tubing , /4 O.D. x 15" Lg. W/Female Fitting Each End
26	1	Tubing 14% " O.D. x 48" Lg. W/Female Fitting Each End
27	3	Tube Clamp /4 "
28	3	Self Tapping Screw #6 x 3/8" Pan Head



CONDUCTOR NO.	COLOR	KEY	LAMP & SIGNAL CIRCUITS
1	WHITE	—⋙	GROUND RETURN TO TOWING VEHICLE
2	BLACK	X	CLEARANCE, SIDE MARKER & IDENTIFICATION LAMPS
3	YELLOW	□	LEFTHAND TURN & HAZARD SIGNAL
4	RED	△	STOP LAMP
5	GREEN	◇	RIGHTHAND TURN & HAZARD SIGNAL
6	BROWN	○	TAIL, CLEARANCE & SIDE MARKER LAMPS
7	BLUE	AUX.	AUXILIARY

Figure 4. TRAILER WIRING DIAGRAM, 12 & 24 VOLT

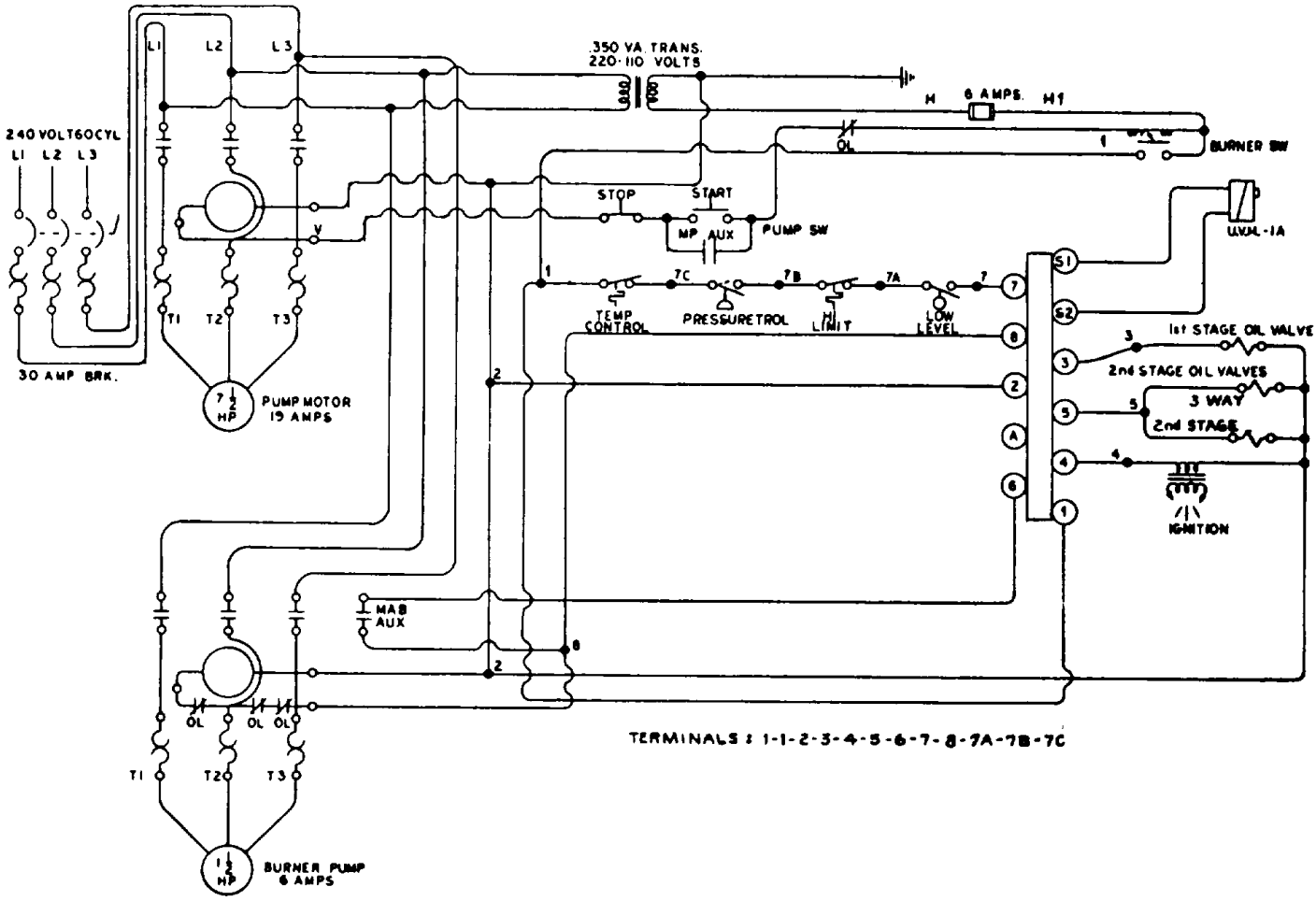


Figure 5. HOT OIL HEATER WIRING DIAGRAM, 230 VOLT

CHAPTER 2
OPERATION
Section A. SERVICE UPON RECEIPT OF EQUIPMENT

7. Unloading the Equipment

a. Shipment by Tractor. When the hot oil heater is received by tractor, tow it to its destination.

b. Shipment by Rail.

1. Blocking and tiedown removal. The operator and organizational maintenance personnel will remove tiedown cables, strapping, blocking, cribbing, and other items used for securing the equipment during rail shipment.

2. Ramp Unloading Block the flatcar wheels and construct a suitable ramp at the end of the railway flatcar. Connect a towing vehicle to the trailer, raise the swivel load jacks (Fig 2) and tow the hot oil heater from the flatcar.

CAUTION: BE SURE HOT OIL HEATER HAS SUFFICIENT CLEARANCE BEFORE UNLOADING

c. Lifting Hot Oil Heater. Refer to Figure 6 and remove the hot oil heater from the flatcar.

WARNING: LIFT AND TIEDOWN MOUNTED HOT OIL HEATER BY TRAILER LIFTING AND TIEDOWN ATTACHMENTS ONLY.

WARNING: DO NOT USE A LIFTING DEVICE WITH A CAPACITY OF LESS THAN 10, 000 POUNDS TO LIFT THE TRAILER MOUNTED HOT OIL HEATER. DO NOT ALLOW THE UNIT TO SWING OR SWAY WHILE SUSPENDED. FAILURE TO OBSERVE THIS WARNING MAY RESULT IN INJURY OR DEATH TO PERSONNEL

8. Unpacking the Equipment

a. Unpacking. The hot oil heater is shipped with protective material and devices.

b. Removal of Protective Material and Devices. Remove bands from the tool box, hose carrier, electrical control box, fire extinguisher, and cable reel. Open electrical control panel and remove desiccant packages; close box. Remove cap from bottom of the vent pipe. Remove wire from stack hinge. Remove tape from liquid level gauge, brake hose assemblies, and 100 foot cable.

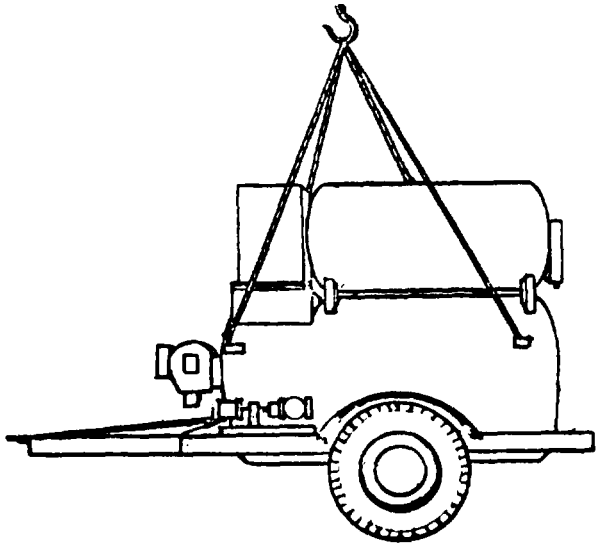


Figure 6. TRAILER UNLOADING BY CRANE

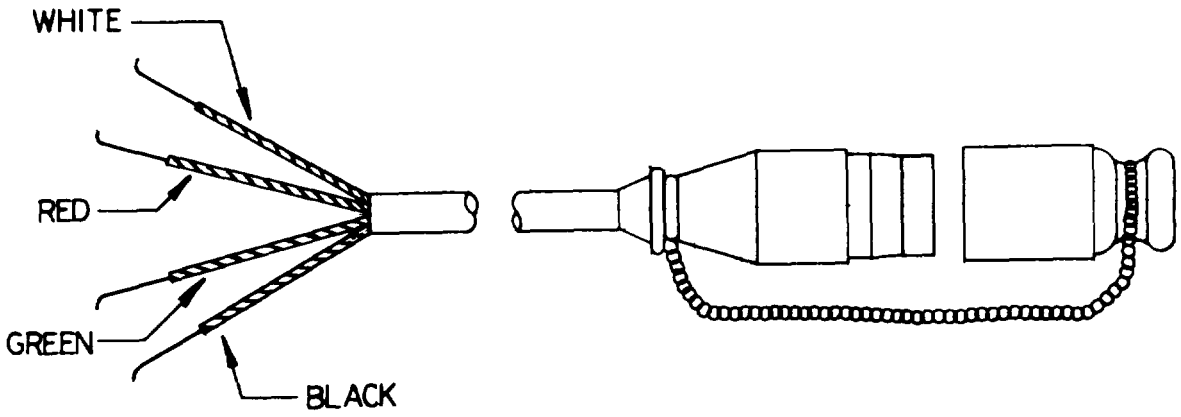


Figure 7. POWER CABLE ADAPTER ASSEMBLY, 230 VOLT.

NOTE: Power cable adapter is to be connected to electrical power supply source. This cable then connects to 100' power cable which adapts to power receptacle on hot fluid heater electrical panel.

9. Inspecting and Servicing the Equipment

a. Inspection.

1. Prepare the hot oil heater for inspection and operation.

2. Carefully inspect the hot oil heater for missing parts and possible damage that may have occurred during shipment.

3. Inspect the hot oil pressure gauge, hot oil temperature gauge and liquid level sight gauge for broken glass or other damage.

4. Inspect all wiring and conduits for broken or damaged wiring or loose connections.

5. Inspect the fuel oil strainers, fuel oil lines, blower, blower motor and linkage for breakage, cracks or loose mountings.

6. Inspect the control box, ultraviolet (U.V.) cell and ignition transformer for possible damage.

7. Inspect the hot fluid strainer, strainer valves, hot fluid piping, circulating pump and motor for possible damage.

8. Inspect the relief valve, supply valve, fill valve, makeup valve and pump valve for possible damage and freedom of operation.

9. Correct the deficiencies noted or report the condition to direct support.

b. Servicing.

1. Lubricate the hot oil heater in accordance with the current lubricating order (Figure 16).

10. **Installation of Separately Packaged and Packed Components (Fig. 8)**

a. Power Cable Adapter Assembly. Cable. The power cable adapter is used to connect the hot oil heater to its source of electrical power, usually a generator set. Refer to Figure 7 and install as follows.

1. Install red, white and black wires to 3 Phase terminals on power source.

2. Install green wire to ground terminal.

3. Remove cover from power adapter assembly and hook up to 100 foot cable.

b. Steel Threaded Unions. The four steel unions are used to connect the four liquid transfer hosesto the external user and the hot fluid heater. Refer to Fig. 9 and install as required.

c. Grounding Rods. The grounding rods should be installed before the equipment is put into operation and should not be removed until the equipment is prepared for movement. Refer to Figure 10 and install the grounding rods.

d. 100 Foot Cable. The 100 foot cable is used to connect the electrical power source 3/60/230 Volt to the electrical connector on control panel of the hot oil heater. Refer to Fig. 1, Item 9 and Fig. 11, Item 3.

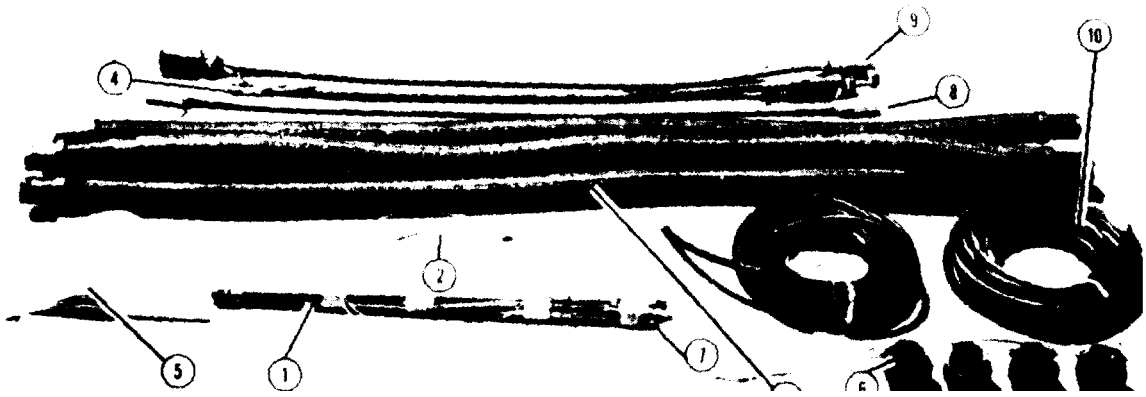


Figure 8. PACKED ITEMS, TOOL BOX.

1. **Ground Rods (disassembled)**
2. **Ground Cable**
3. **Liquid Transfer Hoses (4)**
4. **Power Adapter Cable Assembly**
5. **Instructions Manual**
6. **Unions 2" (4)**
7. **Ground *Rod* Cable Clamp**
8. **Intervehicular Harness (12 volt)**
9. **Intervehicular Harness (24 volt)**
10. **Fuel Hose 50 ft. (2)**

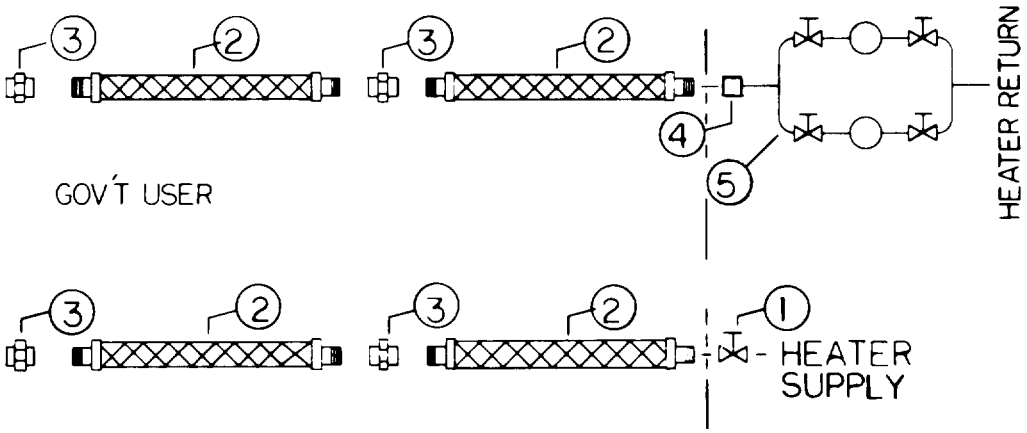


Figure 9. ASSEMBLY OF HEAT TRANSFER HOSE & UNIONS, HOT OIL HEATER TO GOVERNMENT USER.

1. **Supply Valve A**
2. **2" Liquid Transfer Hose (4)**
3. **2" Steel Union (4)**
4. **2" Coupling**
5. **Hot Oil Strainer Assembly**

1. To connect hot oil heater to user, four liquid transfer hoses and four steel unions are required.

2. Install the four unions on the four heat transfer hoses, as shown in Figure 9.

3. Connect two heat transfer hoses together as shown in Figure 9.

4. Connect threaded end of one heat transfer hose to 2" coupling, hot oil heater return and threaded end of one heat transfer hose to supply valve A on hot oil heater. Refer to Figure 9.

5. Remove ½2 of steel union item 3 from each hot oil hose assembly and connect to user.

6. Attach unions together on both assemblies & tighten in place.

7. Check for leaks in unions & connecting points before putting hot oil heater in service.

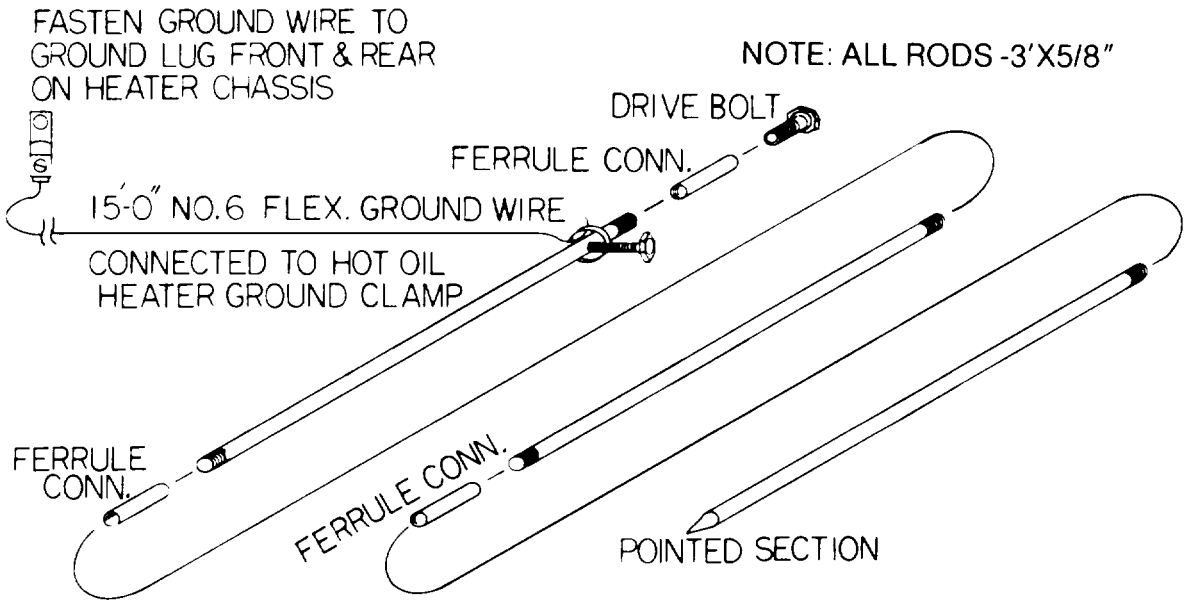


Figure 10. ASSEMBLY-GROUND RODS

1. Assemble the two ground rods as shown in Figure 10.

2. Connect ground wires (cable) to ground rods as shown in Figure 10.

3. Connect ground wires to ground lugs on heater one to the front of the heater (Ref. Fig. 11, Item 4) and one to the rear of the heater (Ref. Fig. 12).

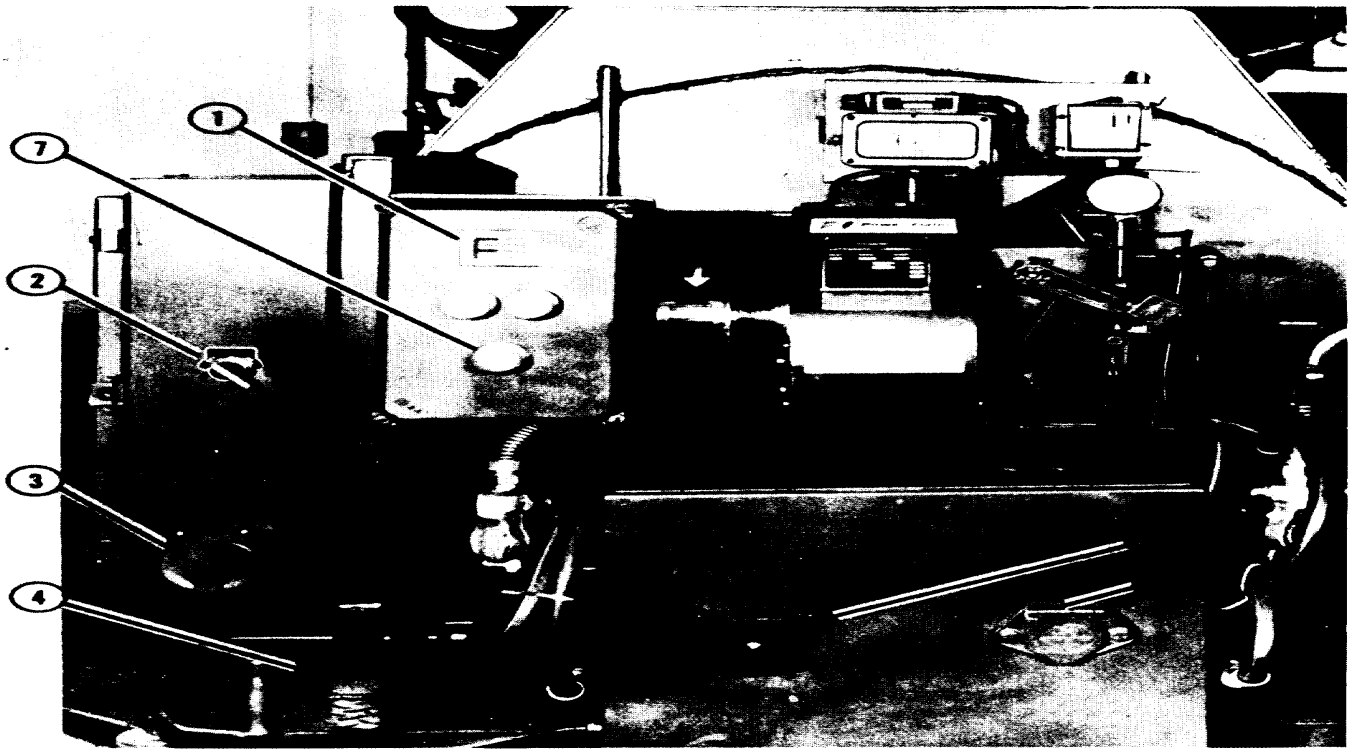


Figure 11. BURNER SWITCH AND CIRCULATING PUMP PUSHBUTTON, ELECTRICAL CONNECTIONS.

1. **Circulating Pump Starter**
2. **Burner Switch**
3. **External Power Plug-In Connection**
4. **Ground Cable Connection**
5. **24 Volt connection**
6. **12 Volt connection**
7. **Circulating Pump Starter Reset Button**

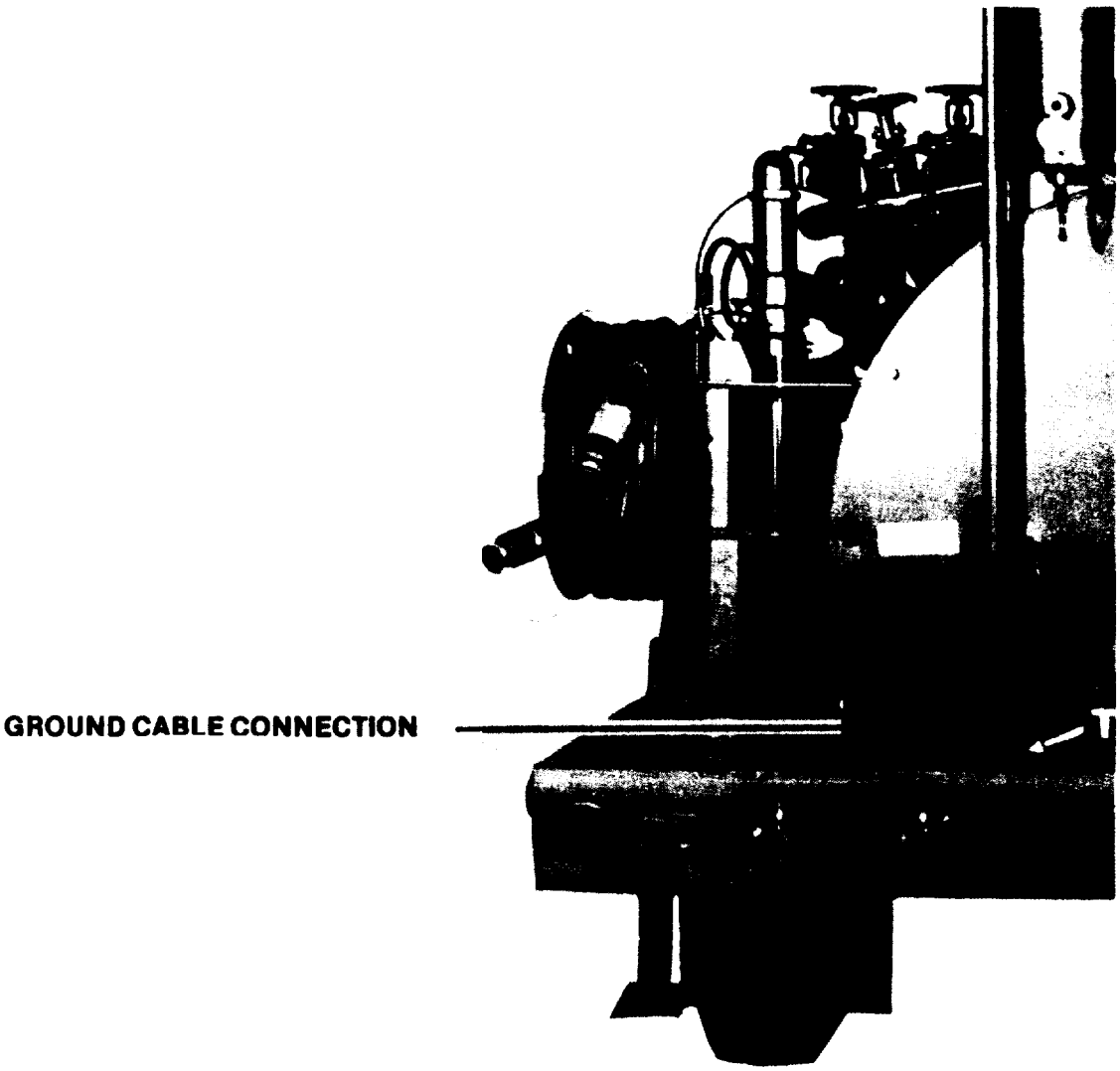


Figure 12. REAR GROUNDING CONNECTION.

e. Liquid Transfer Hoses The four liquid transfer hoses are used to connect the hot oil heater with the external system requiring heat. They can be used singly or linked together according to the individual application Two separate liquid transfer hose systems must be installed: one to carry the heated transfer oil to the external systems, and one to return the cooled oil to the hot oil heater for reheating Refer to Figure 9 and install the liquid transfer hoses.

11. Preparation for Operation.

WARNING: DO NOT OPERATE THE HOT OIL HEATER IN AN ENCLOSED AREA UNLESS THE EXHAUST GASES ARE PIPED TO THE OUTSIDE. INHALATION OF EXHAUST FUMES CAN RESULT IN SERIOUS ILLNESS OR DEATH.

WARNING: DO NOT OPERATE THE HOT OIL HEATER UNTIL IT HAS BEEN GROUNDED. ELECTRICAL FAULTS IN THE POWER SOURCE, LOAD LINES, OR THE BURNER AND ELECTRICAL SYSTEM CAN CAUSE DEATH BY ELECTROCUTION WITH AN UNGROUNDED SYSTEM.

a Install packaged components, ref Para 10

b. Open the exhaust stack rain cap, Fig. 1, Item 5. The rain cap should remain open during operation of the hot oil heater.

WARNING: DO NOT OPERATE THE HEATER WITH RAIN CAP CLOSED. OPERATION OF HEATER WITH RAIN CAP CLOSED COULD CAUSE A HAZARDOUS CONDITION.

c. Connect external fuel supply and return lines

1. Ref. Fig. 1, Item 12, and remove plug.

2. Connect (1) fuel hose (Fig 8, Item 10) to piping and fuel supply This is the supply line.

3. Refer to Fig. 1, Item 13 and remove plug.

4. Connect (1) fuel hose to piping and fuel supply. This is the return line.

Section B. OPERATION OF EQUIPMENT

12. General

a. The instructions In this section are published for the Information and guidance of the personnel responsible for the operation of the hot oil heater

b. The operator must know how to perform every operation of which the hot oil heater is capable. This section gives instructions of starting and stopping the hot oil heater, and how to perform the specific tasks for which the equipment is designed. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit the individual job.

13. Starting, Operating, and Stopping

a. Preparation for Starting.

1. Perform the daily preventive maintenance services.

2. Lubricate the hot oil heater as specified in the current lubrication order (Fig. 16).

3. Be sure the hot oil heater is properly grounded (Figure 10).

4. See that the liquid transfer hoses are properly installed and connected (Figure 9).

5. Open the exhaust stack rain cap.

6. See that the external power source and the external fuel source are connected, that power is being received Turn the fuel valves at the fuel oil strainer to the receiving position. (Fig. 13).

7. Refer to Figure 14 for manual transfer oil valve settings

WARNING: DO NOT OPERATE THE HOT OIL HEATER IN AN ENCLOSED AREA UNLESS THE EXHAUST GASES ARE PIPED TO THE OUTSIDE. INHALATION OF EXHAUST FUMES CAN CAUSE SERIOUS ILLNESS OR DEATH.

NOTE: An uninterrupted flow of transfer oil through the hot fluid filters is possible only if the valves are properly positioned The four gate valves are opened by turning the wheels fully counterclockwise (Fig. 14).

WARNING: USE GLOVES FOR OPERATION AS THE HIGH OPERATING TEMPERATURES OF THE HOT OIL HEATER COULD CAUSE SERIOUS BURNS.

WARNING: STAND CLEAR OF VENT PIPE DURING OPERATION AS INTERNAL PRESSURES MAY CAUSE MINOR ERUPTIONS OF HOT FLUID WHICH MAY SPRAY THE IMMEDIATE AREA.

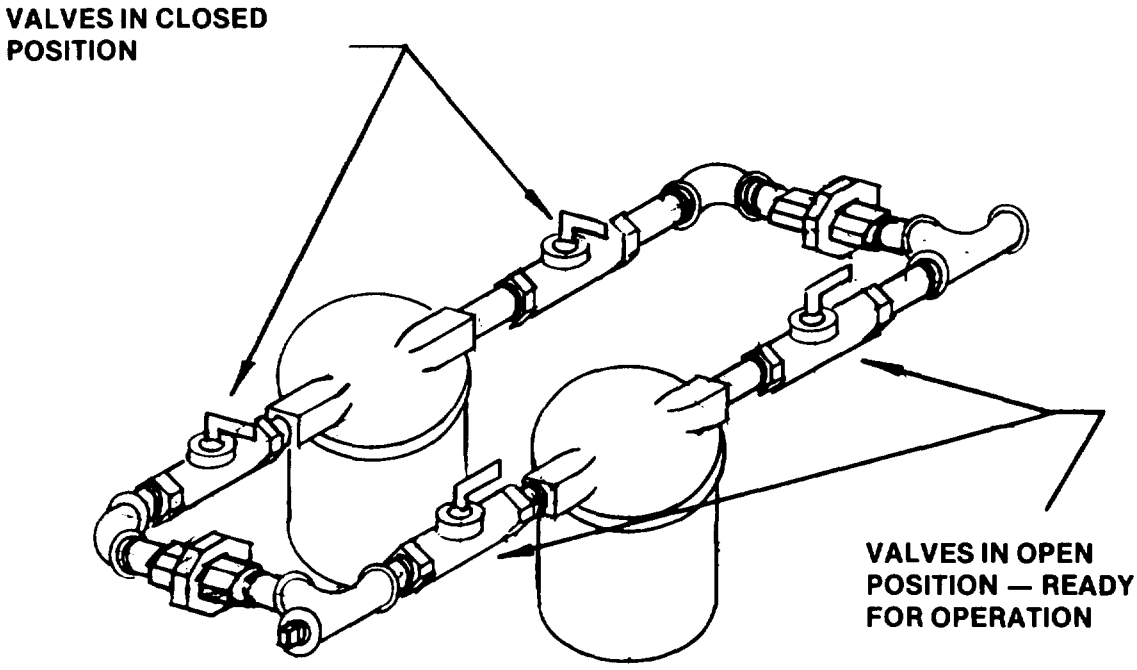


Figure 13. DUAL FUEL STRAINER VALVE OPERATION.

The receiving position is the position of one set of valves open & one set of valves closed, as shown

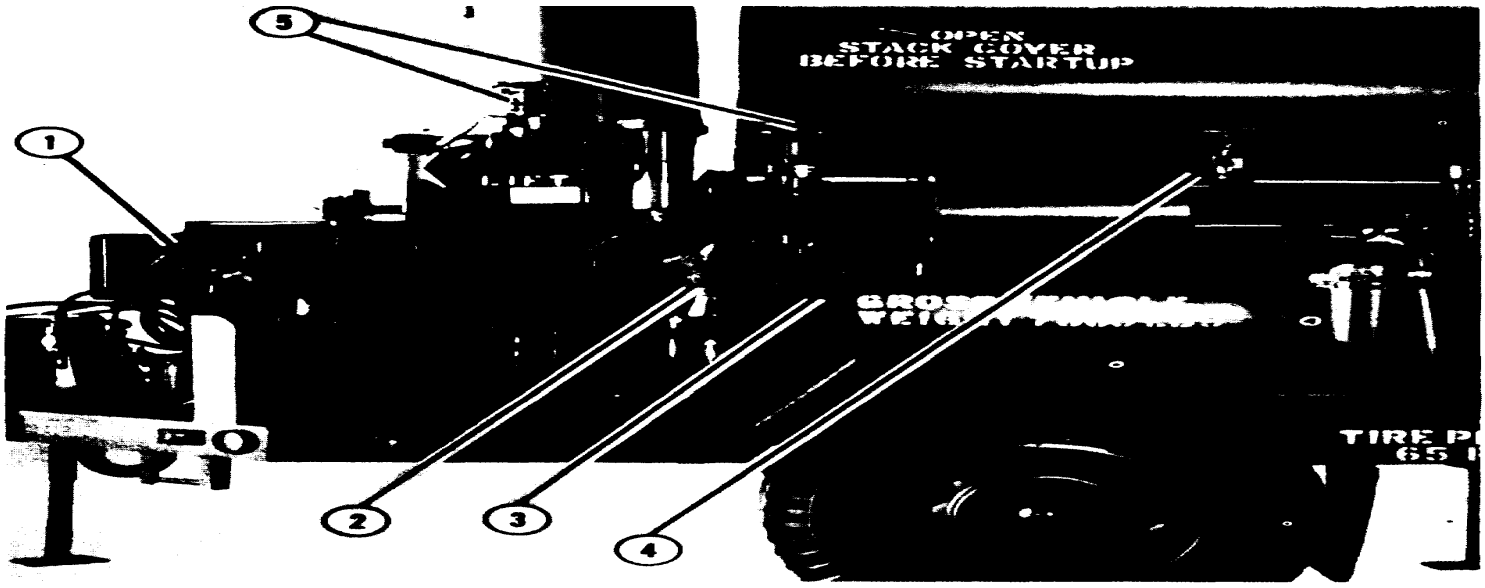


FIGURE 14. MANUAL TRANSFER OIL VALVES (GATE VALVES)

1. Valve A, Supply Valve
2. Valve B, Fill Valve
3. Valve C, Pump Suction Valve
4. Valve D, Make-Up Valve
5. Two sets of two Stainer Valves:
   Outside Set-Valves E&F
   Inside Valves-Valves G&H

VALVES OPERATING POSITIONS

1. Valve A must be open
2. Valve B must be closed
3. Valve C must be open
4. Valve D must be open
5. One set Valves E & F or Valves G & H must be open. One set must be closed.

To open valves, turn valve handle counter clockwise.

To close valves, turn valve handle clockwise.

b. Starting

1. Check expansion tank and external user to be sure that the system is filled If more oil is needed, add heat transfer oil complying to MIL-L-22851 Type 3.

2. Check all connections for tightness of joints to protect against leakage.

3. Check that proper valves are open to provide oil circulation Open one set of valves (Fig 14), E and F or G and H, on the hot fluid strainers to get flow for system. Keep one set closed. Open front supply gate valve (Fig 14), marked A, and pump suction gate valve (Fig. 14), marked C.

4. Connect 3 phase, 60 Hertz, 230 Volt power supply, ref Para. 10, a & d

5. Check rotation of motors; rotation is indicated by an arrow on pump and burner housing Momentarily start blower motor and circulating pump motor for this check.

6. Turn on main circulating pump. Push start button on circulating pump starter (Fig. 11, Item 1). When pressure is steady at about 35 PSI on pump discharge, open fuel valves (Fig. 13).

7. Set temperature control to desired temperature 350 to 4500F.

8. Turn burner switch "ON" (Fig. 11, Item 2) when fuel pressure is established; burner will ignite and continue fully automatic to satisfy demand for heat.

9. Observe flame through observation port at rear of heater. Flame should be clean, not smoky. Observe exhaust stack; stack should have light haze, not smoky.

c. Operation.

1. Sequence of Operation After the activation of the program controller, the automatic sequence of operation is as follows:

The burner controls and mechanisms move into the prepurge stage during which the blower operates to scavenge all ash, dust, unburned oil vapors, and residue from the combustion chamber. The prepurge period has a duration of approximately thirty seconds.

Following the prepurge, the control energizes the pilot valves and ignition transformer. There is a 12 second period of trial for ignition. With ignition, the low fire valve opens and the oil cylinder drives the air damper to the high fire position. The damper will remain in the high fire position until the temperature requirement is reached.

When the temperature controller indicates that the required temperature has been reached, the low and high fire valves close, the burner flame is extinguished, and oil cylinder returns the air damper to the closed position at which time the unit goes into standby, then only the circulating pump motor is operating the pump to circulate the heated transfer oil

Burner mechanism remains on standby until temperature drops, and then restarts the heating cycle

If there is a flame failure during the period in which the burner is in operation, the air damper will return to the low fire position, the flame program control will return to prepurge for approximately 30 seconds After the prepurge, there will be a trial ignition lasting 12 seconds. If the burner does not ignite, the burner shuts off on safety. If there is no flame detected at this time, the flame program control will go into flame failure safety and can be restarted only after depressing the red reset button located on Its cover

d Stopping.

1. Turn burner switch "OFF"

2. Close manual fuel valves

3. Allow main circulating pump to operate until temperature of the circulating oil has dropped to 2500F as indicated by thermometer on front of heater

4. Push stop button on pump starter

5. Close the return oil valves located on the strainer assembly (Fig 14)

6. Close and secure control panel box door

NOTE Before leaving the heater, make sure there are no flammable materials left open or spread around the area

14. Operation in Extreme Heat

a. Indoor Ventilation If the hot oil heater is operated Indoors or In an enclosed area, allow sufficient room around the equipment for air circulation and ventilation of the area.

NOTE Various units in the control box will not function properly above 125°F Make provision to keep control box operating In an ambient temperature of 1 25°F or less.

b Lubrication. Refer to the current lubrication order and detailed lubrication Instructions (Para 31 & Fig 16).

15. Start-Up of Hot Oil Heater in Cold Weather

a. When heat transfer oil Is viscous because of low ambient temperature, the thermal overloads on pump starter will safety out Push reset button on pump starter (Fig 11, Item 7) and remedy as follows

1. Reduce pressure on the relief valve (Fig 2, Item 9) as low as possible This will relieve pumping pressure and return oil to expansion tank (Ref Para. 38).

2. Make sure that the pressuretrol controller, Para. 50, Is also backed off with adjusting screws so the electrical circuit is also completed.

3. Turn on burner switch (Fig. 11, Item 2) and fire heater at intervals of 1-1 /2 minutes until heat transfer oil has enough heat to lower viscosity and start to circulate through system.

4. If thermal overloads in main pump starter go into safety without being able to fire heater, allow 2 minutes for cooling and reset.

5. After circulation is established throughout system, readjust relief valve so that 35 PSI shows on the hot oil pressure gauge located on front header piping; resume normal operation.

16. Operation in Dusty or Sandy Areas.

a. Protection. Shield blower motor intake, blower intake, circulating pump and circulating pump motor from dust. Seal the case edge openings of units such as the temperature controller, low fluid level cutoff, pressuretrol, control box, ultraviolet (U.V.) cell, and end switch.

CAUTION: DO NOT SEAL THE BLOWER INTAKE SO CLOSELY AS TO PREVENT FILTERED AIR FROM ENTERING.

b. Fuel. See that the fuel is strained before it is put into the external system. Service the fuel strainers frequently to remove sand and dust.

c. Lubricants. Clean the lubrication points before applying lubricants.

17. Operation Under Rainy or Humid Conditions.

a. Electric switches, contacts, and terminals corrode and rust easily under rainy or continued humid conditions. Keep electrical components clean and free of moisture.

b. If unit is outside and not operating, cover the controls, instruments, electrical components, and the circulating pump motor and adjacent junction box. Remove covers during dry periods.

18. Operation in Salt Water Areas.

a. General. Wash unit frequently with clean fresh water. Do not contaminate the fuel system or damage electrical equipment.

b. Protection. Coat exposed metal surfaces with rustproofing material. Remove rust immediately and apply paint and broil as applicable.

19. Operation in Rough Terrain.

a. Position the hot oil heater as nearly level as possible.

b. Be sure the circulating pump is positioned at the lowest level of operation of the hot oil heater.

20. Unloading the System

a. General. The external system will be unloaded, heat transfer oil withdrawn, when the hot oil heater is shut down and is to be disconnected from external user.

b. Unloading. Reference Figure 15.

1. With hot oil heater shut down, close valve A.

2. Disconnect supply flexible hose at valve A.

3. Close valves E & G at return, hot oil strainers

4. Disconnect return flexible hose at return, hot oil strainers.

5. Connect return flexible hose to Valve B, fill valve at pump.

6. Open valve B & close valve C, suction line from surge tank.

7. Start circulating pump on hot oil heater; heat transfer fluid will move into expansion tank through valve D

CAUTION: DO NOT OVER FILL HOT OIL HEATER EXPANSION TANK AS HEAT TRANSFER FLUID WILL OVERFLOW FROM VENT LINE

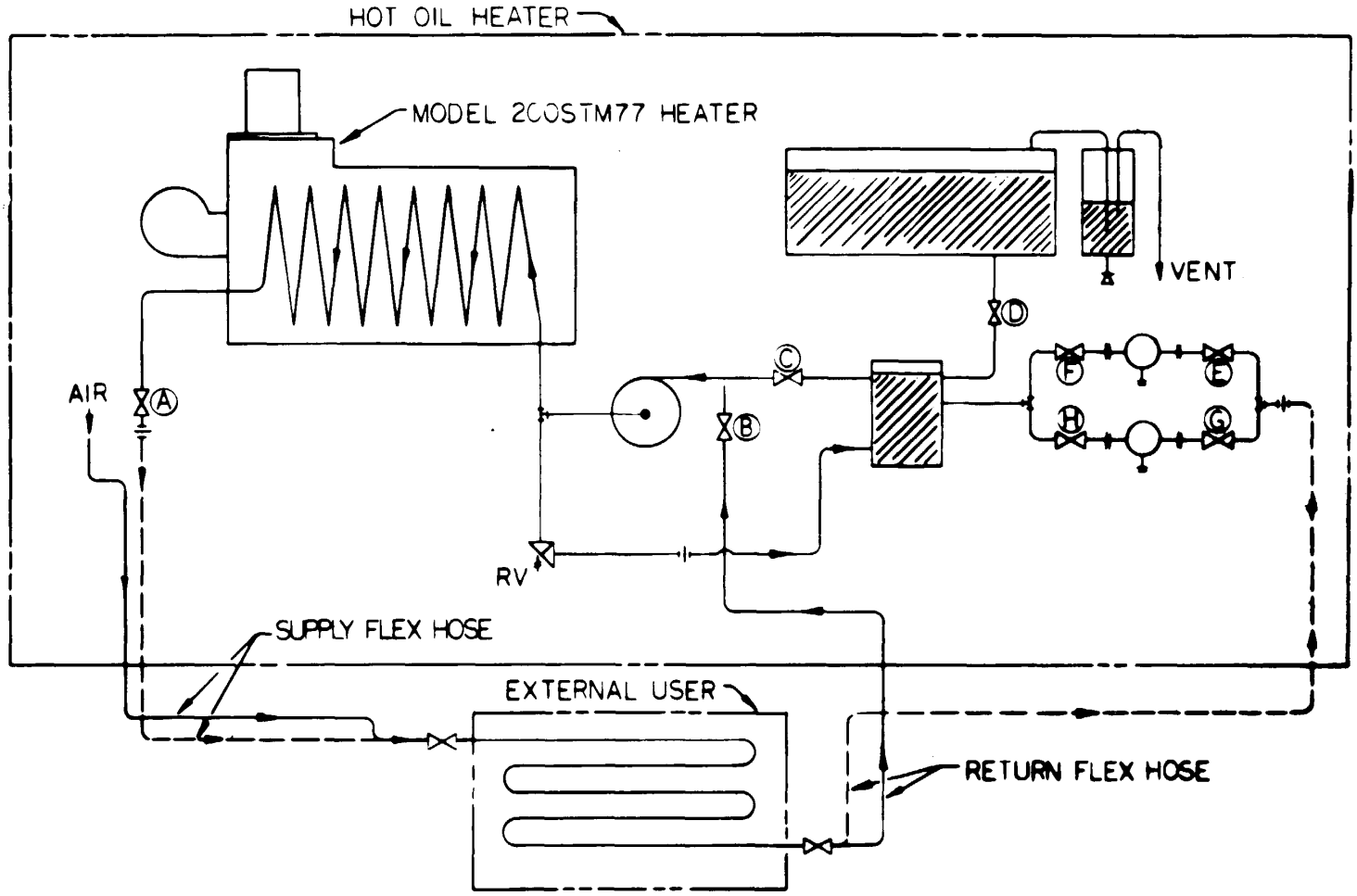


Figure 15 SYSTEM UNLOADING DIAGRAM

Section C. OPERATION OF AUXILIARY MATERIAL USED IN CONJUNCTION WITH THE EQUIPMENT

21. General

a. Inspect the trailer assembly for loose attachment bolts, cracked panel assemblies, bent brackets and other types of related damage. Inspect towing lunette and safety chain for cracks, bends, or loose attaching bolts. Report any damage or deficiencies to the proper authority.

22. Springs and Shock Absorbers

a. Inspect spring assemblies for worn or cracked attaching bolts, broken shocks or broken or misplaced spring leaves.

b. Inspect shock absorbers for broken mounting bolts and see that the mounting bolts are properly securing the mounting. Inspect for damage to the shock absorber bodies.

23. Air/Hydraulic

a. Inspect the air/hydraulics brake system for worn or leaking air lines and hydraulic lines particularly at areas where they pass through frame members or around sharp corners.

b. Inspect power cluster for proper hydraulic fluid level.

c. Inspect the relay valve and air tank for evidence of leakage.

d. Upon discovery of air leakage or fluid leakage, report to the proper authority.

24. Nose Box and Lights

a. Inspect the nose box for loose connections, both electrical and air. Report any defect or deficiency to the proper authority.

b. Inspect the lights regularly for cracked lenses, loose mounting bolts, and spent bulbs. Replace all burned out bulbs immediately. Lights and their components are placed at specific areas on the equipment for identification and clearance; making it important to replace defective parts as soon as possible.

25. Wiring Harness

a. A cord connected to the electrical system of the towing vehicle is plugged into a standard receptacle on the trailer. Electrical current is supplied to tail lights, stop light and clearance lights Inspect trailer wiring for loose connections, evidence of wear and breakage, and bare spots Report any damage or malfunctioning to the proper authority For ease in tracing, wires in the electrical system harness are number coded and tagged

26. Reflectors

a. Replace broken reflectors as follows: Remove the two nuts, lockwashers, and bolts securing the reflector to the trailer chassis. Remove the reflector. Place a new reflector in position and secure with a bolt, lockwasher and nut at each side of the reflector.

27. Chocks, Chassis and Mud Guards

a. Ascertain that chocks are secured in their proper location either under wheels while equipment is in operation or in their cradles for towing the hot oil heater to a new jobsite

b. Inspect retaining chains for cracks or possible breakage. Inspect and replace extremely worn links.

c. Inspect mud guards for possible tears, loose bolts or general deterioration. Report any deficiencies to the proper authority.

28. Tires and Wheels

a. Inspect tires for proper inflation, cuts, bruises, bulges and worn spots Tire pressure should be 65 pounds per square inch.

b. Inspect lug nuts to insure their proper tightness. Report any damage or malfunctioning to the proper authority.

NOTE: IT IS IMPORTANT TO GIVE PROMPT ATTENTION TO THE DISCOVERY OF ANY DAMAGE OR MALFUNCTIONING AS DELAY WILL FURTHER AGGRAVATE EXISTING DAMAGE.

CHAPTER 3
MAINTENANCE
Section A. OPERATOR MAINTENANCE

29. Special Tools and Equipment

No special tools or equipment are required by operator maintenance personnel for the maintenance of this hot oil heater.

30. General Lubrication Information

a. This section contains a reproduction of the lubrication order and lubrication instructions which are supplemental to and not specifically covered in the lubrication order.

b. The lubrication order shown in Fig. 16 is an exact reproduction of the approved lubrication order for the hot oil heater.

31. Detail Lubrication Information

a Care of Lubricants.

Keep all lubricants in closed containers and store in a clean dry place away from external heat. Allow no dirt, dust, water or other foreign material of any kind to mix with the lubricant.

b. Points of Lubrication.

Refer to Fig. 16 for illustration of the lubrication points.

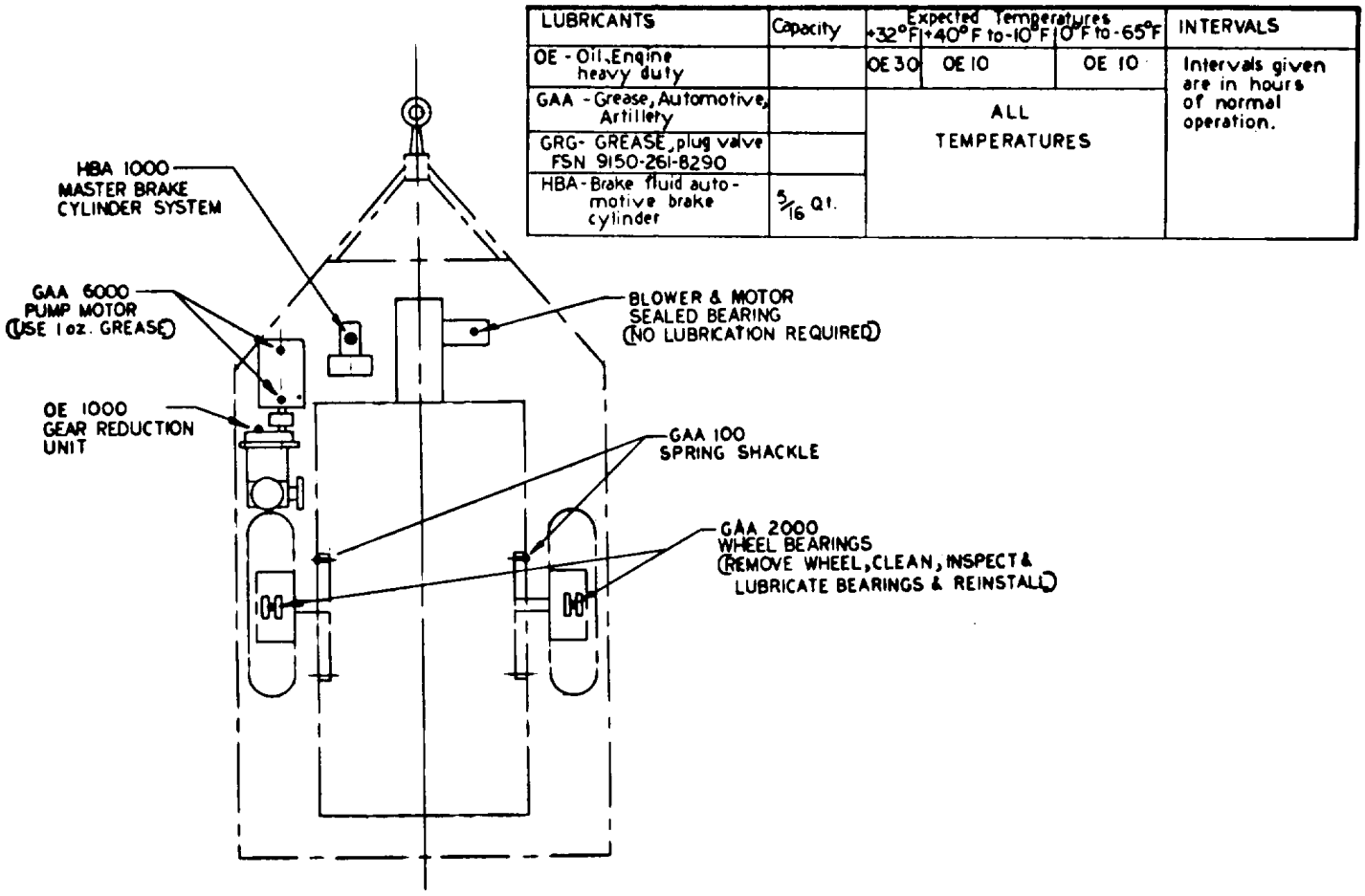
c. Cleaning.

Keep all external parts not requiring lubrication clear of lubricant. Before lubricating the equipment, wipe all lubrication points free of dirt and grease. Clean all lubrication points after lubricating to prevent the accumulation of foreign matter.

FIGURE 16 LUBRICATION ORDER
HEATER, HOT OIL, TRLR. MTD.
2,100,000 BTU VOLCANIC MODEL 200STM77

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

Clean parts with SOLVENT, dry-cleaning or with OIL, FUEL, DIESEL. Dry before lubricating.
Clean fittings before lubricating.
Lubricate points indicated by dotted arrow shafts on both sides of equipment.



LUBRICANTS	Capacity	Expected Temperatures +32°F	+40°F to -10°F	0°F to -65°F	INTERVALS
OE - Oil, Engine heavy duty		OE 30	OE 10	OE 10	Intervals given are in hours of normal operation.
GAA - Grease, Automotive, Artillery		ALL TEMPERATURES			
GRG - GREASE, plug valve FSN 9150-261-8290					
HBA - Brake fluid automotive brake cylinder	5/16 Qt.				

NOTES:

1. **OIL CAN POINTS. Every 50 hours lubricate control linkages, jack screws, and all exposed adjusting threads with OE.**

2. **LIBRICANTS. The following is a list of lubricants with the Military Symbols and applicable specification numbers.**

OE MIL-L 2104 **GAA MIL-G-10924**
GRG MIL-G-6032 **HBA MIL-H-13910**

Figure 16

Section B. HOT FLUID SYSTEM

32. General

The components of the hot fluid system are used to circulate, clean and control the heat transfer oil. The circulating pump keeps the fluid in constant motion during operation. The fluid flows on each passing through one of the two filters which serve to remove any sand, grit or other foreign matter from the fluid. The four valves are used to divert the flow of heat transfer oil to the particular strainer being used. The vent pipe assembly is used to provide a vent during operation.

WARNING: ALLOW FOR SUFFICIENT COOLING AFTER OPERATION BEFORE PERFORMING MAINTENANCE ON THE HOT OIL HEATER AS SERIOUS INJURY FROM SECOND AND THIRD DEGREE BURNS COULD RESULT.

33. Circulating Pump, Gear Reduction Assembly, Circulating Pump Coupling

a. On-Equipment Testing (Direction of Rotation).

1. Start the hot oil heater (Para. 13).

2. Refer to Fig. 17 and inspect the pump coupling and shaft for proper rotation as marked on motor housing.

3. Stop the hot oil heater (Para. 13).

b. Removal. Refer to Fig. 17 and 18 to remove the circulating pump with gear reduction assembly and pump coupling.

1. Remove all electrical power from circulating pump motor.

2. Remove bolts from coupling guard; remove coupling guard.

3. Loosen set screws in coupling, slide coupling back on shaft

4. Shut valves off to surge tank (Fig. 14).

5. Remove bolts from pump flanges; drain heat transfer fluid.

6. Remove four bolts from pump base; remove pump with gear reduction assembly.

c. Disassembly and Assembly. Refer to Figures 19 and 20 for disassembly and assembly of the circulating pump and gear reduction assembly.

d. Cleaning and Inspection.

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

2. Inspect the gear reduction assembly for signs of wear and damage. Inspect the circulating pump for leaky packing, signs of wear, and other damage. Inspect the pump coupling for signs of wear or other damage.

3. Inspect the mounting hardware for cracks, breaks, and damaged threads. Replace any defective parts.

e. Installation. Refer to Fig. 17 and install the circulating pump with gear reduction assembly and pump coupling.

f. Alignment. Refer to Fig. 18 and align the circulating pump motor, the pump coupling, and the circulating pump with gear reduction assembly.

g. Packing Nut Adjustment. The two packing nuts which; surround the shaft of the circulating pump are accessible from the drive end of the pump. Tighten the nuts equally or loosen equally as necessary to prevent leakage or reduce friction. In the event the nuts cannot be loosened for a friction adjustment without causing leakage, check packing for replacement.

34. Circulating Pump Motor

a. Removal. Refer to Fig. 17 and remove the circulating pump motor.

1. Turn off all electrical power.

2. Remove 2 screws from junction box; remove cover.

3. Disconnect and tag all electrical wires; remove electrical connections.

4. Remove 4 mounting bolts from motor base; remove motor.

b. Cleaning and Inspection.

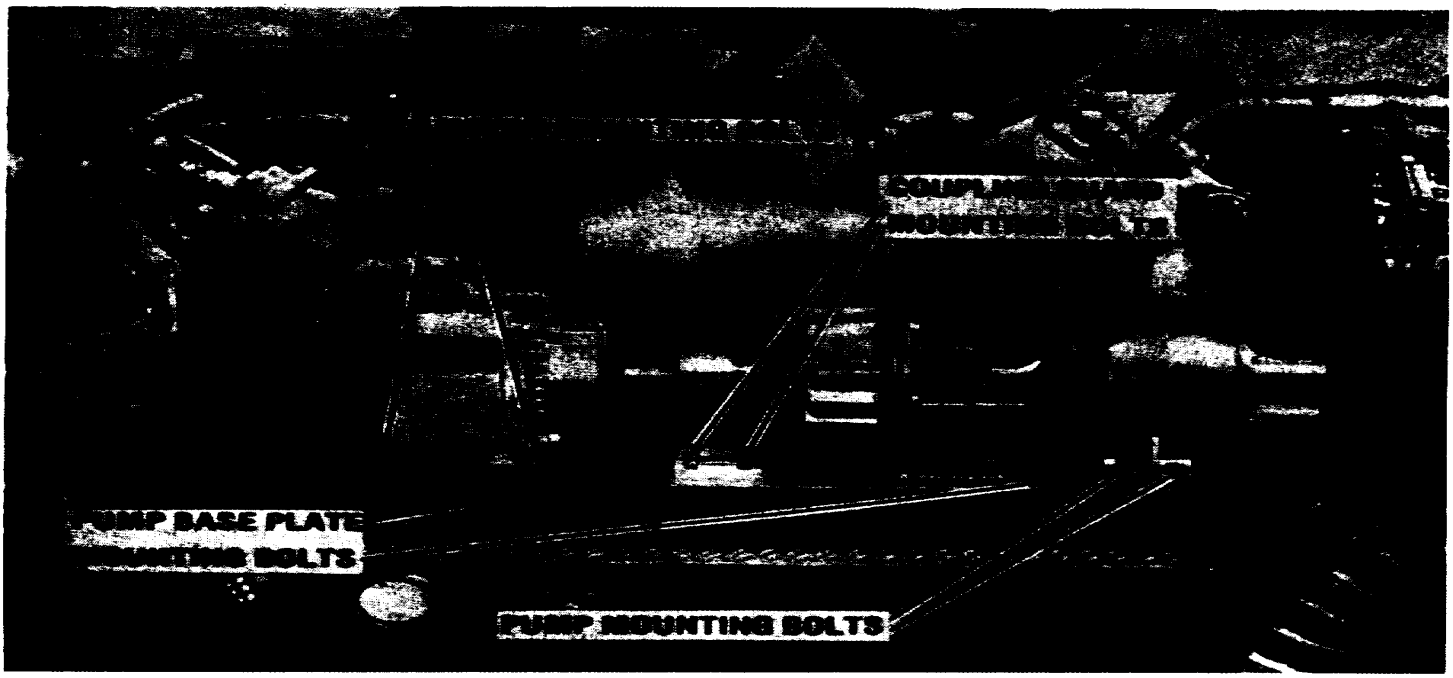
1. Clean all parts with an approved cleaning solvent and dry thoroughly. Clean the circulating pump motor with a cloth dampened with an approved cleaning solvent.

2. Inspect the circulating pump motor for signs of damage, overheating, and shaft wear.

3. Inspect the mounting hardware for cracks, breaks, and damaged threads. Replace a defective part.

c. Installation. Refer to Fig. 17 and install the circulating pump motor.

d. Alignment. Refer to Fig. 17 and 18 to align the circulating pump, circulating pump motor, and pump coupling.



NOTE: Pump Coupling located under coupling guard.

Figure 17. CIRCULATING PUMP AND MOTOR MOUNTING HARDWARE

35. Pump Base Plate

a. Removal.

1. Remove the circulating pump motor (Para. 34).

2. Remove the circulating pump and pump coupling (Para. 33).

3. Refer to Fig. 17 and remove 4 mounting bolts from the pump base plate. Remove by raising plate up and out.

b. Cleaning and Inspection.

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

2. Inspect the pump base plate for cracks, breaks, warpage and other damage.

3. Inspect the mounting hardware for cracks, breaks and damaged threads. Replace any defective parts.

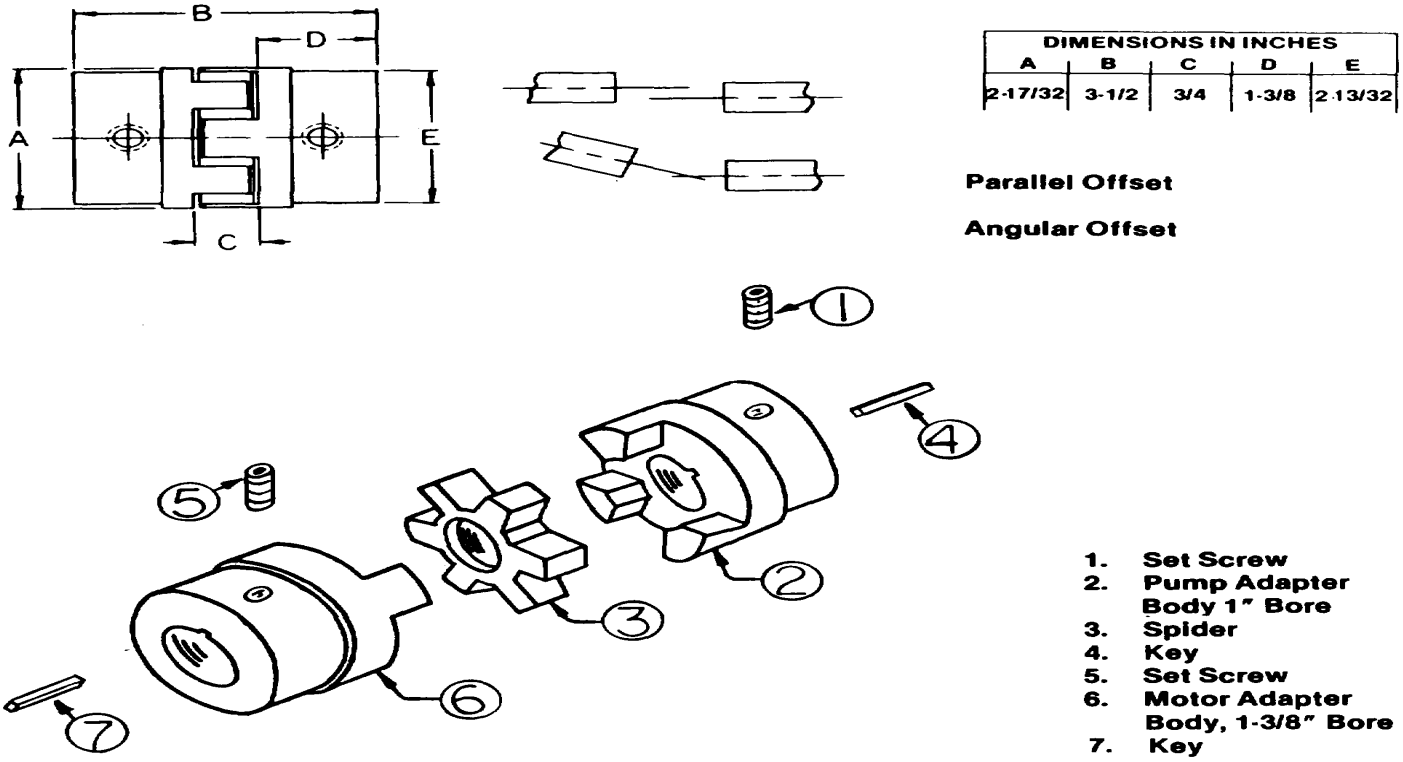
c. Installation.

1. Refer to Fig. 17 and install the pump base plate.

2. Install the circulating pump and pump coupling. (Para. 33).

3. Install the circulating pump motor (Para. 34).

To align circulating pump to circulating pump motor, the center line height of both shafts must be the same. The coupling should be parallel when aligned on the circulating pump shaft and the circulating pump motor shaft with no more than .015 inches offset. This would be the maximum parallel offset allowed. The angular offset must not be more than 1 degree.



DIMENSIONS IN INCHES				
A	B	C	D	E
2-17/32	3-1/2	3/4	1-3/8	2-13/32

1. Set Screw
2. Pump Adapter Body 1" Bore
3. Spider
4. Key
5. Set Screw
6. Motor Adapter Body, 1-3/8" Bore
7. Key

Figure 18. CIRCULATING PUMP AND MOTOR COUPLING

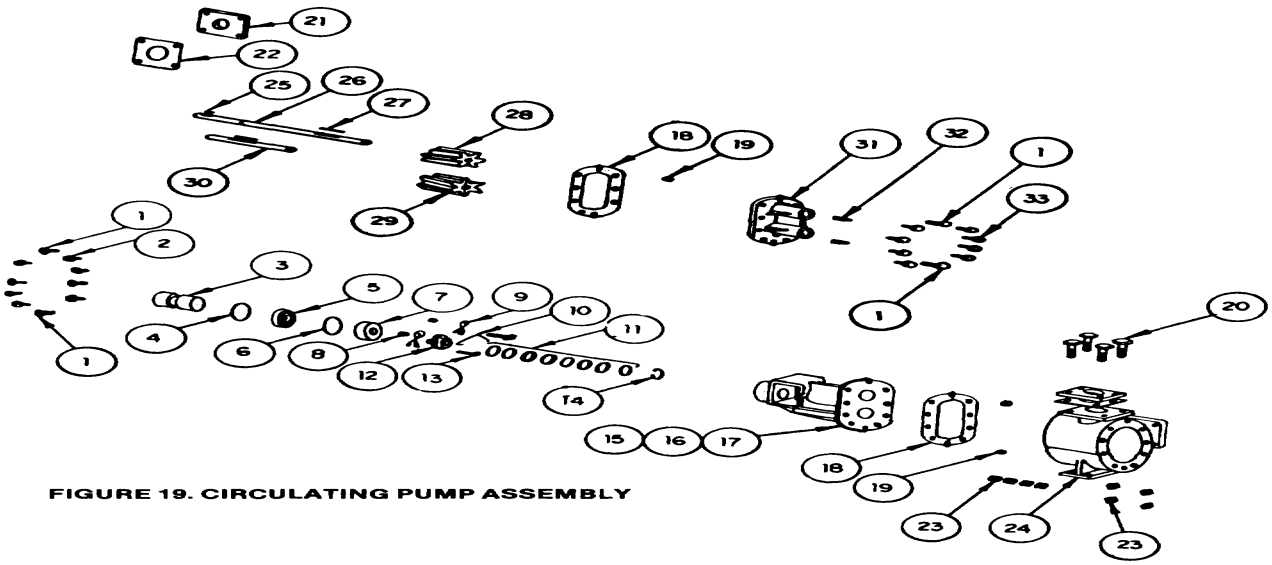


Figure 19. Circulating Pump Assembly

ITEM NO.	DESCRIPTION	ROPER PIN QTY.		ITEM NO.	DESCRIPTION	ROPER PIN QTY.	
1	WASHER HD CAP SCREW	G4924	4	18	GASKET, CASE	D11-338	2
2	HEX HEADCAPSCREW	G49-037100	8	19	HOLLOW DOWEL PIN	D48-34	4
3	SLEEVE	G45-100	1	20	HEX HEAD CAP SCREW	G49-0622 25	8
4	RETAINING RING	G41-20	1	21	FLANGE	P23-10	2
5	BALL BEARING	G40-147	1	22	GASKET, FLANGE	D11-90	2
6	RETAINING RING	G41-76	1	23	NUT	G44-062	8
7	LIP SEAL	D83-5	1	24	CASE	P1-175	1
8	LOCK NUT	D441-755	2	25	KEY	D30-32	1
9	PACKING GLAND CLIP	D42-1	2	26	DRIVE SHAFT	D1-1158’	1
10	SPRING CLIP	D42-2	1	27	KEY	D30-9	2
11	PACKING SET	N43-1	1	28	DRIVE GEAR (LH)	P6-278	1
12	PACKING GLAND	P10-178	29	IDLER GEAR (RH)	P6-277	1	
13	SQ J D BOLT	G67-043275	2	30	IDLER SHAFT	D1-1077	1
14	PACKING WASHER	G8-246	1	31	FACEPLATE ASS’Y, PLAIN N3-177	1	
15	BACKPLATE ASSEMBLY N2-406	1	32	PIPE PLUGS	G56-12	2	
16	BUSHING(SHORT)	G5-258	1	33	HEX HEADCAPSCREW	G49-037100	8
17	BUSHING (LONG)	G5-257	1				

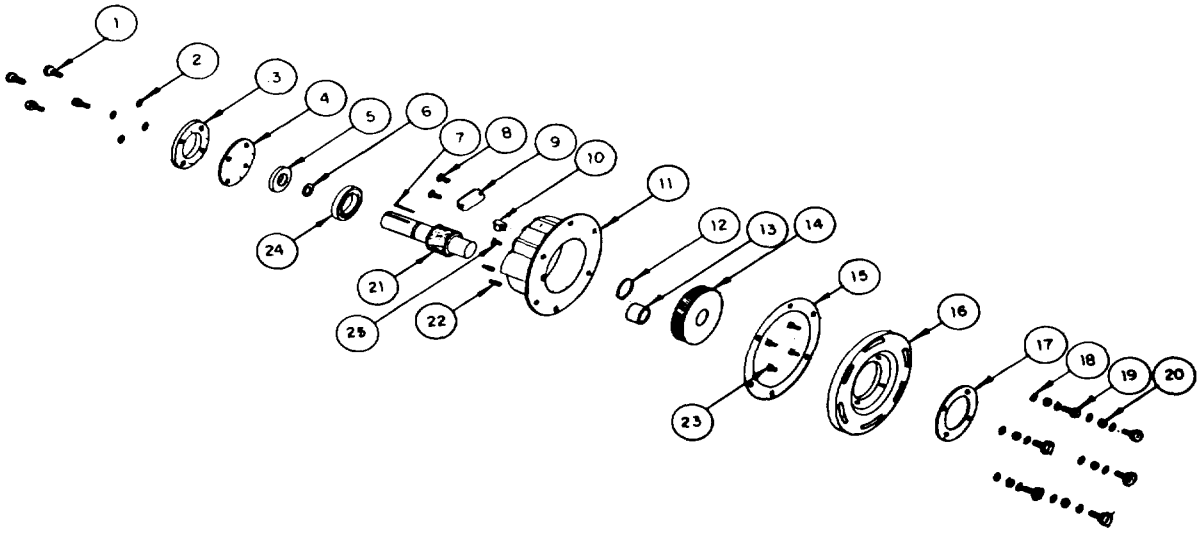


Figure 20. CIRCULATING PUMP GEAR REDUCTION ASSEMBLY

ITEM NO.	DESCRIPTION	ROPER P/N	NO REQ'
1	HEX HEAD CAPSCREW	G49-031075	4
2	LOCKWASHER	G8-71	4
3	BEARING RETAINER	P4-384	1
4	GASKET	D11-277	1
5	LIP SEAL	D83-22	1
6	RETAINING RING	G41-78	1
7	KEY	D30-9	1
8	DRIVE SCREW	G62-9	2
9	NAMEPLATE	G12-85	1
10	OILCUP	G61-239	1
11	GEAR CASE	P49-2	1
12	RETAININGRING	G41-76	1
13	NEEDLE BEARING	G40-30	1
14	DRIVE GEAR	D37-64	1
15	GASKET	D11-278	1
16	COVER	P22-13	1
17	GASKET	D11-276	1
18	WASHER	G8-52	12
19	HEX HEAD CAP SCREW	G49-037125	6
20	LOCKWASHER	G8-72	6
21	PINION	D37-120	1
22	PIPE PLUG	G56-12	2
23	SOC HEAD CAP SCREW	G45-037100	4
24	BALL BEARING	G40-10	1
25	PETCOCK	G61-71	1

36. Hot Fluid Strainers

a. Removal. Refer to Fig. 21 and remove the hot fluid strainers.

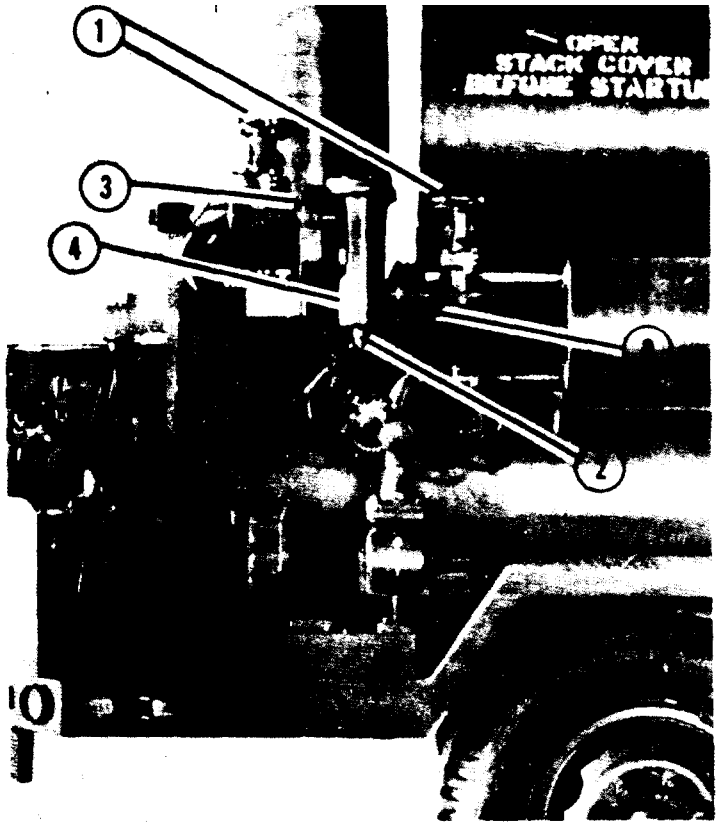
1. Shut off all valves on each side of strainers.
2. Remove plugs in bottom of strainer; allow to drain and install plug.
3. Remove bolts from flanges on strainers; remove strainers.
4. Reference Figure 22 and disassemble strainers.

b. Cleaning and Inspection.

1. Clean all parts with an approved cleaning solvent and dry thoroughly.
2. Inspect the hot fluid strainer bodies, flanges, top plate and fittings for cracks, breaks, damaged threads, and other damage.
3. Inspect the condition of the strainer baskets. Replace all defective parts.

c. Installation.

1. Refer to Figure 22 and assemble strainers.
2. Install strainers in reverse order of removal.
3. Check all gaskets when putting strainers back in place.



1. **Valves**
2. **Drain Plug**
3. **Flange Bolts**
4. **Strainer**

Figure 21. Hot Fluid Strainer Mounting

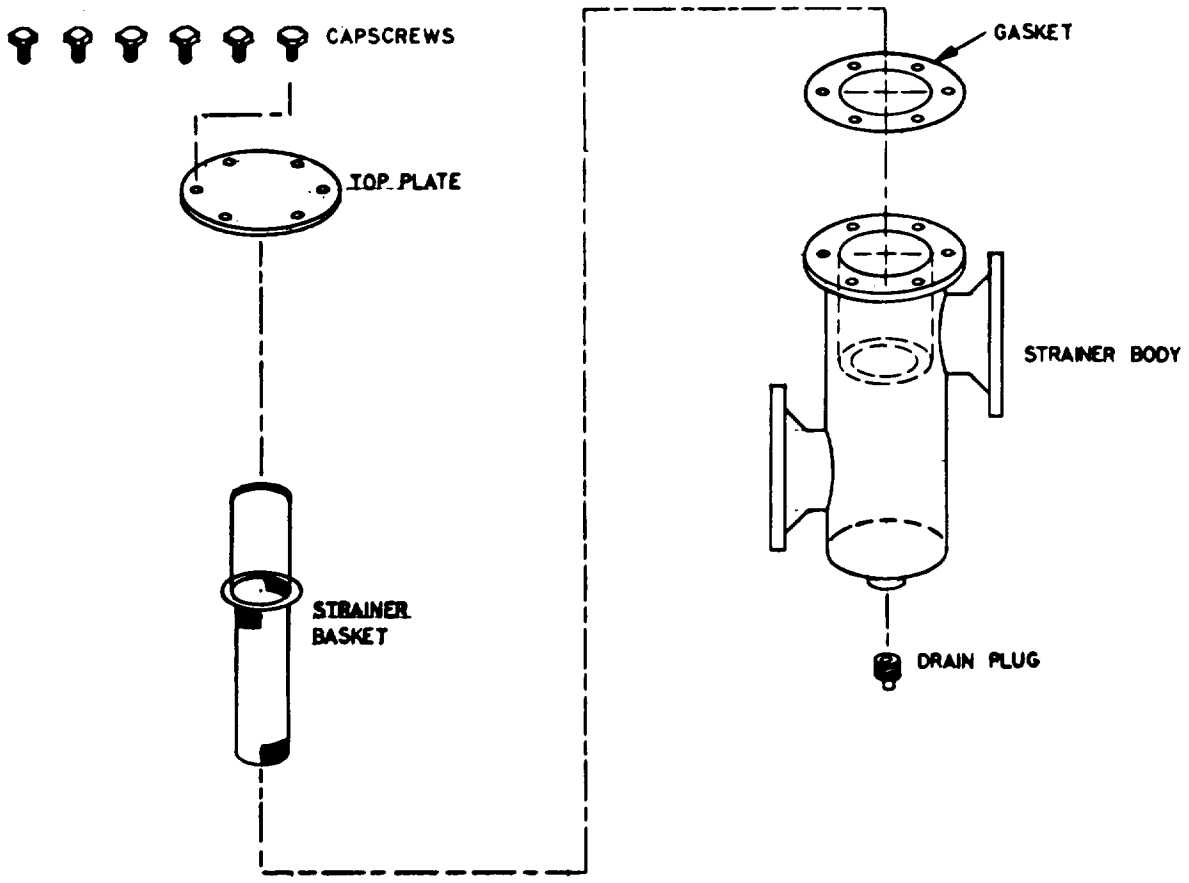


Figure 22. HOT FLUID STRAINER

37. Valves, Lines and Fittings

a. General. The valves, lines and fittings consist of the following assemblies: hot oil strainer piping, pump inlet line, pump discharge line, by-pass line, reservoir (make up) line, and coil front (header) pipe. The only removable lines are the front part of the strainer piping and the rear part of the by-pass line. Ref. Figure 23

b. Removal.

1. Remove the hot fluid strainers, Para. 36.

2. Remove front part of strainer piping.

c. Cleaning and Inspection.

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

2. Inspect valves, lines and fittings for cracks, breaks, damaged threads and inspect the valves for operation.

d. Installation. Replace the hot fluid strainers, Para. 36.

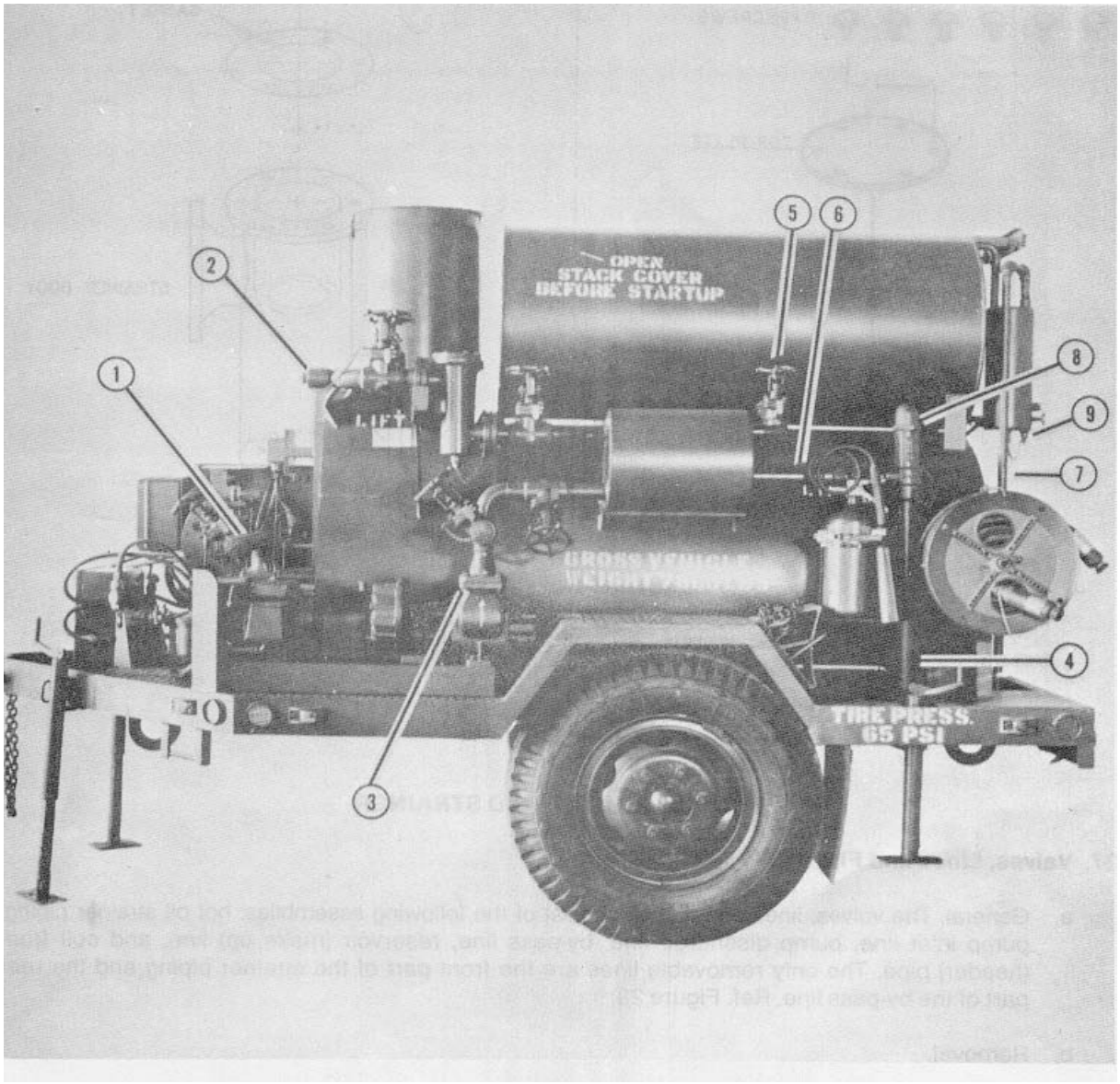


Figure 23. VALVES, LINES AND FITTINGS

1. **Coil Front (Header) Pipe.**
2. **Hot Oil Strainer Piping**
3. **Pump Inlet Line**
4. **Pump Discharge Line**
5. **Reservoir (Make Up) Line**
6. **By-Pass Line**
7. **Vent Pipe Assembly**
8. **Hot Oil Relief Valve**
9. **Cold Seal Tank Drain Plug**

38. Hot Oil Relief Valve

a. Removal. Refer to Fig. 23 to locate hot oil relief valve, Item 8.

1. Close makeup valve D.
2. open fill valve B and drain surge tank and piping.
3. Turn 2" pipe union on by-pass line counterclockwise until connection is broken.
4. Turn relief valve counterclockwise and remove from pump discharge line.

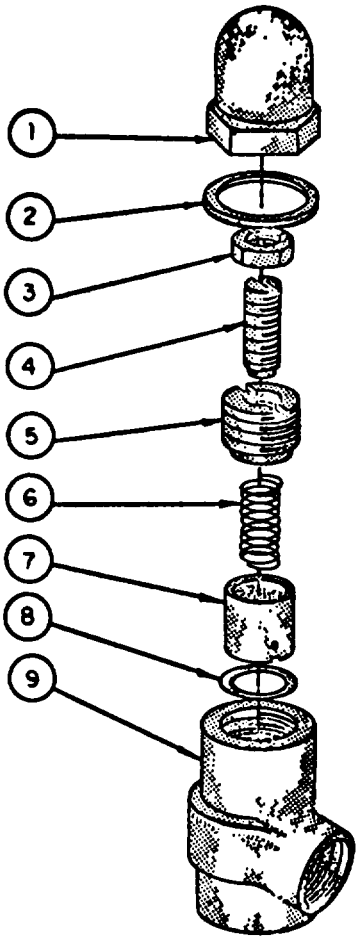
b. cleaning and Inspection.

1. Clean all parts in an approved cleaning solvent and dry thoroughly
2. Inspect the hot oil relief valve body for cracks, breaks, and damaged threads.
3. Replace defective parts.

c. Installation. Refer to (a) above and install by reversing steps (1) to (4)

d. Adjusting. Refer to Fig. 24.

1. Remove cap.
2. Loosen lock nut.
3. To reduce pressure on relief valve, turn adjusting screw counterclockwise
4. To increase pressure on relief valve, turn adjusting screw clockwise.
5. Tighten lock nut.
6. Replace cap.



ITEM	DESCRIPTION
1	CAP
2	CAP GASKET
3	LOCK NUT
4	ADJUSTING SCREW
5	RETAINER NUT
6	SPRING
7	PISTON
8	STOP RING
9	BODY

Figure 24. RELIEF VALVE

39. Vent Pipe Assembly

a. General. The vent pipe assembly is located on the rear of the heater, Fig. 23, Item 7.

b. Removal. Refer to Fig. 25 and remove vent pipe assembly.

1. Remove anchor clip from angle support; turn screw counterclockwise.

2. Remove pipe by turning pipe and fittings counterclockwise.

c. Cleaning and Inspection.

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

2. Inspect the vent piping for cracks, breaks, damaged threads and other damage.

3. Replace a defective part.

d. Installation. Install in reverse order of removal.

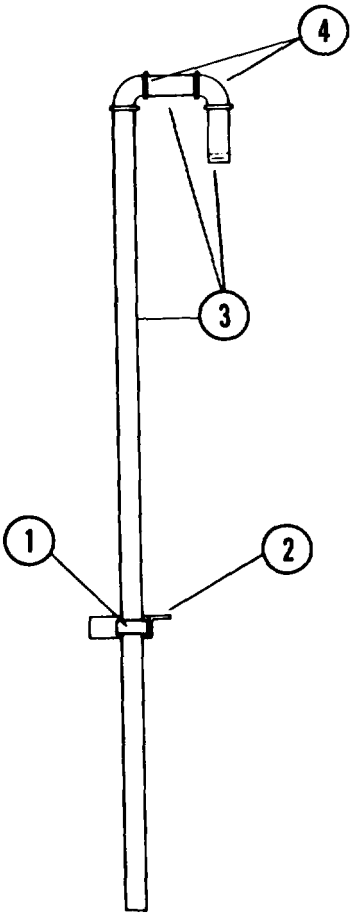


Figure 25. VENT PIPE ASSEMBLY

1 · Anchor Clip

2 - Angle Support

3- Pipe

4- Fittings

Section C. ELECTRICAL SYSTEMS

40. General

The electrical complex of the hot oil heater consists of two separate electrical systems The clearance, stop, and taillights normally are operated only when the unit is joined to a tractor or other hauling vehicle for traveling and operate from the towing vehicle's electrical generating system. The hot oil heater electrical components are energized by an external power source of much higher electrical rating Lights require a 12 or 24 volt power supply, whereas heater requirements are: 3 phase/60 Hertz/230 volts

NOT : Nose box will reduce 24 volts to 12 volts If towing vehicle has a 24 volt system

WARNING : DO NOT PERFORM MAINTENANCE OR SERVICE TO THE HOT OIL HEATER'S ELECTRICAL SYSTEM UNTIL THE EXTERNAL ELECTRICAL POWER SERVICE CABLE HAS BEEN DISCONNECTED

41. Wiring and Conduits

a. General. Inspect the wiring for defective insulation. Pay particular attention to locations where wires pass over metal edges. Wrap slight insulation deterioration with an approved electrical tape. Refer to the trailer wiring diagram and the hot oil heater wiring diagram (Fig 4 and 5) when repairing or replacing wires. Tag each wire and corresponding terminal before removal to insure correct reassembly of the wire to the proper terminal

b. Testing. To test wires for continuity, disconnect each end of the wire from the component to which it is attached. Touch probes of a test instrument to each end of the wire disconnected If the test does not indicate continuity, replace the wire. Test for Improper ground by placing a test probe to one end of the wire and the other probe to the frame of the hot oil heater If the test instrument indicates a ground where no ground should be indicated, repair or replace the wire.

c. Cleaning, Inspection, and Repair.

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

2. Inspect for signs of wear and other damage Replace a defective part

42. Marker, Stop and Tail, Clearance, Identification, Lamps and Reflectors.

a. General. The marker, clearance, and identification, including the lamps, are the same with the different color lenses.

b. Removal. Refer to Fig. 26 and remove 4 mounting screws, nuts and washers (Items 2, 8 & 7). Unplug electrical connection.

c. Cleaning and Inspection.

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

2. Inspect the reflectors for condition of the reflecting surface and other damage.

d. Refer to Fig. 27 and remove the stop, tail, and identification lamps.

e. Assemble lights by referring to Figures 26 & 27.

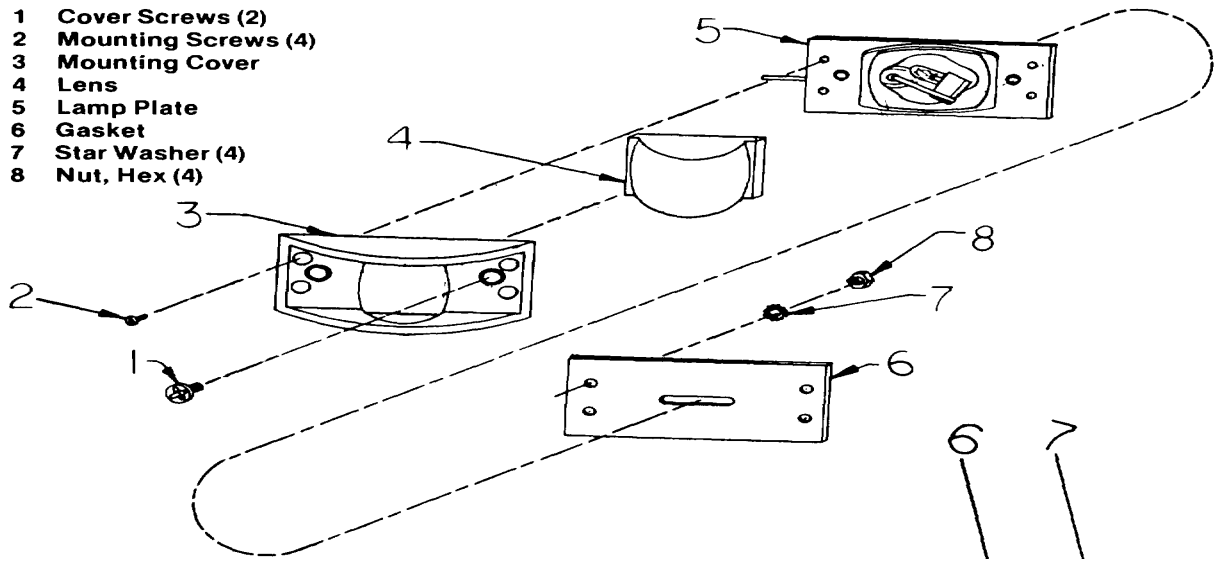


Figure 26. MARKER & CLEARANCE LAMPS

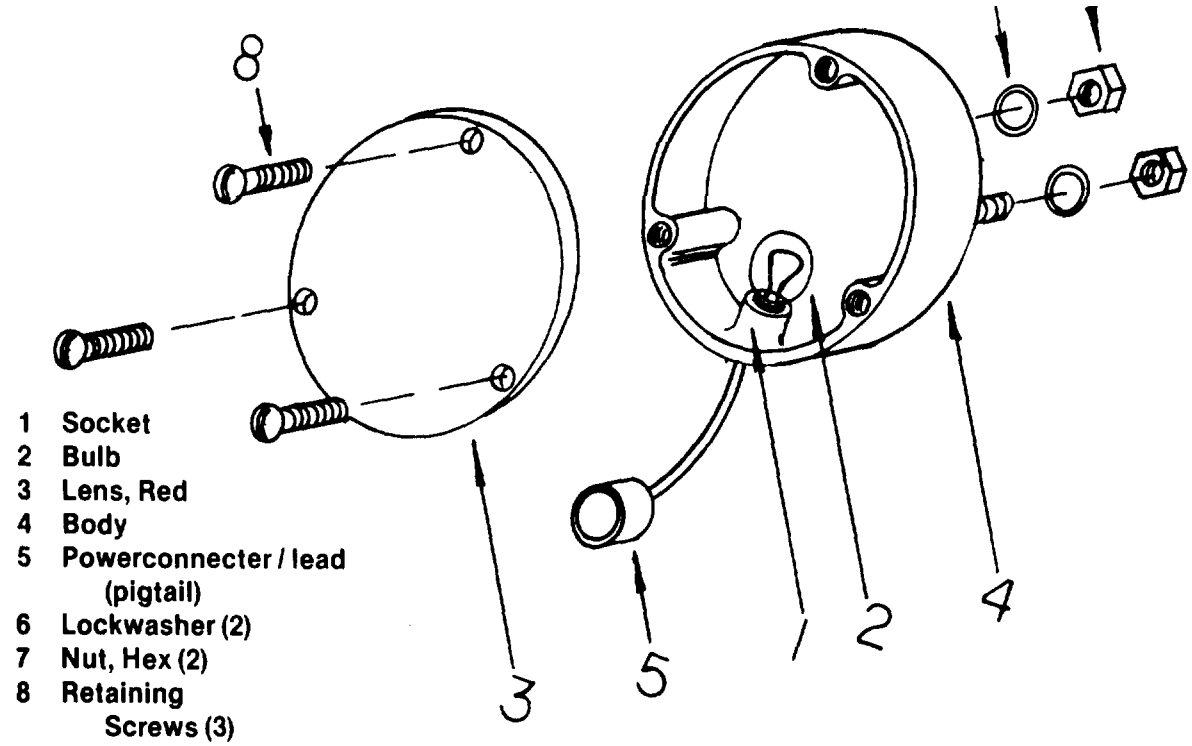


Figure 27. STOP, TAIL, AND IDENTIFICATION LAMPS.

43. Fuse Block

a. Removal.

1. Remove the fuse, Fig. 28.

2.Remove the wires from the two terminal screws. Remove the mounting screws. Remove the fuse block.

b. Cleaning and Inspection.

1. Clean all parts with a cloth dampened in an approved cleaning solvent and dry thoroughly.

2. Inspect for cracks, breaks, and other damage. Inspect the mounting hardware for cracks, breaks, and damaged threads. Replace a defective block.

c. Installation.

1. Refer to Fig. 28 and install the fuse block in reverse order of removal.

2. Install the fuse.

44. Blower Motor Starter Overload Heaters

a. Removal.

1. Refer to Fig. 32 and remove the blower motor starter overload heaters.

2. Remove the two screws that hold the heaters in place; remove heaters from starter.

b. Cleaning and Inspection.

1. Clean all parts with a cloth dampened in an approved cleaning solvent and dry thoroughly

2. Inspect the heaters for cracks, breaks, signs of overheating and other damage. Inspect the mounting hardware for cracks, breaks, and damaged threads. Replace a defective part

c. Installation. Refer to Fig. 32 and install the blower motor starter overload heaters Replace heaters in reverse order of removal

45. Blower Motor Starter

a. General. The blower motor starter is a magnetic starter with a fast tripping circuit breaker and a reset bar. It is equipped with three overload heaters which are replaceable without removing the blower motor starter

b. Removal.

1. Remove the blower motor starter overload heaters, Para. 44.

2. Refer to Fig. 28 and remove the blower motor starter.

3. Remove the power leads from the starter connections, L1, L2 and L3.

4.Remove the motor leads from the starter connections, T1, T2 and T3.

5. Remove the two wires from the starter coil.

6. Remove the mounting screws that hold the starter in place.

NOTE: TAG ALL WIRES BEFORE REMOVING.

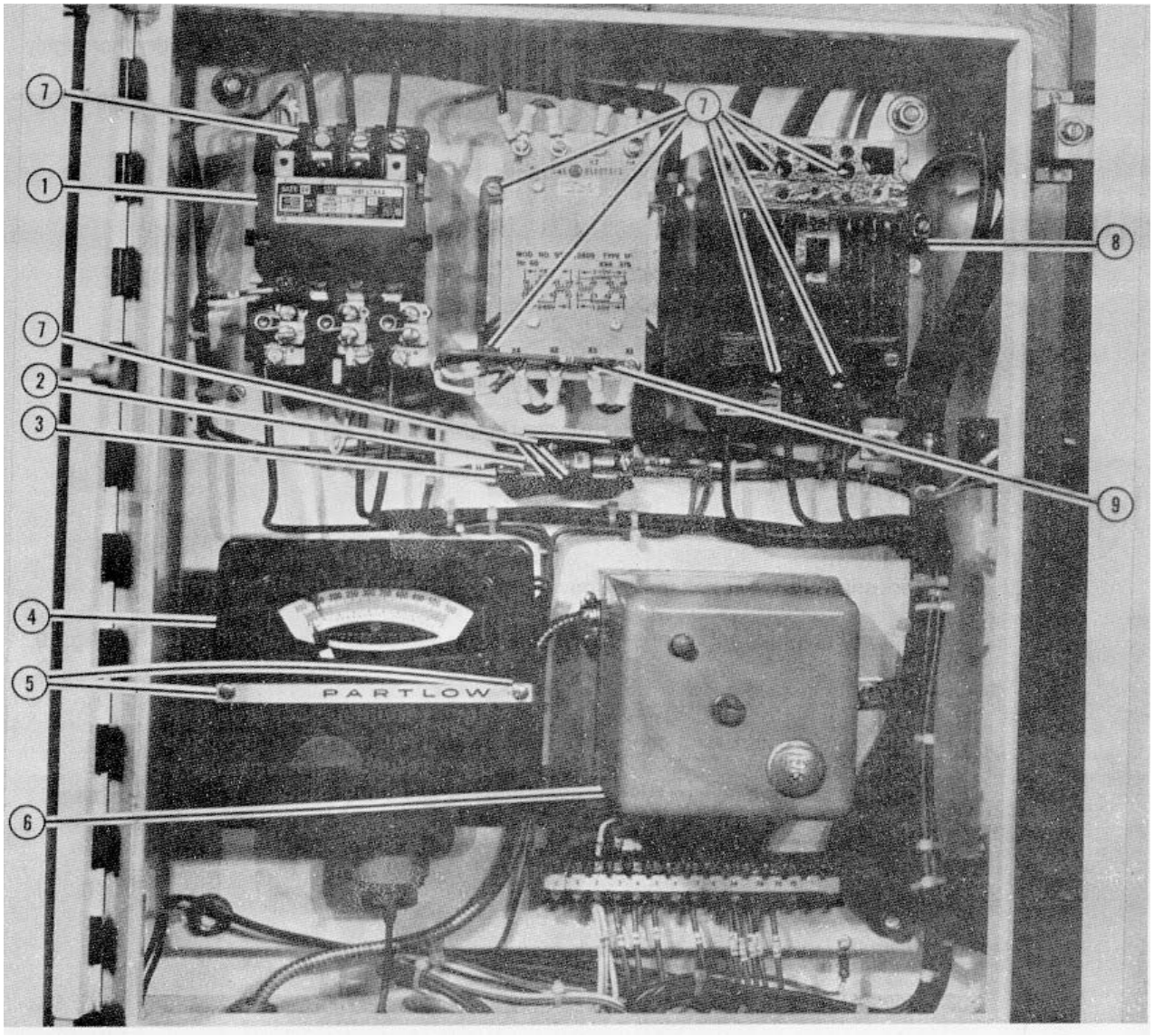


Figure 28. CONTROL BOX EQUIPMENT

1 - BLOWER MOTOR STARTER

2- FUSE

3 - FUSE BLOCK

4. TEMPERATURE CONTROL

5 - TEMPERATURE CONTROL COVER SCREWS

6 - FLAME PROGRAM CONTROL

7- MOUNTING SCREWS

8 - CIRCUIT BREAKER

9 CONTROL PANEL TRANSFORMER

c. Cleaning and Inspection.

1. Clean all parts with a cloth dampened in an approved cleaning solvent and dry thoroughly.

2. Inspect the blower motor starter for corrosion, damaged terminal posts, signs of over-heating, and other damage.

3. Inspect the mounting hardware for cracks, breaks, and damaged threads.

4. Replace defective parts.

NOTE: DO NOT FILE CONTACTS.

d. Installation.

1. Install the blower motor starter in reverse order of removal.

2. Install the blower motor starter overload heaters. (Para. 44)

46. Flame Program Controller

a. Removal.

1. Loosen screw in cover; remove cover. Ref. Fig. 29.

2. Loosen retaining screws in chassis - one at top and bottom; remove chassis. Ref. Fig. 29.

b. Cleaning and Inspection.

1. Clean the program controller with an approved cleaning solvent and dry thoroughly.

2. Inspect for corrosion, missing terminal screws, signs of overheating and other damage.

3. Replace a missing terminal screw. Replace a defective program controller.

c. Installation.

1. Install program control into base in reverse order of removal.

2. Install the cover (Fig. 29).

47. Temperature Controller

a. On-Equipment Testing.

1. Refer to Para. 80 and remove the hot oil thermometer and replace with a reliable testing thermometer.

2. Start the hot oil heater (Para. 13).

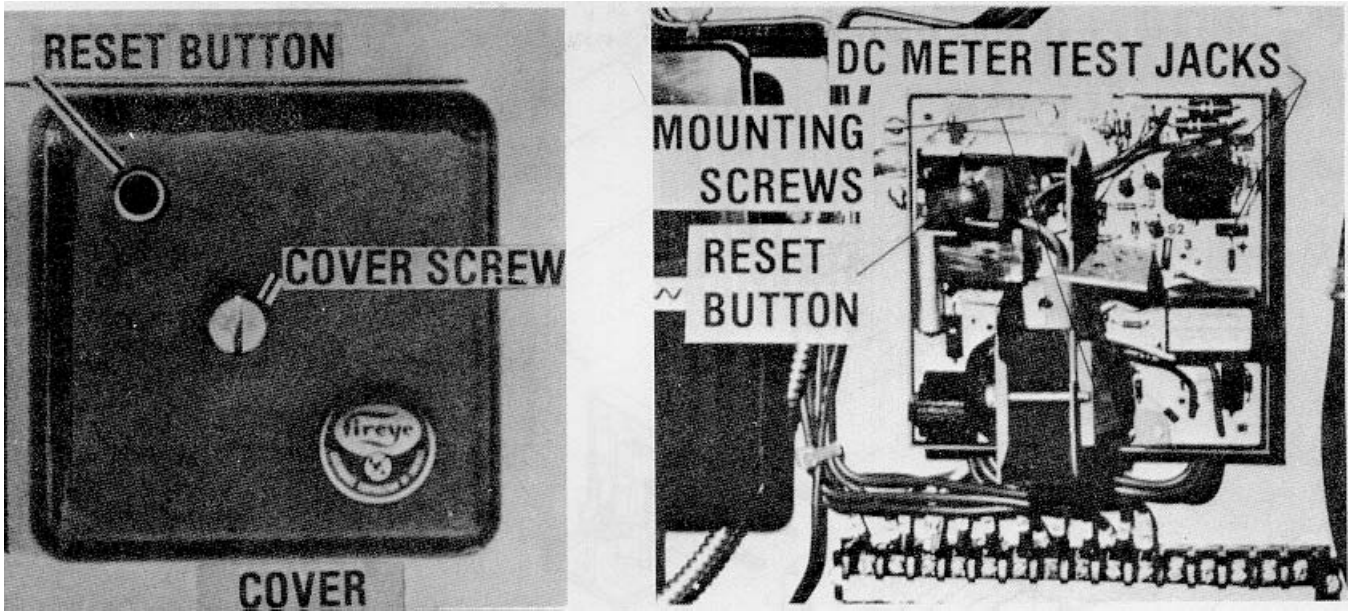


Figure 29. FLAME PROGRAM CONTROLLER

3. The temperature control should be set to within plus or minus of 15° of that shown on the test thermometer.

4. If the temperature control does not respond as above, replace the capillary tube and bulb.

5. It is possible to calibrate the control using a small wrench. This calibration should not be made unless the capillary tube and bulb has first been checked as outlined In one (1) through three (3) above.

6 Following replacement of the capillary tube and bulb, perform steps one (1) through three

(3) above. If the temperature controller does not respond as indicated in three (3) above,

the controller is defective and should be replaced.

7. Following the test, stop the hot oil heater (Para. 13).

8. Remove the test thermometer and reinstall the regular thermometer in the line.

NOTE: TO CALIBRATE TEMPERATURE CONTROL, REFERENCE FIG. 30 AND PROCEED AS FOLLOWS:

1. Move setting point tip to temperature indicated by test thermometer, Item 9.

2. Remove cover screws, knob, and cover, Items 2, 3 & 1.

3. Loosen push rod set screw, Item 6.

4. Using 3/16" wrench, turn push rod (counterclockwise to decrease temperature and clock-wise to increase temperature) until indicating pointer tip reaches temperature that the setting point tip is set to, Items 5, 8 & 9.

5. Tighten push rod set screw.

6. Replace cover, knob, and cover screws.

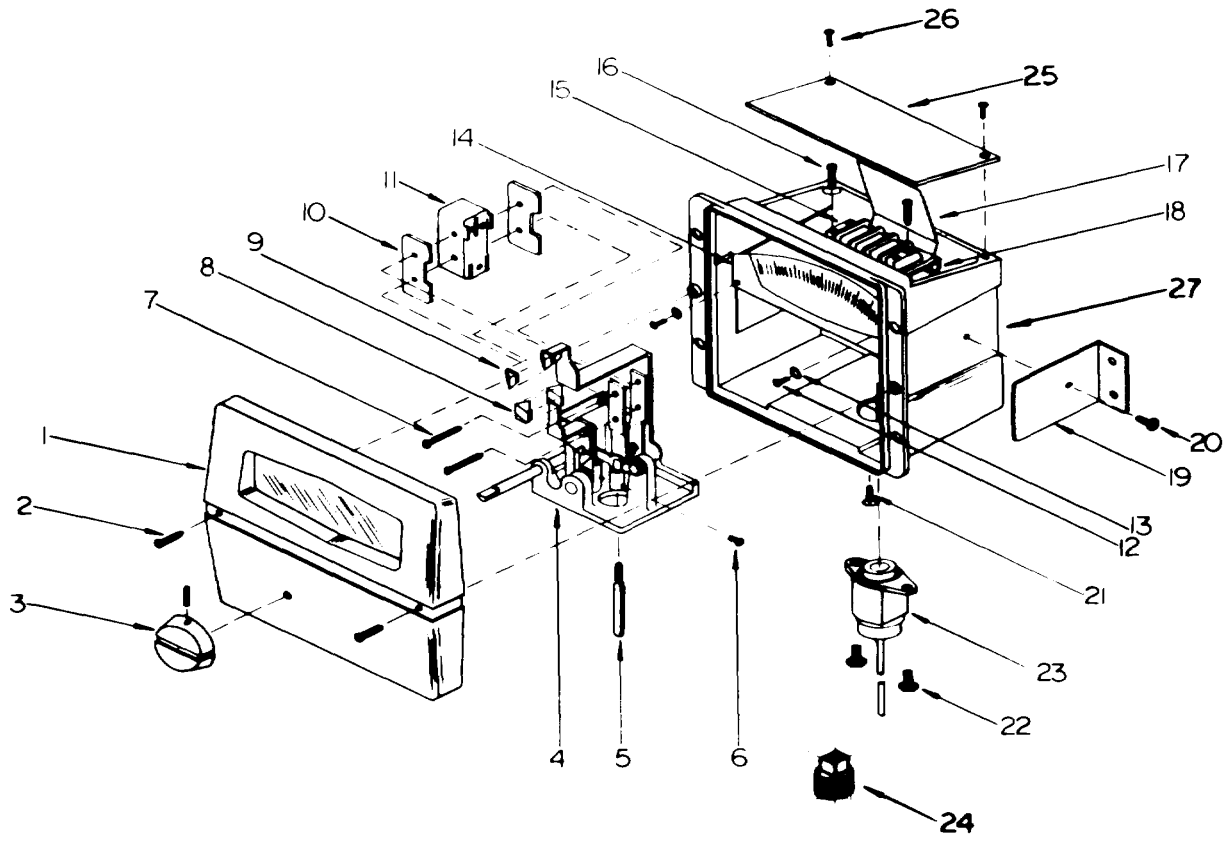


Figure 30. TEMPERATURE CONTROL.

1. Cover
2. Cover Screw
3. Knob W/Set Screw
4. Mechanism Assembly
5. Push Rod
6. Push Rod Set Screw
7. Switch Holding Screw
8. Indicating Pointer Tip
9. Setting Pointer Tip
10. Switch Insulator
11. Control Switch
12. Dial Screw
13. Dial Washer
14. Dial
15. Terminal Block
16. Terminal Block Screw
17. Terminal Block Insulator
18. Terminal Block Mounting Bracket
19. Mounting Angle
20. Mounting Angle Screw
21. Mechanism Holding Screw
22. Element Flange Screw
23. Capillary (Thermal) Element
24. 3/8" Brass Slotted Pipe Plug
25. Outlet Box Cover
26. Outlet Box Cover Screw
27. Case

b. Removal

1. Remove two element flange screws - pull capillary element down and away from control, Fig. 30, Items 22 & 23.
2. Remove outlet box cover on top of control; disconnect all electrical connections, Fig. 30, Item 25.

3. Remove mounting screws; refer to Figs. 28 & 31 and remove control from panel. NOTE:TAG AND NOTE ALL ELECTRICAL WIRING.

c. Installation. Install the temperature controller in reverse order of removal.

48. Circulating Pump Motor Starter Overload Heaters

a. Removal. Refer to Fig. 32 and remove the circulating pump motor starter overload heaters without removing the circulating pump motor starter.

1. Remove circulating pump motor starter enclosure cover, Figure 33.

2. Remove the two screws that hold heaters in place.

3. Remove heaters from starter.

b. Cleaning and Inspection.

1 Clean all parts with a cloth dampened in an approved cleaning solvent and dry thoroughly.

2. Inspect the heaters for cracks, breaks, signs of overheating, and other damage Inspect the mounting hardware for cracks, breaks, and damaged threads. Replace a defective part.

c. Installation. Refer to Fig. 32 and install the circulating pump starter overload heaters. Replace heaters in reverse order of removal.

49. Circulating Pump Motor Starter

a. General. The circulating pump motor starter is a magnetic starter with a reset bar used to activate the circulating pump motor. It is equipped with three overload heaters which are replaceable without removing the blower motor.

b. Removal.

1. Remove circulating pump motor starter enclosure cover, Fig. 33.

2. Remove the circulating pump motor starter heaters, Para. 48.

3. Refer to Fig. 32 and remove the circulating pump motor starter.

4. Remove the power leads from the starter connections, L1, L2 and L3.

5. Remove the motor leads from the starter connections, T1, T2 and T3.

6. Remove the two wires from the starter coil.

7. Remove the mounting screws that hold the starter in place.

NOTE: TAG ALL WIRES BEFORE REMOVING.

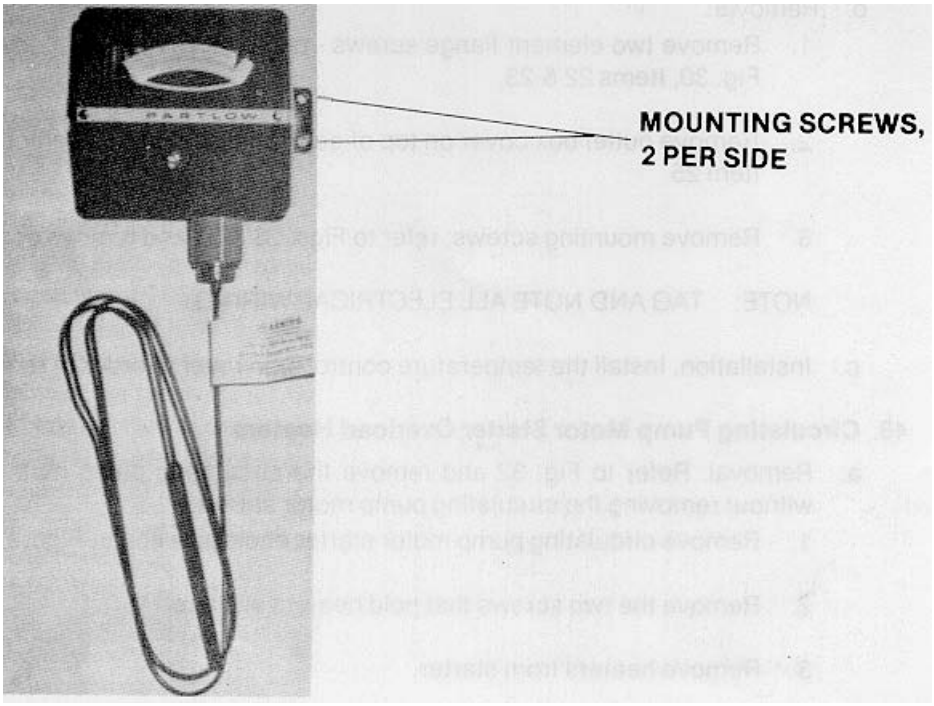
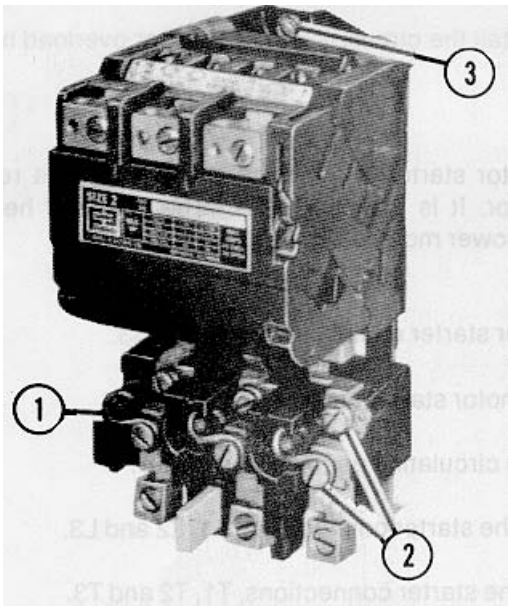


Figure 31. TEMPERATURE CONTROL MOUNTING.



1. OVERLOAD HEATERS

2. HEATER MOUNTING SCREWS

3. STARTER MOUNTING SCREWS

NOTE: TWO BOTTOM MOUNTING SCREWS

Figure 32. STARTER OVERLOAD HEATERS & MOUNTING.

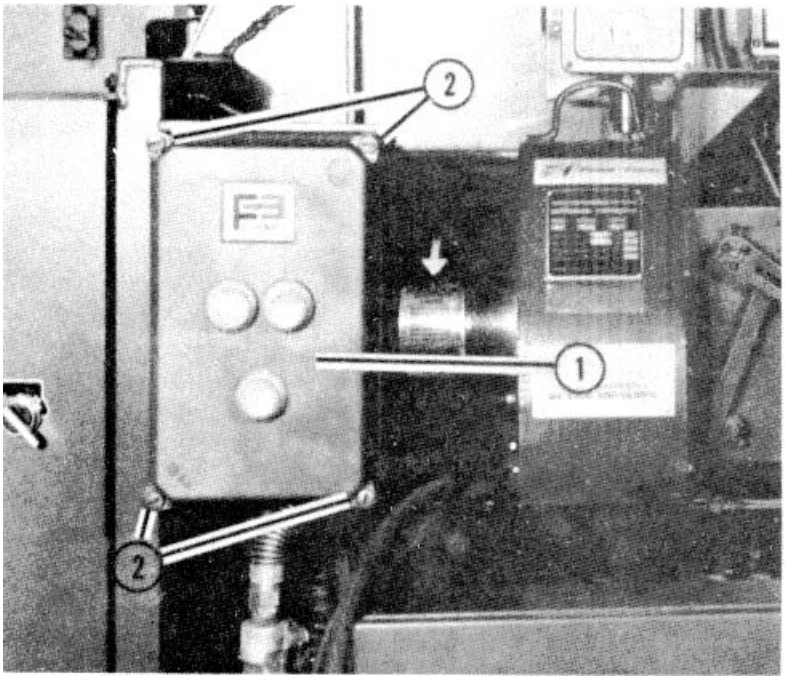


Figure 33. CIRCULATING PUMP MOTOR STARTER ENCLOSURE.

c. Cleaning and Inspection.

1. Clean all parts with a cloth dampened in an approved cleaning solvent and dry thoroughly.

2. Inspect the circulating pump motor starter for corrosion, damaged terminal posts, overheating, and other damage.
3. Inspect the mounting hardware for cracks, breaks, and damaged threads. Replace all defective parts.

d. Installation. Install in reverse order of removal.

1. Refer to Fig. 32 and install the circulating pump motor starter.

2. Install the circulating pump motor starter heaters (Para. 48).

3. Replace starter enclosure cover, Fig. 33.

50. Pressuretrol

a. Removal. Refer to Fig. 1, Item 4, and Fig. 34; remove the pressuretrol.

1. Loosen four screws in cover plate; remove cover plate.

2. Loosen nut on pressure line at bottom of pressuretrol.

NOTE: SHUT VALVE OFF BEFORE REMOVING PRESSURE LINE.

3. Disconnect electrical connections.

4. Remove mounting screws; remove pressuretrol.

b. Cleaning and Inspection.

1. Clean the pressuretrol with a cloth dampened in an approved cleaning solvent and dry thoroughly.

2. Inspect for corrosion, broken or defective snap switch, and other damage. Replace a defective pressuretrol.

c. Installation. Refer to Fig. 34. Install in reverse order of removal.

d. Adjustment.

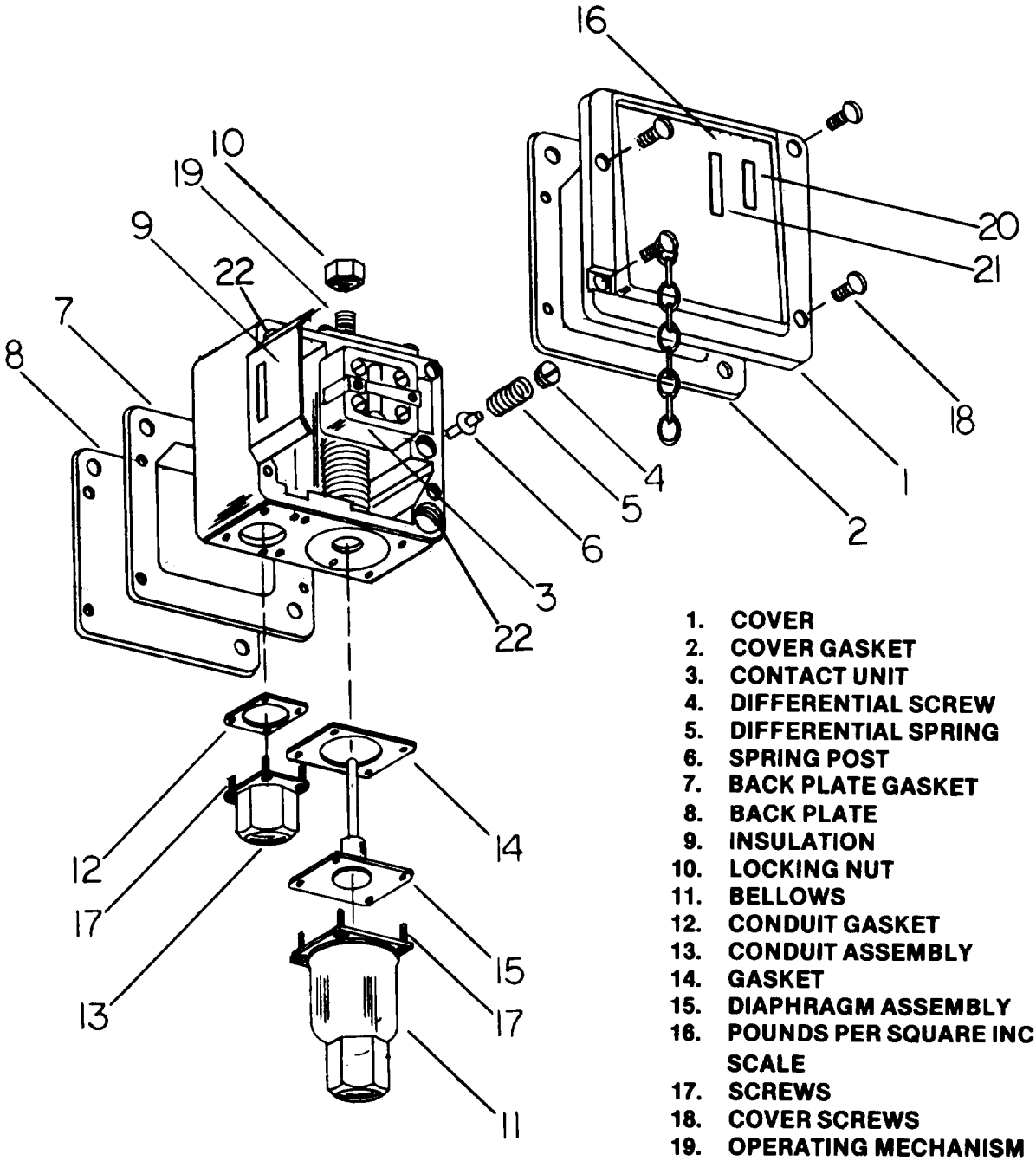
1. Refer to the adjustment points and setting indicators, Fig. 34.

2. NOTE:REFER ONLY TO THE POUNDS PER SQUARE INCH SCALES.

3. Set the bellows, Item 11, until the low cutoff pressure is 25 PSI.

4. Set the differential adjusting screw, Item 4, until the differential pressure scales reads 2 PSI.

NOTE: WHEN PROPERLY ADJUSTED, THE PRESSURETROL WILL SHUT DOWN THE HOT OIL HEATER WHEN THE HOT FLUID PRESSURE LOWERS TO 5 PSI AND ALLOWS THE HEATER TO BE RESTARTED WHEN THE PRESSURE RISES TO 7 PSI.



1. COVER
2. COVER GASKET
3. CONTACT UNIT
4. DIFFERENTIAL SCREW
5. DIFFERENTIAL SPRING
6. SPRING POST
7. BACK PLATE GASKET
8. BACK PLATE
9. INSULATION
10. LOCKING NUT
11. BELLOWS
12. CONDUIT GASKET
13. CONDUIT ASSEMBLY
14. GASKET
15. DIAPHRAGM ASSEMBLY
16. POUNDS PER SQUARE INCH SCALE
17. SCREWS
18. COVER SCREWS
19. OPERATING MECHANISM
20. DIFFERENTIAL PRESSURE SCALE INDICATOR
21. LOW CUTOFF SCALE INDICATOR
22. MOUNTING SCREWS

Figure 34. PRESSURETROL

5**1. Low Fluid Level Cutoff** (Low Level Control)

a Removal. Refer to Fig. 35 & 36 and remove the low fluid level cutoff.

NOTE MAKE CERTAIN ALL HEAT TRANSFER FLUID IS REMOVED FROM EXPANSION TANK BEFORE REMOVAL OF LOW FLUID CUTOFF.

1. Loosen screws in cover; remove cover

2 Tag and disconnect all electrical connections.

3 Turn hex section with wrench, counterclockwise; remove control.

b. Cleaning and Inspection.

1. Clean the low fluid level cutoff with a cloth dampened in an approved cleaning solvent and dry thoroughly.

2. Inspect for corrosion, broken or defective switch and other damage. Inspect mounting hardware for cracks, breaks, and damaged threads

3. Replace any defective parts. Ref. Fig. 36.

c. Installation. Refer to Fig. 35 and install the low fluid level cutoff in reverse order of removal.

52. High Temperature Limit Control

a. On-Equipment Adjustment.

1. This is an internally set control. An adjusting screw inside the case is turned to position the switch for actuation at a specified temperature. Refer to Fig. 37 and adjust control.

2. While hot oil heater is in operation and temperature control is set above high temperature required, adjust high temperature control setting for shutoff. Maximum setting 4500F.

3. If the high temperature control does not respond and actuate switch, replace the capillary tube and bulb.

4. Following replacement of a new capillary, repeat adjustment for high temperature control setting.

5. Reduce temperature control setting for operating temperature of hot oil heater below setting of high temperature control.

6. This high temperature adjustment should be made with the temperature control test (Para. 47).

b. Removal. Refer to Fig. 1, Item 3 and remove the high temperature control.

1. Loosen 2 screws in cover plate on top; remove cover.

NOTE: MAKE CERTAIN ALL ELECTRICAL POWER HAS BEEN TURNED OFF.

2. Remove and tag electrical connections.

3. Remove 2 screws from thermal element, Fig. 37, and remove thermal element by pulling down and away from control.

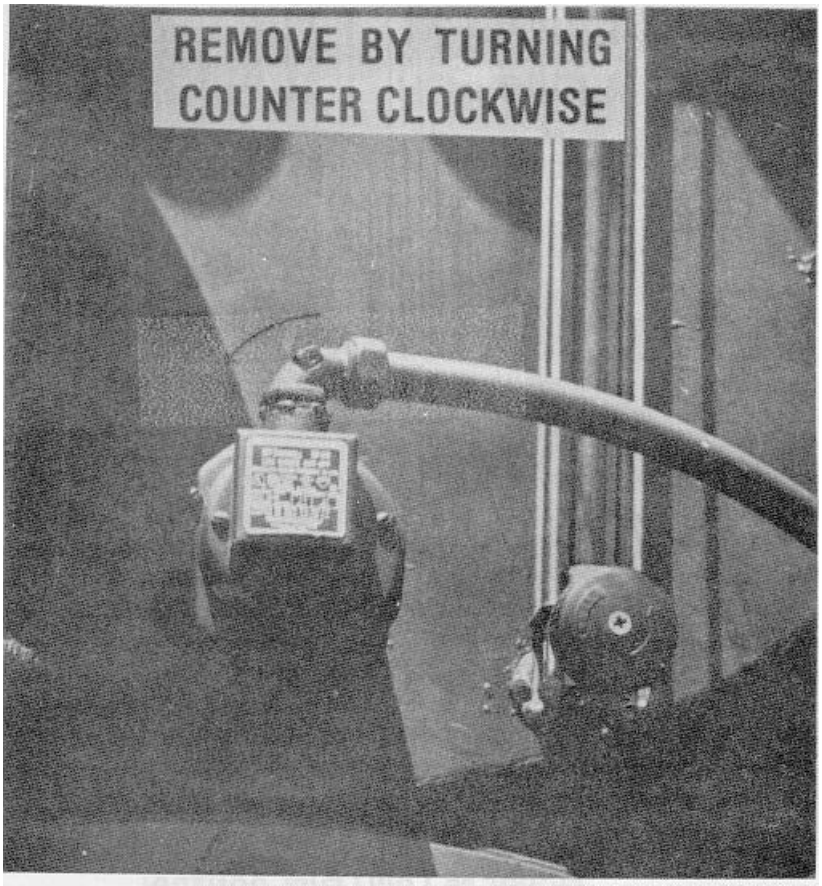


Figure 35. LOW LEVEL CONTROL MOUNTING.

MOUNTING: The low level control has a 21/2" pipe thread and is mounted into a 21/2" pipe coupling welded into the expansion tank. In mounting the control to the tank, the hex nut should be turned so that the 1/2 " conduit opening is at the top in a horizontal plane. The float must move up and down in a vertical plane.

OPERATING: The dual switches are activated by movement of the float ball. When the ball rises, the top switch is closed; when the ball falls the switch opens. This is controlled by the heat transfer oil level. The second switch is not used. It is left disconnected.

SWITCHING: The switch designations are 1 & 2 and 3 & 4. On a rising level, 1 & 2 close with 3 & 4 opening.

SWITCH RATING: 115V.A.C. .....- 7.4 Amps.
230 V.A.C. -.....- 3.7 Amps.

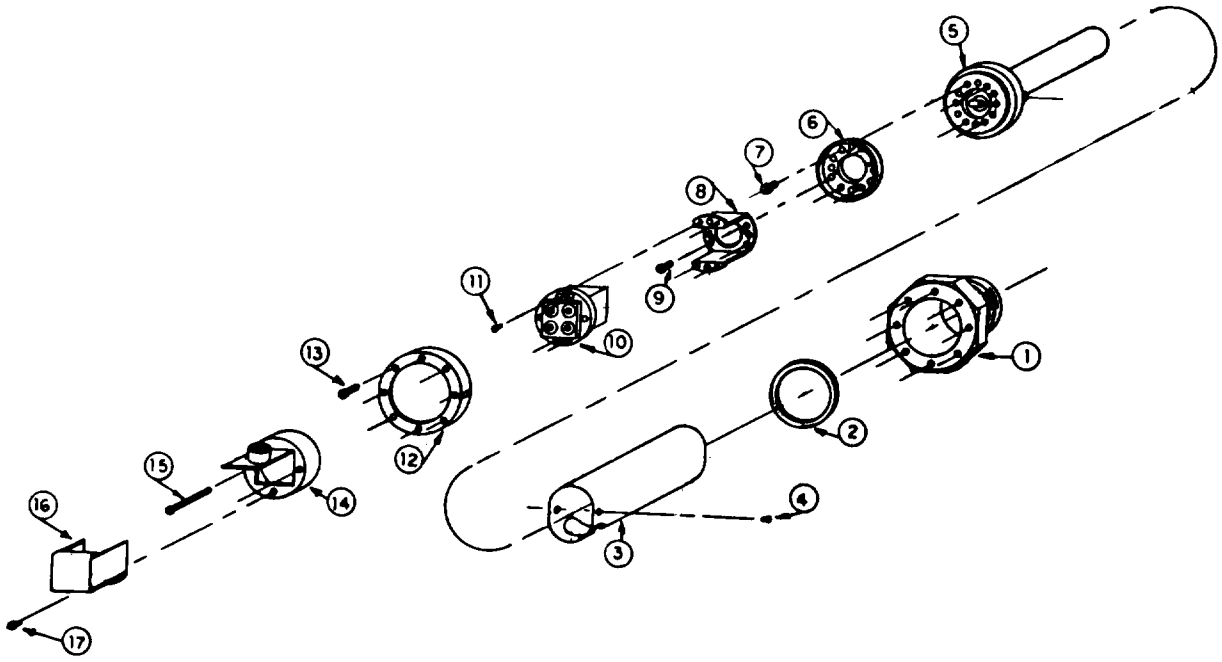


Figure 36. LOW LEVEL CONTROL

1 LEVEL BODY

2 BODY GASKET

3 FLOAT GUIDE/PROTECTOR

4 FLOAT GUIDE SCREWS 2 REQ'D.

5 FLOAT

6 SWITCH MOUNTING RING

7 MOUNTING RING SCREWS 4 REQ'D.

8 SWITCH SUPPORT BRACKET

9 BRACKET SCREWS 4 REQD.

10 LEVEL SWITCH

11 SWITCH MOUNTING SCREWS -4 REQ'D.

12 RETAINING FLANGE

13 RETAINING SCREWS 8 REQ'D.

14 SWITCH BOX

15 SWITCH BOX SCREWS -2 REQ'D.

16 BOX COVER

17 COVER SCREW 1 REQ'D.

c. Cleaning and Inspection

1. Clean all parts with a cloth dampened in an approved cleaning solvent and dry thoroughly.

2. Inspect the control for cracks, breaks, signs of overheating, and other damage. Inspect the mounting hardware for cracks, breaks, and damaged threads. Replace a defective part.

d. Installation. Refer to Fig. 1, Item 3, and install the high temperature limit control. Replace In reverse order of removal.

1. **Cover**
2. **Cover Gasket**
3. **Cover Screw**
4. **Switch Holding Screw**
5. **Control Switch**
6. **Switch Insulator**
7. **Outlet Box Cover**
8. **Cover Screw**
9. **Outlet Box**
10. **Outlet Box Screw**
11. **Terminal Block**
12. **Block Mounting Screw**
13. **Element Flange Screw**
14. **Thermal Element**
15. **Adjusting Screw**
16. **Slotted Brass Nut**
17. **Control Housing**

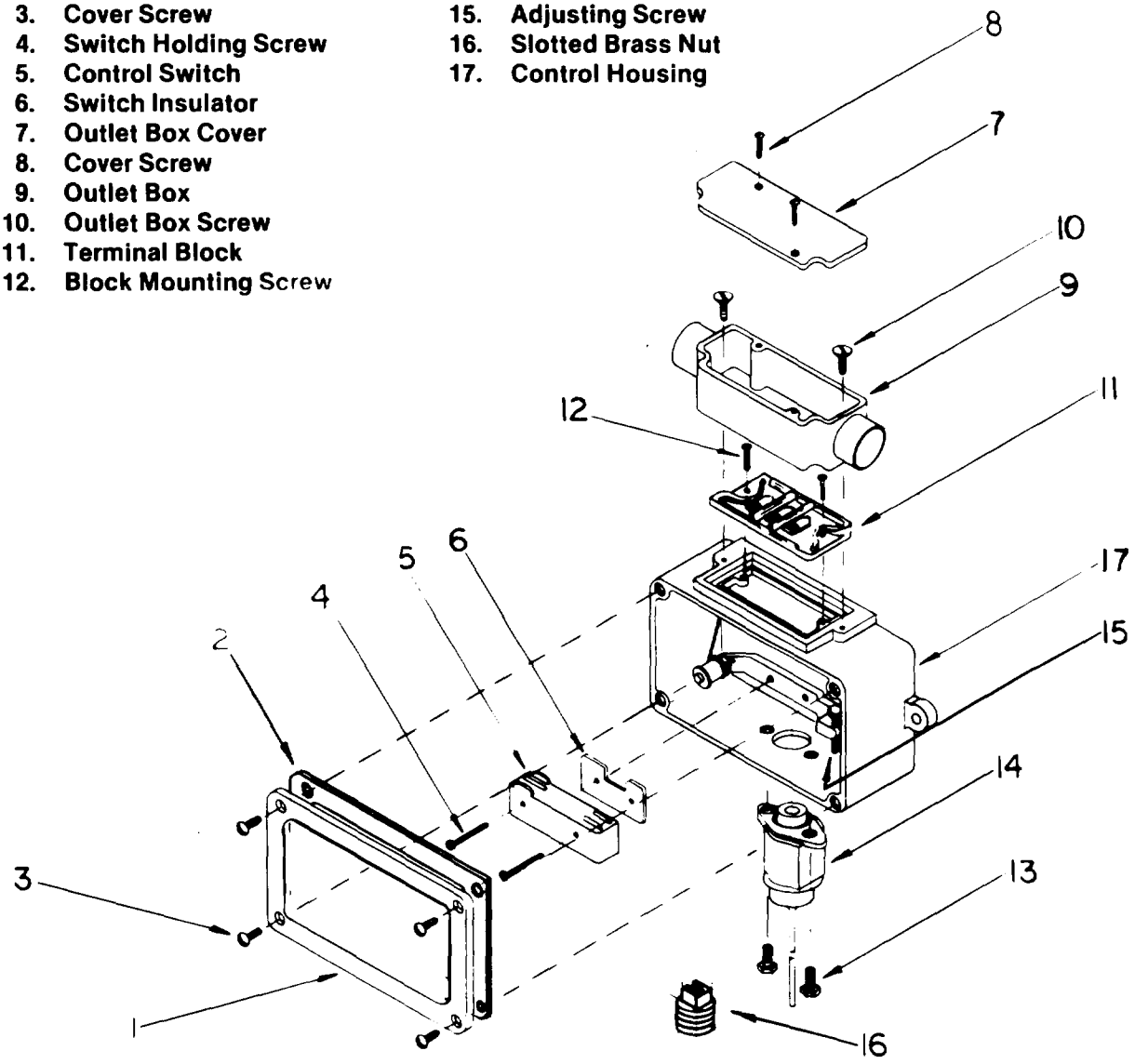


Figure 37. HIGH TEMPERATURE CONTROL

53. Ultraviolet (UV) Scanner

a. On-Equipment Testing.

1. With a 20,000 ohms/volt test meter set on the low VDC scale and plugged into the test jacks on the control (Fig. 29) (top jack - and bottom jack +) the flame relay will pull in at approximately 3VDC NOTE IF THE METER READS BACKWARDS, REVERSE THE JACKS Now, start the heater.

2. To assure sufficient margin of signal to hold In during random momentary downware fluctuations of the signal, it is desirable to obtain an average of 3 50 DC or more A good reading will be from 3.5VDC to 6VDC.

3. Allow the flame program control to program normally and observe a signal on the volt- meter. If the signal Is below 3.5 volts, this is indicative of either A) a dirty or otherwise obscured viewing window on the U V. cell or B) a faulty cell A smoky fire will also reduce detection.

4. If the readings are normal as indicated In "3" above, further check the U V. cell by shutting down the fuel supply. Within two (2) seconds of burner flameout, the meter will read "0" and the burner will go into alarm requiring a manual reset Refer to Fig 29 to restart and recycle

5. If the U V cell does not check out as described in the above, refer to Fig. 38 for removal and/or replacement.

b. Removal Refer to Fig. 38 and remove the U.V cell and electron tube.

1. Turn nut on U V cell counterclockwise and remove from 112" NPT pipe attached to burner body

2. Disconnect electrical connections & remove from control.

3. Replace in reverse order.

c. Cleaning and Inspection.

1. Clean all parts with a cloth dampened with an approved cleaning solvent and dry thoroughly. The viewing window in particular should be clean and free of obstruction.

2. Inspect the U.V. cell and electron tube for defects and damage Inspect for a bent or misaligned viewing window tube.

3. Inspect mounting hardware for cracks, breaks, and damaged threads. Replace any defective parts.

d. Installation. Refer to Fig. 38 and Install the U.V. cell and electron tube.

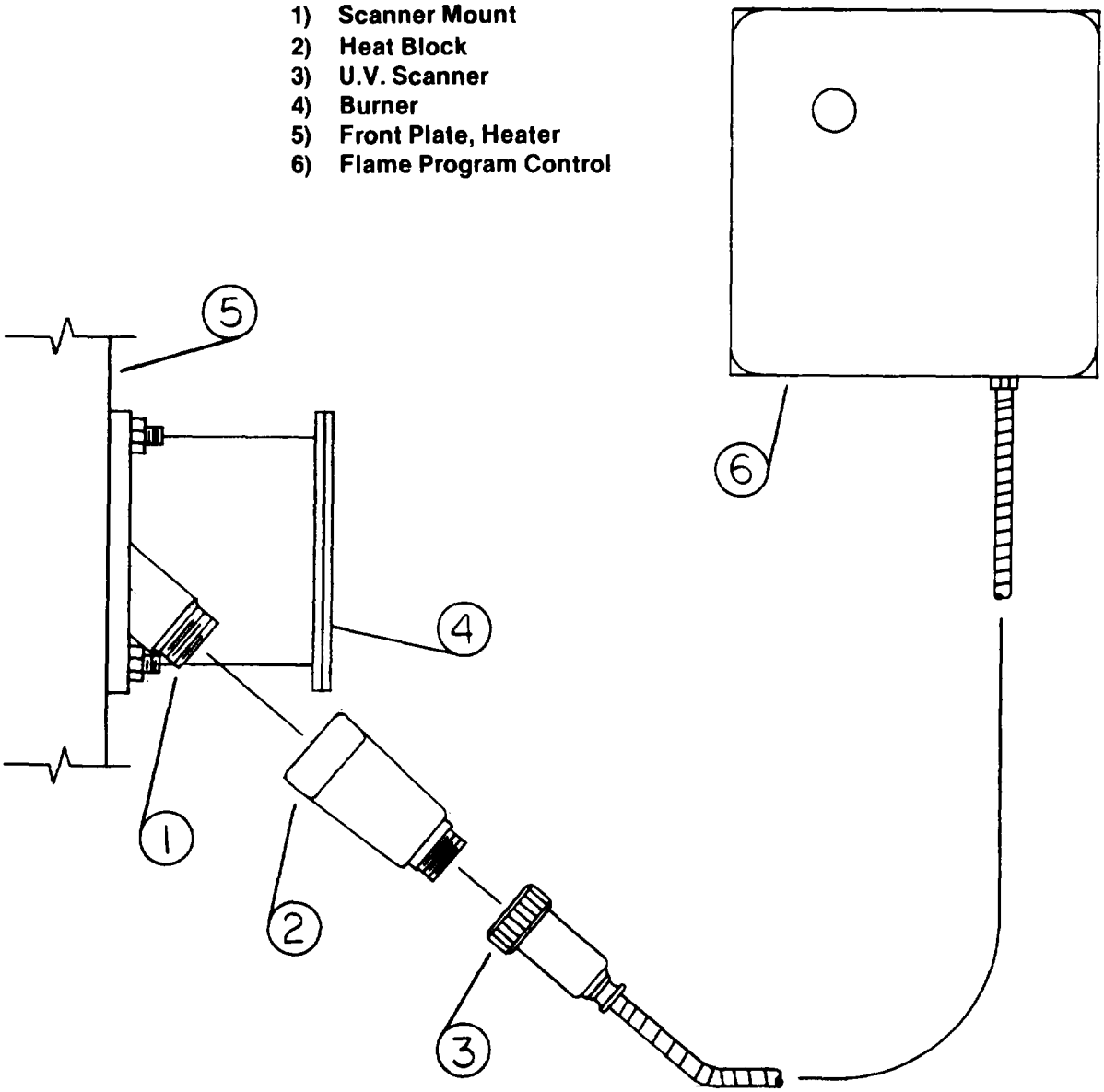


Figure 38. ULTRAVIOLET (U.V.) CELL.

54. Ignition Transformers and Bussbars

a. Removal. Refer to Fig. 39 and remove the ignition transformer and ignition cables.

WARNING: DO NOT SERVICE ANY ELECTRICAL EQUIPMENT WHILE ELECTRICAL SUPPLY IS CONNECTED. TURN ALL ELECTRIC POWER OFF. IGNITION TRANSFORMER HAS 120 VOLTS PRIMARY CONNECTIONS, WITH 10,000 VOLTS SECONDARY TO GROUND.

1. Remove 2 screws on ignition transformer; tag and disconnect electrical wires, remove electrical fittings.
2. Remove 2 screws from burner cover plate; remove plate.
3. Pull ignition wires from ignition transformer.
4. Remove 2 nuts from mounting studs; remove ignition transformer.

b. Cleaning and Inspection.

1. Clean all parts with a cloth dampened with an approved cleaning solvent and dry thoroughly.

2. Inspect the transformer and gasket for defects. Inspect the bussbars for signs of arcing, overheating, and other damage.

3 Inspect the mounting hardware for cracks, breaks, and damaged threads.

4. Replace all defective parts.

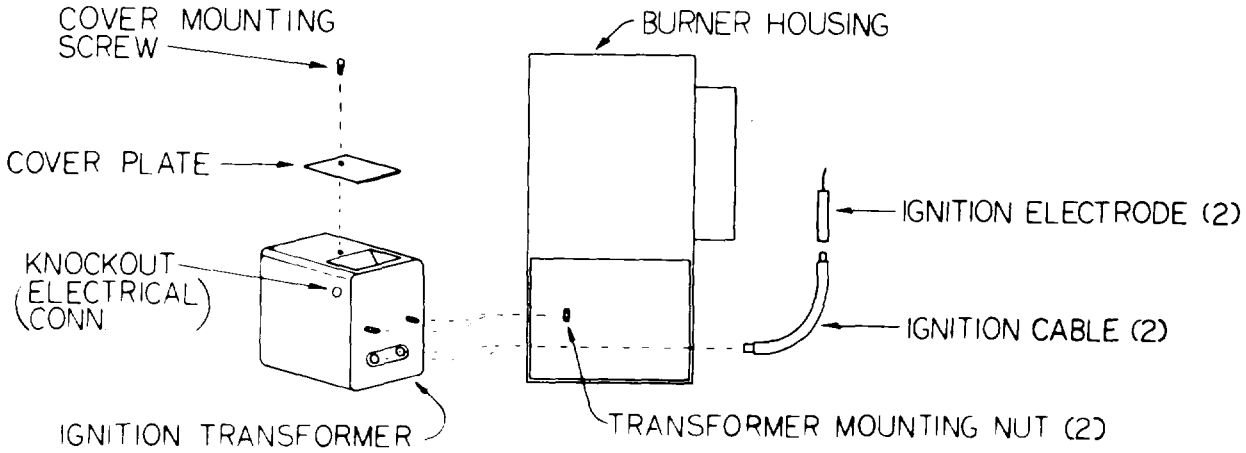


Figure 39. IGNITION SYSTEM

55. Burner Switch, Blower Motor Starter and Circulating Pump Starter Pushbuttons

a Removal Refer to Fig 11, 40 & 41 to remove the burner switch, blower motor starterand circulating pump starter pushbuttons

1. Turn off electric power to control power panel.

2 Open control panel door

3 Turn nut counterclockwise on burner switch, remove nut.

4 Remove & tag electrical wires from switch block.

5 Remove switch

b. Remove for Cleaning and Inspection.

1. Loosen screws in pump starter cover.

2. Remove cover from starter enclosure, Fig. 33.

3. Remove protective boot from pushbutton.

4. Turn nut counterclockwise on pushbutton; remove nut.

5. Remove pushbutton from cover.

c. Cleaning and Inspection.

1. Clean all parts with a cloth dampened in an approved cleaning solvent and dry thoroughly.

2. Inspect the switch or pushbutton for corrosion, defective operation, or other damage. Replace a defective switch or pushbutton.

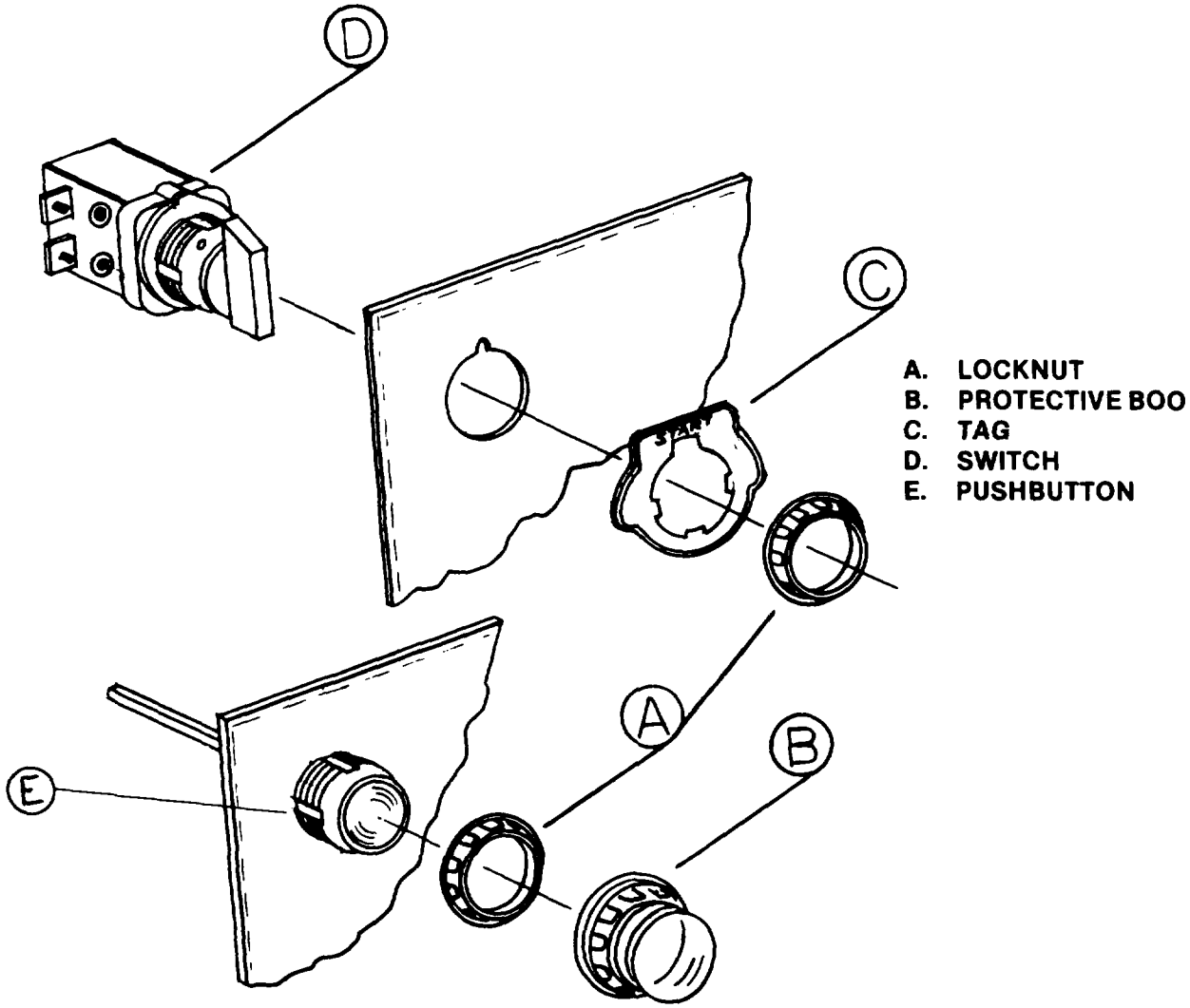


Figure 40. CONTROL SWITCHES.

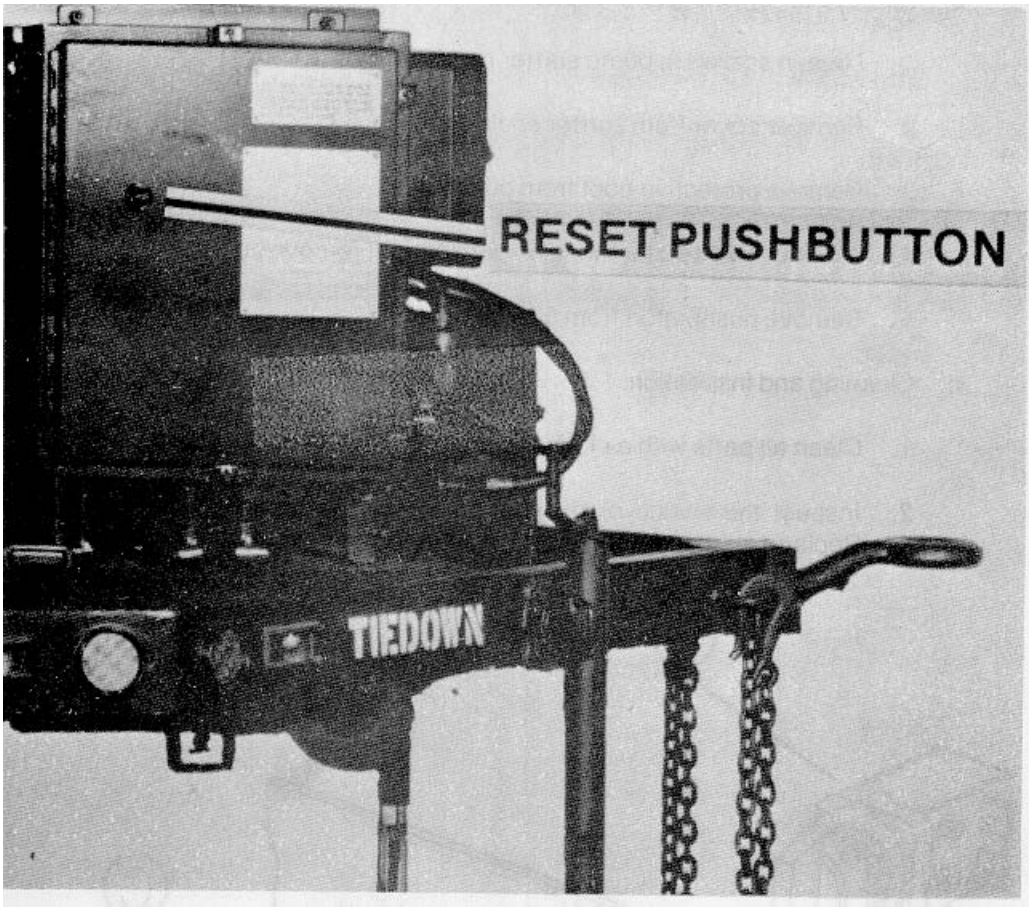


Figure 41. BLOWER MOTOR STARTER RESET PUSHBUTTON.

Section D. BURNER DRAWER ASSEMBLY, NOZZLE, AND ELECTRODES

56. General

The drawer assembly is the internals of the burner which combines the ignition spark with the proper fuel/air ratio for combustion. One nozzle and two electrodes combined with fuel lines, ignition cables, and one air spinner make up the drawer assembly. These are combined so they may be removed as one assembly.

a. Assembly and Disassembly.

1. With burner shut down, remove the drawer assembly by loosening long nuts on fuel line to drawer assembly. (Ret Fig. 42, Item 17).

2. Remove two screws from burner housing back plate, ref. Fig. 44, Item 34. Remove burner housing back plate.

3. Remove capscrew from oil gun mounting plate (Fig. 42, Item 2) and pull assembly from burner housing after unhooking ignition cables from ignition transformer.

4. Ref. Fig. 42 and disassemble the nozzle and electrodes

b. Cleaning, Inspection and Repair.

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

2. Remove any carbon deposits from the electrodes and nozzle. Nozzle apertures and air and fuel passages should be clear of obstruction.

3. Inspect all parts for cracks, breaks, and other damage

4. Inspect the ceramic portions of the electrodes for cracks, breaks, and loose mounting.

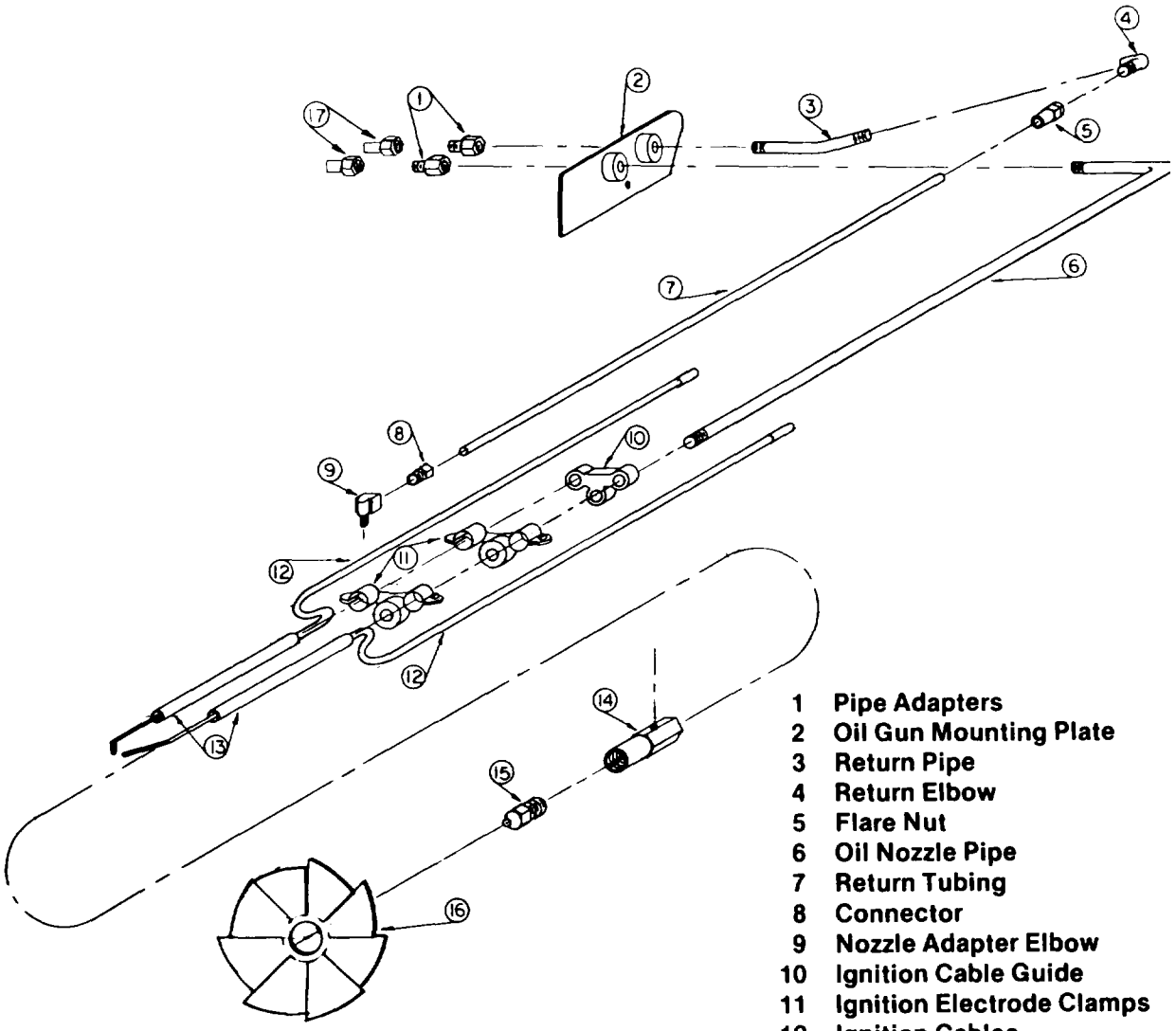
5. Inspect the hardware for cracks, breaks, and damaged threads.

6. Replace any defective parts as may be necessary.

c. Reassembly and Installation.

1. Refer to Fig. 42 and reassemble the nozzles and electrodes.

2. Adjust the burner electrodes (Para 58), Fig. 42.



1 Pipe Adapters
2 Oil Gun Mounting Plate
3 Return Pipe
4 Return Elbow
5 Flare Nut
6 Oil Nozzle Pipe
7 Return Tubing
8 Connector
9 Nozzle Adapter Elbow
10 Ignition Cable Guide
11 Ignition Electrode Clamps
12 Ignition Cables
13 Ignition Electrodes & Porcelain Insulators
14 Nozzle Adapter
15 Oil Nozzle
16 Spinner
17 Long Nuts

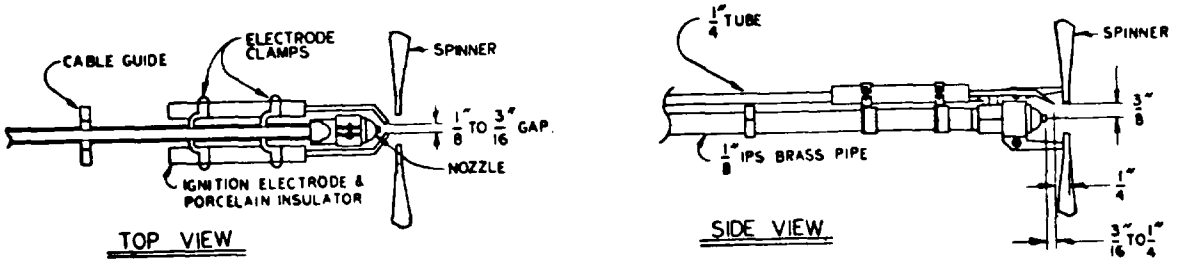


Figure 42. ELECTRODE ADJUSTMENT AND DETAIL ASSEMBLY.

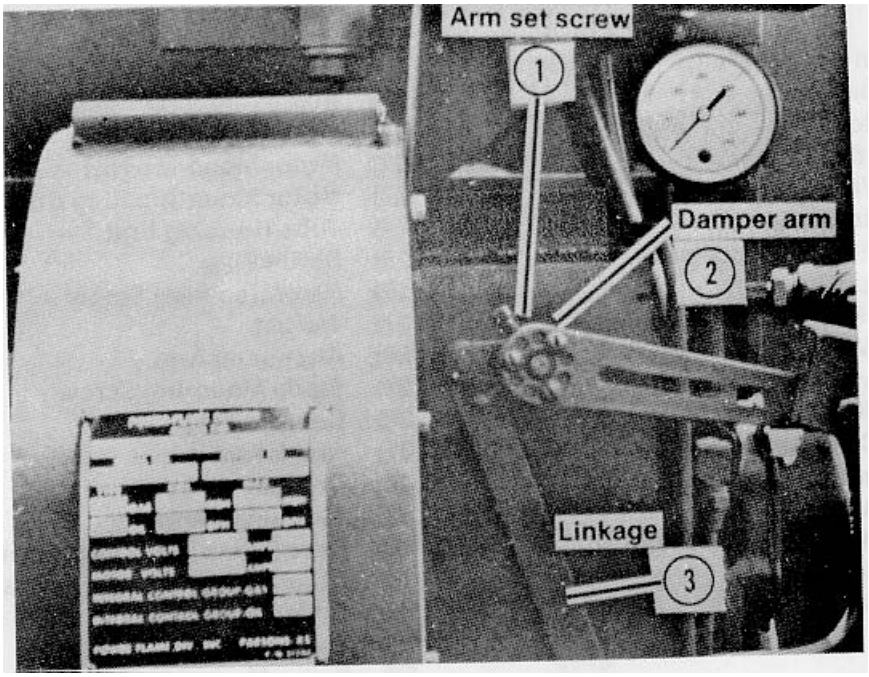


Figure 43. AIR DAMPER LINKAGE

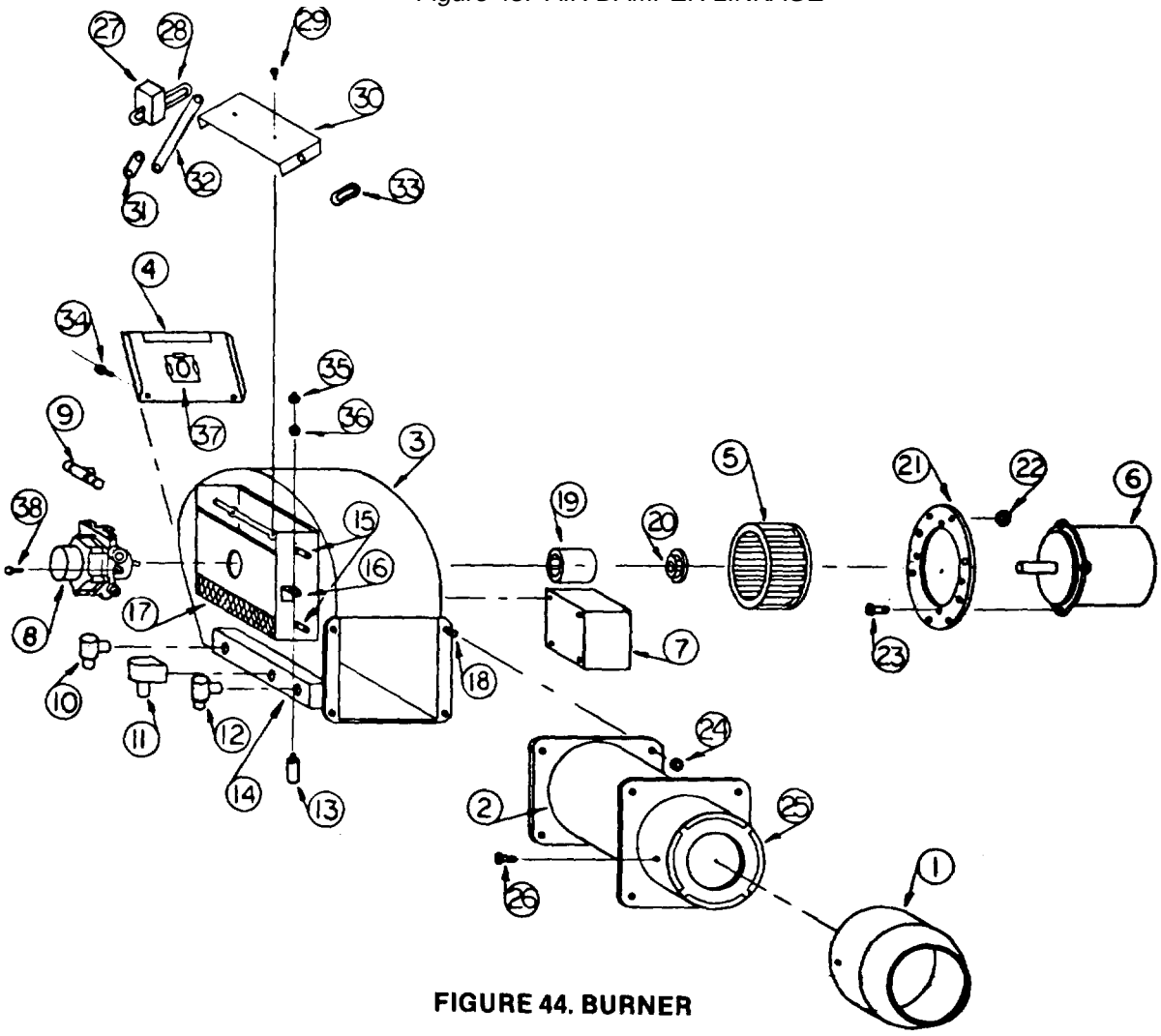


Figure 44. BURNER

Nomenclature for Figure 44

1) Retention Ring
2) Blast Tubes
3) Blower Housing
4) Housing Back Plate
5) Blower Wheel
6) Blower Motor
7) Pilot Ignition Transformer
8) Fuel Supply Pump
9) Low Fire Regulating Valve
10) Main Oil Valve
11) Three-Way Oil Valve
12) Return Oil Valve
13) Damper Cylinder
14) Valve Junction Box Cover
15) Damper Axle
16) Cylinder Mounting Bracket
17) Damper Screen
18) Tube Housing Stud
19) Pump Coupling
20) Pump Coupling Adapter
21) Motor Mounting Ring
22) Motor Mounting Nut
23) Motor Mounting Ring Bolt
24) Tube Housing Unit
25) Baffle Ring
26) Retention Ring Screw
27) Weight
28) Aluminum Arm
29) Blade Mounting Screw
30) Damper Blade
31) Crank Arm
32) Crossover Link
33) Aluminum Arm
34) Cover Plate Mounting Screw
35) Return Oil Pressure Regulator
36) Cylinder Mounting Nut
37) Back Plate Sight Glass
38) Pump Mounting Screw

57. Blower

a Removal The blower consists of a blower motor and blower wheel Inserted into the blower housing

1 Remove electrical connections at blower motor junction box Tag wires for Identification

2 Remove six nuts from studs in blower housing (Ref Fig 47)

3 Remove blower motor and blower wheel from blower housing

NOTE: Pump coupling to motor adapter will be disconnected at this time. This consists of 1/2 of the coupling installed on the blower motor shaft When removing this coupling from shaft, mark shaft for reinstallation Refer to Fig 44, Item 19

b Disassembly Refer to Fig 44 to disassemble the blower components

1. Remove coupling adapter from blower motor shaft.

2 Remove blower wheel from blower motor

c. Cleaning. Inspection and Repair

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

2. Inspect the blower housing for cracks, dents, breaks, and elongated mounting holes

3 Inspect the mounting ring (Fig 44, Item 21). damper blades (Fig 44. Item 30), and linkage (Fig 43) for cracks, breaks. and other damage

4. Inspect the mounting hardware for cracks, breaks and damaged threads.

5. Pound out dents and weld minor breaks in the blower housing.

6. Straighten a bent damper blade and adjust the air damper to position In relation to the control linkage.

7. Replace a defective part.

d. Air Damper Positioning. Position the air damper (Fig. 46) to the control linkage in such a manner that in the open position, the lower end of the control linkage will be nearest the blower housing.

e. Reassembly. Refer to Fig. 44 and reassemble the blower in reverse order of removal.

f. Installation. Refer to Fig. 47 and install the blower motor and blower wheel to the blower housing.

58. Burner Electrode Adjustment

a. Removal for Adjustment. Refer to Para. 56 and remove the drawer assembly

1. Loosen screws in ignition electrode clamps (Fig. 42, Item 11).

2. Remove Ignition cables from electrodes and remove electrodes.

b. Cleaning and Inspection

1. Clean the electrodes with an approved cleaning solvent and dry thoroughly. Remove any carbon deposits that may have formed on the electrodes.
2. Inspect for broken electrodes, both metal and ceramic portions. Inspect for other damage

3. If the electrodes or the nozzles are defective, replace the defective parts.

c. Adjustment Refer to Fig. 42 and adjust the burner electrodes in the drawer assembly.

d. Installation. Refer to Para. 56 and install the drawer assembly.

e. Electrode Spark Inspection.

1. Refer to Para. 13 and start the hot oil heater.

2. Refer to Fig. 45 and view the electrode spark through the rear plate viewer assembly Spark should be a bright blue if electrodes are properly adjusted.

3. If spark is red or yellow, or any other color than bright blue, readjust the ignition electrodes (See a through d, above).

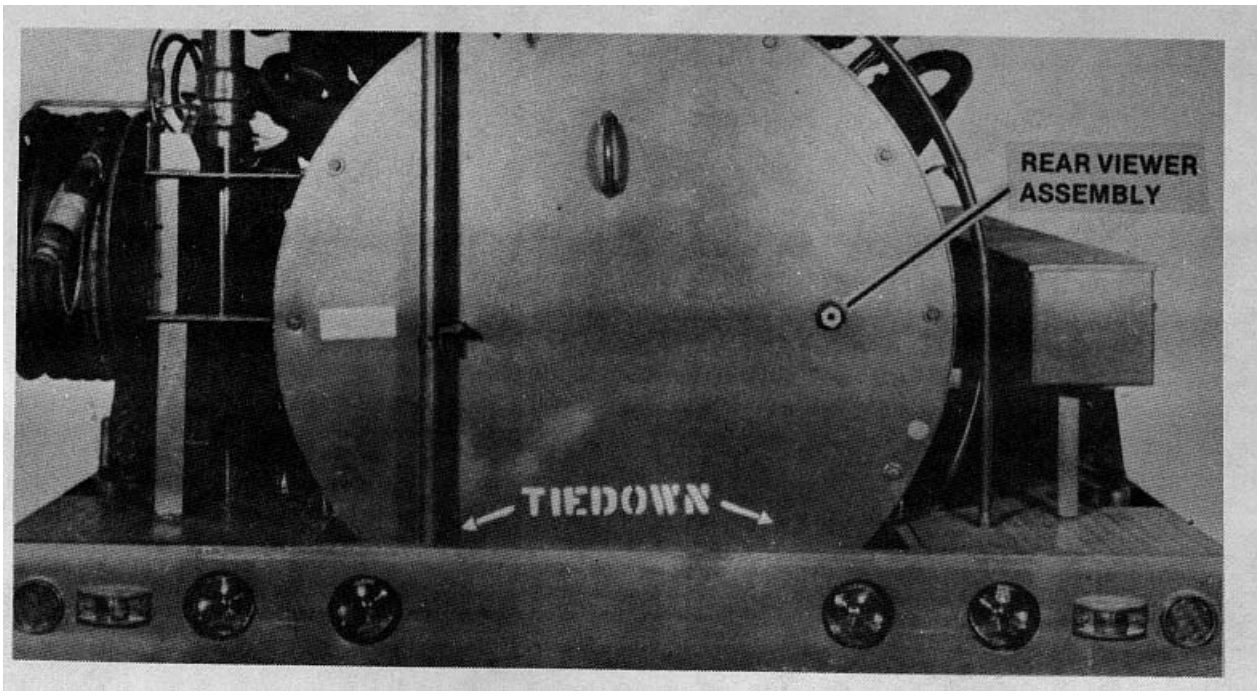


Figure 45. REAR VIEWER ASSEMBLY.

59. Damper Cylinder Nut and Mounting

a General The damper cylinder is attached to the air scoop by means of a nut threaded on the cylinder shaft which in turn passes through a mounting bracket There is also a fuel connection in the bottom of the cylinder which supplies oil pressure for the cylinder to operate

b. Removal. Refer to Fig. 46.

1. Remove the nut by turning counter-clockwise.

2. Remove the fuel piping, breaking union connection, and turning counter-clockwise from bottom of cylinder

3. Remove the damper cylinder

c. Replacement.

1. Replace the nut and fuel piping by reversing steps 1 & 2 above.

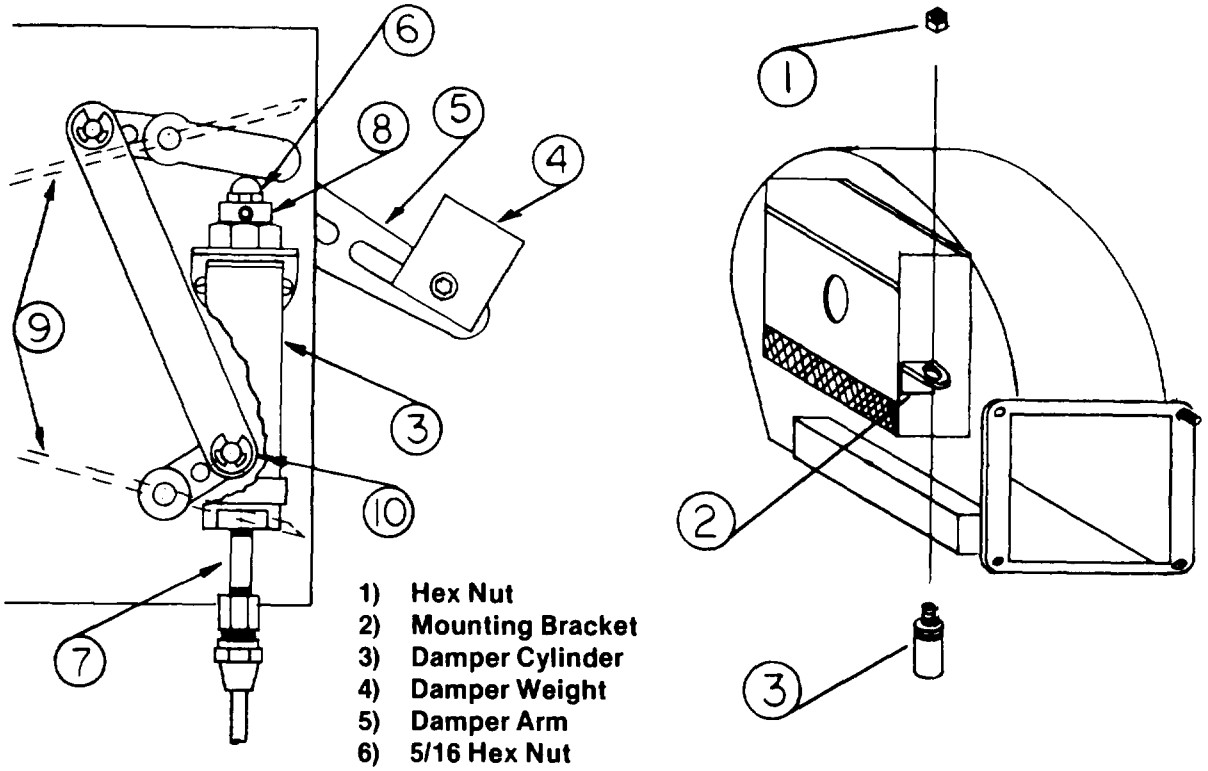


Figure 46. DAMPER CYLINDER MOUNTING

60. Damper Cylinder and Damper Cylinder Linkage

a. General. The damper cylinder controls the movements of the damper butterfly valve on the blower housing which controls the flow of air to the burner After the flame is detected In the low fire position the high fire valve opens sending oil to the oil cylinder which In turn opens the air damper.

b. Removal.

1. Remove the cylinder nut and piping from solenoid valve (Para. 59)

2. Refer to Fig. 44 and remove the air damper cylinder and damper cylinder linkage

c. Cleaning and Inspection.

1. Clean all parts with a cloth dampened in an approved cleaning solvent and dry thoroughly.

2. Inspect the air damper cylinder for damage and operation. Inspect the cylinder shaft for wear and full travel. Inspect the linkage for signs of wear, bent shafts, damaged threads, and other damage.

3. Inspect the mounting hardware for cracks, breaks, and damaged threads Replace any defective part.

d. Installation.

1. Refer to Fig. 44 and install the damper cylinder and the damper cylinder linkage.

2. Install the cylinder nut and piping from solenoid valve (Para. 59).

e. Damper Cylinder Linkage Adjustment.

1. Refer to Fig. 43 for the linkage adjustment points.

NOTE: THE ADJUSTMENT OF THE DAMPER CYLINDER LINKAGE SHOULD BE STARTED WITH THE HOT OIL HEATER WHEN IT IS NOT OPERATING AND AFTER IT HAS BEEN COOLED TO AMBIENT TEMPERATURE.

NOTE: DO NOT ATTEMPT TO ADJUST THE DAMPER CYLINDER LINKAGE UNLESS THERE IS SOME EVIDENCE THAT LINKAGE HAS SLIPPED, SUCH AS EXCESSIVE SMOKE DURING FIRING OR WHEN CYLINDER HAS BEEN REMOVED.

2. With the burner firing and in the low fire position, adjust the linkage until the stack has a slight haze.

3. Allow the control to program into high fire and adjust the linkage until stack has a slight haze in high fire.

4. Turn burner switch to "OFF" position. Control will program "OFF" and burner will return to low fire. Turn burner switch "ON" readjust low fire setting until stack has a slight haze Allow control to program to high fire and repeat adjustment if necessary.

5. Using an exhaust analyzer, test the CO2 content at the exhaust stack. In low fire it should be 9.0 to 10.0 per cent. At high fire, it should be 10.5 to 11.5 per cent.

6. If the adjustment proves impossible, refer to Para. 58 and adjust the burner electrodes and properly position the damper valve.

7. Follow positioning of the butterfly valve and adjustment of the burner electrodes; perform steps one (1) through four (4) above.

8. Stop the hot oil heater (Para. 13).

61. Burner Oil Valves

a. Removal. Refer to Fig. 44, Items 10, 11 and 12 and remove the burner oil valves.

1. Turn off electrical power supply.
2. Remove & tag all electrical connections
3. Disconnect all piping from the three oil valves.
4. Remove the three oil valves.

b. Cleaning and Inspection

1. Clean all parts in an approved cleaning solvent and dry thoroughly.
2. Inspect the burner oil valve. Replace a defective burner oil valve.

c. Installation. Install the burner oil valves in reverse order of removal.

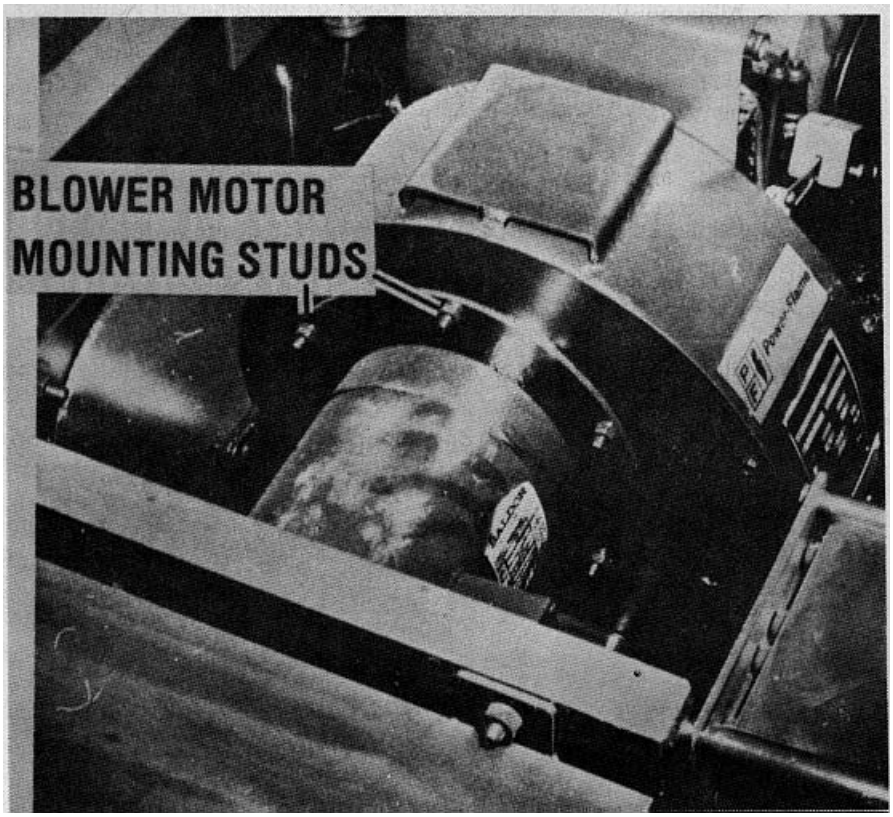


Figure 47. BLOWER MOUNTING

Section E. FUEL SYSTEM

62. General

The fuel system consists of a two stage fuel pump which is operated by the blower motor. Fuel lines from the dual fuel oil strainers allow oil to pass to the suction side of the fuel pump At this time the fuel passes through and is raised in pressure by the fuel pump. Fuel lines allow the fuel to flow from the fuel pump to the burner oil valves. From the oil valves the fuel passes on into the internal assembly and is passed on through the fuel nozzle or returned to the fuel system. The fuel pump must have a return and supply fuel line attached to a fuel supply for operation. Selector fuel oil manual valves are mounted near the dual fuel oil strainers for optional use of either strainer.

63. Fuel Pump

a. Removal and Disassembly. Refer to Fig. 48 and remove the fuel pump.

1. To remove fuel pump from burner, disconnect all piping from fuel pump. Remove 2 bolts from fuel pump mounting. Remove screws from burner cover plate. Reach inside burner housing and loosen set screws in pump coupling. Remove pump by pulling away from burner housing.

2. Refer to Fig. 49 and disassemble the fuel pump.

b. Cleaning, Inspection and Repair.

1. Clean all parts with the exception of the antihum wafer (sound cushion), in an approved cleaning solvent and dry thoroughly.

2. Discard the antihum wafer.

3. Inspect the mounting hardware for cracks, breaks, signs of wear, damaged threads, and fittings.

4. Replace a defective part. Install a new antihum wafer.

c. Reassembly. Refer to Fig. 49 and reassemble the fuel pump.

d. Installation. To install the fuel pump, mount in reverse order of removal.

e. Adjustment. Refer to Para. 64 and Fig. 50 and adjust the fuel pump.

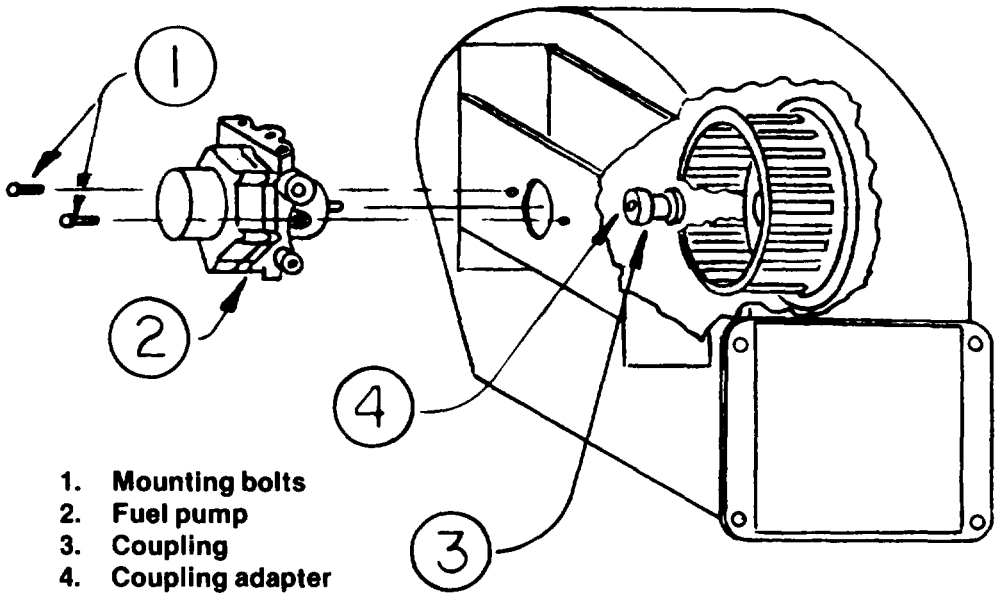


Figure 48. FUEL PUMP MOUNTING.

64. Fuel Pump Adjustments

Refer to Fig. 50 and adjust the fuel pump.

CAUTION: THIS IS A TWO STAGE PUMP AND MUST HAVE A RETURN LINE BACK TO FUEL SUPPLY TANK.

Step 1. Remove the valve cover screw to expose the pressure adjusting screw.

Step 2. Remove the fuel oil pressure gauge, Fig. 67, Item 1

Step 3. Install a test gauge with a range of 0 to 400 psi in the test gauge port.

Step 4. Start the hot oil heater (Para. 13).

Step 5. Using the pressure adjusting screw set pressure to 300 psi. To adjust pressure, use 118" Allen wrench to turn pressure adjusting screw.

Step 6. Stop the hot oil heater (Para. 13).

Step 7. Remove the test gauge and install the fuel pressure gauge and the valve cover screw.

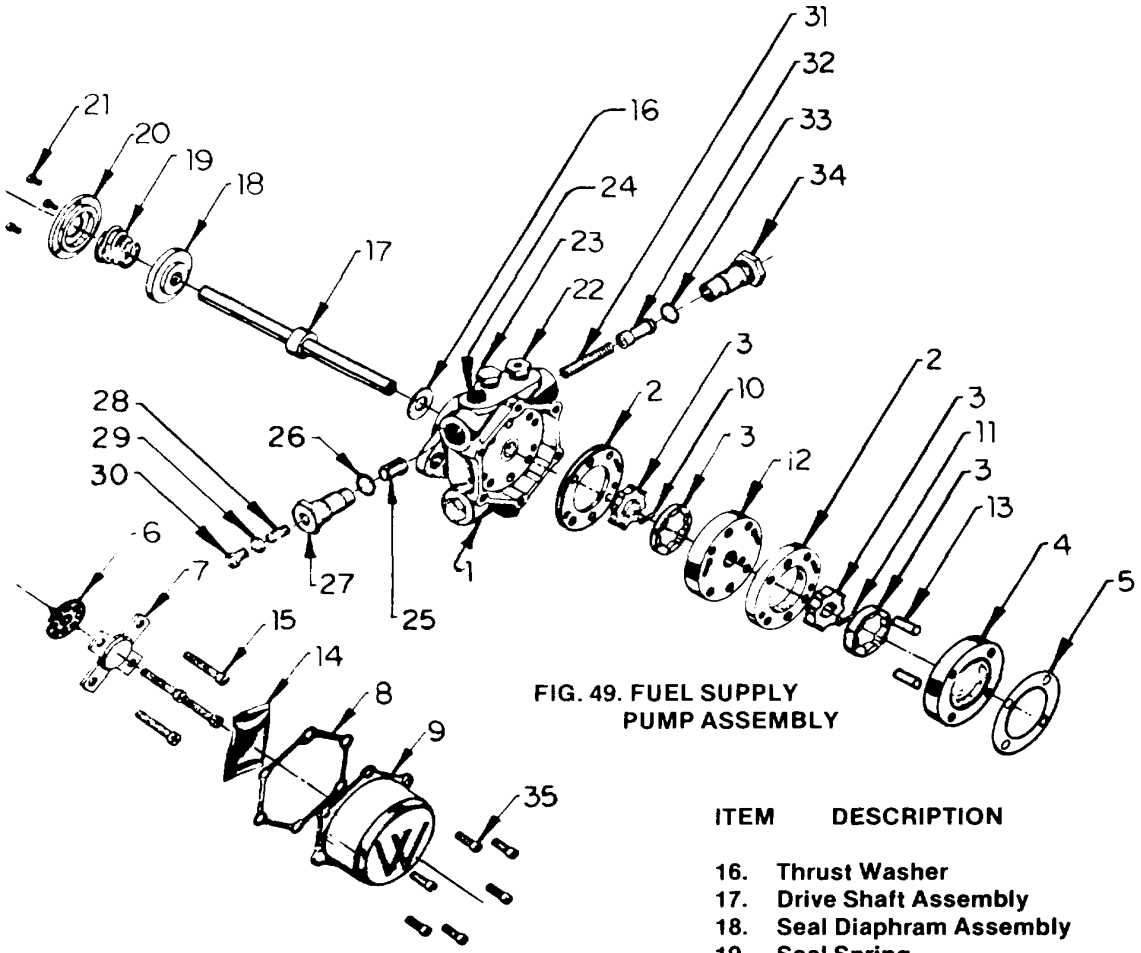


FIG. 49. FUEL SUPPLY PUMP ASSEMBLY

ITEM	DESCRIPTION
1.	Pump Body
2.	Gear Plate
3.	Inner and Outer Gear
4.	Gear Cover Plate
5.	Cleaner Spacer
6.	Cleaner Blade
7.	Cleaner Cover
8.	Front Cover Gasket
9.	Front Cover
10.	Drive Pin
11.	Drive Key
12.	Intermediate Plate
13.	Dowel Pin
14.	Sound Cushion
15.	Screw, Cleaner Cover

ITEM	DESCRIPTION
16.	Thrust Washer
17.	Drive Shaft Assembly
18.	Seal Diaphram Assembly
19.	Seal Spring
20.	Seal Retainer
21.	Seal Retaining Screw
22.	Vent Plug
23.	(4) Pipe Plugs
24.	Flush Plug
25.	Spring Cap
26.	Valve Gasket
27.	Pressure Adj. Screw Plug
28.	Pressure Adj. Screw
29.	Valve Cover Screw Gasket
30.	Valve Cover Screw
31.	Valve Spring
32.	Piston Assembly
33.	Valve Gasket
34.	Plug Guide Assembly
35.	Front Cover Screws

NOTE: When ordering replacement part, specify manufacturer & model number of pump, stamped on pump body.

Webster Electric, Pump Model 22R221D

Figure 49. Fuel Supply Pump Assembly

65. Fuel Oil Strainers

a. Servicing. Refer to Fig. 51 for servicing.

1. Turn assembling screw counterclockwise and remove.
2. Remove strainer cover.
3. Remove & inspect element.
4. Check cover gasket.
5. Clean and inspect. See (c) below.
6. Install by reversing Steps 1-4 above.

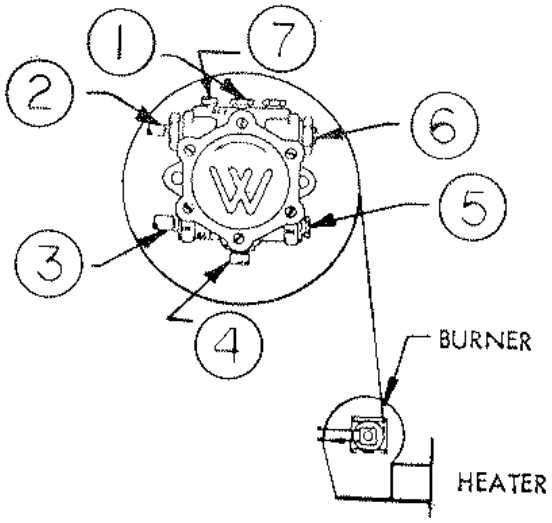
b. Removal. Refer to Fig. 52 and remove the two fuel oil strainers as follows.

1. Remove pipe anchors from angle support, located behind first set of fuel oil valves.
2. Loosen unions; remove one strainer complete.
3. Turn remaining strainer counterclockwise; remove complete.

c. Cleaning and Inspection.

1. Clean all parts with an approved cleaning solvent and dry thoroughly.
2. Inspect the fuel oil strainers for cracks, breaks, and other damage.
3. Inspect the cover mounting hardware for cracks, breaks, and damaged threads.
4. Install new gaskets and filters; defective parts should be replaced.

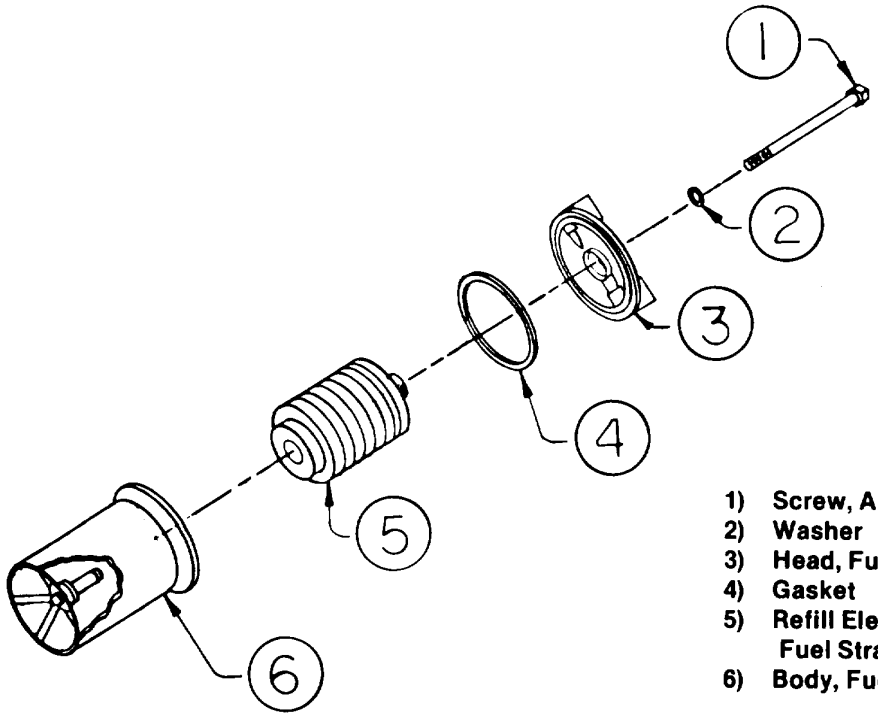
d. Installation. Refer to Fig. 52 and install the fuel oil strainers; replace in reverse order of removal.



1) Return Port -, Optional
2) Fuel Supply Port
3) Fuel Suction Port
4) Fuel Return Port
5) Fuel Suction Port -
6) Valve Cover Screw & Pressure Adjusting Screw
7) Pressure Gauge Port

HEATER FRONT

Figure 50. FUEL OIL PUMP ADJUSTMENTS



1) Screw, Assembling
2) Washer
3) Head, Fuel Strainer
4) Gasket
5) Refill Element, Fuel Strainer
6) Body, Fuel Strainer

Figure 51. FUEL OIL STRAINERS

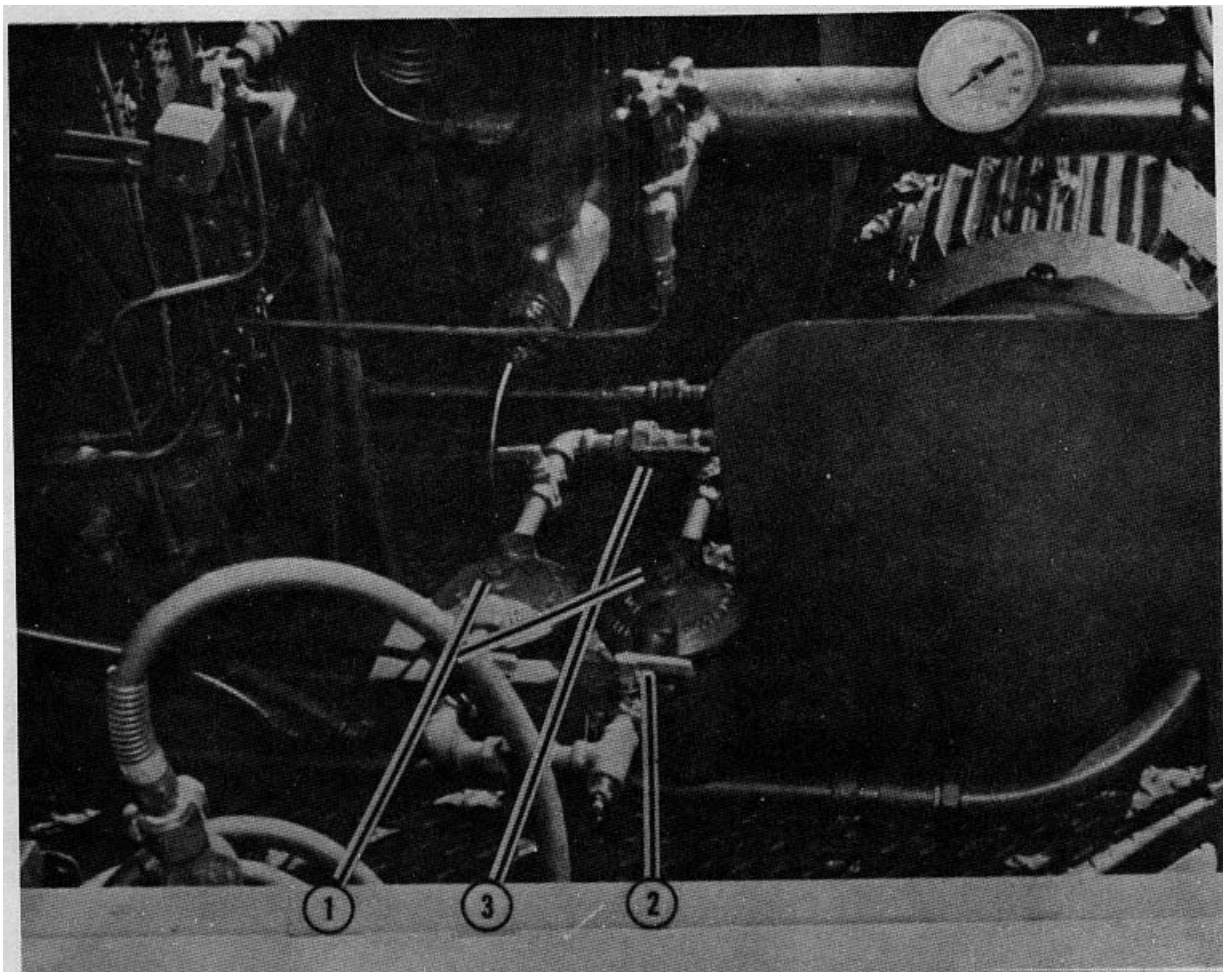


Figure 52. FUEL STRAINER MOUNTING

1. Assembling Screw
2. Pipe anchors located behind front valves.
3. Unions

Section F. BRAKES, LINES AND FITTINGS, WHEELS AND RIMS, MAINTENANCE INSTRUCTIONS

66. General

This Model 200STM Hot Oil Heater is equipped with an air-over hydraulic brake system. This brake system includes a brakeaway emergency that will set the brakes should it be disconnected from the towing vehicle. To release the brakes when disconnected from a towing vehicle, drain air tank using the air tank drain cock.

67. Air Tank and Relay Valve

a. Removal. Refer to Figs. 53 & 54.

1. Remove all lines from air relay. Lines removed by attaching wrench and turning counterclockwise.
2. Remove four bolts with nuts and lockwashers from air tank mounting supports.
3. Remove air tank and relay valve.
4. Remove relay valve from air tank by turning counterclockwise.

b. Cleaning and Inspection.

1. Clean all parts with an approved cleaning solvent and dry thoroughly.
2. Inspect all parts for leaks, cracks, distortion, damaged threads and rust.
3. Replace all defective parts as may be necessary.

c. Installation.

1. Connect air relay valve to air tank by turning clockwise.
2. Install air tank and relay valve on heater.
3. Replace four mounting bolts with nuts and lockwashers.
4. Reconnect lines to air relay.

68. Tires, Wheels, Rims, Springs and Shock Absorbers

The unit is supported on two 900 x 20 ply tires which are in turn mounted on two 7.5 x 20 wheel assemblies mounted inboard of the wheels; directly under the main frame supports is one pair of 12, 000 pound springs.

NOTE: HOT OIL HEATER MUST BE ADEQUATELY SUPPORTED BEFORE ANY WORK IS STARTED ON UNDER CARRIAGE. DO NOT USE SUPPORT JACKS FOR ONLY SUPPORT OF HOT OIL HEATER.

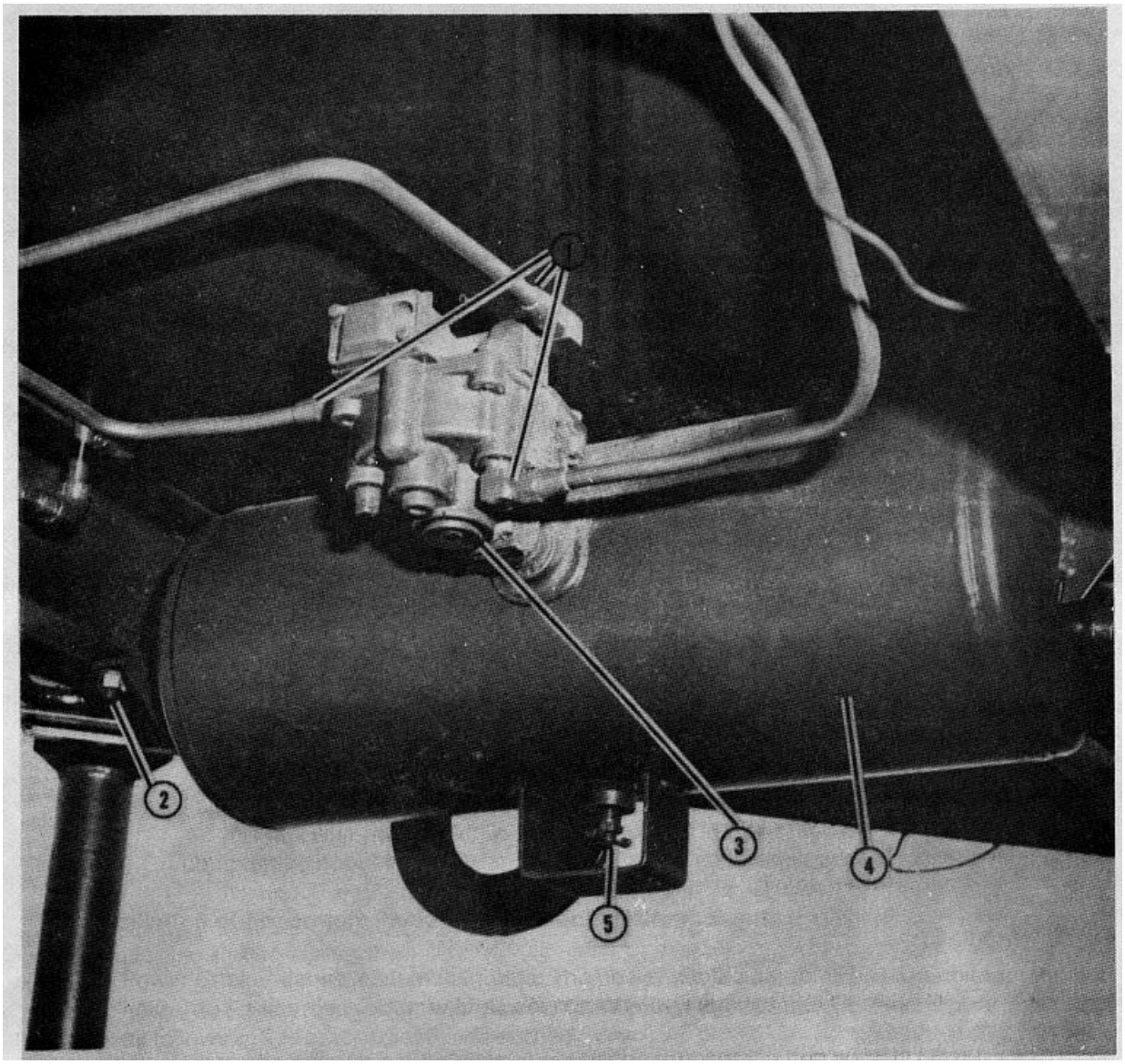


Figure 53. AIR TANK & RELAY VALVE MOUNTING

1. Fitting & Lines
2. Mounting bolts, nuts & lockwashers (2 each end)
3. Relay valve
4. Air tank
5. Drain cock

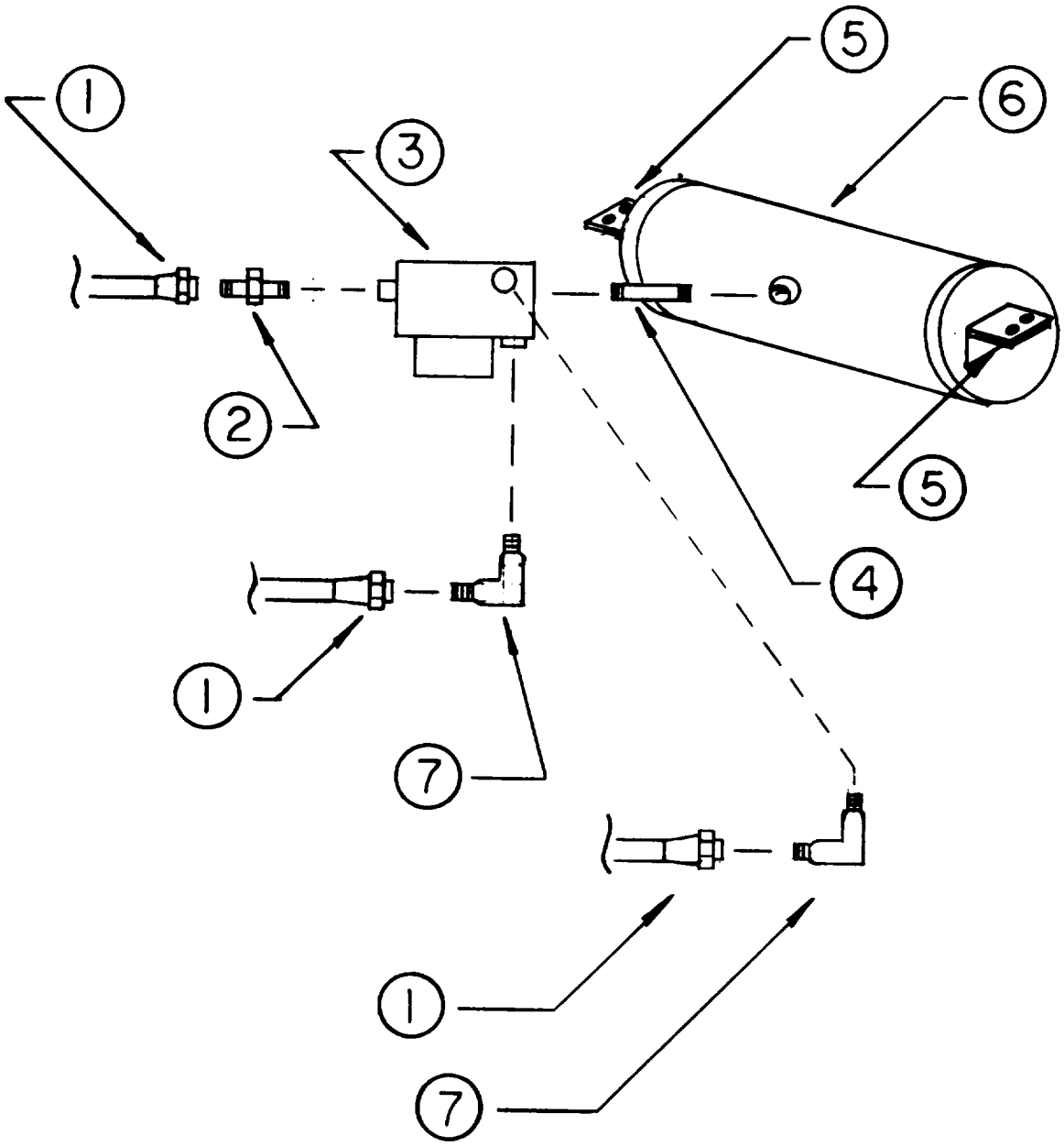


Figure 54. AIR TANK & RELAY VALVE

1) Flair Nut, 37.5° 3/8" Tube
2) Flair Fitting, 3/8" Tubes, 1/4 " NPT
3) Air Relay
4) 3/4" x 2" Nipple
5) Mounting Bracket, Air Tank
6) Air Tank
7) Male Fitting, 90° 3/*8"* Tube, ¼" NPT

a. Removal

1. Refer to Fig 55 to remove the tire and wheel from the drum assembly Turn the 6 wheel rim nuts (Item 17) counterclockwise and remove from wheel rim bolts Remove tire and wheel as a unit.

2. Refer to Fig 57 to remove the shock absorbers Turn mounting nuts counterclockwise and remove along with washers from the bolts Remove shock absorber by pulling shocks off the mounting bolts.

3. Refer to Fig 57 to remove the springs Turn U-bolt nuts counterclockwise and remove from U-bolts Pull axle down and out Refer to Fig 84 for next step Remove cotter pins from shackle bolt and rivet, Items 3, 2 & 6 Remove shackle bolt and rivet Remove spring.

b. Cleaning and Inspection

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

2. Inspect tires for breaks, signs of excess wear, tire pressure, bulges, rips, breaks and other damage. Inspect the wheels and springs for cracks, distortions, dents, displaced springs, damaged threads and other damage.

3. Repair or replace defective parts

c. Reassembly and Installation

1. Refer to Fig. 57 and install the springs

2. Refer to Fig. 57 and install the shocks

3. Refer to Fig. 55 and install the tire and wheel.

69. Brakes and Bearings

a. General.

The brakes are 15 x 3 wheel brakes activated by hydraulic wheel cylinders The bearings used are manufactured by the Timken Roller Bearing Company and are of the tapered variety

NOTE: CARE SHOULD BE TAKEN WHEN REPLACING A WHEEL NOT TO TIGHTEN THE HUB NUT SO TIGHTLY AS TO CAUSE THE BEARINGS TO JAM. A SUGGESTED PRACTICE IS **TO TIGHTEN THE NUT UNTIL THE WHEELS TURN SLIGHTLY THEN BACK OFF 1/2 TURN.**

b. Removal of Bearings, Brake Shoes, and Linings. Ref. Fig 55

1. Remove tire and wheel from hub by turning wheel rim nuts counterclockwise, Item 1 7.

2. Remove dust cover retaining screw and dust cover, Items 13 & 14.

3. Remove cotter pin from hub nut; remove hub nut, Item 12.

4. Remove retaining washer and outer bearing, Items 10 & 11.

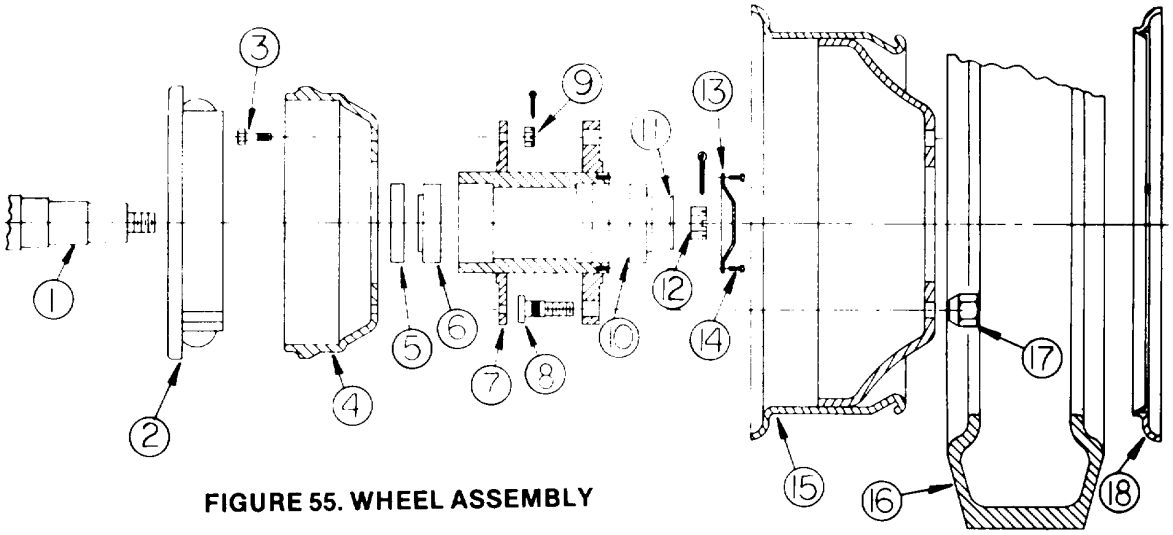


FIGURE 55. WHEEL ASSEMBLY

1. SPINDLE
2. BRAKE ASSEMBLY
3. DRUM BOLT
4. BRAKE DRUM
5. SEAL
6. INNER BEARING
7. HUB
8. WHEEL RIM BOLT
9. DRUM NUT W/COTTER PIN
10. OUTER BEARING
11. RETAINING WASHER
12. HUB NUT W/COTTER PIN
13. DUST COVER
14. DUST COVER RETAINING SCREW
15. WHEEL RIM
16. TIRE
17. WHEEL RIM NUT
18. TIRE RETAINING RING

Figure 55. WHEEL ASSEMBLY

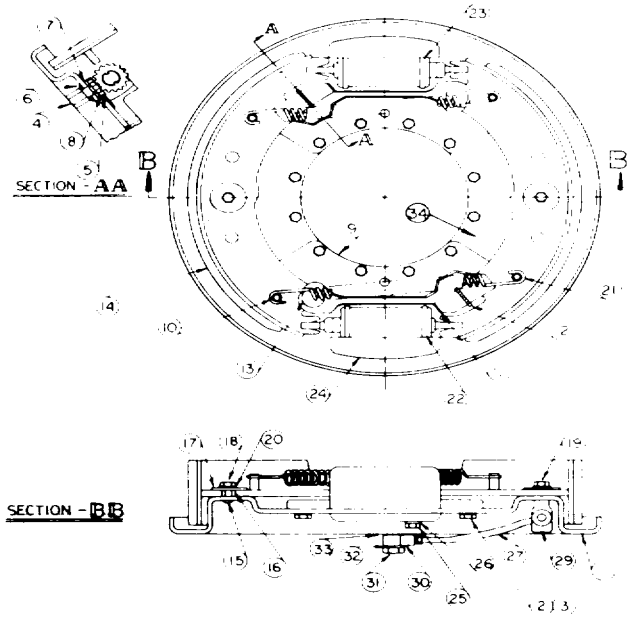


FIGURE 56. BRAKES

1) Backing Plate
2) Hex Head Capscrew
3) Lockwasher
4) Stud & Spring Washer Assy.
5) Adjusting Gear
6) Washer Stud
7) Lockwasher
8) Hex Nut
9) Anchor Support
10) Pin Spring
11) Screw Adj.
12) Wheel Adj.
13) Pin Anchor
14) Shoe & Lining
15) Bolt - Shoe Guide
16) Sleeve - Shoe Guide
17) Washer
18) Brass Hex Nut
19) Hex Head Capscrew
20) Lockwasher
21) Spring
22) Wheel Cylinder Assy. - Lower
23) Wheel Cylinder Assy. - Upper
24) Cover Wheel Cylinder
25) Hex Head Capscrew
26) Lockwasher
27) Tube Connector - Top
28) Tube Connector - Bottom (Not Shown)
29) Distributor Fitting
30) Fitting
31) Bolt Fitting
32) Gasket
33) Gasket
34) Backing Plate Mounting Bolt

Figure 56. Brakes

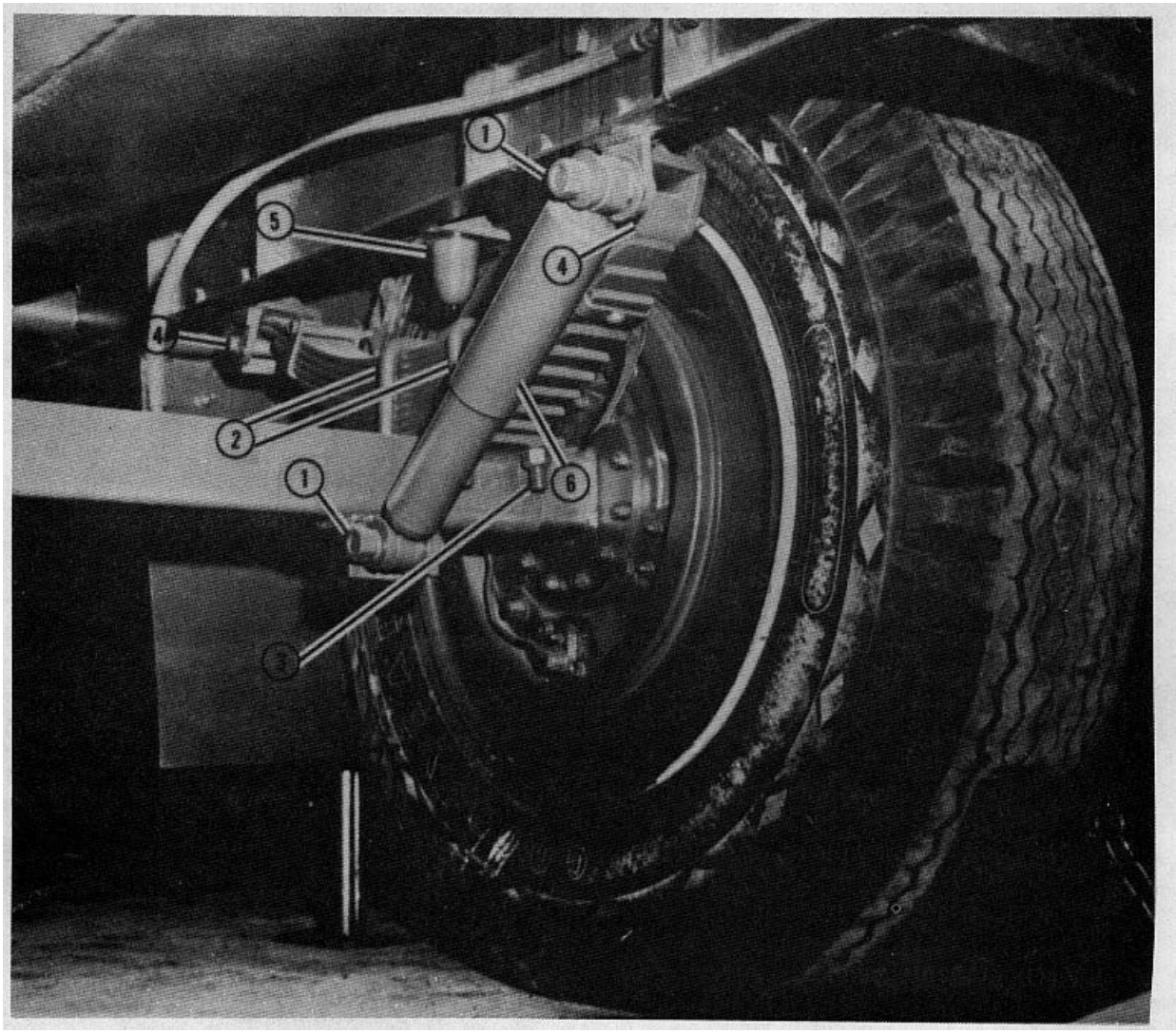


Figure 57. SPRINGS & SHOCKS

1. Shock absorber mounting bolts, nuts and washers
2. U-bolts
3. U-bolt nuts (2 for each U-bolt)
4. Spring pins
5. Snubber
6. Shock Absorber

5. Remove hub and brake drum assembly by pulling out Assembly includes inner bearings and seal, Items 4, 5, 6 & 7.

6. Refer to Fig 56 and remove brake shoes and linings as follows:
   a) disconnect springs from spring pins (Items 10 & 21).
   b) remove retaining brass hex nut, hex head capscrew, and washers (Items 17, 18, & 19).
   c) remove brake shoes and linings (Item 14).

c. Cleaning, Inspection and Repair.
   1. Clean all parts in an approved cleaning solvent and dry thoroughly.

   2. Inspect for worn linings, wheel cylinder leakage, and worn or defective bearings. Inspect all threads for damage and pins for wear. Replace all defective parts.

d. Installation of Bearings, Brake Shoes, and Linings. Repeat Steps 1 to 6 in reverse order.

70. Axle

a. General.
   1. The axle is rated 12, 000# when used with 2, 10 leaf, 1642 springs.

   2. The axle is one piece with a 125 spindle. Spring mounting 46" centers with wheels mounting for 66" centers.

b. Removal.
   1. Remove tire and wheel assembly (Para. 68) and hub and brake drum assembly.

   2. Remove backing plate with brake assembly, ref. Fig. 56:
   a) remove backing plate mounting bolts (Item 34)
   b) remove backing plate with brake assembly (Item 1)

   3. Remove springs and shock absorbers, Para. 68.

   4. Remove axle, Fig. 58.

c. Installation. Install in reverse order of removal.

71. Power Cluster

a. General. The power cluster is a diaphragm operated air valve which activates the hydraulic cylinder on the front portion of the assembly. This hydraulic motion in turn exerts pressure through the hydraulic lines causing the wheel cylinders to operate and they in turn transmit the applied force to the brake bands causing them to rub the brake drum. Due to the force applied in this manner, the laws of friction come into play and the vehicle comes to a stop.

b. Removal.
   1. Disconnect tubing from air relay (Fig. 3, Item 22).

   2. Disconnect tubing from male elbow on power cluster (Fig. 3, Items 23, 19 & 3).

   3. Remove mounting bolts from mounting plate (Fig. 59).

   4. Remove power cluster.

c. Cleaning, Inspection and Repair

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

2. Inspect for signs of leaks or cracks in the body of the power cluster

d. Disassembly and Reassembly.

1. Refer to Fig. 60 and disassemble the power cluster.

2. Replace all damaged and worn parts.

3. Refer to Fig. 60 and reassemble the power cluster

e. Installation. Refer to Fig. 59 and install the power cluster.

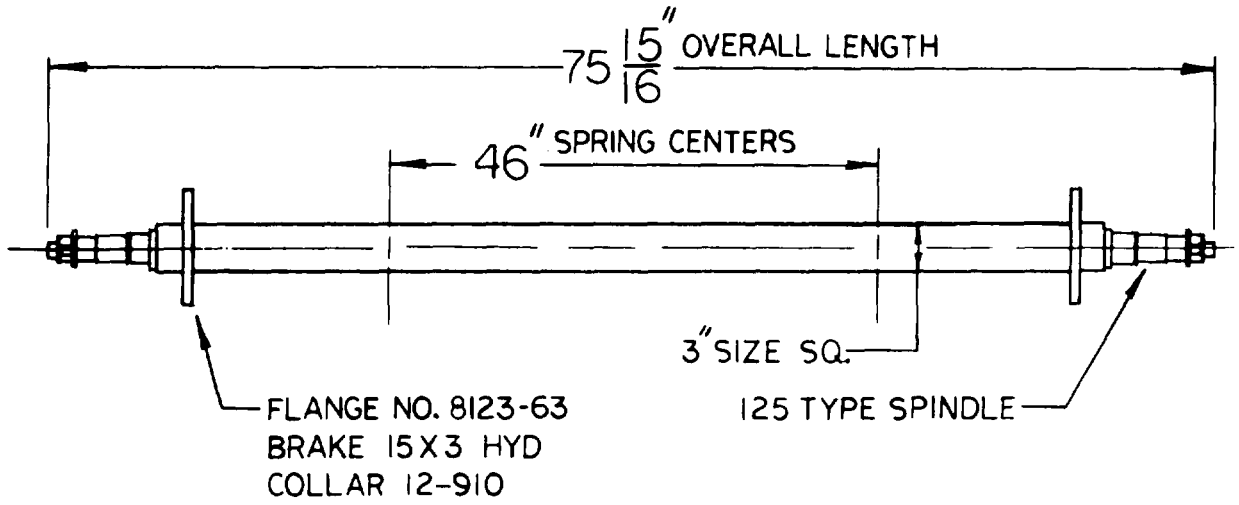
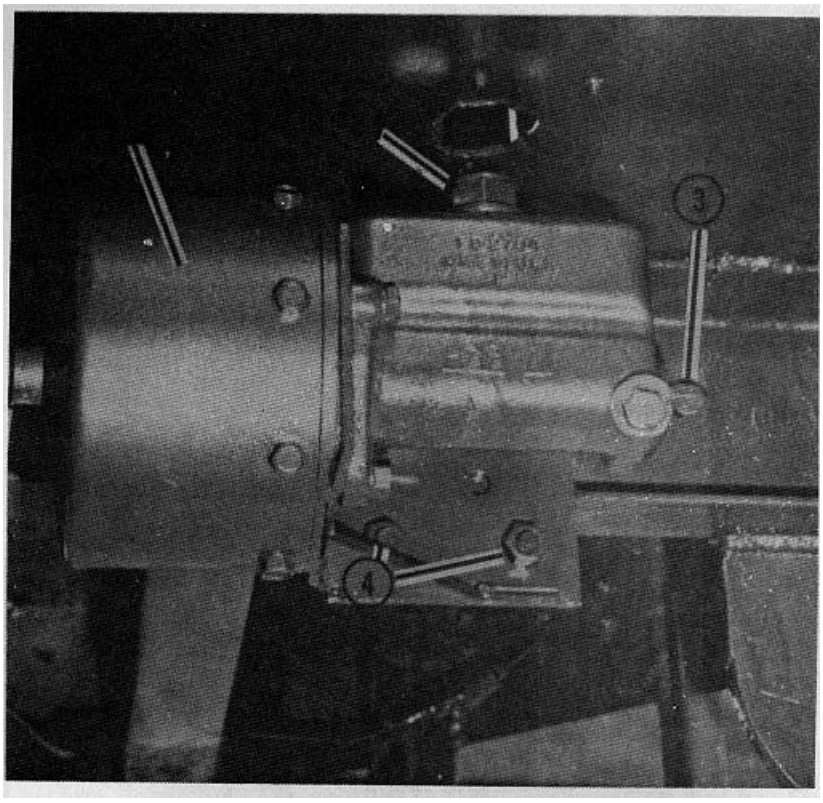
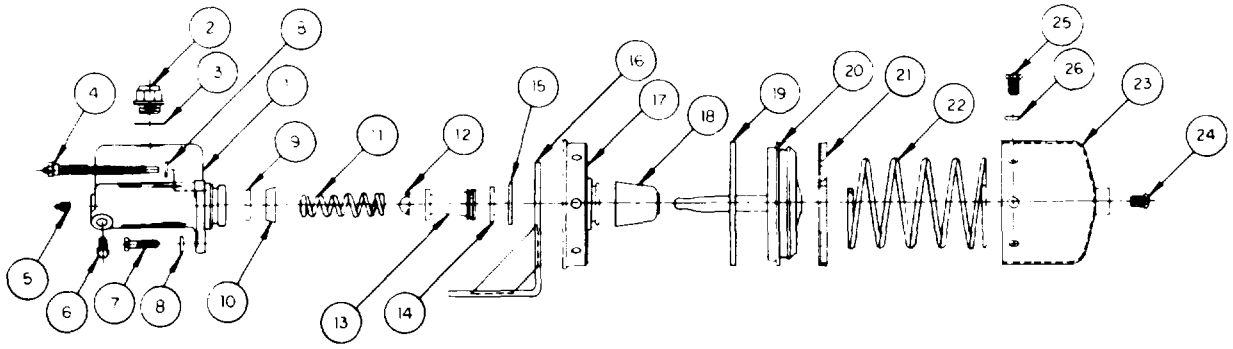


Figure 58. AXLE.



1. Power Cluster
2. Fill cap
6. Male elbow
4. Mounting bolts with nuts
5. Air tubing

Figure 59. POWER CLUSTER MOUNTING.



1	END HOUSING	10	END CAP	19	FELT WIPER RING
2	VENT PLUG	11	PLUNGER STRING	20	PLUNGER
3	GASKET	12	STRAINER	21	OIL SEAL
4	ADJUSTMENT BOLT	13	PLUNGER GUIDE	22	PLUNGER SPRING
5	END PLUG	14	BRASS WASHER	23	SEAL HOUSING COVER
6	PIPE PLUG (2)	15	SNAP RING	24	PIPE FITTING
7	MOUNTING BOLT (2)	16	MOUNTING BRACKET	25	COVER BOLT (8)
8	LOCK WASHER (3)	17	SEAL HOUSING	26	LOCK WASHER (8)
9	WASHER	18	DIAPHRAGM		

Figure 60. POWER CLUSTER.

Section G. HOSE CARRIERS, TOOLBOX, NOSE BOX, MUD GUARDS, AND CABLE REEL

72. General

The tool box mounted on the right side is provided for the storage of the ground rods, the normal maintenance tools, and hot oil transfer flexible hose These may be reached by opening the hinged lid to remove them The mud guards are attached to the rear of the fender platform are so placed to stop and scatter road debris thrown by the wheels when the hot oil heater is In transport The nose box plate combines the air connections for brakes and the Intervehicular wiring receptacle in an accessible location The circuit breakers for the lights are also located in the nose box The cable reel is a hand operated type reel provided as a means of storing the 100 foot power cable

73. Hose Carrier(Beneath Tool Box) See Fig 61

a. Removal The hose carrier Is attached to the heater base plate and should not be removed unless It is damaged by bending and has to be replaced

b. Cleaning and Inspection

1. Clean the hose carrier with an approved cleaning solvent and dry thoroughly

2. Inspect the hose carrier for cracks, breaks and other damage

3. Inspect periodically for Indications of moisture Inside the carrier.

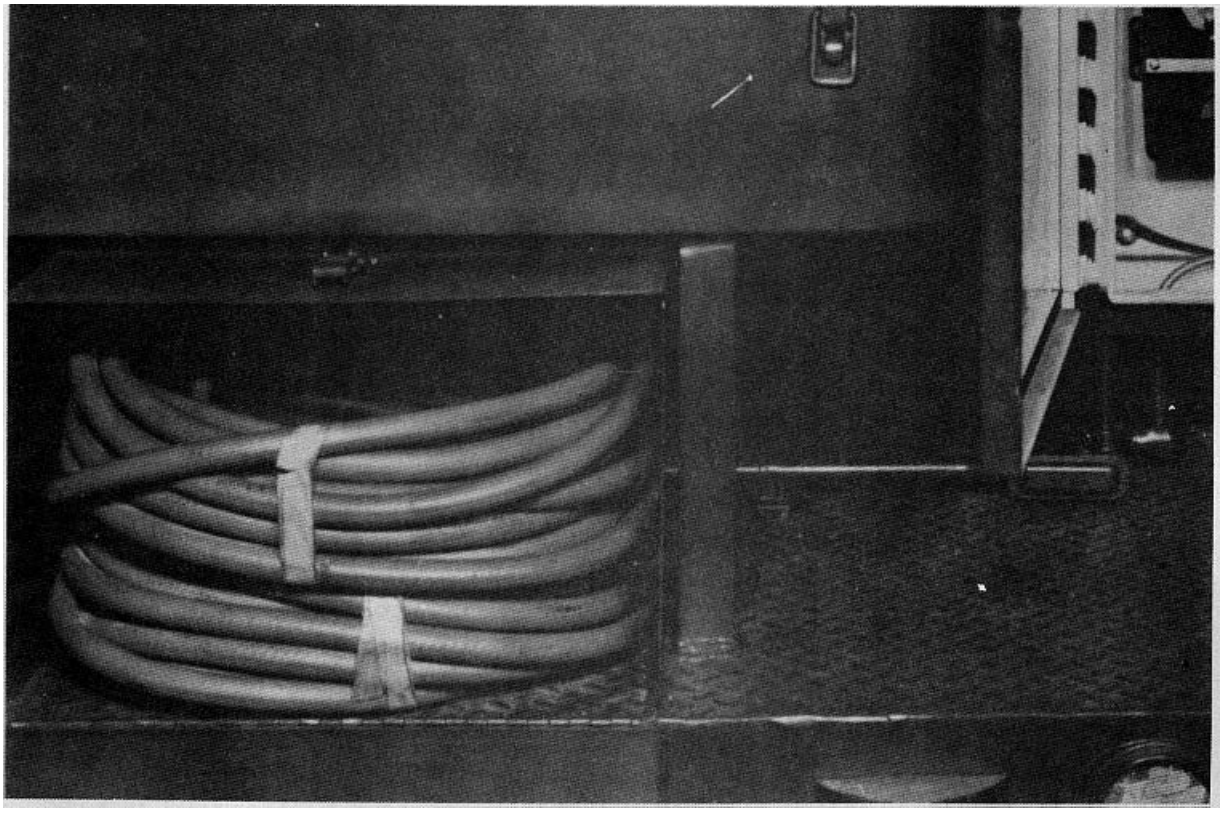


Figure 61. HOSE CARRIER

74. Tool Box (Above Hose Carrier)

a. Removal-

1 Remove any Item which might be in the tool box (Para. 10)

2 Refer to Fig. 62 and remove the tool box.

b. Cleaning and Inspection

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

2 Inspect for cracks, breaks, defective hinges or latches, and other damage.

3. Inspect the mounting hardware for cracks, breaks, or damaged threads. Replace any defective part.

c. Installation. Refer to Fig 62 and Install tool box

NOTE: THE TOOL BOX HAS A HOLE DRILLED IN EACH END TO PERMIT ANY MOISTURE ACCUMULATION TO DRAIN TOWARD THE OPENING THEREBY DRAINING IT.

75. Nose Box (Intervehicular Junction Box)

a. Removal Refer to Fig. 63 & 64 and remove the nose box.

1. Unplug all connections inside nose box - tag & note all wiring.

2. Disconnect ground wire and all electrical connections from nose box.

3. Remove 4 mounting bolts.

4. Remove nose box

b. Cleaning and Inspection.

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

2. Inspect the air connections for the condition of the rubber seals in the glad-hands. Inspect the wiring terminals for damaged threads, loose connections or broken or cracked mounting.

3. Replace any defective or damaged parts.

c. Installation. Refer to Fig 63 & 64 and install the nose box.

1. Install in reverse order of removal.

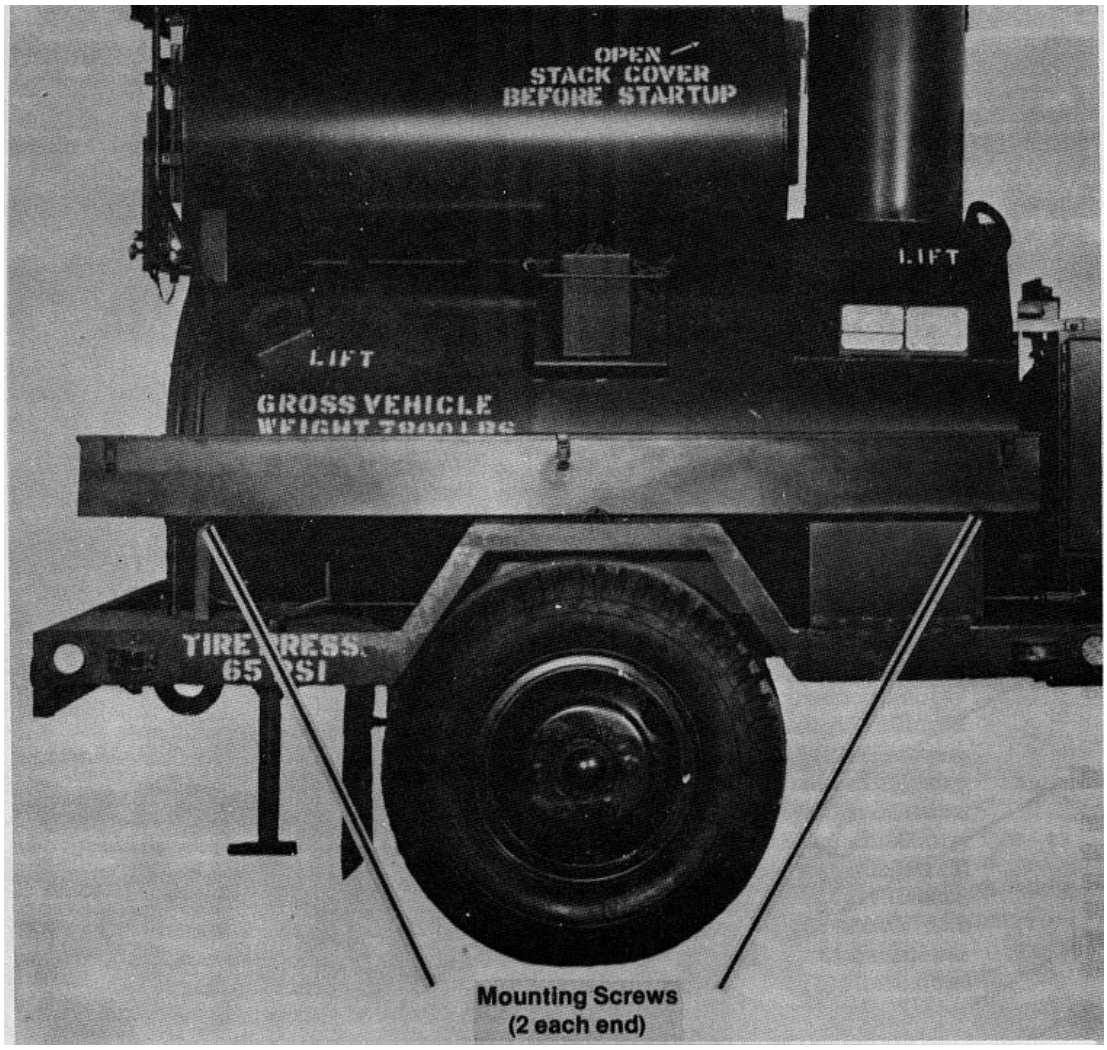


Figure 62. TOOL BOX MOUNTING HARDWARE

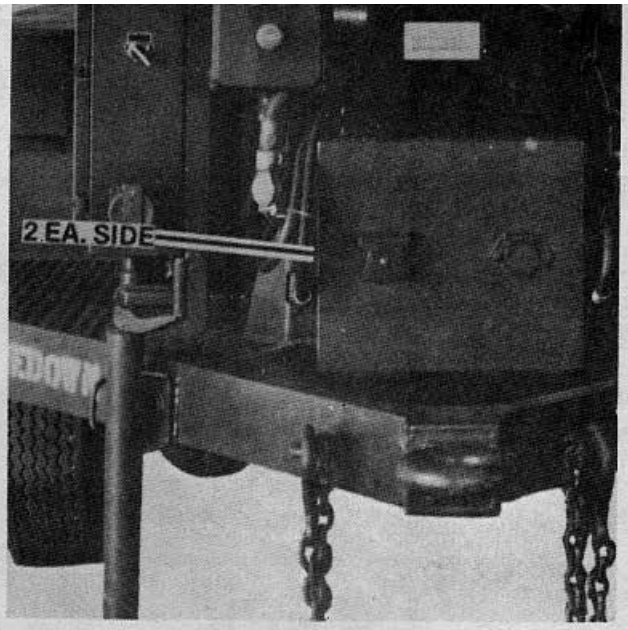


Figure 63. NOSE BOX MOUNTING HARDWARE

1 - 24 VOLT CONNECTION
2 - 12 VOLT CONNECTION
3 - 24/12 VOLT CIRCUIT BOX WITH AUTOMATIC RESET CIRCUIT BREAKERS

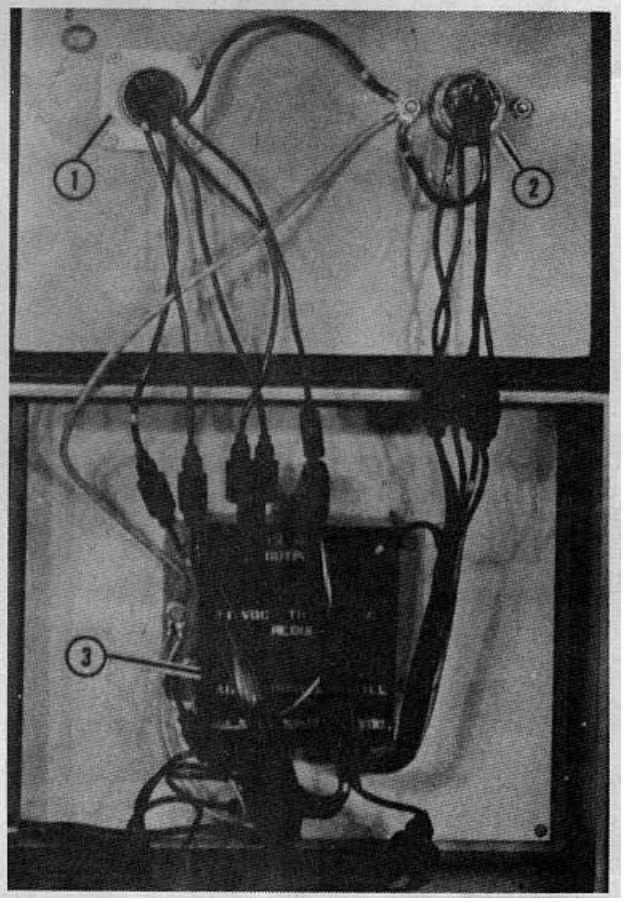


Figure 64. NOSEBOX INTERNAL VIEW

76. Cable Reel

a. Removal Refer to Fig 65 and remove the cable reel

1. Loosen cable reel anchor bar.

2. Remove 100 ft power cable.

3. Remove 4 bolts with nuts and lockwashers.

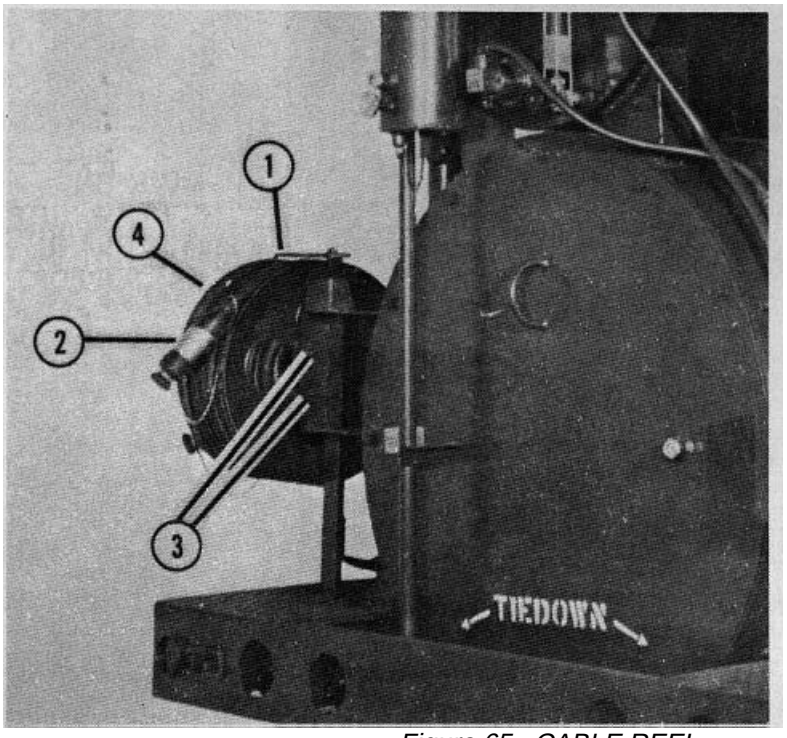
4. Remove cable reel

b. Cleaning and Inspection

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

2 Inspect the reel assembly for cracks, distortion, breaks, and other damage.

c. Installation. Refer to Fig 65 and install the cable reel Mount In reverse order of removal



1 - ANCHOR BAR
2 - 100 FT. POWER CABLE
3 - MOUNTING BOLTS
WINUTS & LOCKWASHER,
2 - EA. SIDE
4 - CABLE REEL

Figure 65. CABLE REEL

77. Mud Guards

a. Removal. Refer to Fig. 66 and remove the mud guards.

1. Remove 4 mounting bolts with nut & lockwashers; remove metal bar.

2. Remove mud guard.

b. Cleaning and Inspection.

1. Clean the mud guards with a solution of soap and water; dry thoroughly.

2. Clean all metal parts with an approved cleaning solvent and dry thoroughly.

3. Inspect the mud guards for rips and tears and elongated or torn out mounting holes. Inspect the mounting bars for bends, breaks, and rust.

4. Inspect the mounting hardware for cracks, breaks, rust, and damage threads. Replace all defective parts.

c. Installation. Refer to Fig. 66 and install the mud guards. Replace in reverse order of removal.

1 - MOUNTING BOLTS WINUTS
2 - MUD GUARD
3 - BAR SUPPORT

Figure 66.

Section H. GAUGES

78. General

There are four indicating gauges on the hot oil heater. Three are used to indicate conditions regarding the heat transfer oil. The hot oil pressure gauge and hot oil temperature gauge indicate actual operating pressure and temperature of the transfer oil. The cold seal tank temperature gauge indicates the temperature of the transfer oil in the cold seal tank. The fourth indicating gauge, the fuel oil pressure gauge, indicates the pressure of the fuel coming out of the fuel supply pump. The fifth gauge is the liquid level sight gauge which indicates the liquid level of oil in the expansion tank.

79. Hot Oil Pressure Gauge, Lines and Fittings

a. Removal.

1. Refer to Fig. 67 and shut off 14 " bar stock valve. Close by turning handle counterclockwise. Do not remove valve.

2. Remove the hot oil pressure gauge by turning gauge counterclockwise

3. Remove line from piping tee and bottom of pressuretrol by placing wrench on fittings and turning counterclockwise. Drain oil into a container. This will be a small amount.

b. Cleaning and Inspection.

1. Clean the hot oil pressure gauge with a cloth dampened with an approved cleaning solvent and dry thoroughly.

2. Clean the bar stock valve body and line to pressuretrol with an approved cleaning solvent and dry thoroughly. Blow pressuretrol lines clean with compressed air.

3. Inspect the hot oil pressure gauge for cracked or broken glass or dial, defective threads, or other damage.

4. Inspect the line and fittings for cracks, breaks, signs of leakage, restrictions, and damaged threads.

5. Replace all defective parts.

c. Installation.

1. Refer to Fig. 67 and install the hot oil pressure gauge, lines and fittings. Replace in reverse order of removal.

2. Open bar stock valve.

80. Hot Oil Temperature Gauge

a. Removal. Refer to Fig. 67 and locate the hot oil temperature gauge. Remove by attaching wrench to bottom of gauge and turning gauge counterclockwise.

b. Cleaning and Inspection.

1. Clean the hot oil temperature gauge with a cloth dampened with an approved cleaning solvent.

2. Inspect the gauge for cracked or broken dial or glass, for correct indication, and other damage Replace all defective parts or a defective gauge.

c. Installation. Install the hot oil temperature gauge by turning gauge clockwise

81. Fuel Oil Pressure Gauge

a. Removal.

1. Refer to Fig. 67 to remove fuel oil pressure gauge.

2. With hot oil heater shut down, turn pressure gauge at square socket counterclockwise and remove gauge.

b. Cleaning and Inspection

1. Clean gauge in an approved cleaning solvent and dry thoroughly.

2. Inspect for broken or cracked glass, damaged threads or housing.

c. Installation. Refer to Fig 67 and install fuel oil pressure gauge in reverse order of removal.

82. Cold Seal Tank Temperature Gauge

a. Removal. Drain cold seal tank into a container by turning drain plug counterclockwise, Fig. 23, Item 9.

1. Refer to Fig. 68 to remove cold seal tank temperature gauge.

2. Remove by turning gauge at square socket counterclockwise.

b. Cleaning and Inspection.

1. Clean gauge in an approved cleaning solvent and dry thoroughly.

2. Inspect for broken or cracked glass, damaged threads or housing.

c. Installation Install in reverse order.

83. Liquid Level Sight Gauge

a. Removal. (Ref. Figs. 68 & 69)

1. Drain expansion tank.

2. Remove sight glass protection rods; lift out from top.

3. Unscrew packing nuts on upper and lower sight gauge.

4. Remove sight glass from upper and lower assemblies by allowing packing nuts to move towards center of sight glass; push sight glass up into upper assembly, removing it from lower assembly; lift out

5. Turn counterclockwise upper and lower assemblies and remove from expansion tank.

b. Cleaning and Inspection

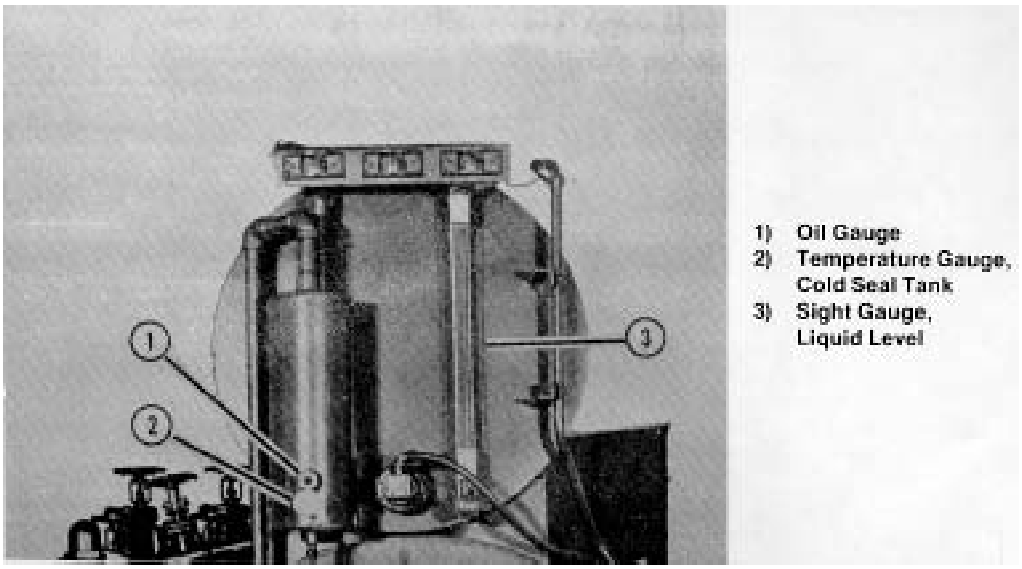
1. Clean all parts In an approved cleaning solvent and dry thoroughly

2. Inspect for broken or cracked glass damaged threads, and other damage. Replace all defective parts

c. Installation Install in reverse order of removal

Figure 67. GAUGES, FRONT

1. Fuel oil pressure gauge.
2. 1/4 " bar stock valve (directly behind gauge).
3. Line & fitting (other end at pressuretrol)
4. Hot oil pressure gauge
5. Hot oil temperature gauge.



1) Oil Gauge
2) Temperature Gauge, Cold Seal Tank
3) Sight Gauge, Liquid Level

Figure 68. Gauges , Rear

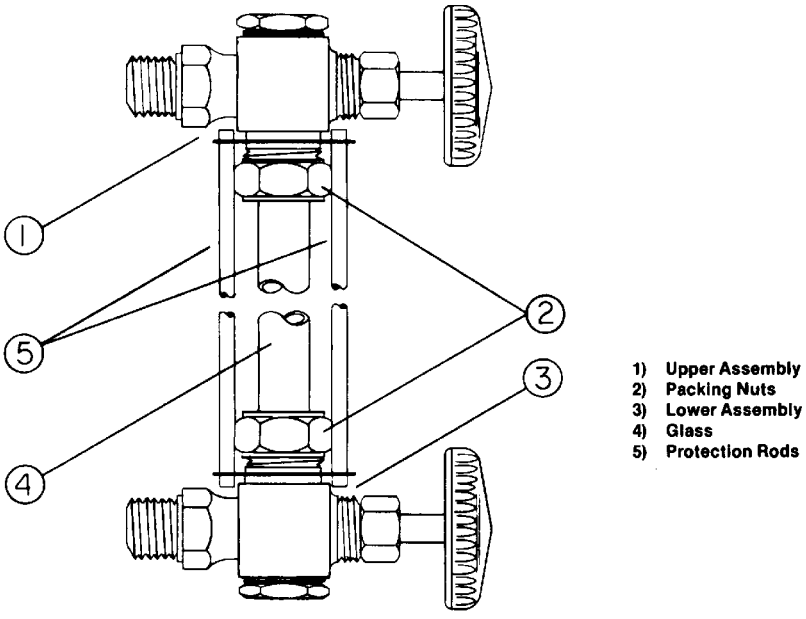


Figure 68. GAUGES, REAR

CHAPTER 4
TROUBLESHOOTING

Section A. GENERAL

84. Heating with the Hot Oil Heater

a. There are many conditions which arise outside the heat exchanger which can cause poor heat transfer through an external user to the hot oil heater.

NOTE: When hot oil heater is set up for operation and a new 3 phase electrical power source is connected, always check for rotation of blower and circulating pump motors. If rotation is not correct, change any two electrical power leads to correct rotation.

1. Air trapped in piping and tanks will sometimes move into the oil stream causing the following conditions. The pump will become noisy. The sound will give you the impression that there are foreign objects in the pump. This condition is called cavitation. The pressure gauges will fluctuate wildly and the flexible lines on the return to the strainer will move about. The pressure gauge at the heater discharge will register other than normal operating pressure of about 35 psi because the pump is actually trying to compress this air trapped in the lines. Small amounts will work out through the vent in the cold seal tank. The chief cause of air entering the system is usually because the system is improperly filled. Therefore, make certain the fluid level in the expansion tank is equal or above the line stenciled on the tank end, behind the sight glass. If the air continues to enter the system during operation, check all pipe joints to the pump suction to see that they are tight and not leaking.

2. Water will enter the system due to condensation after a unit has been shutdown for a prolonged period of time or due to water in any makeup oil put in the system. When water is present in the system the hot oil will create a popping or sizzling sound in the expansion tank. If the presence of water is detected, it is wise to lower the temperature to 2500F until the water is boiled out and vented as a vapor. It is also suggested upon starting after a prolonged shutdown, the unit be operated for an hour or so at a temperature of 250°F before going on up to the operating temperature.

3. Valving. There are five operating valves located on the hot oil heater. They are identified as follows: supply valve A - located on the heater front, pump valve C - located above the pump, on the pump suction, makeup valve D - located in a 1 1/2 line from the expansion tank, entering the surge tank above the pump, fill valve B - mounted between the pump valve and pump, with one end threaded for filling system from an external source. In normal operation the pump valve is full open and the supply valve is full open. Open the makeup valve from expansion tank to surge tank. Close fill valve.

Observe the heat transfer oil level to see that it does not drop below the line stenciled on the tank head. To add heat transfer oil to the system, connect the fill valve to a drum with a flexible hose or suitable connection, with one end submerged to the bottom of a drum of heat transfer oil Close the pump valve and open the fill valve at the same time. Leave the valves this way until the drum is empty, then close the fill valve and open the pump valve to change drums. If the system is in operation, let the pump run, but if the system is not in operation, turn the pump switch off while changing drums.

NOTE: When adding heat transfer oil to a system from a drum, make sure that the drum has a second opening for air to enter. If not, the drum can be collapsed by pump suction.

The valves on the external user should be operated as follows:

The supply valve should remain full open. You should throttle the return valve to control the temperature. To reduce the temperature, throttle the valve to close, but never close completely. To raise the temperature, open the valve. When the temperature is close to the desired amount, you should move the valve handle approximately 1/2 turn at a time.

Allow approximately one half hour between adjustments to allow for heat balance.

4. If the stack of the heater should become smoky, this is caused either by not enough combustion air, or too much fuel oil. In either case, there will not be a good heat release and heating will be poor. This condition should be cleared up as soon as possible by either increasing the combustion air or limiting the fuel oil going into the burner.

85. Scope

a. This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the hot oil heater and its components. Each trouble symptom stated is followed by a list of probable causes of trouble. The possible remedy recommended is stated and described opposite the probable cause.

Section B. HOT FLUID SYSTEM

86. TRANSFER OIL DOES NOT CIRCULATE PROPERLY

Probable Cause	Possible Remedy
Supply valve closed or partially closed	Open the supply valve (Fig 14)
Pump rotation incorrect	Reverse rotation of the circulating pump (Para 33)
Strainer valves closed or partially closed	Open the strainer valves (Para 37)
Circulating pump motor-to-pump drive coupling broken	Replace a defective coupling (Para 33)
Pump not primed	Prime the pump with heat transfer oil
Hot fluid strainers clogged	Service the hot fluid strainers (Fig 22)
Air or water vapor trapped in lines	Make certain that vent is open
Circulating pump motor not operating	Check overloads on circulating pump starter. Reset (Fig 11, Item 1). Motor defective - replace motor (Para 34).
Circulating pump defective	Replace defective pump (Para 33).

87. CIRCULATING PUMP NOISY

Probable Cause	Possible Remedy
Circulating pump and circulating pump motor out of alignment	Align the pump and motor (Para. 33 & 34)
Circulating pump defective	Replace a defective circulating pump (Para 33)
Pump is cavitating	Check to insure that the pump suction valve is open (Valve C) and that there is an adequate oil supply in the heater

88. CIRCULATING PUMP DEFECTIVE

Probable Cause	Possible Remedy
Dirt or grit in transfer oil	Service hot fluid strainers. Replace defective strainer basket (Fig. 22)
Gear reducer drive defective -	Check lubrication level. Shaft or gears broken - replace defective parts. Bearing defective - replace bearings (Fig 20).

89. CIRCULATING PUMP CAPACITY IS LOW

Probable Cause	Possible Remedy
Circulating pump motor does not run at rated R.P.M.	Generator not producing correct voltage & cycles. Check power supply. Replace a defective motor (Para 34)
Air leaks or cavitation	Tighten all loose or leaking pipe or hose connections in the hot fluid transfer oil system (Para. 10 & 37). Tighten all valve packing
Pump packing causing friction	Adjust packing nuts (Para. 33)
Circulating pump defective	Replace a defective pump (Para. 33)

90. CIRCULATING PUMP MOTOR NOISY

Probable Cause	Possible Remedy-
Circulating pump motor running single phase	Inspect for open circuit and make necessary repairs (Para. 34 & 41).
Circulating pump motor out of alignment with the circulating pump	Inspect alignment of the drive coupling. Align the motor and pump (Para 33 & 34).
Defective circulating pump	Operate the motor without a load Replace a defective pump or motor if necessary (Para 33 & 34)
Mounting bolts loose	Tighten mounting bolts
Bearings worn out	Replace bearings

91. CIRCULATING PUMP MOTOR RUNS HOT

Probable Cause	Possible Remedy
Circulating pump motor running single phase	Inspect for open circuit and make necessary repairs (Para 34 & 41).
Improperly adjusted packing, defective pump	Adjust the packing nuts or replace defective pump
Incorrect voltage and cycles	Inspect and check incoming external power source (Para 10 & 41)
Restricted ventilation	Clean air passages (Para. 34)
Coupling out of alignment	Align the circulating pump motor and the circulating pump (Para 33 & 34)

Section C. ELECTRICAL

92. CIRCULATING PUMP MOTOR WILL NOT START Probable Cause

	Possible Remedy
Circuit breaker has tripped because of overload	Allow sufficient time for cooling. Reset at circulating pump motor starter (Fig. 11) Reset main breaker (Fig. 28) Start hot oil heater (Para 13).
Power not connected	Inspect external power source Check continuity of power lines(Para 10&41)
Voltage too low	Test rating of incoming external power (Para. 10) and remedy cause of low voltage
Improper power connections	Make the correct connections (Para. 10)
Circulating pump is locked	Replace a defective pump (Para 33)

93. BLOWER MOTOR STARTER OVERLOAD CONTINUES TO TRIP

Probable Cause	Possible Remedy
Blower motor pulling too much amperage	Check amperage at starter
Blower motor starter overload defective overload (Para 44 & 45)	Replace a defective blower motor starter or
Ambient temperature is above 125°F	Open control panel box for ventilation. Shade control box from direct sunlight

94. BLOWER MOTOR WILL NOT START

Probable Cause	Possible Remedy
Overload has tripped because of overloading	Allow sufficient time for cooling; reset blower motor starter in control box (Para. 44)
Power not connected	Inspect external power source. Check continuity of power lines (Para. 10 & 41)
Starter "chatters"	Check reduced voltage transformer for 1 15/1/60 supply; replace faulty transformer
Operating limit open	Check oil level at sight glass, rear of expansion tank, pressure setting on pressuretrol, and temperature setting on operating & high limit controls. Overload in blower starter may be tripped - reset (Para 44)

94. BLOWER MOTOR WILL NOT START (continued)

Voltage too low	Test rating of incoming external power (Para. 10) and remedy cause Improper power connections
Improper power connections	Make the correct connections (Para. 10)
Fuel pump or blower fan locked	Replace a defective fuel pump or blower fan
Blower motor starter defective	Repair or replace a defective motor starter (Para. 45)
Blower motor defective	Replace a defective blower motor

95. HOT OIL HEATER WILL NOT START

Probable Cause	Possible Remedy
Circulating pump motor starter or blower motor	Reset motor starters (Para 44 & 48) starter overloads tripped
Fuse blown	Replace fuse as necessary (Para. 43)
Low oil condition	Add heat transfer fluid as necessary
Circulating pump starter defective	Replace a defective motor starter (Para. 49)
Blower motor starter defective	Replace a defective motor starter (Para. 45)
Power supply not connected	Connect external power supply

96. BLOWER MECHANISM WILL NOT PROGRAM OUT OF PREPURGE

Probable Cause	Possible Remedy
Program controller defective	Replace a defective program controller (Para. 46)

97. BURNER MECHANISM WILL NOT PROGRAM OUT OF LOW-FIRE

Probable Cause	Possible Remedy
Program controller defective	Replace a defective program controller (Para. 46)
Voltage low	Inspect incoming external power for proper rating (Para. 10)
High fire solenoid valve defective	Replace defective solenoid valve
Defective oil cylinder	Replace defective oil cylinder

98. ULTRAVIOLET (UV) CELL FAILS TO OPERATE

Probable Cause	Possible Remedy
Viewing window on U.V. Cell tube obscured	Clean viewing window (Para. 53)
Defective UV scanner	Replace a defective UV scanner (Para. 53)
Program controller defective	Replace a defective program controller (Para. 46)

99. PROGRAM CONTROLLER WILL NOT START OPERATING SEQUENCE

Probable Cause	Possible Remedy
Blower motor starter reset switch open	Reset switch (Para. 44)
Defective blower motor starter	Replace a defective blower motor starter (Para. 45)
Operating limit open	Check oil level in expansion tank for low level, oil pressure and pressuretrol setting, hot oil temperature and temperature controller settings and/or overloads in starters
Temperature controller improperly set or defective	Set operating limits on temperature controller compatible with heat range of hot oil heater. Replace a defective temperature controller (Para 47)
Program controller defective	Replace a defective program controller (Para. 46)
Burner switch turned to "OFF"	Turn switch to "ON" position
Control power dead	Check transformer for output and check fuses

Section D. BURNER

100. BURNER FAILS TO IGNITE

Probable Cause	Possible Remedy
Ignition electrodes improperly gapped	Adjust the ignition electrodes (Para. 58)
Ignition transformer defective	Replace a defective ignition transformer (Para. 54)
Carbon deposits on electrode tips	Clean off carbon deposits and adjust electrodes (Para. 58)
No fuel going to burner nozzles	Check fuel strainer, burner nozzle, and fuel supply; check for plugged fuel lines
U.V. cell inoperative	Check for 12 V. D.C. reading on meter; replace defective U.V. cell

101. BURNER FLAME FAILURE

Probable Cause	Possible Remedy
Defective burner oil valve	Replace a defective oil valve (Para. 61)
Fuel lines leaking air	Tighten all fittings and replace a leaking oil line
Program control on safety lockout	Reset program control (Fig. 46)
Loss of fuel pressure	Check fuel supply; check and tighten fittings in fuel line
U.V. scanner defective	Replace U.V. scanner (Fig. 53)
Burner nozzle defective or plugged	Clean a plugged nozzle; replace a defective nozzle (Fig. 42)
Out of fuel	Refill fuel supply tank if empty
Low fuel oil pressure	Adjust the fuel pump (Para. 64)
Coupling between fuel pump and motor, loose or broken	Replace a defective coupling (Fig. 48)
Fuel oil strainers clogged	Service or replace a defective fuel oil strainer (Fig. 51)
Fuel valves closed or partially closed	Open fuel valves (Para. 65)

102. BURNER EXHAUST SMOKY

Probable Cause	Possible Remedy
Damper cylinder linkage out of adjustment	Adjust damper linkage (Para. 60)
Air damper improperly positioned	Position properly
Air damper cylinder defective	Replace a defective damper cylinder (Para. 59)

Section E. FUEL SYSTEM

103. FUEL PUMP FAILS TO DELIVER ADEQUATE PRESSURE

Probable Cause	Possible Remedy
Fuel pump improperly adjusted	Adjust the fuel pressure (Para. 64)
Air leak in intake line	Tighten fittings in intake line or replace a defective line
Restricted intake line	Inspect tubing and valves for restrictions and damage; replace a defective line or valve
Loose or broken coupling to blower motor	Repair a defective coupling (Fig. 48)
Wrong pump rotation	Check the pump rotation; reverse rotation of the pump
Frozen pump shaft	Replace a defective fuel pump (Para. 63)
Fuel strainers clogged	Clean fuel strainers

104. FUEL PUMP NOISY

Probable Cause	Possible Remedy
Improper coupling alignment	Reline fuel pump to coupling
Gear click on newly installed pump	Continue operation for 4 to 5 hours to eliminate noise. Replace a defective fuel pump.

105. PULSATING FUEL PUMP PRESSURE

Probable Cause	Possible Remedy
Fuel oil strainers clogged	Service the fuel oil strainers (Para. 65)
Intake line or fuel valves leaking	Tighten all fittings. Replace a defective line or fuel valve
Fuel oil strainer cover leaks	Tighten cover screws (Para. 65)

CHAPTER 5
ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST
SECTION I. INTRODUCTION

1.Scope.
This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and di-agnostic equipment (TMDE); and other special support equipment required for performance of Organizational Direct Support and General Support Maintenance of the Hot Oil Heater, 200 STM 77. It authorizes the requisitioning, and special tools as indicated by the source, maintenance and recoverability (SMR) codes.

2.General.
In addition to Section I. Introduction, this Repair Parts and Special Tools List is divided into the following sections:

a. *Section II. Repair Parts List.* A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the author-in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Bulk materials are listed in item name sequence. Repair kits are listed separately in their own functional group within Section II. Repair parts for repair-the item able special tools are also listed in the section. Items listed are shown on the associated illustration(s)/figure(s).

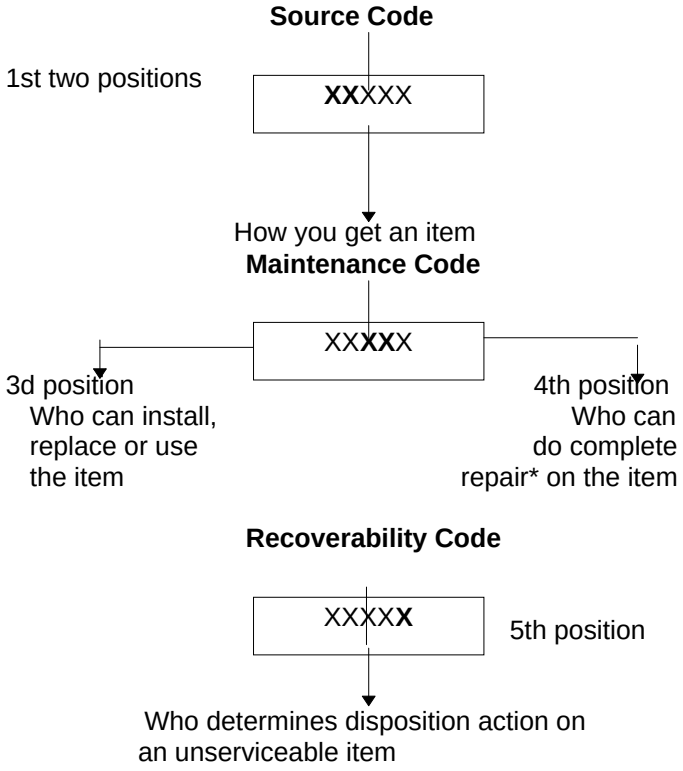
b. *Section III. Special Tools List.* A list of special tools, special TMDE, and other special support equip-ment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in DESCRIPTION AND US-Who determines disposition action on ABLE ON CODE column) for the performance of maintenance.

c. *Cross-reference Indexes.* A list, in National Item Identification Number (NIIN) sequence, of all National stock numbered items appearing in the listing, followed by a list in alphanumeric sequence of all part numbers appearing; in the listings. National stock numbers and part numbers are cross-referenced to each illustration, figure and item number appearance. The figure and item number index lists figure and item numbers in al phanumeric sequence and cross-references NSN, CAGE and part numbers.

3.Explanation of Columns (Sections II and Ill).

a.*ITEM NO. (Column (1)).* Indicates the number used to identify items called out in the illustration.

b.*SMR CODE (Column (2))*. The Source, Maintenance, and Recoverability (SMR) code is a position code containing supply/requisitioning information, maintenance category authorization criteria and disposition instructions, as shown in the following breakout:



**Complete Repair.* Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use/user environ-ment in order to restore serviceability to a failed item.

(1) Source Code. The source code tells you how to get an item needed for maintenance, repair or overhaul of an end item/equipment. Explanations of source codes follows:

Code	Application/Explanation
PA PB PC*** PD PE PF PG	Stocked items; use the applicable NSN to request/requisition items with these source codes. They are authorized to the category indicated by the code entered in 3d position of the SMR code. **Items coded PC are subject to deterioration.
KD KF KB	Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance category indicated in the 3d position of the SMR code. The complete kit must be requisitioned and applied.
MO - (Made at UM AVUM Level)	Items with these codes are not to be requested individually. They must be made from bulk material which is identified by the part number in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the Bulk Material group of the repair parts list in this RPSTL. If the item is authorized to you by the 3d position code of the SMR code, but if the source code indictes it is made at a higher level, order the item from the higher level of maintenance.
MF-(Made at DS/ AVUM Level)	
ML-(Made at Specialized Repair Act (SRA))	
MD-(Made at Depot)	
AO-(Assembled by UM/AVUM Level)	Items with these codes are not to be requested/requisitioned individually The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the 3d position code of the SMR code by authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.
AF-(Assembled by DS/AVIM Level)	
AH-(Assembled by GS category)	
AL-(Assembled by SRA)	
AD-(Assembled by Depot)	
XA -	Do not requisition an "XA"-coded Item. Order its next higher assembly. (Also, refer to the NOTE below.)
XB -	If an "XB" item is not available from salvage order it using the CAGE and part number given
XC -	Installation drawing, diagram, diagram, instruction sheet, field service drawing, that is identified by the manufacturer's part number.
XD -	Item is not stocked. Order an "XD"-coded item through the CAGE and part number given, if no NSN is available.

NOTE: Cannibalization or controlled exchange, when authorized, may be used as source of supply for items with the above source codes, except for those source coded "XA" or those aircraft support items restricted by requirements of AR 700-42.

(2) Maintenance Code. Maintenance codes tell you the level(s) of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the SMR Code as follows:

(a) The maintenance code entered in the third position tells you the lowest maintenance level authorized to remove, replace and use an item. The maintenance code entered in the third position will indicate authorization to one of the following levels of maintenance:

Code	Application/Explanation
C-	Crew or operator maintenance done within unit or aviation maintenance.
O-	Unit maintenance or aviation unit category can remove, replace and use the item.
F-	Direct support or aviation intermediate level can remove, replace and use the item.
H-	General support level can remove, replace and use the item.
L-	Specialized repair activity can remove, replace and use the item.

D- Depot level can remove, replace, and use the item.

(b) The maintenance code entered in the fourth position tells whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (i.e., perform all authorized repair functions.) (NOTE: Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.) This position will contain one of the following maintenance codes:

Code	Application/Explanation
O-	Unit maintenance or Aviation unit is the lowest level that can do complete repair of the item
F-	Direct support or aviation intermediate is the lowest level that can do complete repair of the item.
H-	General support is the lowest level that can do complete repair of the item.
L-	Specialized repair activity is the lowest level that can do complete repair of the item.
D-	Depot is the lowest level that can do complete repair of the item.
Z-	Nonreparable. No repair is authorized.
B-	No repair is authorized. (No parts or special tools are authorized for the maintenance of a "B" coded item.). However, the item may be reconditioned by adjusting, lubrication, etc, at the user level.

(3) Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR Code as follows:

Code	Application/Explanation
Z-	Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in 3d position of the SMR code.
O-	Reparable item. When uneconomically reparable, condemn and dispose of the item at unit maintenance or aviation unit level.
F-	Reparable item. When uneconomically reparable, condemn and dispose of the item at the direct support or aviation intermediate level.
H-	Reparable item. When uneconomically reparable, condemn and dispose the item at the general support level.
D-	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item not authorized below depot level.
L-	Reparable item. Condemnation and disposal of item not authorized below specialized repair activity (SRA).
A-	Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

c. *CAGEC (Column (3)).* The Commercial And Government Entity (CAGE) Code (C) is a 5-digit alphanumeric code which is used to identify the manufacturer, distributor or Government agency, etc., that supplies the item.

d. *PART NUMBER (Column (4)).* Indicates the primary number used by the manufacturer (individual, company, firm, corporation or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards and inspection requirements to identify an item or range of items.

NOTE: When you use a NSN to requisition an item, the item you receive may have a different part number from the part you ordered.

e. *DESCRIPTION AND USABLE ON CODE (UOC) (Column (5)).* This column includes the following information:

(1) The Federal item name and, when required, a minimum description to identify the item.

(2) Physical security classification. Not applicable.

(3) Items that are included in kits and sets are listed below the name of the kit or set on Figure KIT.

(4) Spare/repair parts that make up and assembled item are listed immediately following the assembled item line entry.

(5) Part numbers for bulk materials are referenced in this column in the line item entry for the item to be manufactured/fabricated.

(6) When the item is not used with all serial numbers of the same model, the effective serial numbers are shown on the last line(s) of the description (be-fore UOC). Not applicable.

(7) The usable on code, when applicable (see paragraph 5, Special information).

(8) In the Special Tools List section, the basis of issue (BOI) appears as the last line(s) in the entry for each special tool, special TMDE and other special sup-port equipment. When density of equipments supported exceeds density spread indicated in the basis of issue, the total authorization is increased proportionately.

(9) The statement "END OF FIGURE" appears just below the last item description in Column 5 for a given figure in both Section II and Section III. f. QTY (Column (6)). The QTY (quantity per figure Column) indicates the quantity of the item used in the breakout shown on the illustration figure, which is pre-pared for a functional group, subfunctional group or an assembly. A "V" appearing in this column in lieu of a quantity indicates that the quantity is variable and the quantity may vary from application to application.

4. Explanation of Columns (Section IV).

a. *NATIONAL STOCK NUMBER (NSN) INDEX.*

(1) STOCK NUMBER column. This column lists the NSN by National item identification number (NIIN)
Sequence. The NIIN consists of the last nine
NSN
digits of the NSN (i.e., 5305-01-674-1467)
NIIN
When using this column to locate an item, ignore the first 4 digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

(2) FIG. column. This column lists the number of the Figure where the item is identified/located. The fig-ures are in numerical order in Section II and Section III

(3) ITEM column. The item number identifies the item associated with the figure listed in the adjacent FIG. Column. This item is also identified by the NSN listed on the same line.

b. *PART NUMBER INDEX.* Part numbers in this index are listed by part number in ascending alphanumeric sequence (i.e., vertical arrangement of letter and number combination which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order.)

(1) CAGEC column. The Commercial And Government Entity (CAGE) Code (C) is a 5 digit alphanumeric code used to identify the manufacturer, distributor or Government agency, etc., that supplies the item.

(2) PART NUMBER column. Indicates the primary number used by the manufacturer (individual, firm, corporation or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of Items

(3) STOCK NUMBER column. This column lists the NSN for the associated part number and manufacturer identified in the PART NUMBER and CAGEC columns to the left.

(4) FIG. column. This column lists the number of the figure where the item is identified/located in Section II and III

(5) ITEM column. The item number is that number assigned to the item as it appears in the figure refer-enced in the adjacent figure number column.

c. *FIGURE AND ITEM NUMBER INDEX.*

(1) FIG. column. This column lists the number of the figure where the item is identified/located in Section II and III.

(2) ITEM column. The item number is that number assigned to the item as it appears in the figure refer-enced in the adjacent figure number column.

(3) STOCK NUMBER column. This column lists the NSN for the item.

(4) CAGEC column. The Commercial and Government Entity (CAGE) Code (C) is a 5 digit alphanumeric code used to identify the manufacturer, distributor or Government agency, etc., that supplies the item.

(5) PART NUMBER column. Indicates the primary number used by the manufacturer (individual, firm, corporation or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards and inspection requirements to identify an item or range of items.

5.Special Information.
Use the following subparagraphs as applicable:

a. *USABLE ON CODE.* Not Applicable.

b. *FABRICATION INSTRUCTIONS.* Not Applicable.

c. ASSEMBLY INSTRUCTION. Detailed assembly instructions for items source coded to be assembled From component spare/repair parts are found in this manual. Items that make up the assembly are listed immediately following the assembly item entry or reference is made to an applicable figure.

d. *KITS.* Not Applicable.
Number or Part Number. The NSN index is in National

e. INDEX NUMBERS. Items which have the word BULK in the figure column will have and index number shown in the item number column. This index number is a cross-reference between the National Stock Number/ Part Number Index and the bulk material list in Section II.

f. *ASSOCIATED PUBLICATIONS.* Not Applicable.

6. How to Locate Repair Parts.

a. When National Stock Number or Part Number is Not Known.

(1) First. Using the table of contents, determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are pre-pared for assembly groups and subassembly groups, and listings are divided into the some groups.

(2) Second. Find the figure covering the assembly group or subassembly group to which the item belongs

(3) Third. Identify the item on the figure and use the Figure and Item Number Index to find the NSN.

b. When National Stock Number or Par Number is Known.

(1) First. Using the National Stock Number or the Part Number Index, find the pertinent National Stock Item Identification Number (NIN) sequence (see 4.a(1)). The part numbers in the Part Number index are listed in ascending alphanumeric sequence (see 4.b). Both indexes cross-reference you to the illustration/figure and item number of the item you're looking for.

(2) Second. Turn to the figure and item number, verify that the item is the one you're looking for, then locate the item number in the repair parts list for the figure.

7. Abbreviations.
For standard abbreviations see MIL-STD-1 2D, Military Standard Abbreviations For Use On Drawings, Specifications, Standards And In Technical Documents.

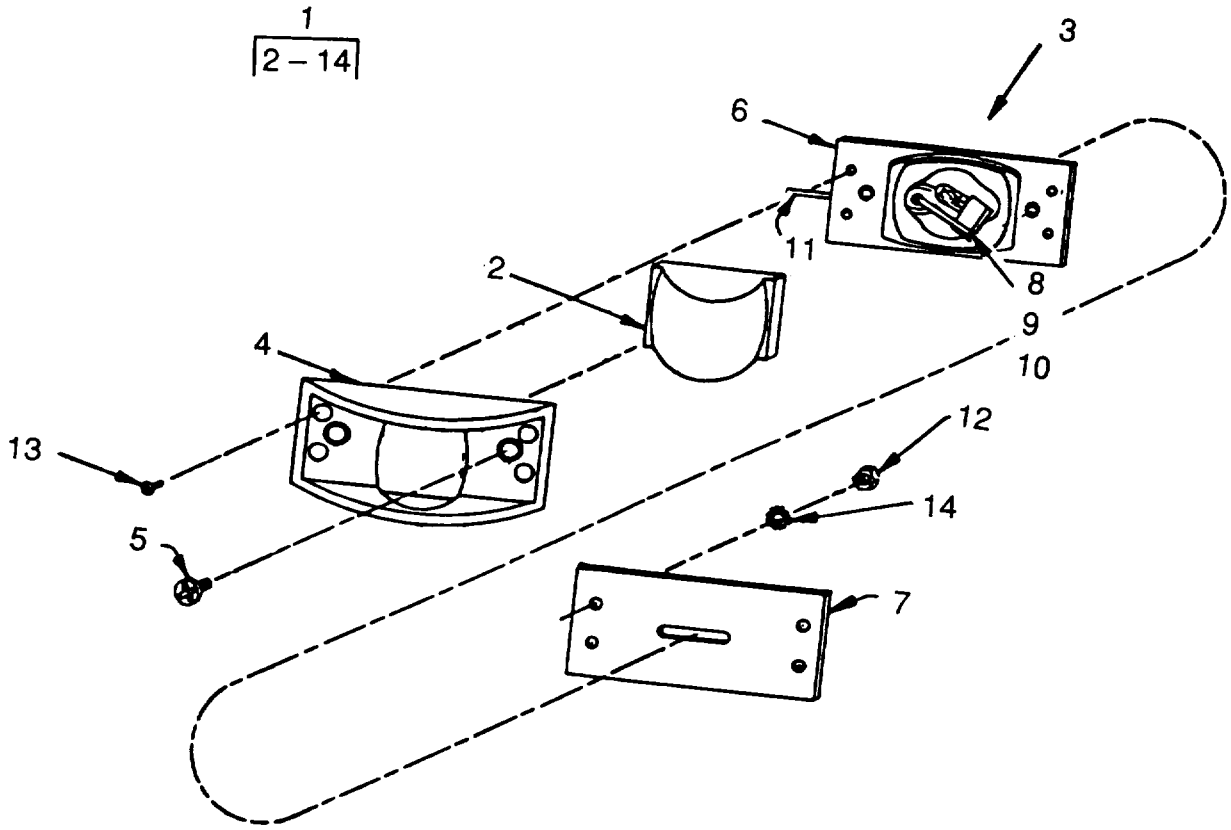


Figure 1. CLEARANCE LIGHTS.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:06 ELECTRICAL GROUP:0609 LIGHTS	
				FIGURE 1. CLEARANCE LIGHTS.	
1	XDOOO	82370	0419	LAMP, CLEARANCE AMBER	4
1	XDOOO	82370	0416	LAMP, CLEARANCE RED	3
2	XDOZZ	82370	0311	.LENS AMBER	1
2	XDOZZ	82370	0312	.LENS RED	1
3	XDOZZ	82370	1017	.BULB	1
4	XDOZZ	82370	0313	.COVER, MOUNTING	1
5	XDOZZ	82370	0601	.SCREW	2
6	XDOZZ	82370	0314	.PLATE, LAMP	1
7	XDOZZ	82370	0524	.GASKET	1
8	XDOZZ	82370	0603	.CONTACT	1
9	XDOZZ	82370	0607	.SOCKET	1
10	XDOZZ	82370	0608	.TERMINAL	1
11	XDOZZ	82370	0609	.CABLE	1
12	XDOZZ	82370	0611	.NUT, PLAIN HEX	2
13	XDOZZ	82370	0612	.SCREW,MACHINE	2
14	XDOZZ	82370	0613	.WASHER	2
				END OF FIGURE	

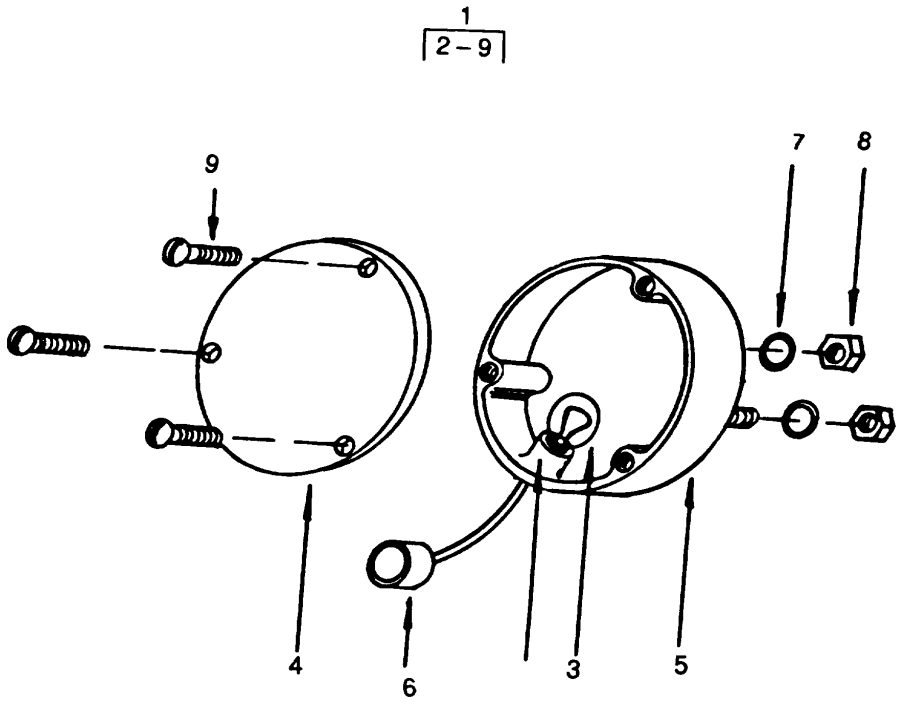


Figure 2. COMBINATION TURN, STOP AND TAIL LIGHTS.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:0609 LIGHTS	
				FIGURE 2. COMBINATION TURN, STOP AND TAILIGHTS	
1	XDOOO	82370	2606	LAMP, TURN, TAIL, STOP	1
2	XDOZZ	82370	2607	SOCKET	1
3	XDOZZ	82370	1157	BULB	1
4	XDOZZ	82370	2608	LENS	1
5	XDOZZ	82370	2609	BODY	1
6	XDOZZ	82370	2610	PIGTAIL	1
7	XDOZZ	82370	0614	WASHER, LOCK	2
8	XDOZZ	82370	0615	NUT, PLAIN HEX	2
9	XDOZZ	82370	2608	SCREW, RETAINING	12
				END OF FIGURE	

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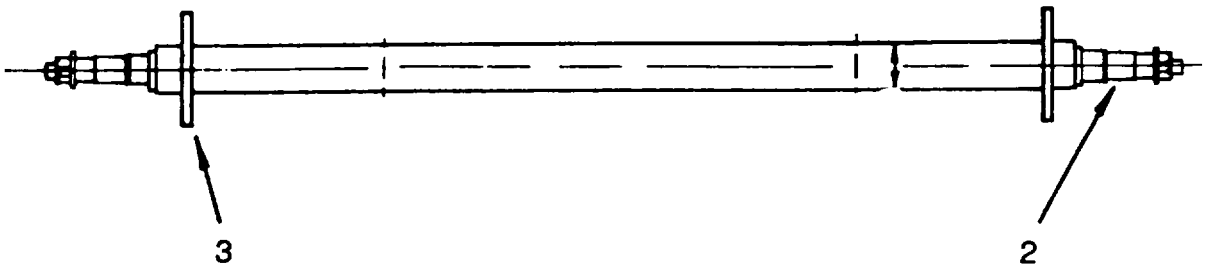

Figure 3. AXLE.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:11 REAR AXLE GROUP:1100 REAR AXLE ASSEMBLY	
				FIGURE 3. AXLE.	
1	XDFZZ	22938	16-12762	AXLE UNIT ASSY 66	1
2	XDFZZ	22938	1-7394	AXLE BEAM WELDMENT	1
3	XDFZZ	22938	12-910	COLLAR, AXLE.....	2
				END OF FIGURE	

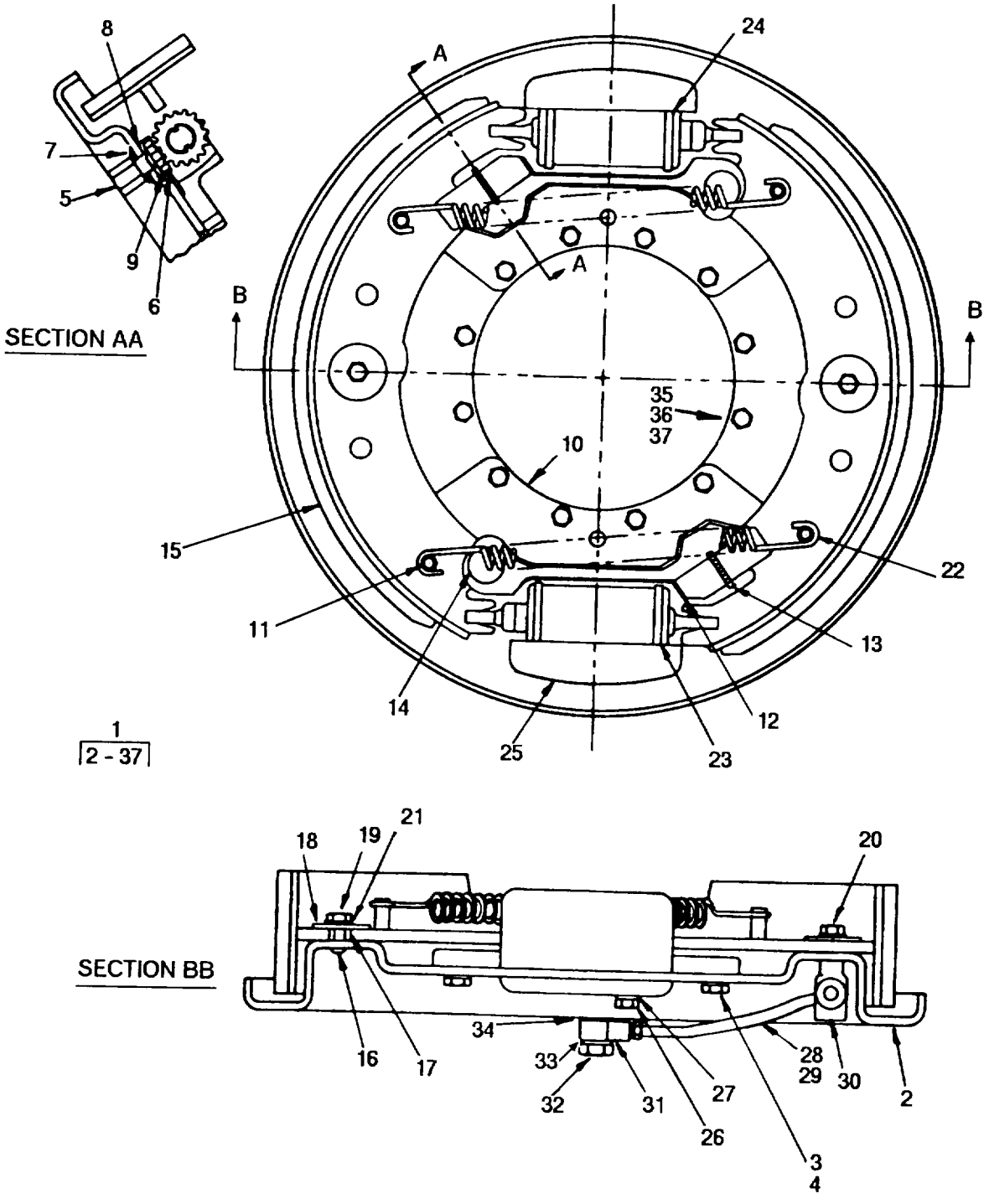

Figure 4. BRAKES.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:12 BRAKES GROUP:1202 SERVICE BRAKES	
				FIGURE 4. BRAKES	
1	XDOOO	63477	RH-FF19578	BRAKE ASSY, RIGHT	1
1	XDOOO	95026	7-8123	BRAKE ASSY, LEFT	1
2	XDOZZ	63477	8123-12	BACKING PLATE R.H. RIGHT	1
2	XDOZZ	63477	8123-11	BACKING PLATE L.H. RIGHT	1
3	PAOZZ	96906	MS90727-64	CAPSCREW	4
4	PAOZZ	96906	MS35338-46	LOCK WASHER	4
5	XDOZZ	63477	8123-15	STUD AND SPINAL WASH	1
6	XDOZZ	63477	8123-16	ADJUSTING GEAR	1
7	XDOZZ	63477	8123-17	WASHER STUD	1
8	PAOZZ	96906	MS35338-45	LOCK WASHER	2
9	PAOZZ	96906	MS51968-5	NUT, HEX	2
10	XDOZZ	63477	8123-18	ANCHOR SUPPORT R.H.	1
11	XDOZZ	63477	8123-60	PIN, SPRING	1
12	XDOZZ	63477	8123-65	SCREW, ADJUSTING	1
13	XDOZZ	63477	8123-66	WHEEL, ADJUSTING	1
14	XDOZZ	63477	8123-20	PIN, ANCOR	1
15	XDOZZ	63477	8123-58	SHOE AND LINING	1
16	XDOZZ	63477	8123-31	BOLT, SHOE GUIDE	1
17	XDOZZ	63477	8123-32	SLEEVE, SHOE GUIDE	1
18	XDOZZ	63477	8123-33	WASHER	1
19	PAOZZ	96906	MS59168-2	NUT, HEX	1
20	PAOZZ	96906	MS90727-8	CAPSCREW, HEX HEAD	
21	PAOZZ	96906	MS35338-44	LOCK WASHER	2
22	XDOZZ	63477	8123-55	SPRING	1
23	XDOZZ	63477	8123-36	WHEEL CYL ASSY BOTH	1
24	XDOZZ	63477	8123-37	WHEEL CYL ASSY TOP	1
25	XDOZZ	63477	8123-38	COVER WHEEL CYL BOT	1
25	XDOZZ	63477	8123-39	COVER WHEEL CYL TOP	1
26	PAOZZ	96906	MS90728-31	CAPSCREW, HEX HEAD	4
27	PAOZZ	96906	SM35338-45	LOCK WASHER	4
28	XDOZZ	63477	8123-40	TUBE CONNECTOR TOP LEFT	1
28	XDOZZ	63477	8123-43	TUBE CONNECTOR TOP RIGHT	1
29	XDOZZ	63477	8123-41	TUBE CONNECTOR BTM LEFT	1
30	XDOZZ	63477	8123-42	DISTRIBUTOR FITTING	1
31	XDOZZ	63477	8123-45	FITTING TUBE	1
32	XDOZZ	63477	8123-46	BOLT, FITTING	1
33	XDOZZ	63477	8123-47	GASKET	1
34	XDOZZ	63477	8123-54	GASKET	1
35	PAOZZ	96906	MS97027-64	CAPSCREW	12
36	PAOZZ	96906	MS35338-46	LOCK WASHER	12
37	PAOZZ	96906	MS51968-8	NUT, HEX	12
				END OF FIGURE	

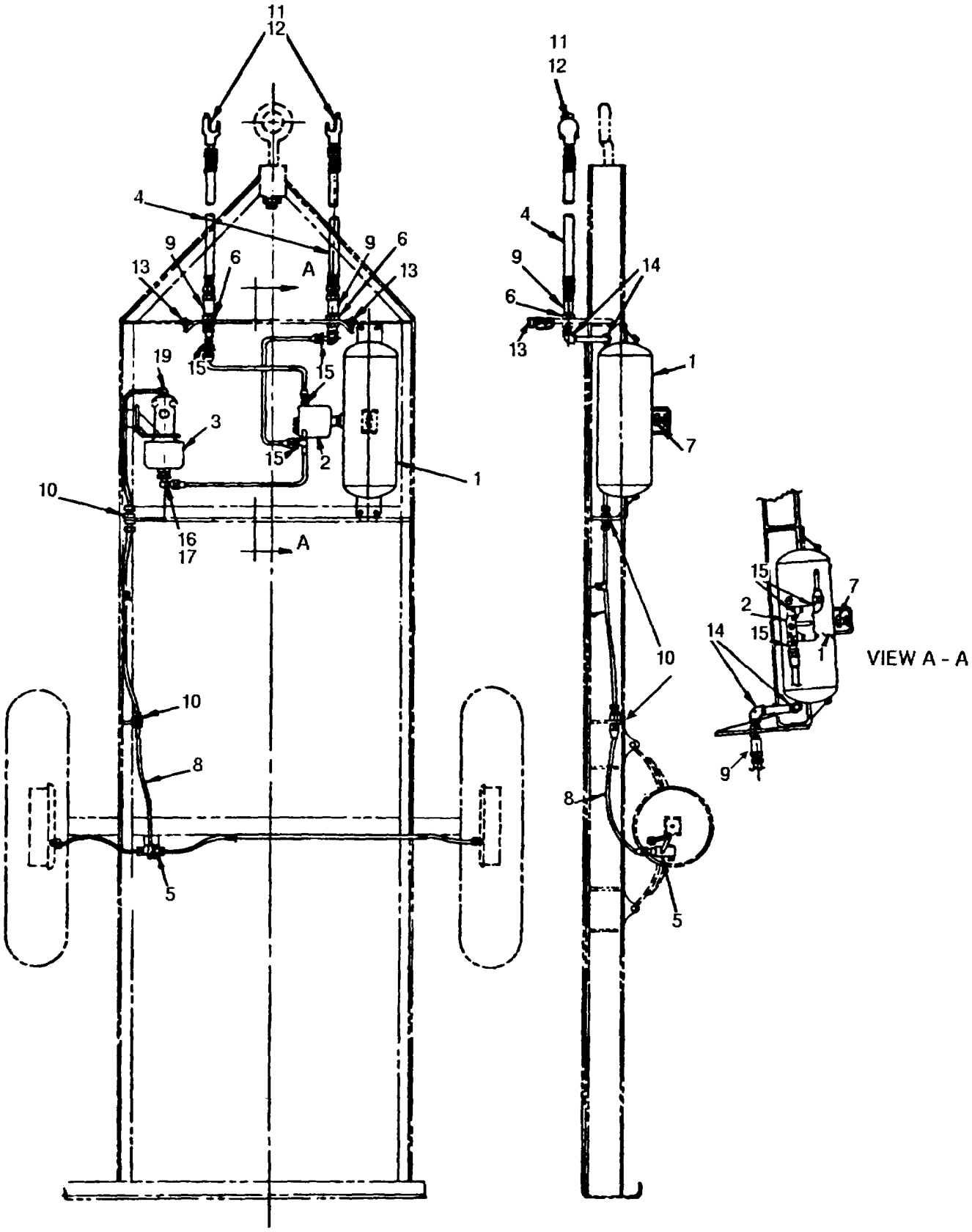

Figure 5. AIR/HYDRAULIC BRAKE ASSEMBLY

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:1208 HYDRAULIC BRAKE SYSTEM	
				FIGURE 5. AIR/HYDRAULIC BRAKE ASSEMBLY	
1	XDOZZ	63477	AD35779	TANK, AIR	1
*2	XDOZZ	16662	AF46227	RELAY, RE VALVE	1
*3	XDOZZ	16662	AE838	CLUSTER ASSEMBLY	1
4	XDOZZ	82370	133-203	HOSE ASSEMBLY, NONME	2
5	XDOZZ	82370	543 T-4-4	TEE	1
6	XDOZZ	82370	81-203	CONNECTOR BULKHEAD	2
7	XDOZZ	22938	17-214	SHUT-OFF COCK	1
*8	XDOZZ	22938	9-857	HOSE, HYDRAULIC	1
*9	XDOZZ	22938	NPT-300	COUPLING	2
10	XDOZZ	22938	OS-WTX-WLN-04	BULKHEAD UN1OMN	2
11	XDOZZ	63477	AC77770	HOSE COUPLER1GLADHA	1
*12	XDOZZ	63477	AC77771	TAG, EMERGENCY	1
13	XDOZZ	22938	127-203	COUPLER, DUMMY VENT	1
14	XDOZZ	22938	82370	PIPE, ELL	4
15	XDOZZ	82370	MS51503A6Z	MALE CONNECTOR	3
16	XDOZZ	96906	MS5150816Z	MALE CONNECTOR	1
17	XDOZZ	82370	DS-CTX-04	MALE ELBOW	1
				END OF FIGURE	

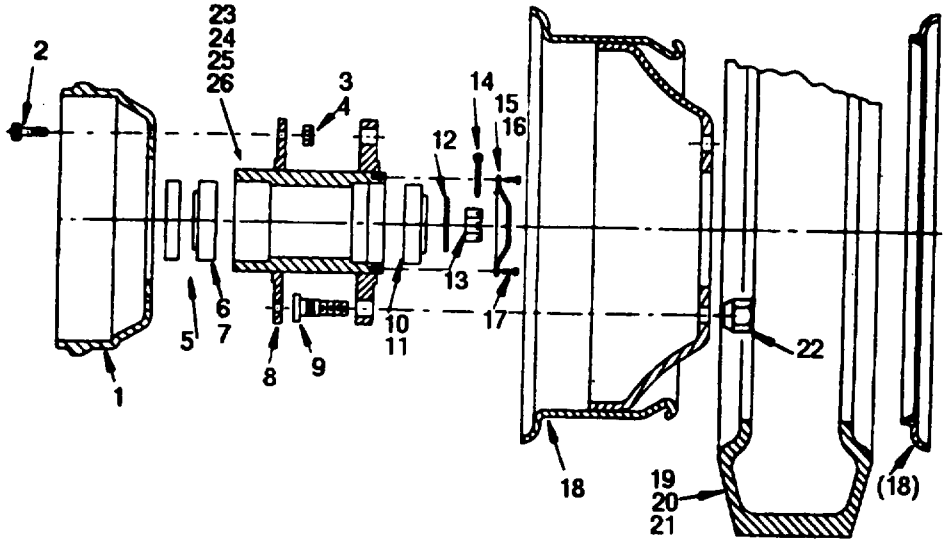

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Figure 6. WHEEL ASSEMBLY.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:13 WHEELS AND TRACKS GROUP:1311 WHEEL ASSEMBLY	
				FIGURE 6. WHEEL ASSEMBLY.	
1	XDOZZ	22938	51-876-03	DRUM	1
*2	PAOZZ	80204	B1821BH050C150N	SCREW, CAP,HEXAGON H	10
3	PAOZZ	96906	MS51968-14	NUT, PLAIN, HEXAGON	10
4	PAOZZ	96906	MS35338-48	WASHER, LOCK	10
5	XDOZZ	22938	455088	SEAL	2
6	XDOZZ	65282	A10283X	CUP, TAPERED ROLLER	2
7	PAOZZ	60038	3982	CONE AND ROLLERS,TA	2
8	XDOZZ	22938	51-614	HUB & DRUM ASSEMBLY	2
*9	PAOZZ	22938	46-64R	STUDS, R.H	12
10	PAFZZ	60038	454	CUP, TAPERED ROLLER	2
11	XDFZZ	60038	462	CONE AND ROLLERS, TA	2
12	PAOZZ	96906	MS35338-7	WASHER, RETAINING	2
*13	PFOZZ	96906	MS35692-109	NUT, PLAIN, SLOTTED, H	2
14	PAOZZ	96906	MS24665-689	COTTER PIN	2
15	XDOZZ	22938	3-13	DUST COVER	2
16	XDOZZ	22938	4-13A	GASKET	2
17	PAOZZ	96906	MS90725-3	SCREW	6
18	XDOZZ	95026	7-1599	WHEEL	1
*19	PAOHA	81348	ZZ-T-381M/GRP-3/	TIRE, PNEUMATIC 9.00-20/F/TBMS	1
20	PAOZZ	81348	9.00-20/TR443/TR .	1 INNER TUBE, PNEUMATI 463/TR175A/TB	1
21	XDOZZ	73842	20-8-0	FLAP, TIRE	1
22	XDOZZ	22938	5556R	WHEEL NUTS, R.H.	12
23	XDOZZ	22938	35X194	NUT, SELF-LOCKING, HE	8
24	XDOZZ	22938	1642	SPRING ASSEMBLY, LEA	1
25	XDOZZ	95026	5-1723	SPRING & AXLE CLAMP	1
26	XDOZZ	22938	15-1729	U-BOLT	1

END OF FIGURE

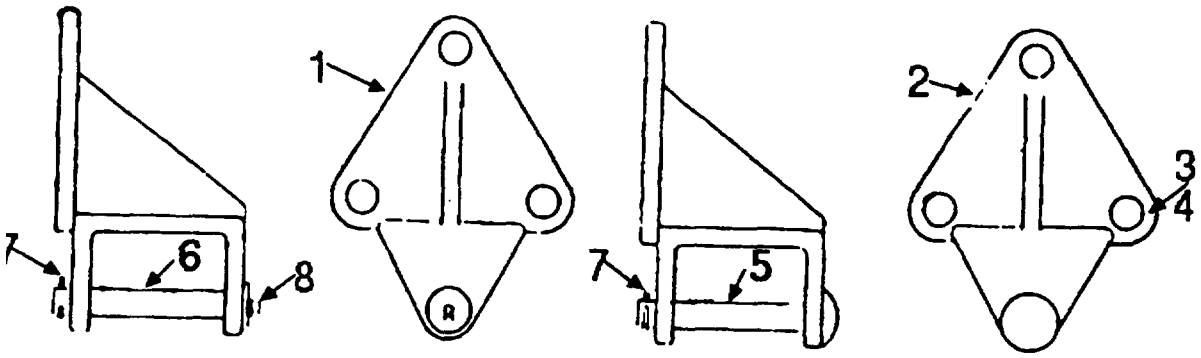

Figure 7. SIDEMOUNT BRACKETS.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:16 SPRINGS AND SHOCK ABSORBERS GROUP:1601 SPRINGS	
				FIGURE 7. SIDEMOUNT BRACKETS	
1	XDOZZ	22S38	1509	SPRING BRACKET ASSY	2
2	XDOZZ	22938	1510	SPRING, BRAKT, HOOK	1
3	PAOZZ	96906	MS90725-162	CAPSCREW	12
4	PAOZZ	96906	MS90728-5	NUT	12
5	XDOZZ	22938	6-804	PIN, STRAIGHT HEADED	1
6	XDOZZ	22938	6-804	SHACKLE BOLT	2
7	PAOZZ	96906	MS24665-495	CUTTER PIN	2
8	PAOZZ	22938	3-410	FITTING, LUBRICATION	2
				END OF FIGURE	

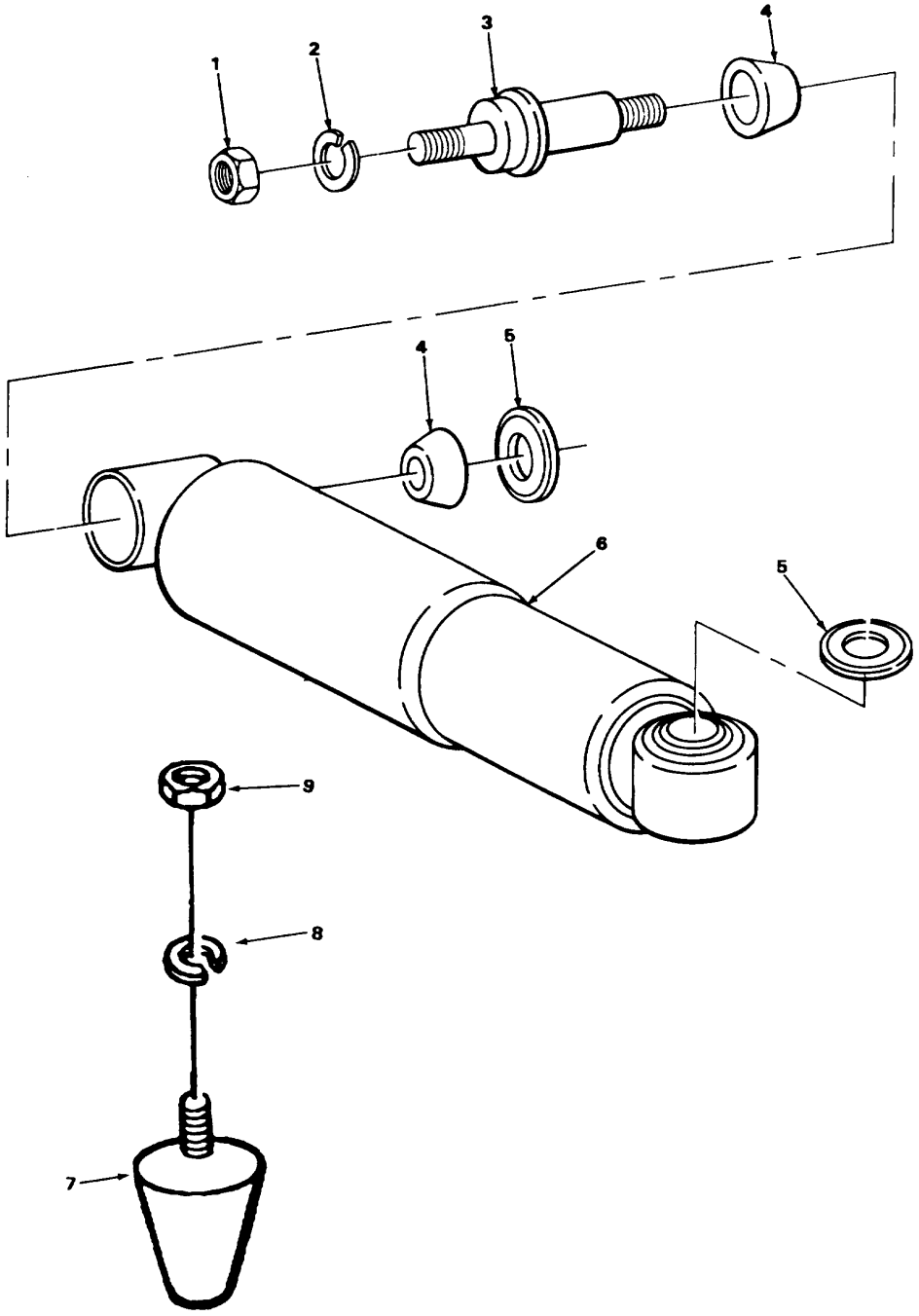

Figure 8. SNUBBER AND SHOCK ABSORBER.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:1604 SHOCK ABSORBERS	
				FIGURE 8. SNUBBER AND SHOCK ABSORBER	
1	PAOZZ	96906	MS35338-50	WASHER, LOCK	4
2	PAOZZ	96906	MS51967-20	NUT, PLAIN, HEXAGON	4
3	XBOZZ	82370	700-5	STUD, UPPER	4
4	XBOZZ	82370	701-6	BUSHING RUBBER	8
5	XBOZZ	82370	701-1	WASHER	4
6	XBOZZ	82370	6857	SHOCK ABSORBER	2
7	XBOZZ	82370	1608	SHOCK ABSORB SNUBBE	2
8	PAOZZ	96906	MS35338-46	WASHER, LOCK	2
* 9	PAOZZ	80204	B1821BH025C038N	NUT, HEX	2
				END OF FIGURE	

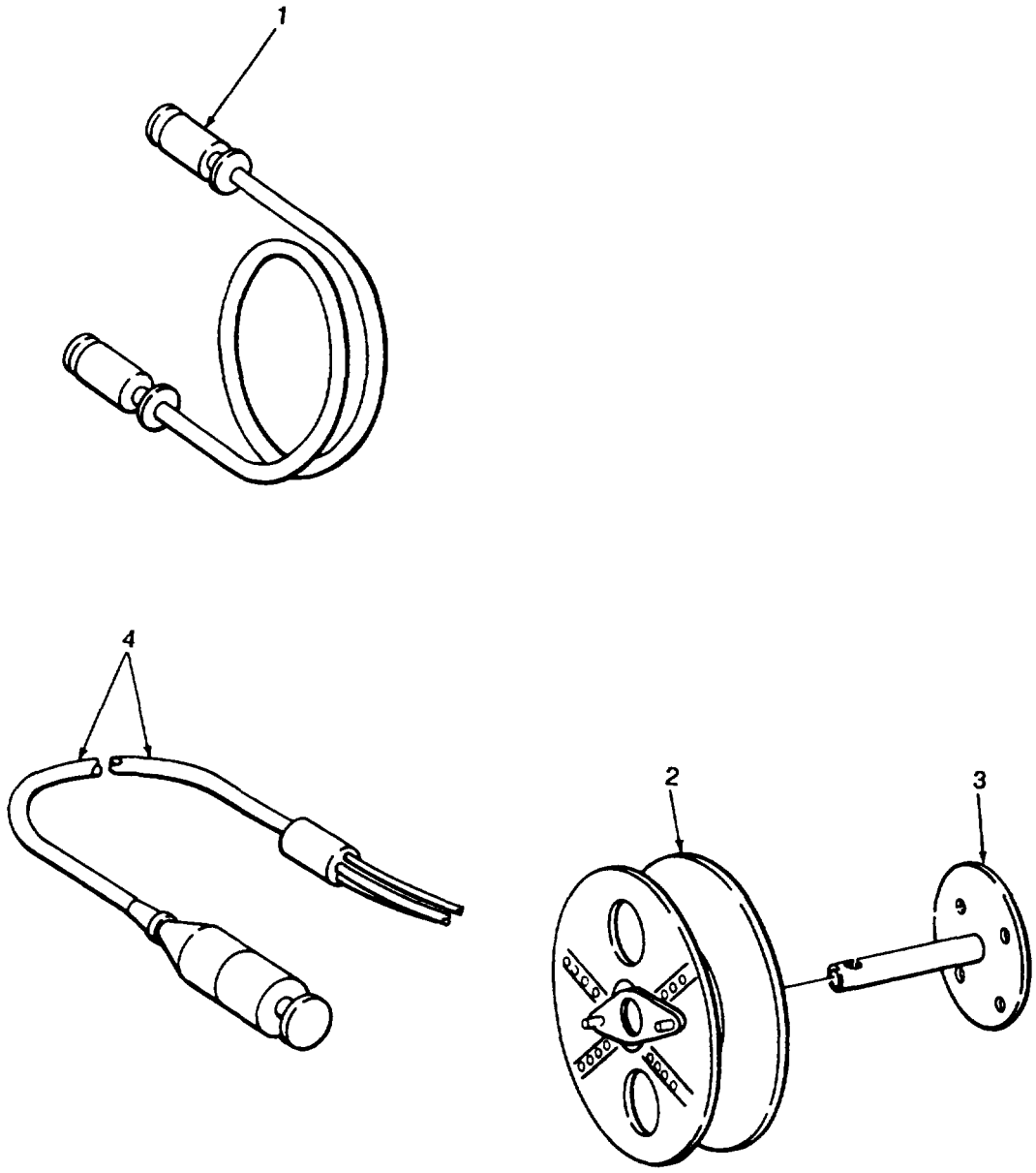

Figure 9. POWER CABLE ASSEMBLY AND POWER CABLE ADAPTER

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:22 ACCESSORY ITEMS	
				GROUP:2202 ACCESSORY ITEMS	
				FIGURE 9. POWER CABLE ASSEMBLY AND POWER CABLE ADAPTER.	
1	PDOOO	82370	8111	CABLE ASSEMBLY, SPEC.....	1
2	XDOZZ	82370	8112	REEL, POWER CABLE	1
3	XDOZZ	82370	8113	STAND, CABLE HEEL.....	1
4	XDOZZ	82370	8114	POWER CABLE ADAPTER.....	1

END OF FIGURE

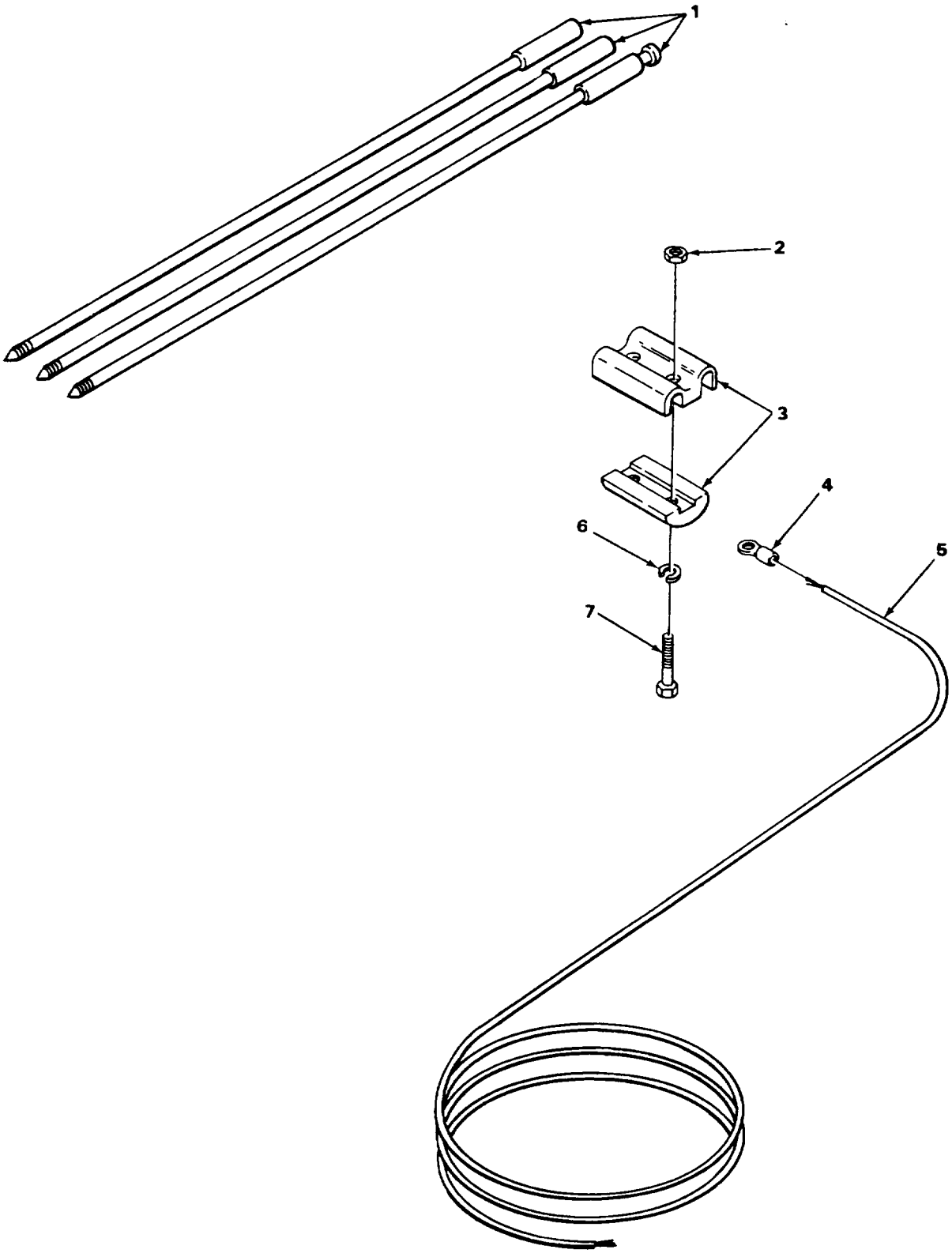

Figure 10. GROUND ASSEMBLY RODS.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:22 BODY ACCESSORY ITEMS GROUP:2202 ACCESSORY ITEMS	
				FGURE 10. GROUND ASSEMBLY RODS.	
1	PFOZZ	82370	8103	ROD, GROUND	2
2	XDOZZ	82370	8108	NUT, HEX	2
3	XDOZZ	82370	8IO9	CLAMP, GROUND	2
4	XDOZZ	82370	8104	LUG.GROUND	2
5	PAOZZ	82370	8105	WIRE, ELECTRICAL	2
6	XDOZZ	82370	8107	LOCK, WASHER, SPLIT	2
7	XDOZZ	82370	8106	SCREW, CAP HEXAGON	2

END OF FIGURE

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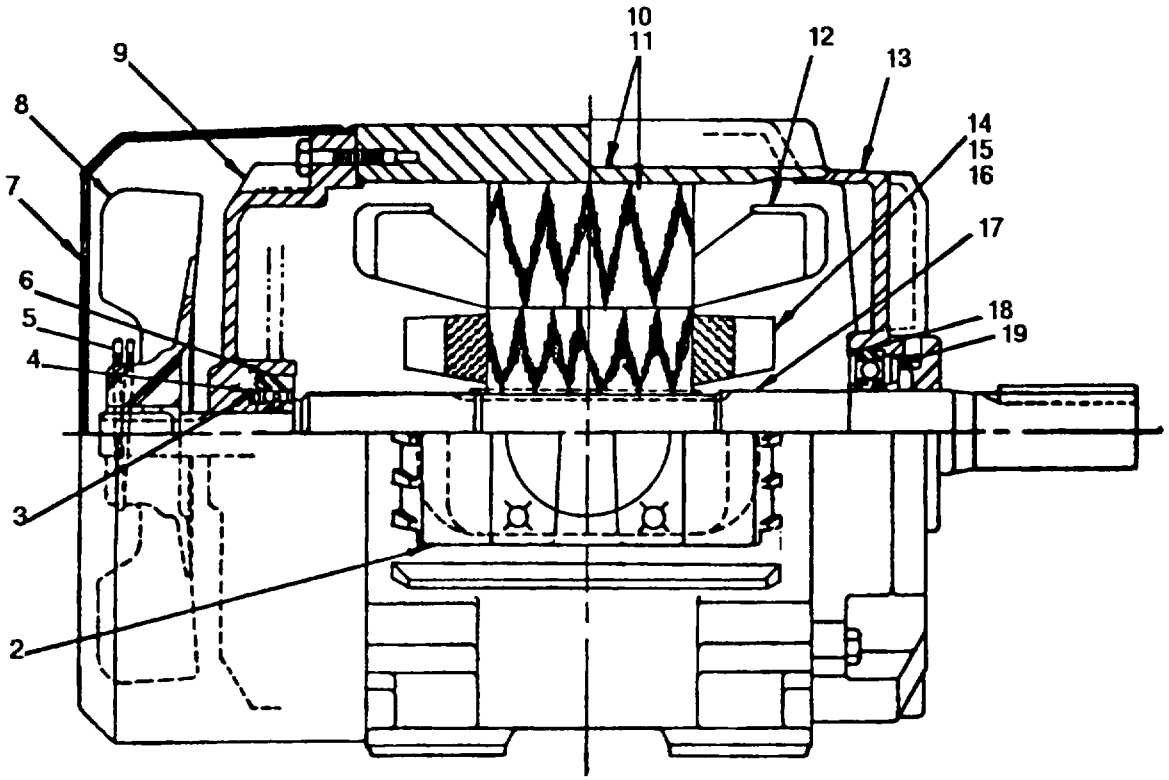

Figure 11. CIRCULATING PUMP MOTOR,

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:40 ELECTRIC MOTORS AND GENERATORS GROUP:4002 STATOR ASSEMBLIES	
				FIGURE 11. CIRCULATING PUMP MOTOR.	
1	XDOFF	50380	P21G340F	MOTOR, PUMP, CIRCULAT	1
2	XBFZZ	53080	75458-A	CONDUIT BOX	1
3	PAFZZ	38740	403733-B	METERING PLATE, BE NEXT HIGHER ASSY - MOTOR, CIRCULATING PUMP	1
* 4	XAFZZ	50380	400638-1-C	WASHER, WAVE	1
5	XDFZZ	50380	411294-1-B	CLAMP, FAN	1
* 6	PFFZZ	50380	405850-95-D	BEARING, BALL, ANNULA NEXT HIGHER ASSY-PUMP MOTOR, CIRCULATING	1
7	XAFZZ	53080	78566-1-A	FAN COVER NEXT HIGHER ASSY-MOTOR, CIRCULATING PUMP	1
8	XAFZZ	53080	7854T-1-G	FAN NEXT HIGHER ASSY - MOTOR, CIRCULATING PUMP	1
9	XAFZZ	50380	85891-4-B	ENDPLATE, FRONT NEXT HIGHER ASSY - MOTOR CIRCULATING PUMP	1
10	XAFZZ	50380	411276-1-AC	STATOR CORE NEXT HIGHER ASSY - MOTOR, CIRCULATING PUMP	1
11	XAFZZ	50380	85871-1-AA	STATOR FRAME NEXT HIGHER ASSY - MOTOR, CIRCULATING PUMP	1
12	XAFZZ	53080	E/S 583022	STATOR COILS NEXT HIGHER ASSY - MOTOR, CIRCULATING PUMP	1
13	XDFZZ	50380	858921-A	BRACKET	1
14	XAFZZ	50380	411286-30-BE	ASSEMBLY, ROTOR NEXT HIGHER ASSY - PUMP MOTOR, CIRCULATING	1
15	XAFZZ	50380	403989-49-AC	SLINGER BE. NEXT HIGHER ASSY - MOTOR, CIRCULATING PUMP	1
16	XBOZZ	50380	XT-K	KEY, SHAFT	1
17	XDFZZ	50380	602515-66-RA	SHAFT	1
18	XDFZZ	50380	403733-C	METERING PLATE	1
* 19	PFFZZ	50380	405850-95-E	BEARING, BALL, ANNULA NEXT HIGHER ASSY - PUMP MOTOR, CIRCULATING	1

END OF FIGURE

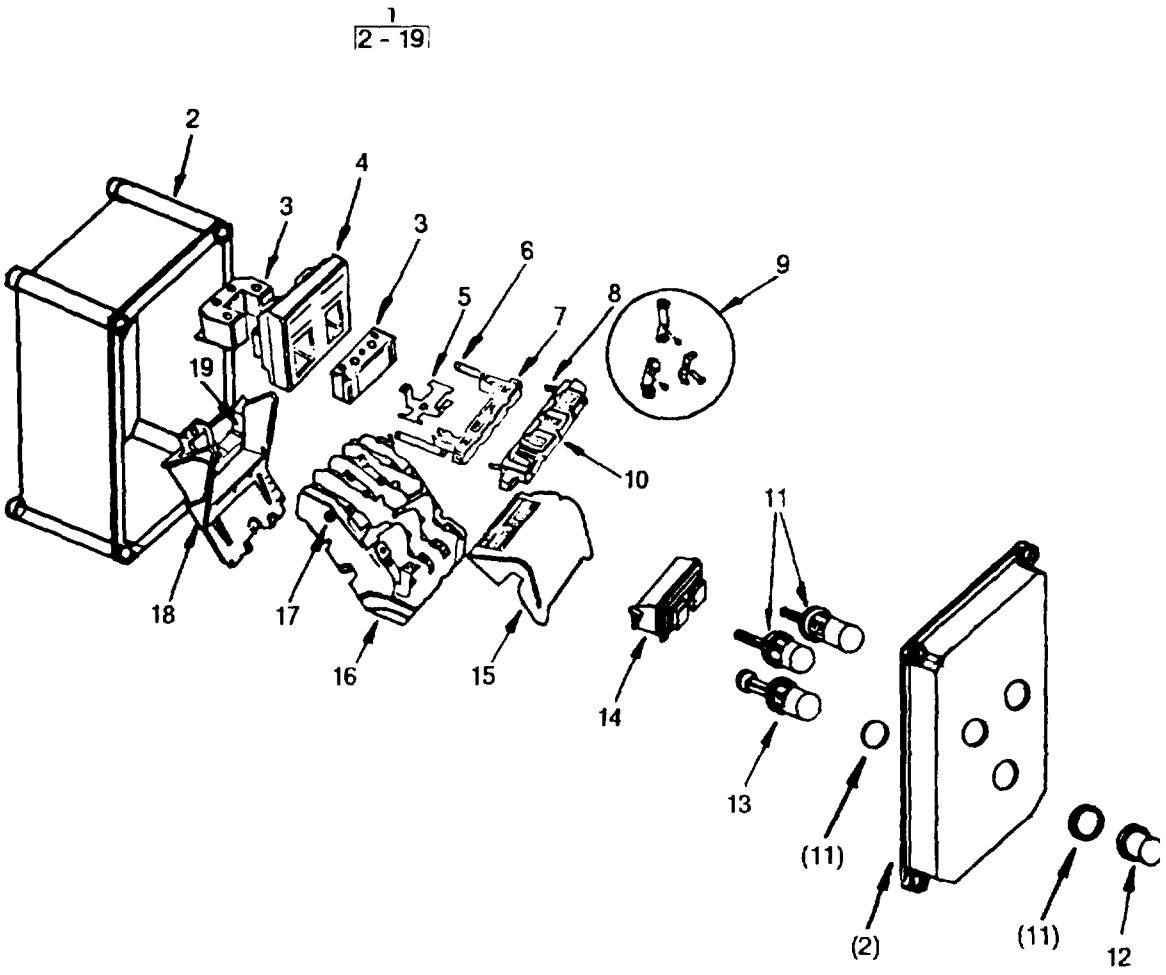

Figure 12. CIRCULATING PUMP MOTOR STARTER.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:4006 STARTING AND PROTECTIVE DEVICES	
				FIGURE 12, CIRCULATING PUMP MOTOR STARTER,	
I	XDFFF	23826	14BF32FAA	STARTER, PUMP MOTOR	1
2	XDFZZ	23826	49EA14EFF	ENCLOSURE	1
3	XDFZZ	23826	025551-001	MAGNET & ARMATURE	1
4	XDFZZ	23826	75D73070A	COIL	1
5	XBFZZ	23826	D24817-001	ARMATURE SPRING CLP	1
6	XDFZZ	23826	DS4826-001	SPRING, CROSS ARM	2
7	XDFZZ	23826	054873-001	CROSS ARM, BASE	1
8	XBFZZ	23826	025013-001	SCREW, CROSS ARM	2
9	PAFZZ	23826	75 AF14	CONTACT ASSEMBLY	1
9	PAFZZ	23826	75 DF14	CONTACT SET, MOTOR S	3
10	XDFZZ	23826	DS4670-001	ARM, CROSS	1
11	XDFZZ	23826	50D54688-F	PUSHBUTTON, PUMP CRR	1
12	XDFZZ	23826	50025621	PROTECTIVE BOOT, CLR	1
13	XDFZZ	23826	49D52209001	OVERLOAD RESET	1
* 14	XDFZZ	23826	50054688-1	PUSH-BUTTON ADAPTOR	1
15	XBFZZ	23826	D73062-001	CONTACT BOARD COVER	1
16	XBFZZ	23826	D73116-021	CONTACT BOARD	1
17	XDFZZ	23826	D24827-001	SCREW, CONTACT BOARD	1
* 18	XDFZZ	23826	D73060-001	BASE	1
19	XDFZZ	23826	NPN	COIL SPRING CLIP BU	2
				END OF FIGURE	

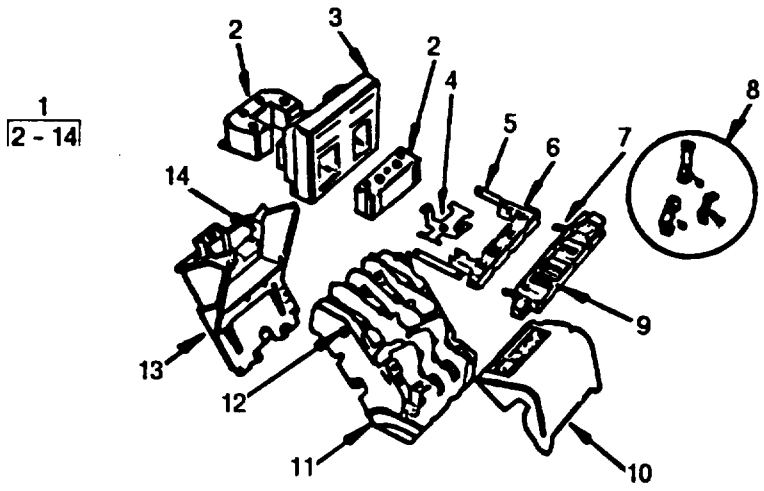

Figure 13. BLOWER MOTOR STARTER.

	(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
					GROUP:4006 STARTING AND PROTECTIVE DEVICES	
					FIGURE 13. BLOWER MOTOR STARTER.	
	1	XDFFF	23826	14BF32AAA	STARTER, AIR BLOWER	1
	2	XDFZZ	23826	025551-001	MAGNET & ARMATURE	1
	3	XDFZZ	23826	75073070A	COIL	1
*	4	PAFZZ	23826	024817-001	ARMATURE SPRING CLP	1
	5	XDFZZ	23826	D24826-001	SPRING, CROSS ARM	2
	6	XDFZZ	23826	054873-001	CROSS ARM, BASE	1
*	7	PAFZZ	23826	025013-001	SCREW, CROSS ARM	2
	8	PAOZZ	23826	75BF14	CONTACT SET, RELAY	1
*	8	PAFZZ	23826	75AF14	ECONTACT SET	1
	9	XDFZZ	23826	DS4670-001	ARM, CROSS	1
*	10	PAFZZ	23826	D73062-001	CONTACT BOARD COVER	1
*	11	PAFZZ	23826	D73116-022	CONTACT BOARD	1
	12	XDFZZ	23826	024827-001	SCREW, CONTACT BOARD	2
	13	XDFZZ	23826	073060-001	BASE	1
	14	XDFZZ	23826	NPN	COIL, SPRING CLIP	2
					END OF FIGURE	

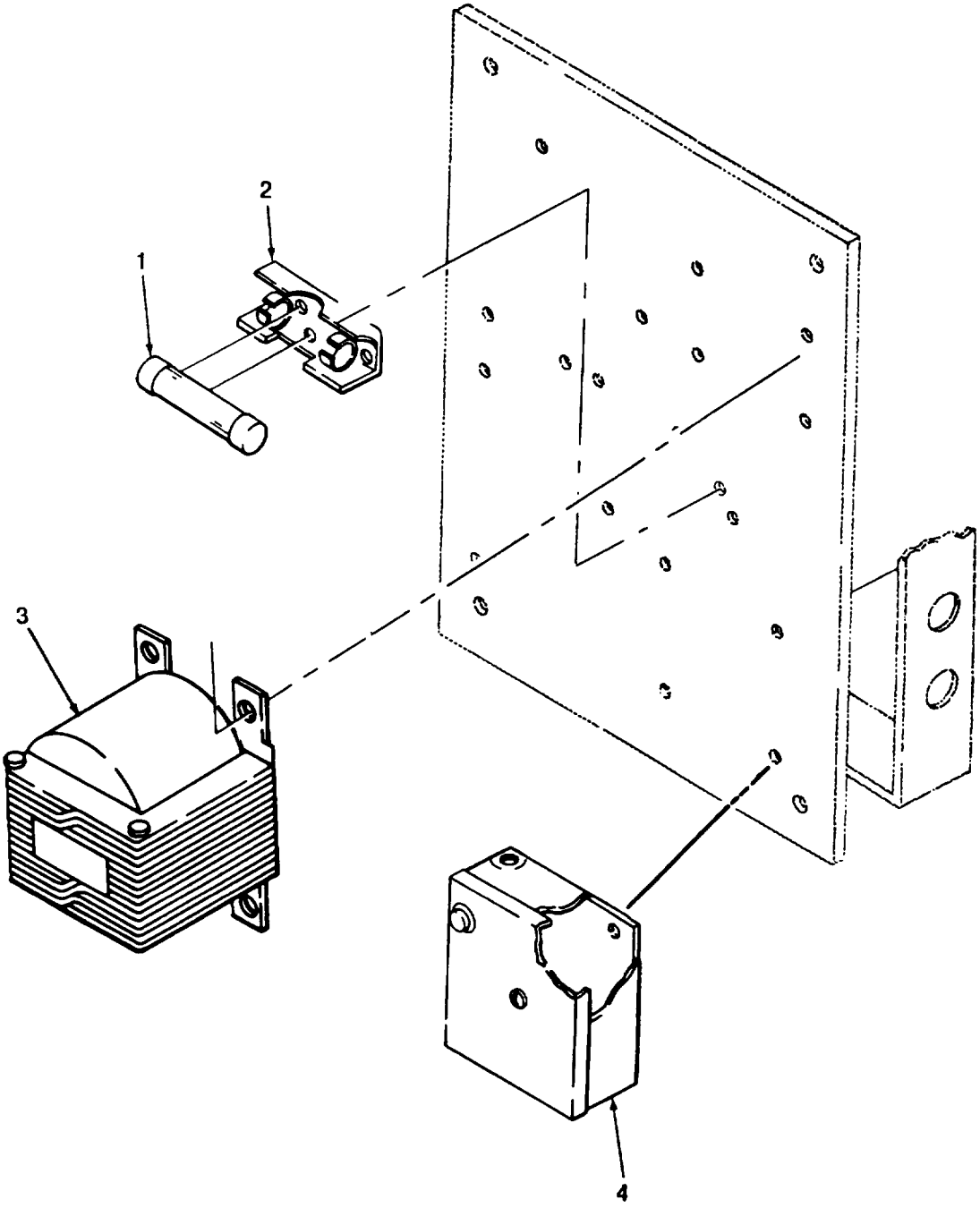

Figure 14. CONTROL BOX EQUIPMENT.

	(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
					GROUP:42 ELECTRICAL EQUIPMENT GROUP:4202 ELECTRICAL CONTROLS	
					FIGURE 14. CONTROL BOX EQUIPMENT.	
	1	PAOZZ	71400	FRN-6	BREAKER, MAIN PANEL	1
*	2	XDOZZ	71400	357004	FUSE BLOCK.....	1
*	3	PFFZZ	03538	9T58B2809	TRANSFORMER, POWER	1
*	4	PAOZZ	72144	UVM2A-30	PROGRAM CONTROL1HEA.....	1

END OF FIGURE

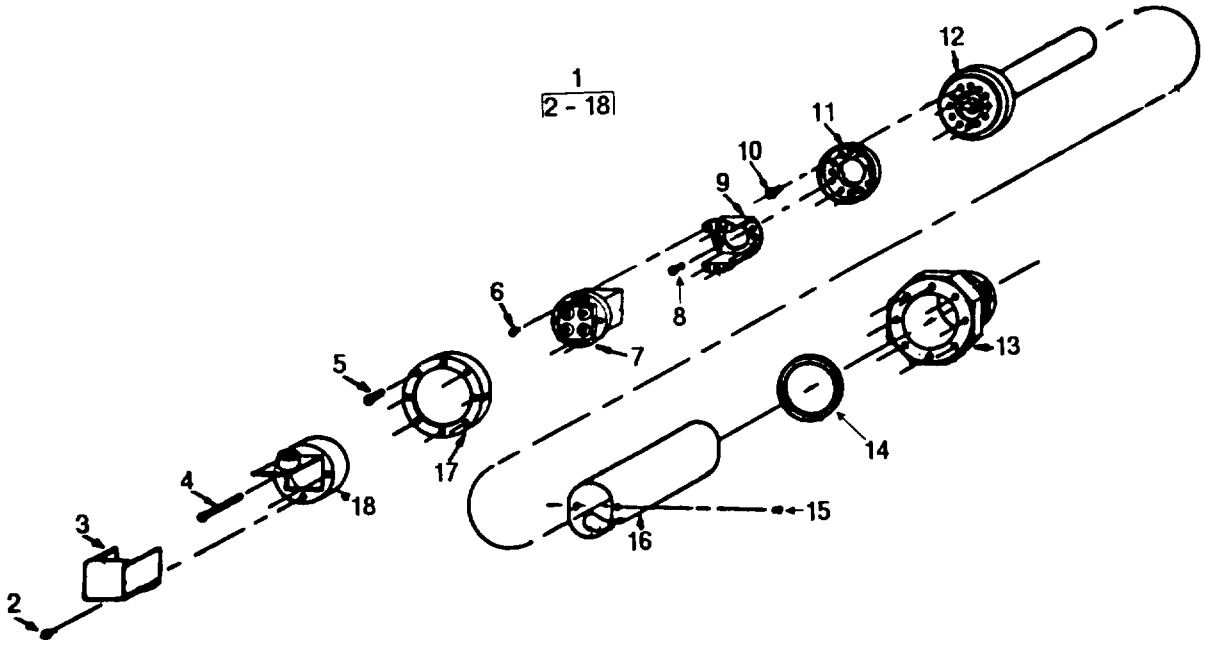

Figure 15. LOW LEVEL CONTROL.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:4202 ELECTRICAL CONTROLS	
				FIGURE 15. LOW LEVEL CONTROL.	
I	XDO00	3S305	MD-69	CUTOF, LOW LEVEL LO	1
2	XDOZZ	39305	MD-69-17	SCREW, COVER	1
3	XDOZZ	39305	MD-69-16	BOX COVER	1
4	XDOZZ	39305	MD-69-15	SCREW, BOX	2
5	XDOZZ	3S305	MD-69-13	SCREW, RETAINIING	4
6	XDOZZ	39305	MD-69-11	SCREW, SWITCH MTM	4
7	XDUZZ	39305	MU-69-10	SWITCH, LEVEL	1
8	XDOZZ	39305	MD-69-9	SCREWS, BRACKET	4
9	XDOZZ	39305	MD-69-8	BRACKET	1
10	XDOZZ	39305	MD-69-7	SCREW , RING MOUNTING	4
11	XDOZZ	3S305	MD-69-6	MOUNTING RING, SWITCH	1
12	XDOZZ	3S305	M4-69-5	FLOAT	1
13	XOOZZ	39305	MD-69-1	BODY	1
14	XBOZZ	39305	MsD-69-2	GASKET, BODY	1
15	XOOZZ	3S305	MD-69-4	SCREW, FLOAT GUIDE	2
16	XDFZZ	39305	MO-69-3	FLOAT GUIDE PROCETOR	I
17	XDOZZ	39305	MD-69-12	FLANGE: RETAING	1
18	XDOZZ	39305	MD-69-14	BOX, SWITCH	1
				END OF FIGURE	

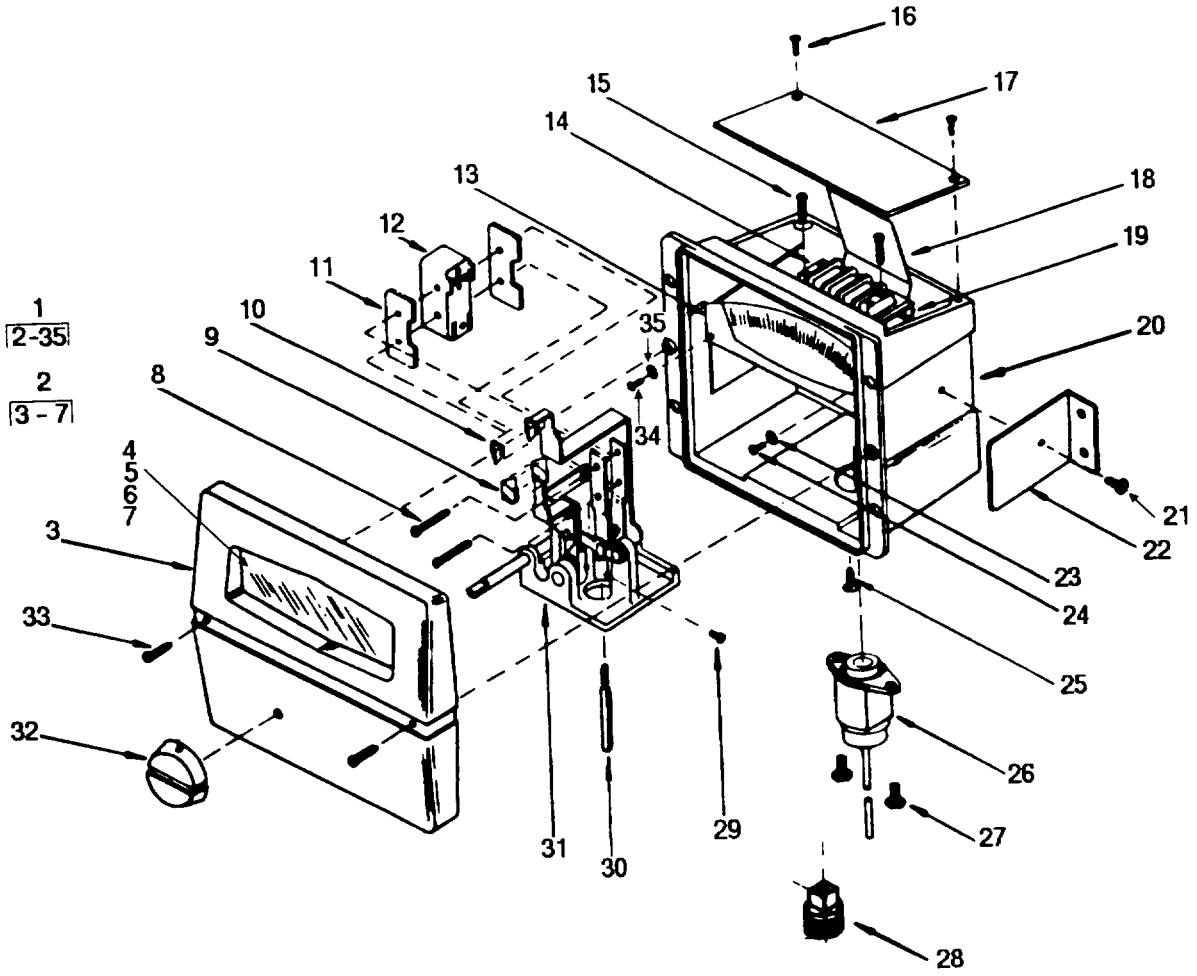

Figure 16. TEMPERATURE CONTROL.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:4202 ELECTRICAL CONTROLS	
				Figure 16. TEMPERATURE CONTROL.	
1	XDFFF	45809	MF47	CONTROL, TEMPERATUR	1
2	XDFZZ	45809	MFS-SZ2	COVER ASSEMBLY	1
3	XDFZZ	45809	MFS-43	COVER	1
4	XDFZZ	45809	MFS-57	GLASS, COVER	1
5	XDFZZ	45809	NPN	SCREW	4
6	XDFZZ	45809	MFS-19	WASHER, RETAINER	4
7	PAFZZ	45809	MFS-58	GASKET	1
8	XDFZZ	45809	NPN	SETSCREW	2
9	XDFZZ	45809	LF-12	POINTER, INDICATING	1
10	XDFZZ	45809	LF-11	POINTER, SETTING	1
11	XDFZZ	45809	MA-35	SWITCH, INSULATOR	1
12	XDFZZ	45809	NO.27	SWITCH, CONTROL	1
13	XDFZZ	45809	QMF-555F	DIAL	1
14	XDFZZ	45809	AHB3TB3	BLOCKITERMINAL	1
15	XDFZZ	45809	NPN	SCREW	2
* 16	PFFZZ	96906	MS35206-227	SCREW, MACHINE	2
17	XDFZZ	45809	MFS-44	COVER, OUTLET BOX	1
18	XDFZZ	45809	MFS-48	INSULATOR, TERM, BLK	1
19	XDFZZ	45809	MFS-56	BRKT, MTNG, TERM BLK	1
20	XDFZZ	45809	MFS-42	CASE	1
21	PFFZZ	96906	MS35207-260	SCREWIMACHINE	2
22	XDFZZ	45809	ZFS-8	ANGLE, MOUNTING	1
23	XDFZZ	45809	MFS-21	WASHER, DIAL	2
* 24	PFFZZ	96906	MS51849-11	SCREW, MACHINE	2
* 25	PFFZZ	96906	MS35206-243	SCREW, MACHINE	1
26	PAOZZ	45809	555HKLP-110-5 FT	CONTROL, MODULATOR	1
27	XDFZZ	45809	MFS-67	SCREW, ELEMENT FLANG	2
28	XDFZZ	45809	143 ACC	NUT, BRASS 3/8	1
29	XDFZZ	45809	NPN	SETSCREW	1
30	XDFZZ	45809	MFS-63	PUSHROD	1
31	XDFZZ	45809	MFS-S9	MECHANISM- ASSEMBLY	1
32	XDFZZ	45809	MFS-49	KNOB, SETTING	1
33	XDFZZ	45809	NPN	SCREW	2
* 34	PFFZZ	96906	MS35206-226	SCREW, MACHINE	2
* 35	PFFZZ	96906	MS35338-39	WASHER, LOCK	2
				END OF FIGURE	

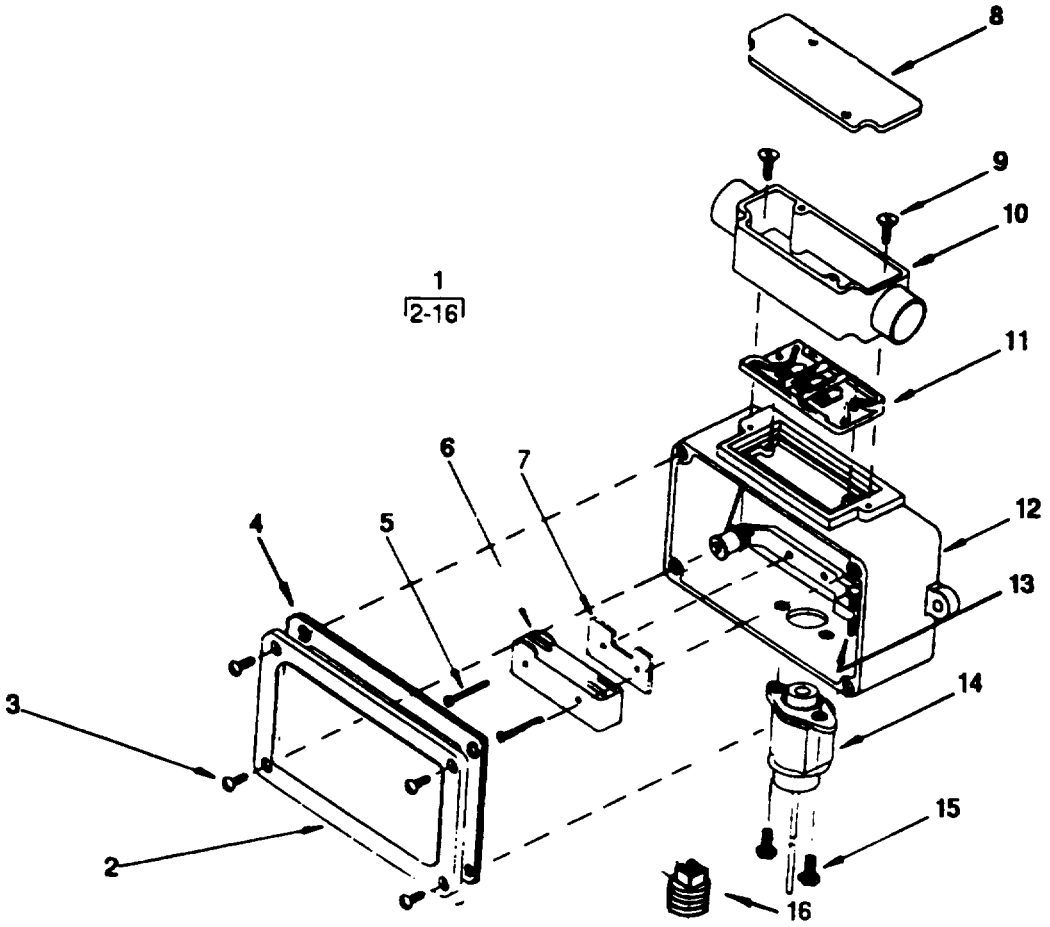

Figure 17. HIGH TEMPERATURE CONTROL.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:4206 THERMOSTATIC, AUTOMATIC AND MANUAL CONTROL DEVICES	
				FIGURE 17. HIGH TEMPERATURE CONTROL.	
1	XDFFF	45809	02	CONTROL SWITCH	1
2	XDFZZ	45809	W-4-F	COVER	1
* 3	PFFZZ	96906	MS51849-33	SCREW, MACHINE	4
4	XDFZZ	45809	SM-12	GASKET	1
* 5	PFFZZ	96906	MS51849-32	SCREW, MACHINE	2
6	XDFZZ	45809	02SW	SWITCH, CONTROL	1
7	XDFZZ	45809	MA-35	SWITCH INSULATOR	1
8	XDOZZ	45809	MA-11	COVER, OUTLET BOX	1
* 9	PFFZZ	96906	MS35206-263	SCREW, MACHINE	2
10	XDOZZ	45809	MA-9	OUTLET BOX	1
11	XDFZZ	45809	M4-408	TERMINAL BLOCK,	1
12	XDFZZ	45809	02-BODY	HOUSING, CONTROL	1
13	DFZZ	45809	02-AS	SCREW, ADJUSTING	1
* 14	PAOZZ	45809	665HBP-110-5 FT	CONTROL, MODULATOR	1
15	XDFZZ	45809	ZC-51	SCREW, ELEMENT FLANG	2
16	XDFZZ	45809	143ACC	NUT, BRASS	1
				END OF FIGURE	

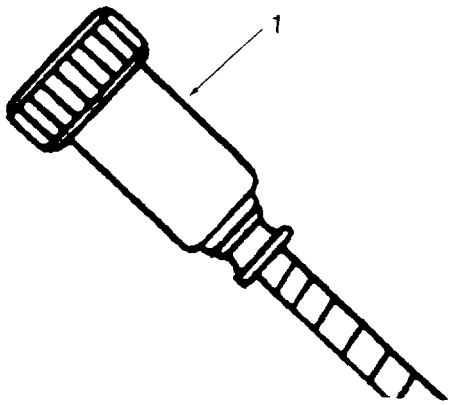

Figure 18. ULTRAVIOLET (UV) SCANNER.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:4206 THERMOSTATIC, AUTOMATIC AND MANUAL CONTROL DEVICES	
				FIGURE 18. ULTRAVIOLET (UV) SCANNER,	
1	XDOZZ	99680	UVM-1A	FLAME DETECTOR, HEAT.....	1
				END OF FIGURE	

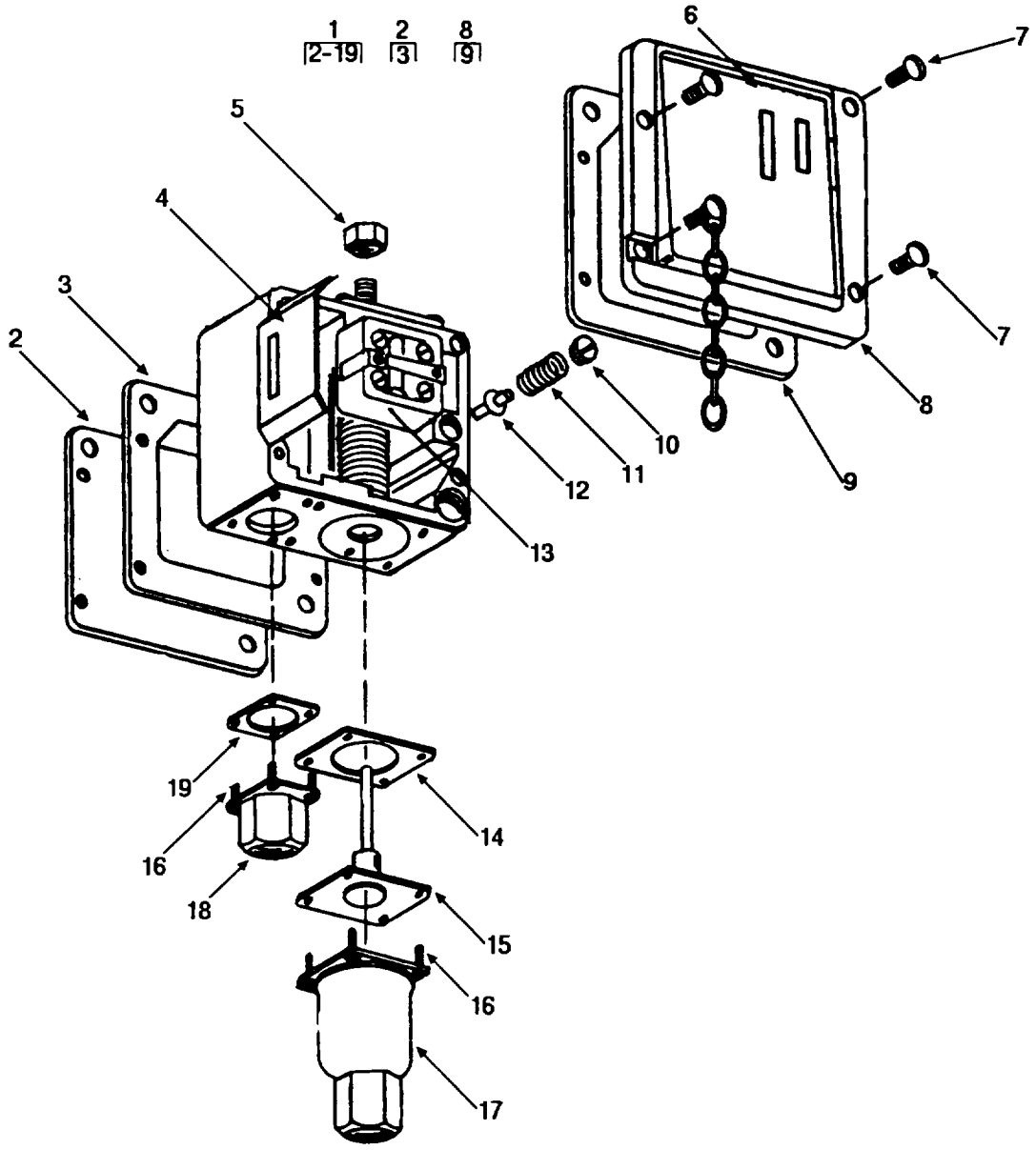

Figure 19. PRESSURETROL.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:47 GAGES (NONELECTRICAL), WEIGHING AND MEASURING DEVICES GROUP:4702 GAGES, MOUNTINGS, LINES AND FITTINGS	
				FIGURE 19. PRESSURETROL.	
* 1	PAOLL	01121	836T-T252J	SWITCH, PRESSURE	1
* 2	XDOZZ	01121	B-27654	BACKPLATE NEXT HIGHER ASSY - PRESSURETROLE	1
* 3	XDOZZ	01121	F-19597	GASKET	1
* 4	XDOZZ	01121	F-19596	INSULATION NEXT HIGHER ASSY - PRESSUERTROLE	1
* 5	XDOZZ	01121	M-6012	LOCKING NUT	1
* 6	XDOZZ	01121	125-1	PLATE, NAME	1
* 7	XDOZZ	01121	S58B	SCREW, MACHINE	1
* 8	XDOZZ	01121	X-335123	COVER, ASSEMBLY.	1
* 9	XDOZZ	01121	F-19597	GASKET	1I
* 10	PAOZZ	01121	M-6011	SCREW DIFFENTL NEXT HIGHER ASSY - PRESSURETROLE	1
* 11	XDOZZ	01121	B-27673	SPRING NEXT HIGHER ASSY - PRESSURETROLE	1
* 12	XDOZZ	01121	B-27669	POST, SPRING NEXT HIGHER ASSY - PRESSURETROLE	1
* 13	XDOZZ	01121	X-217866	CONTACT UNIT	1
* 14	XDOZZ	01211	F-19598	GASKET	1
* 15	PAOZZ	01121	X-310322	DIAPHRAGM, PRESSURE	1
* 16	XDOZZ	01121	S17T	SCREW, MACHINE	1
* 17	XDOZZ	01121	Z-27666	BELLOWS	1
* 18	XDOZZ	01121	X-217947	CONDUIT ASSEMBLY NEXT HIGHER ASSY -PRESSURETROLO	1
* 19	XDOZZ	01121	F-19599	GASKET	1
				END OF FIGURE	

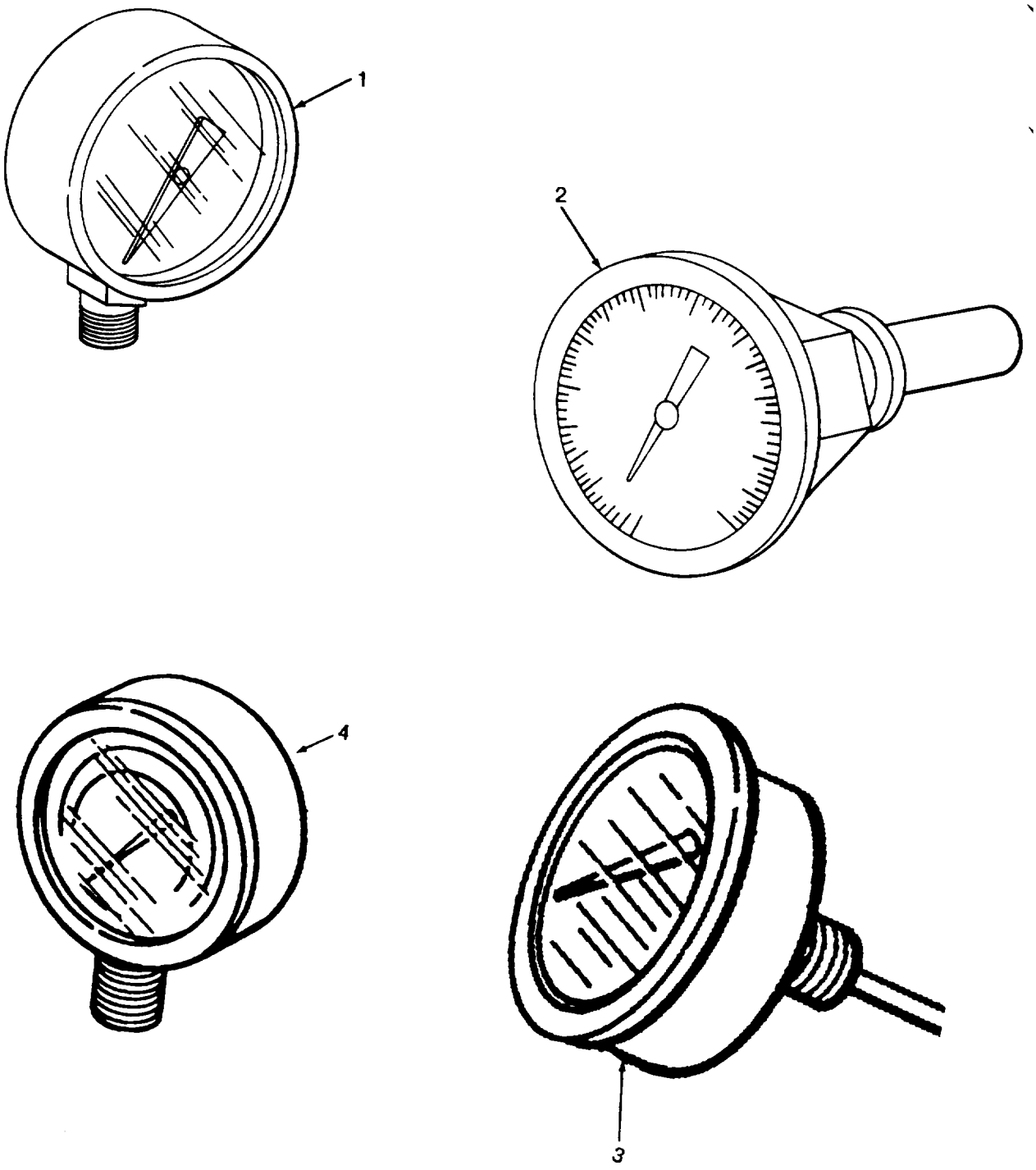

Figure 20. MISCELLANEOUS GAGES.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:4702 GAGES, MOUNTINGS, LINES AND FITTINGS	
				FIGURE 20. MISCELLANEOUS GAGES.	
I	XDOZZ	81966	J7164	GAGE, PRESSURE	1
2	XDOZZ	38056	3O-6360BHI-04R-0	GAGE, TEMPERATURE,HOT OIL	1
2	XDOZZ	38056	20-6360BH1-04R-O 25	GAGE, TEMPERATURE,COLD SEAL TANK....	1
3	XDOZZ	82370	4042	GAGE, OIL	1
4	XDOZZ	38056	1000S-2L	GAGE, PPRESSURE HOT OIL	1
				END OF FIGURE	

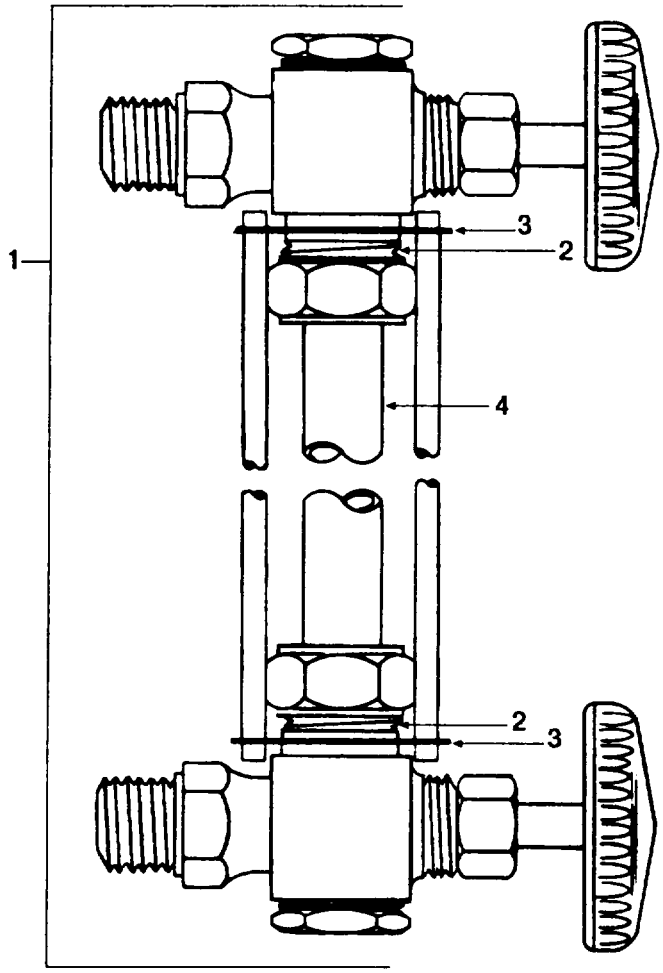

Figure 21. LIQUID LEVEL SIGHT GAGE.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:4702 GAGES, MOUNTINGS, LINES AND FITTINGS	
				FIGURE 21. LIQUID LEVEL SIGHT GAGE.	
* 1	XDOOO	20969	N09S	GAUGE, LIQUID LEVEL	1
2	PAOZZ	20969	WA19-4	GASKET	2
3	XDOZZ	20969	WA38	GASKET	2
4	XDOZZ	20969	NO 9-5/8X30	GAUGE GLASS	2
				END OF FIGURE	

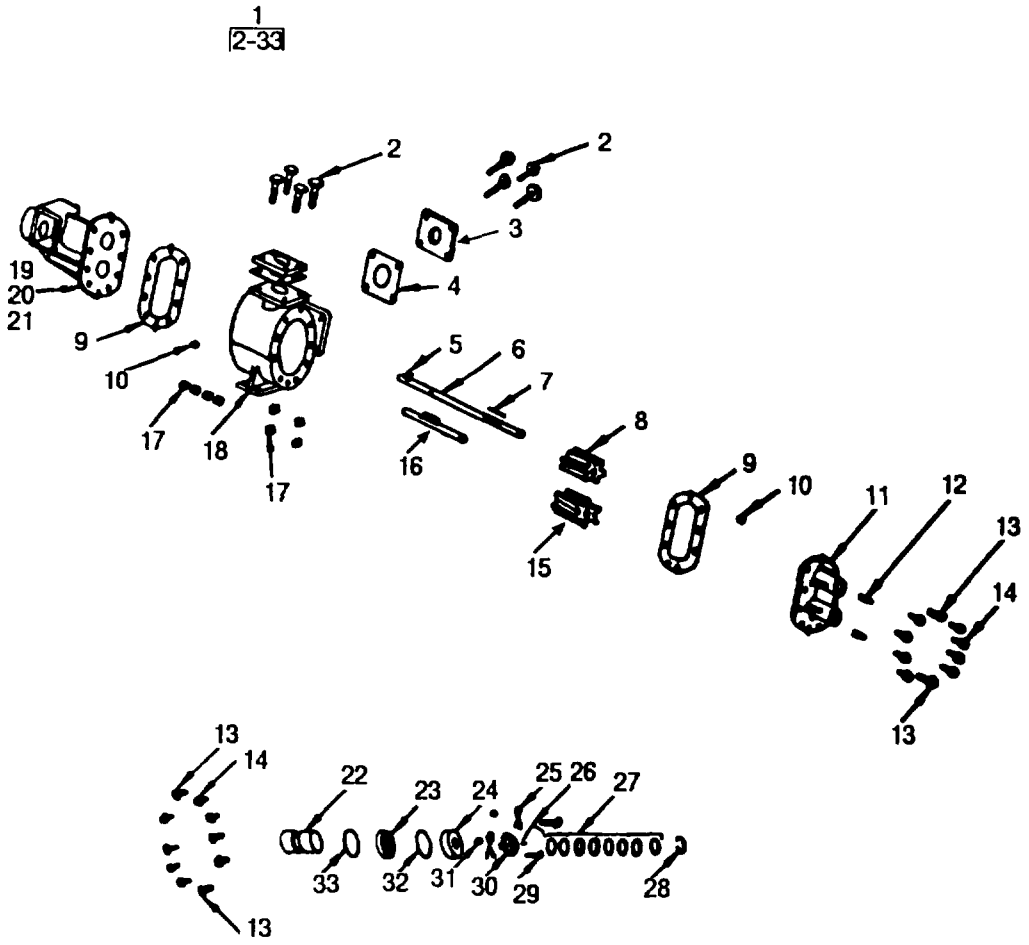

Figure 22. CIRCULATING PUMP ASSEMBLY.

	(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
					GROUP:55 PUMPS GROUP:5500 PUMPS	
					FIGURE 22 CIRCULATING PUMP ASSEMBLY.	
	1	XDOFF	58923	3622GHB	PUMP ASSEMBLY	1
	2	XBFZZ	58923	G49-06225	CAPSCREW, HEX HEAD	8
	3	XDFZZ	58923	P23-10	FLANGE	2
*	4	XDFZZ	58923	011-90	GASKET	2
*	5	XDFZZ	58923	D30-32	KEY, WOODRUFF	1
	6	XDFZZ	58923	D01-1158	DRIVE SHAFT	1
*	7	PAFZZ	58923	D30-9	KEY	2
	8	PAFZZ	64731	P6-278	GEAR, HELICAL	1
*	9	PAFZZ	64731	011-338	GASKET	2
*	10	XDFZZ	58923	D48-34	PIN	4
	11	XBFZZ	58923	N3-177	FACEPLATE ASSY PLAN	1
	12	PAFZZ	58923	G56-12	RING, RETAINING	2
	13	PAOZZ	58923	G49-24	SCREW	4
	14	XDFZZ	58923	G49-037100	SCREW, CAP, HEXAGON H	8
*	15	XDFZZ	64731	P6-277	GEAR, HELICAL	1
*	16	PAOZZ	64731	01-1077	SHAFT, IDLER GEAR	1
	17	XDFZZ	58923	G44-062	NUT	1
	18	XDFZZ	58923	P1-175	CASE	1
	19	XDFZZ	58923	N2-406	BACKPLATE	1
	20	PAFZZ	58923	G5-58	BUSHING 6SLEEVE	1
*	21	XDFZZ	58923	G5-257	BUSHING, SLEEVE	1
*	22	XDFZZ	58923	G45-100	SLEEVE	1
*	23	XDFZZ	58923	G40-147	BEARING, BALL, ANNULA	1
	24	PAFZZ	64731	D83-5	SEAL, PLAIN	1
	25	XDFZZ	58923	D4201	PACKING, GLAND CLIP	2
	26	XDFZZ	58923	D42-2	SPRING1CLIP	1
*	27	XDFZZ	64731	N43-1	PACKING SET	1
	28	XDFZZ	58923	G8-246	WASHER, PACKING	1
	29	XDFZZ	58923	G67-043275	BOLT, SQUARE JD	2
	30	XDFZZ	58923	P10-178	PACKING GLAND	1
*	31	XDFZZ	58923	0441-755	LOCK NUT	1
	32	PAFZZ	58923	G41-76	RING, RETAINING	1
*	33	XDFZZ	58923	G41-20	RETAINING RING	1
					END OF FIGURE	

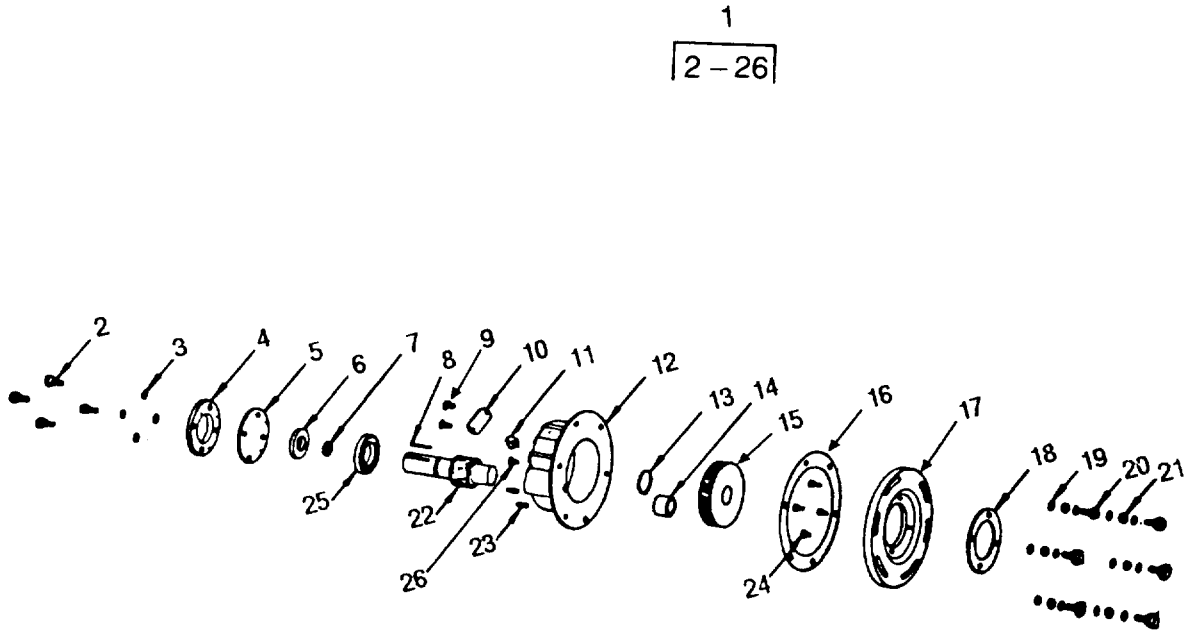

Figure 23. GEAR REDUCTION ASSEMBLY.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:5507 PUMP DRIVE	
				FIGURE 23. GEAR REDUCTION ASSEMBLY.	
1	XDOFF	58923	N41-1	GEAR REDUCTION UNIT	1
* 2	XDFZZ	58923	G49-031075	SCREW,CAP,HEXAGON H	4
* 3	XDFZZ	58923	G8-71	WASHER,LOCK	4
* 4	XDFZZ	58923	P4-354	RETAINER	1
* 5	PAFZZ	64731	D11-277	GASKET	1
* 6	XDFZZ	58923	D83-22	SEAL	1
* 7	XDFZZ	58923	G41-78	RING,RETAINING	1
8	PAFZZ	58923	D30-9	KEY	1
* 9	XDFZZ	58923	G62-9	SCREW,DRIVE	2
10	XDFZZ	58923	G12-85	NAME PLATE	1
11	PAFZZ	58923	G61-239	CUP,OIL,LUBRICATING	1
12	XDFZZ	58923	P49-2	GEAR CASE	1
* 13	XDFZZ	58923	G41-76	RING,RETAINING	1
* 14	XDFZZ	64731	G40-30	BEARING	1
15	XDFZZ	58923	D37-64	DRIVE GEAR	1
* 16	PAFZZ	64731	D11-278	GASKET	1
17	XDFZZ	58923	P22-13	COVER	1
18	XDFZZ	58923	D11-276	GASKET	1
* 19	PAFZZ	96906	MS27183-15	WASHER,FLAT	12
20	PAFZZ	58923	G49-037125	SCREW,CAP,HEXAGON H	6
* 21	XDFZZ	58923	G8-72	WASHER,LOCK	6
22	XDFZZ	58923	D37-120	PINION	1
23	PAFZZ	58923	G56-12	RING,RETAININ	2
* 24	XDFZZ	58923	G49-037100	SCREW,CAP,HEXAGON H	4
25	XDFZZ	58923	G40-10	BALL BEARING	1
* 26	XDFZZ	58923	G61-71	COCK,DRAIN	1
				END OF FIGURE	

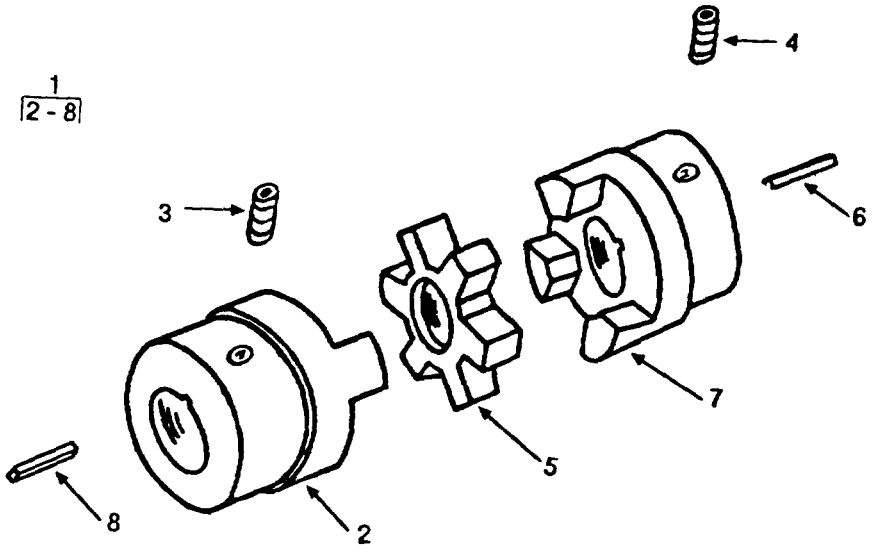

Figure 24. CIRCULATING PUMP AND MOTOR COUPLING.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:5511 COUPLINGS	
				FIGURE 24. CIRCULATIING PUMP AND MOTOR COUPLING.	
1	PAOZZ	E2370	AL-100	COUPLING, SHAFT FLE	1
2	XAOZZ	75665	AL-100 1 3/8	.BODY, MOTOR ADAPTOR	1
3	XAOZZ	75665	AL-180	.SET SCREW, CPL PUMP	1
4	XAOZZ	75665	AL-181	.SET SCREW	1
5	XAOZZ	75665	AL-183	.SPIDER,FLEX COUPLIN	1
6	XAOZZ	75665	AL-179	.KEY, PUMP CPL	1
7	XAOZZ	75665	AL-100 1/8	.BODY, PUMP ADAPTOR	1
8	XAOZZ	75665	AL-182	.KEY, MOTOR ADAPTOR	1
				END OF FIGURE	

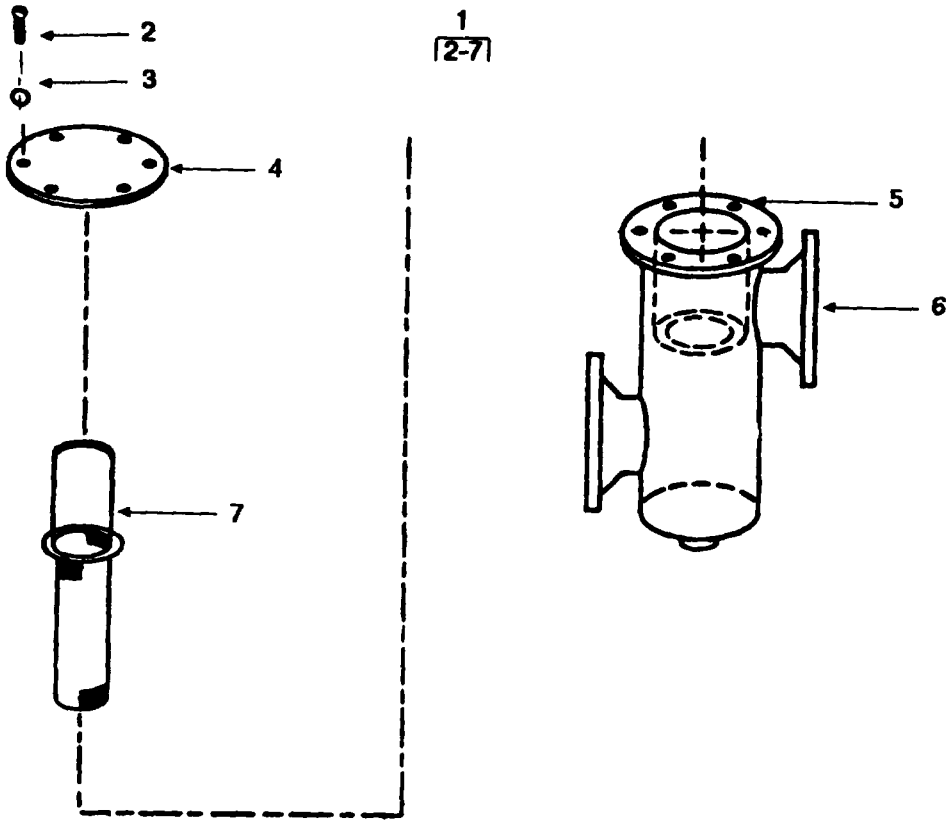

Figure 25. HOT FLUID STRAINER.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP :5513 FLUID LINES	
				FIGURE 25. HOT FLUID STRAINER.	
1	XD000	82370	A215	STRAINER ASSEMBLY	2
2	XDOZZ	82370	A222	SCREW, CAP,HEX HEAD	1
3	XDOZZ	82370	A221	NUT, HEX PLAIN	6
4	XDOLZ	8237C	A217	FLANGE	1
5	PAOLL	82370	A220	GASKET	1
6	XDFZZ	82370	A219	BODY	1
7	PAOZZ	82370	A218	STRAINER ELEMENT, SE	1
				END OF FIGURE	

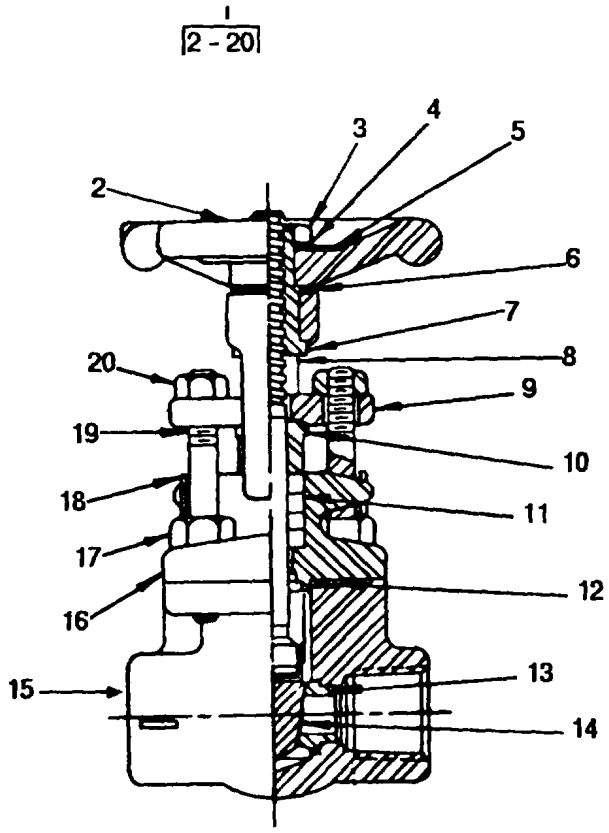

Figure 26.2" GATE VALVE (FIS).

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:5513 FLUID LINES	
				FIGURE 26. 2" GATE VALVE (F/S)	
* 1	XOOZZ	82370	RPC-2S	VALVE, 2”	1
* 2	XDOZZ	82370	RPC-1A	. HAND WHEEL	1
* 3	XDOZZ	82370	RPC-2	. NUT, HANDWHEEL	1
* 4	XDOZZ	82370	RPC-3A	. WASHER,INTERNAL TOO	1
* 5	XDOZZ	82370	RPC-4A	. NAMEPLATE	1
6	XAOZZ	82370	RPC-5A	. WASHER,THRUST	1
* 7	XDOZZ	82370	RPC-6A	. NUT, OPERATING	1
* 8	XDOZZ	82370	RPC-7A	. STEM,	1
* 9	XDOZZ	82370	RPC-9A	. GLAND	1
* 10	XDOZZ	82370	RPC-1OA	. GLAND FOLLOWER	1
* 11	XDOZZ	82370	JC-187-1	. PACKING	1
* 12	XDOZZ	82370	RPC-16A	. GASKET, BONNET	1
* 13	XDOZZ	82370	RPC-17A	. SEAT, RING	1
* 14	XDOZZ	82370	RPC-18A	. WEDGE	1
* 15	XDOZZ	82370	RPC-19A	. BODY	1
* 16	XDOZZ	82370	RPC-15A	. BONNET	1
* 17	XDOZZ	82370	RPC-14A	. BODY, BONNET BOLT	4
* 18	XDOZZ	82370	PC-12A	. WASHER, RETAINING	1
* 19	XDOZZ	82370	RPC-11A	. GLAND BOLT	1
* 20	XDOZZ	82370	RPC-8A	. NUT-GLAND BOLT	1
				END OF FIGURE	

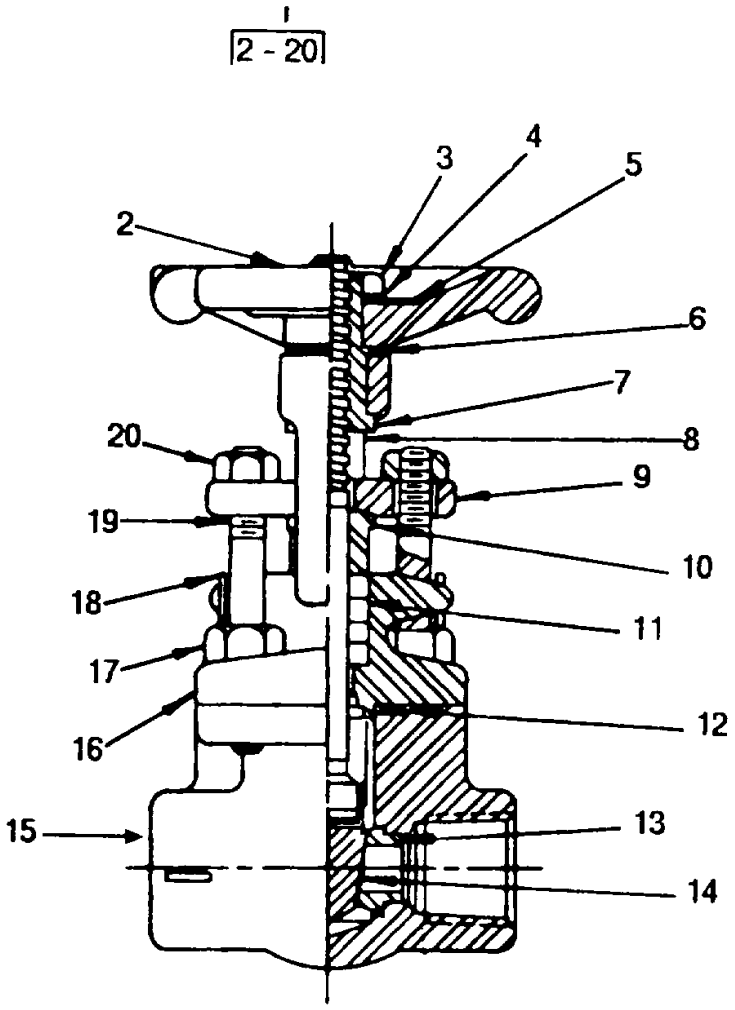

Figure 27.1 1/2" GATE VALVE (F/S).

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:5513 FLUID LINES	
				FIGURE 27. 1 1/2" GATE VALVE (F/S).	
1	XDOZZ	82370	RPC-1.5S	VALVE,GATE FS 1-1/2	1
* 2	XDOZZ	82370	RPC-1	. HANDWHEEL	1
* 3	XDOZZ	82370	RPC-2A	. NUT, HAND WHEEL	1
* 4	XDOZZ	82370	RPC-3	. WASHER,INTERNAL TOO	1
* 5	XDOZZ	82370	RPC-4	. NAMEPLATE	1
6	XAOZZ	82370	RPC-5	. WASHER,THRUST	1
* 7	XDOZZ	82370	RPC-6	. NUT, OPERATING	1
* 8	XDOZZ	82370	RPC-7	. STEM	1
* 9	XDOZZ	82370	RPC-9	. GLAND	1
* 10	XDOZZ	82370	RPC-10	. GLAND FOLLOWER	1
* 11	XDOZZ	82370	JC-187-1	. PACKING	1
* 12	XDOZZ	82370	RPC-16	. GASKET, BONNET	1
* 13	XDOZZ	82370	RPC-17	. SEAT RING	2
* 14	XDOZZ	82370	RPC-18	. WEDGE	1
* 15	XDOZZ	82370	RPC-19	. BODY	1
* 16	XDOZZ	82370	RPC-15	. BONNET	4
* 17	XDOZZ	82370	RPC-14	. BODY, BONNET BOLT	1
* 18	XDOZZ	82370	RPC-12	. WASHER, RETAINER	1
* 19	XDOZZ	82370	RPC-11	. GLAND - BOLT	1
* 20	XDOZZ	82370	RPC-8	. NUT-GLAND BOLT	2

END OF FIGURE

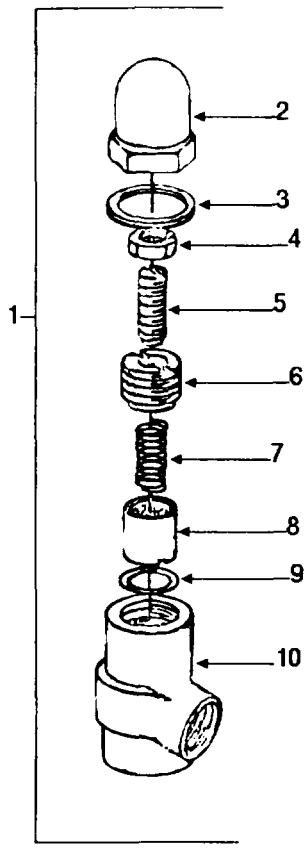

Figure 28. HOT OIL RELIEF VALVE.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:5513 FLUID LINES	
				FIGURE 28. HOT OIL RELIEF VALVE.	
1	XDOOO	23270	VJ-8	VALVE, RELIEF	1
2	XDOZZ	23274	801	. CAP	1
3	XDOZZ	23274	804	. GASKET	1
4	XDOZZ	23274	805	. NUT, HEX HEAD LOOK	1
5	XDOZZ	23274	802	. SCREW, ADJUSTING	1
6	XOOZZ	23274	8O3	. NUT, RETAINING	1
7	XDOZZ	23274	807	. SPRING	1
8	XDOZZ	82370	806-VJ8	. PISTON	1
9	XDOZZ	23274	808	. STOP, RING	1
10	XDOZZ	23274	800	. BODY	1

END OF FIGURE

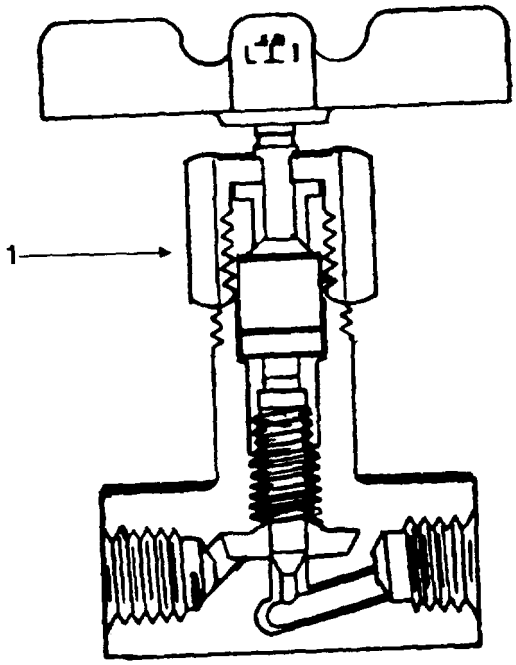

Figure 29.1/4" NEEDLE VALVE (BAR STOCK).

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:5513 FLUID LINES	
				FIGURE 29. 1/4" NEEDLE VALVE (BAR STOCK)	
1	XDOZZ	82370	N1512	VALVE, NEEDLE, BAR ST	1
				END OF FIGURE	

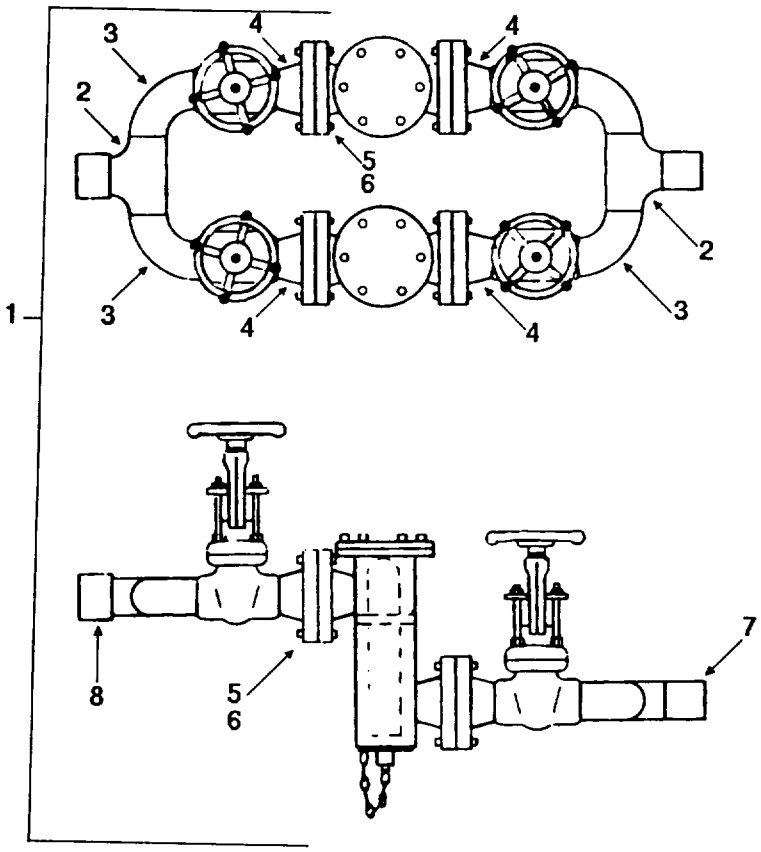

Figure 30. HOT OIL STRAINER PIPING .

	(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
					GROUP:5513 FLUID LINES	
					FIGURE 30. HOT OIL STRAINER PIPING.	
*	1	XDOOO	82370	A214	PIPE,RETURN STRAINE	1
	2	XBOZZ	82370	A-214-2	. TEE WELD 2"	2
	3	XBOZZ	82370	A-214-3	. WELD,ELL	4
	4	XBOZZ	82370	A-214-4	. WELD,CONC RED3"X2".....	4
	5	XBOZZ	82370	A223	. NUT, HEX	4
	6	XBOZZ	82370	A224	. CAPSCREW,STRAINER	16
	7	XBOZZ	82370	A-214-6	. 2"SCH 40PIPEX5 3/8”.....	1
	8	XBOZZ	82370	A-214-1	. PIPE, COUPLING 2"300	1
					END OF FIGURE	

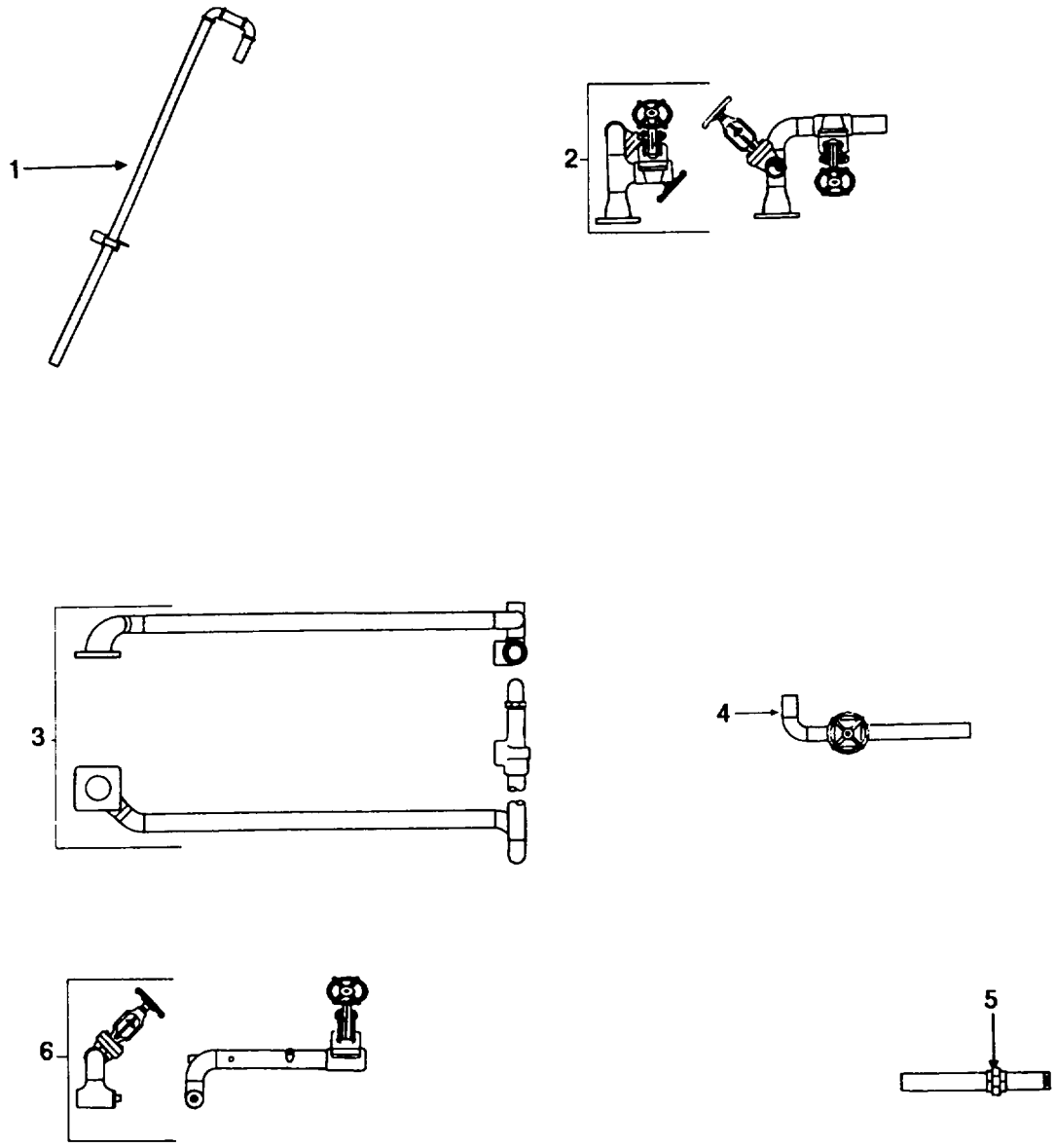

Figure 31. MISCELLANEOUS PIPING.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY

FIGURE 31. MISCELLANEOUS PIPING.

*	1	XDOZZ	82370	A-205	PIPE ASSY, VENT	1
*	2	XDOZZ	82370	A-206	PIPE ASSY,PUMP IN.....	1
	3	XBOZZ	82370	A-230	PUMP,DISCH PIPNG AS.....	1
	4	XBOZZ	82370	A-203	PIPE ASSY, RESERVOIR	1
	5	XBOZZ	82370	A-204	PIPING,BY-PASS.....	1
	6	XBOZZ	82370	A-202	PIPE ASSY, DISCHARG.....	1

END OF FIGURE

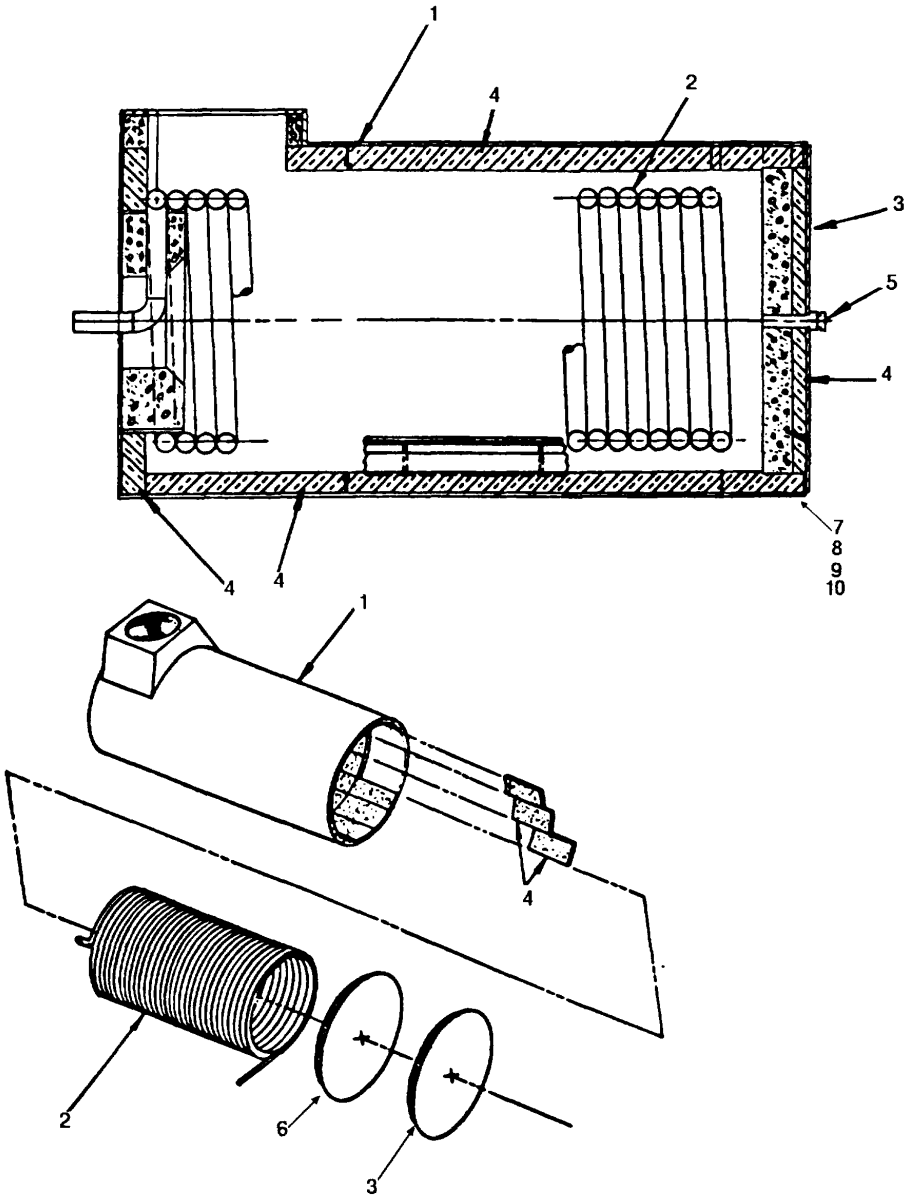

Figure 32. HOUSING.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:60 BURNERS GROUP:6001 HOUSING AND INSULATION	
				FIGURE. 32. HOUSING.	
1	XBOZZ	82370	A301	HULL, HEATER	1
2	XBFZZ	82370	432-A	COIL, HEATER	1
3	XBOZZ	82370	A3G2	PLATE, PLATE	1
4	XBOZZ	82370	4355	INSULATICN,VERPICUL CURVED	1
4	XBFZZ	82370	4356	INSULATION, FLAT FLAT	1
5	XBOZZ	82370	A304	SIGHT PORT, ASSEMBLY	1
6	XBOZZ	82370	A303	SEAL, ASBESTOS	1
7	XBOZZ	82370	A305	CAPSCREW, HEX HEAD	1
8	XBOZZ	82370	A306	WASHER, FLAT	1
9	XBOZZ	82370	A307	CAPSCREW, HEX HEAD	1
10	XBOZZ	82370	A308	NUT, HEX	1
				END OF FIGURE	

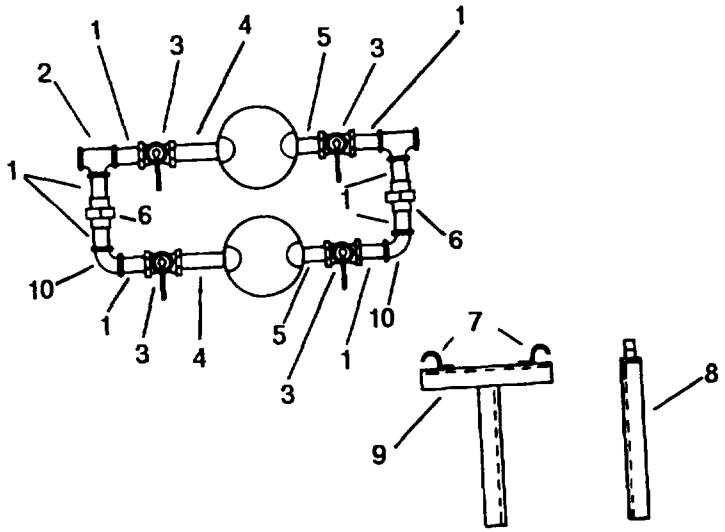

Figure 33. FUEL OIL STRAINER PIPING .

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:6004 FUEL SYSTEP FIGURE 33. FUEL OIL STRAINER PIPING.	
1	XBOZZ	82370	A-502	NIPPLE, PIPE	8
2	XBOZZ	82370	A-504	TEE, PIPE	2
3	XBOZZ	82370	A-501	COCK, FUEL PIPING	4
4	XBOZZ	82370	A-503	NIPPLE, PIPE	4
5	XBOZZ	82370	A-512	NIPPLE, PIPE 3/8X2	3
6	XBOZZ	82370	A-506	UNION	2
7	XBOZZ	82370	A-507	CLAMP W/SCREW	1
8	XBFZZ	82370	A-902	ANGLE	1
9	XBFZZ	82370	A-901	ANGLE	1
10	XBOZZ	82370	A-505	ELL, PIPE 3/8	3

END OF FIGURE

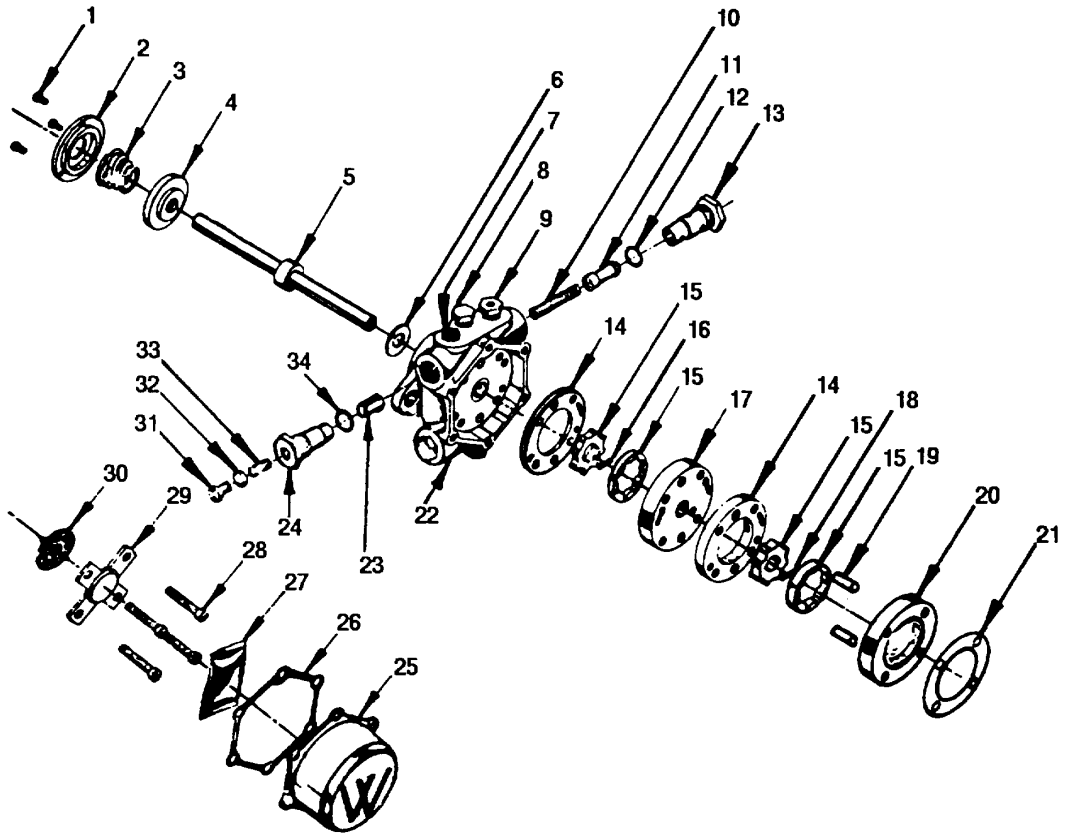

Figure 34. FUEL PUMP- EXPLODED VIEW.

	(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
					GROUP:6004 FUEL SYSTEM	
					FIGURE 34. FUEL PUMP-EXPLODED VIEW.	
*	1	XDFZZ	64294	29526-19	SCREW, SEAL RETAINER	3
*	2	XDFZZ	64294	27917	SEAL, RETAINER	1
*	3	XDFZZ	64294	32672	SEAL, SPRING	1
*	4	XDFZZ	64294	3966	SEAL, DIAPHRAM	1
*	5	XDFZZ	64294	7942-4	DRIVE SHAFT ASSEMBL	1
	6	XAFZZ	64294	21196-2	WASHER THRUST	1
*	7	XDFZZ	64294	37232	FLUSH PLUG	1
*	8	XDFZZ	64294	2953324	PLUG, PIPE	4
*	9	XDFZZ	64294	A3706	PLUG VENT	1
*	10	XDFZZ	64294	19877	SPRING,VALVE	1
*	11	XDFZZ	64294	25121	PISTON ASSEMBLY,FUE	1
*	12	XDFZZ	64294	25124-8	PLUG,GUIDE ASSEMBLY	1
*	13	XDFZZ	64294	29521-78	SCREW, FRONT COVER	1
*	14	XDFZZ	64294	19859-3	GEAR, PLATE	1
*	15	PFFZZ	64294	9862-3	GEAR SET	1
*	16	XDFZZ	64294	25512	DRIVE PIN	1
*	17	XDFZZ	64294	21507-2	INTERMEDIATE PLATE	1
*	18	XDFZZ	64294	21417	DRIVE KEY	1
	19	XAFZZ	64294	20149	PIN, DOWELL	2
*	20	XDFZZ	64294	19858-2	GEAR, COVER PLATE	1
*	21	XDFZZ	64294	19867	CLEANER SPACER	1
*	22	XDFZZ	64294	29521-78A	BODY, FUEL PUMP	1
*	23	XDFZZ	64294	198784	SPRING CAP	1
*	24	XDFZZ	64294	21192	PLUG, PRESSURE	1
	25	XAFZZ	64294	19871-1	COVER, FRONT	1
*	26	PFFZZ	64294	19871-2	GASKET	1
*	27	XDFZZ	64294	35548	CUSHION, SOUND	1
*	28	XDFZZ	64294	29521-49	SCREW, MACHINE	4
*	29	XDFZZ	64294	9868-J	CLEANER COVER	1
*	30	XDFZZ	64294	25086	CLEANER, BLADE	1
*	31	XDFZZ	64294	P36Q2	SCREW	1
*	32	XDFZZ	64294	24177	GASKET VALVE COVER	1
*	33	XDFZZ	64294	295432	PRESSURE, ADJ SCREW	1
*	34	XDFZZ	64294	21204	GASKET	2
					END OF FIGURE	

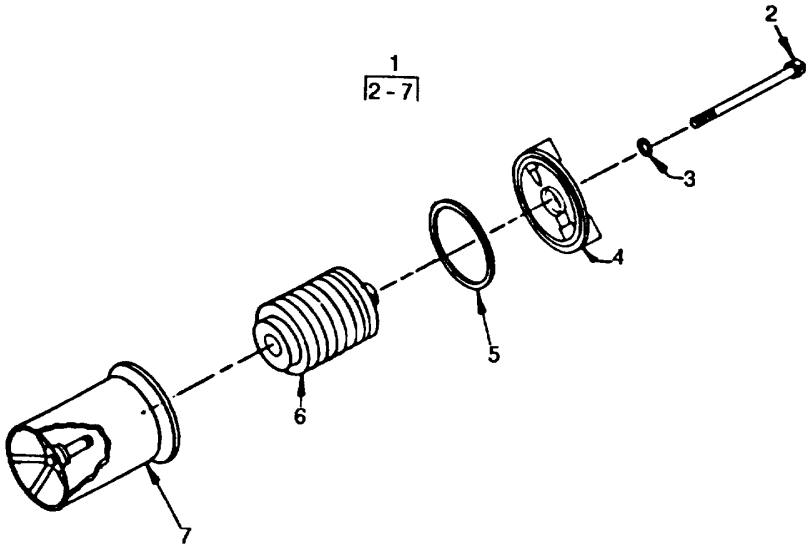

Figure 35. FUEL OIL STRAINER.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:6004 FUEL PUMP	
				FIGURE 35. FUEL OIL STRAINER.	
1	PAOOO	72692	2A-7J0A	FITER, FLUID, PRESSU.....	2
2	XBOZZ	726Y2	2A-7001	. BOLT.....	1
3	XBOZZ	72612	2A-7002	. WASHER	1
4	XBOZZ	72692	2A-7005	. HEAD, FUEL STRAIINER.....	1
5	PAOZZ	82370	2A-7006	. GASKET.....	1
6	PAOZZ	72692	2A-710SL-200N	. ELEMENT	2
7	XBOZZ	72692	2A-7004	. CASE. FUEL STRAINER.....	1
				END OF FIGURE	

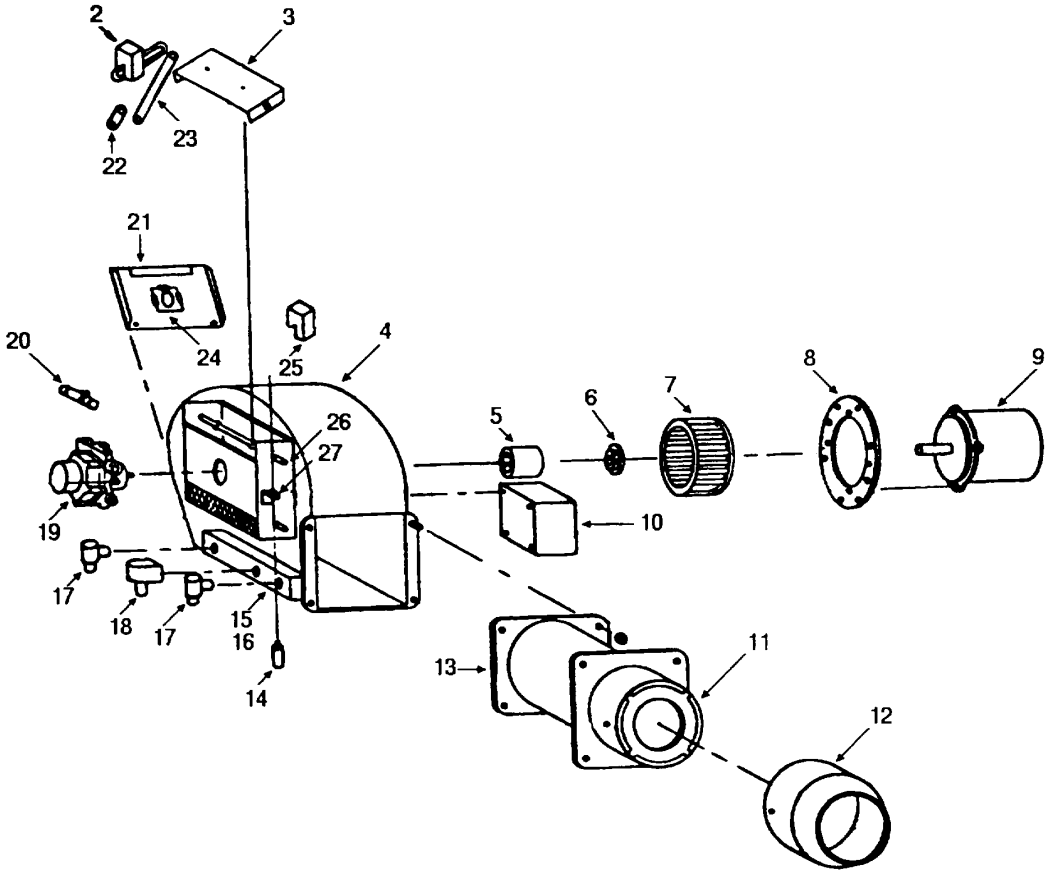

Figure 36. BURNER ASSEMBLY.

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:6005 BURNER ASSEMBLY	
				FIGURE 36. BURNER ASSEMBLY.	
* 1	XDOOO	31923	CR2-OB	BURNER ASSEMBLY	1
* 2	XDOZZ	3S227	02010	DAMPER WEIGHT	1
* 3	XBOZZ	3S227	C10550	. DAMPER BLADE	2
* 4	PFOZZ	3S227	C20030	. HOUSING,CENTRIFUGAL	1
* 5	XDOFF	3S227	12010	. PUMP COUPLING 5.5	1
* 6	XDOZZ	3S227	12200	. PUMP COUPLING ADAPT	1
* 7	XDOZZ	3S227	08110	. BLOWER WHEEL	1
* 8	XDOZZ	3S227	C10740	. MOTOR MOUNTING RING	1
* 9	XDOZZ	3S227	05422	. BLOWER MOTOR	1
* 10	XDOZZ	3S227	312-25AB0-418	. IGNITION TRANSFORME	1
* 11	XDOZZ	3S227	7-3/8”	. RING, BAFFLE	1
* 12	PFOZZ	3S277	C22040	. BURNER HEAD UNIT	1
* 13	PFOZZ	3S227	C20380	. PIPE, EXHAUST	1
* 14	XDOZZ	3S227	10600	. DAMPER CYLINDER	1
* 15	XDOZZ	3S227	0189	. JUNCTION BOX, VALVE	1
* 16	XDOZZ	3S227	0191	. COVER, JUNCTION BOX	1
* 17	XDOZZ	3S227	S311AM02VAC9	. VALVE, SOLENOID	1
* 18	XDOZZ	3S227	S313AM02V2AV1	. VALVE, SOLENOID 3WAY	1
19	PAOZZ	64294	22R221D	. PUMP, ROTARY	1
* 20	XDOZZ	3S227	22001	. VALVE,RELIEF ADJUST	1
* 21	XDOZZ	3S227	C24020	. COVER,ACCESS	1
* 22	XDOZZ	3S227	0194	. CRANK ARM	1
* 23	XDOZZ	3S227	8504	. CROSSOVER LINK CIRCULATING PUMP . MOTOR TO CIRCULATING PUMP	1
* 24	XDOZZ	3S227	8217	. SIGHT GLASS BURNER	1
* 25	XDOZZ	31923	0001	. COUNTER WEIGHT	1
* 26	XDOZZ	3S227	C10590	. DAMPER AXLE	2
* 27	XDOZZ	31923	C13160	. MOUNT BRACKET CYL	1

END OF FIGURE

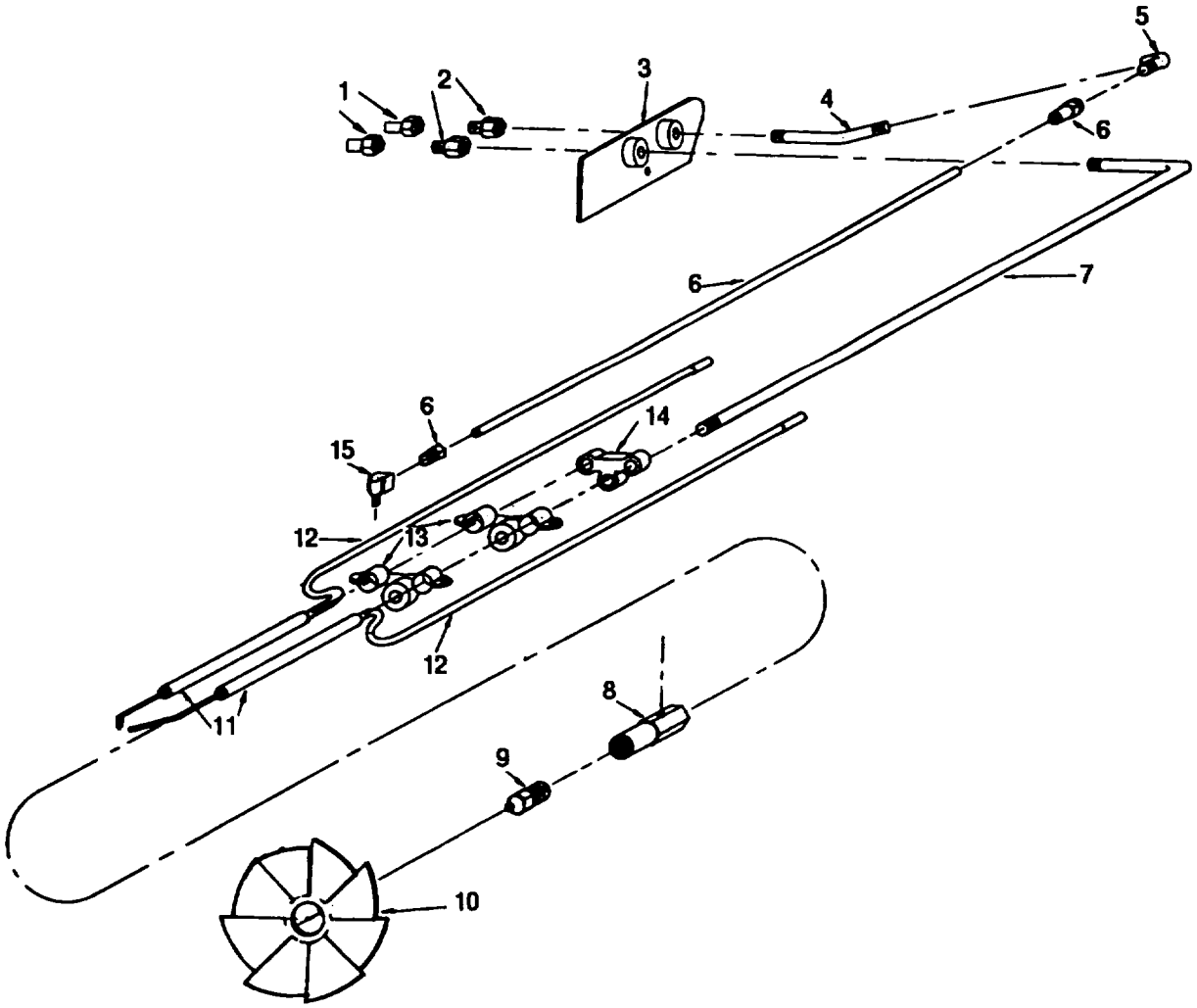

Figure 37. ELECTRODE ADJUSTMENT AND DETAIL ASSEMBLY.

	(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
					GROUP:6005 BURNER ASSEMBLY	
					FIGURE 37, ELECTRODE ADJUSTMENT AND DETAIL ASSEMBLY,	
*	1	XDOZZ	82370	417-A	. TUBING W/NUT RETURN	1
*	2	XDOZZ	82370	418-A	. TUBING W/NUT,BYPASS	1
*	3	XDOZZ	31923	C13110	. MTG. PLATE OIL GUN	1
*	4	XDOZZ	95984	7910.	. PIPE ASSY, RETURN	1
*	5	XDOZZ	82390	416-A	. ELL BRASS FLARE W/N	2
*	6	XDOZZ	95984	7906	. RETURN TUBE W/NUTS	1
	7	XDOZZ	31923	X02803	. FUEL NOZZLE PIPE	1
	8	PAOZZ	95984	X02705	. ADAPTER,NOZZLE,OIL	1
*	9	PAOZZ	3S227	52020	. NOZZLE, OIL BURNER,P	1
*	10	XDOZZ	31923	C23120	. SPINNER	1
*	11	PAOZZ	31923	X04220	. ELECTRODE	1
*	12	XDOZZ	31923	7804	. IGNITION CABLES	2
*	13	XDOZZ	3S227	F20210	. ELECTRODE CLAMP	2
*	14	XDOZZ	31923	X02720	. IGNITION CABLE GUID	1
*	15	XDOZZ	95984	7905	. ELBOW NOZZLE ADAPTE	1

END OF FIGURE

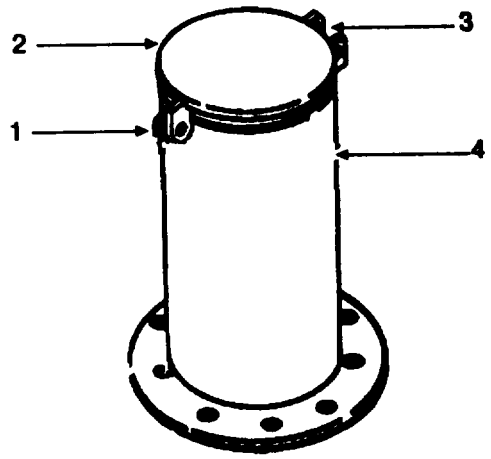

Figure 38. EXHAUST STACK

(1) ITEM NO	(2) SMR CODE	(3) PART CAGEC	(4) NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP:6010 EXHAUST SYSTEM	
				FIGURE 38. EXHAUST STACK.	
1	XBOZZ	8237C	428-A	STACK. EXHAUST	1
2	XBOZZ	2370	42S-A	CAP, RAIN	1
3	XBOZZ	82370	430-A	HINGE.	1
4	XBOZZ	82370	431-A	HASP-CUP LATCH	1
				END OF FIGURE	

CROSS- REFERENCE-INDEXES

NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM
5305-00-068-0500	6	17
5305-00-068-0515	4	20
5305-00-068-7837	7	4
5305-00-071-2069	6	2
5305-00-071-2508	8	9
5330-00-073-7985	21	2
5305-00-088-9044	16	21
3110-00-100-0316	6	10
3110-00-100-3115	6	7
5305-00-164-7082	16	24
5315-00-187-9591	6	14
5306-00-226-4824	4	26
5305-00-227-1543	17	3
5315-00-234-1664	7	7
5305-00-269-3240	4	3
	4	35
2610-00-269-7383	6	20
5930-00-392-3811	19	15
5310-00-407-9566	4	8
	4	27
5305-00-481-6598	19	10
5310-00-543-5060	16	35
5310-00-582-5965	4	21
5310-00-584-5272	6	4
5310-00-637-9541	4	36
	8	8
5305-00-727-2283	7	3
5310-00-732-0559	4	37
5310-00-732-0560	6	3
5310-00-763-8920	8	2
5310-00-768-0319	4	19
4730-00-808-3833	7	8
5310-00-809-4061	23	19
5310-00-820-6653	8	1
4320-00-824-5363	22	16
5330-00-824-5364	22	9
3020-00-825-0758	22	8
5310-00-842-7634	6	13
4320-00-864-4915	34	15
5310-00-880-7746	4	9
4320-00-898-3998	36	19
5330-00-928-7029	16	7
5330-00-960-8965	23	5
5330-00-960-8966	23	16
5305-00-984-4983	16	34
5305-00-984-4984	16	16
5305-00-984-6191	16	25
5305-00-984-6210	17	9
6110-01-007-6028	12	9
	13	8
5930-01-013-5096	19	1
5305-01-030-8753	17	5
6110-01-035-5418	12	9
5365-01-054-0797	22	12
	23	23
5315-01-058-6908	22	7
	23	8
4730-01-058-6938	23	11
5305-01-059-1850	22	13
5330-01-083-6407	25	5
5330-01-083-7048	35	5
3010-01-083-9983	24	1
5977-01-084-0900	37	11
4730-01-084-2763	25	1
6685-01-085-4611	17	14
6685-01-085-4612	16	26
4730-01-086-0909	37	8
4530-01-090-0216	37	9
5975-01-094-8316	10	1
5995-01-116-4734	9	1
5950-01-280-3765	14	3
4520-01-352-2392	36	13
4140-01-355-3514	36	4

CROSS- REFERENCE-INDEXES

NATIONAL STOCK NUMBER INDEX

STOCK NUMBER		FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
82370	A-202				31	6
82370	A-203				31	4
82370	A-204				31	5
82370	A-205				31	1
82370	A-206				31	2
82370	A-214-1				30	8
82370	A-214-2				30	2
82370	A-214-3				30	3
82370	A-214-4				30	4
82370	A-214-6				30	7
82370	A-230				31	3
82370	A-501				33	3
82370	A-502				33	1
82370	A-503				33	4
82370	A-504				33	2
82370	A-505				33	10
82370	A-506				33	6
82370	A-507				33	7
82370	A-512				33	5
82370	A-901				33	9
82370	A-902				33	8
63477	AC77770				5	11
63477	AC77771				5	12
63477	A035779				5	1
16662	AE838				5	3
16662	AF46227				5	2
45809	AHB3TB3				16	14
82370	AL-100			3010-01-083-9983	24	1
75665	AL-100 1 1/8				24	7
75665	AL-100 1 3/8				24	2
75665	AL-179				24	6
75665	AL-180				24	3
75665	AL-181				24	4
75665	AL-182				24	8
75665	AL-183				24	5
65282	A10283X				6	6
82370	A214				30	1
82370	A215				25	1
82370	A217				25	4
82370	A218			4730-01-084-2763	25	7
82370	A219				25	6
82370	A220			5330-01-083-6407	25	5
82370	A221				25	3
82370	A222				25	2
82370	A223				30	5
82370	A224				30	6
82370	A301				32	1
82370	A302				32	3
82370	A303				32	6
82370	A304				32	5
82370	A305				32	7

CROSS-REFERENCE INDEXES

PART NUMBER INDEX

CAGEC	PART NUMBER	STOCK NUMBER	FIG,	ITEM
82370	A306		32	8
82370	A307		32	9
82370	A308		32	10
64294	A3706		34	9
01121	B-27654		19	2
01121	B-27669		19	12
01121	B-27673		19	11
82370	8103	5975-01-094-8316	10	1
82370	8104		10	4
82370	8105		10	5
82370	B106		10	7
82370	B107		10	6
82370	B108		10	2
82370	B109		10	3
82370	B111	5995-01-116-4734	9	1
82370	B112		9	2
82370	B113		9	3
82370	B114		9	4
80204	81821BH025C038N	5305-00-071-2508	8	9
80204	B1821BHO50C150N	5305-00-071-2069	6	2
31923	CR2-OB		36	1
35227	C10550		36	3
35227	C10590		36	26
3S227	C10740		36	8
31923	C13110		37	3
31923	C13160		36	27
35227	C20030	4140-01-355-3514	36	4
3S227	C20380	4520-01-352-2392	36	13
35277	C22040		36	12
31923	C23120		37	10
3S227	C24020		36	21
82370	DS-CTX-04		5	17
23826	DS4670-001		12	10
			13	9
23826	054826-001		12	6
64731	D1-1077	4320-00-824-5363	22	16
58923	D01-1158		22	6
58923	011-276		23	18
64731	Dl0-277	5330-00-960-8965	23	5
64731	011-278	5330-00-960-8966	23	16
64731	011-338	5330-00-824-5364	22	9
58923	011-90		22	4
23826	024817-001		12	5
			13	4
23826	D024826-001		13	5
23826	D24827-001		12	17
			13	12
23826	D025013-001		12	8
			13	7
23826	D 25551-001		12	3
			13	2

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CAGEC	PART NUMBER	STOCK NUMBER	FIG,	ITEM
58923	D30-32		22	5
58923	D30-9	5315-01-058-6908	22	7
			23	8
58923	D37-120		23	22
58923	D37-64		23	15
58923	D042-2		22	26
58923	D4201		22	25
58923	DD441-755		22	31
58923	D48-34		22	10
23826	D54873-001		12	7
			13	6
23826	D73060-001		22	18
			13	13
23826	D73062-001		12	15
			13	10
23826	073116-021		12	16
23826	073116-022		13	11
58923	D83-22		23	6
64731	D83-5		22	24
53080	E/S 583022		11	12
01121	F-19596		19	4
01121	F-19597		19	3
			19	9
01211	F-19598		19	14
01121	F-19599		19	19
71400	FRN-6		14	1
3S227	F20210		37	13
58923	G12-85		23	10
58923	G40-10		23	25
58923	G40-147		22	23
64731	G40-30		23	14
58923	G41-20		22	33
58923	G41-76		22	32
			23	13
58923	G41-78		23	7
58923	G44-062		22	17
58923	G45-100		22	22
58923	G49-031075		23	2
58923	G49-037100		22	14
			23	24
58923	G49-037125		23	20
58923	G49-06225		22	2
58923	G49-24	5305-01-059-1850	22	13
58923	G65-257		22	21
58923	G5-58		22	20
58923	G56-12	5365-01-054-0797	22	12
			23	23
58923	G61-239	4730-01-058-6938	23	11
58923	661-71		23	26
58923	G62-9		23	9
58923	G67-043275		22	29

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CAGEC	PART NUMBER	STOCK NUMBER	FIG,	ITEM
58923	G8-246		22	28
58923	G8-71		23	3
58923	G8-72		23	21
82370	JC-187-1		26	11
			27	11
81966	J7164		20	1
45809	LF-11		16	10
45809	LF-12		16	9
01121	M-6011	5305-00-481-6599	19	10
01121	M-6012		19	5
45809	MA-11		*1T*	*8*
45809	MA-35		16	11
			17	7
45809	MA-9		17	10
39305	MD-69		15	1
39305	MD-69-1		15	13
39305	MO-69-10		15	7
39305	MD-69-11		15	6
39305	MD-69-12		15	17
39305	MO-69-13		15	5
39305	MO-69-14		15	18
39305	MO-69-15		15	4
39305	MD-69-16		15	3
39305	MO-69-17		15	2
39305	MD-69-2		15	14
39305	MD-69-3		15	16
39305	MD-69-4		15	15
39305	MD-69-5		15	12
39305	MD-69-6		15	11
39305	MO-69-7		15	10
39305	MD-69-8		15	9
39305	MD-69-9		15	8
45809	MFS-S12		16	2
45809	MFS-S9		16	31
45809	MFS-19		16	6
45809	MFS-21		16	23
45809	MFS-42		16	20
45809	MFS-43		16	3
45809	MFS-44		16	17
45809	MFS-48		16	18
45809	MFS-49		16	32
45809	MFS-56		16	19
45809	MFS-57		16	4
45809	MFS-58	5330-00-928-7029	16	7
45809	MFS-63		16	30
45809	MFS-67		16	27
45809	MF47		16	1
96906	M524665-495	5315-00-234-1664	7	7
96906	MS24665-689	5315-00-187-9591	6	14
96906	MS27183-15	5310-00-809-4061	23	19
96906	MS35206-226	5305-00-984-4983	16	34

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CAGEC	PART NUMBER	STOCK NUMBER	FIG,	ITEM
96906	MS35206-227	5305-00-984-4984	16	16
96906	MS35206-243	5305-00-984-6191	16	25
96906	MS35206-263	5305-00-984-6210	17	9
96906	MS35207-260	5305-00-088-9044	16	21
96906	MS35338-39	5310-00-543-5060	16	35
96906	M5S35338-44	5310-00-582-5965	4	21
96906	MS35338-45	5310-00-407-9566	4	8
			4	27
96906	MS35338-46		4	4
		5310-00-637-9541	4	36
			8	8
96906	MS35338-48	5310-00-584-5272	6	4
96906	MS35338-50	5310-00-820-6653	8	1
96906	MSS35338-7		6	12
96906	MS35692-109	5310-00-842-7634	6	13
82370	MS51503A6Z		5	15
96906	MS5150816Z		5	16
96906	MS51849-11	5305-00-164-7082	16	24
96906	MS51849-32	5305-01-030-8753	17	5
96906	MS51849-33	5305-00-227-1543	17	3
96906	M551967-20	5310-00-763-8920	8	2
96906	M551968-14	5310-00-732-0560	6	3
96906	MS51968-2	5310-00-768-0319	4	19
96906	MS51968-5	5310-00-880-7746	4	9
96906	MS51968-8	5310-00-732-0559	4	37
96906	MS90725-3	5305-00-068-0500	6	17
96906	MS90727-162	5305-00-727-2283	7	3
96906	MS90727-64	5305-00-269-3240	4	3
			4	35
96906	MS90727-8	5305-00-068-0515	4	20
96906	MS90728-31	5306-00-226-4824	4	26
96906	MS90728-5	5305-00-068-7837	7	4
45809	M4-408		17	11
20969	NO 9-5/8X30		21	4
45809	NO.27		16	12
20969	N09S		21	1
23826	NPN		12	19
			13	14
			16	5
			16	8
			16	15
			16	29
			16	33
22938	NPT-300		5	9
82370	N1512		29	1
58923	N2-406		22	19
58923	N3-177		22	11
58923	N41-1		23	1
64731	N43-1		22	27
22938	OS-WTX-WLN-04		5	10
58923	P1-175		22	18

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CAGEC	PART NUMBER	STOCK NUMBER	FIG,	ITEM
58923	P10-178		22	30
50380	P21G340F		11	1
58923	P22-13		23	17
58923	P23-10		22	3
64294	P36Q2		34	31
58923	P4-384		23	4
58923	P49-2		23	12
64731	P6-277		22	15
64731	P6-278	3020-00-825-0758	22	8
45809	QMF-555F		16	13
63477	RH-FF19578		4	1
82370	RPC-1		27	2
82370	RPC-l.SS		27	1
82370	RPC-1A		26	2
82370	RPC-10		27	10
82370	RPC-10A		26	10
82370	RPC-11		27	19
82370	RPC-11A		26	19
82370	RPC-12		27	18
82370	RPC-12A		26	18
82370	RPC-14		27	17
82370	RPC-14A		26	17
82370	RPC-15		27	16
82370	RPC-15A		26	16
82370	RPC-16		27	12
82370	RPC-16A		26	12
82370	RPC-17		27	13
82370	RPC-17A		26	13
82370	RPC-18		27	14
82370	RPC-18A		26	14
82370	RPC-19		27	15
82370	RPC-19A		26	15
82370	RPC-2		26	3
82370	RPC-2A		27	3
82370	RPC-2S		26	1
82370	RPC-3		27	4
82370	RPC-3A		26	4
82370	RPC-4		27	5
82370	RPC-4A		26	5
82370	RPC-5		27	6
82370	RPC-SA		26	6
82370	RPC-6		27	7
82370	RPC-6A		26	7
82370	RPC-7		27	8
82370	RPC-7A		26	8
82370	RPC-8		27	20
82370	RPC-8A		26	20
82370	RPC-9		27	9
82370	RPC-9A		26	9
45809	SM-12		17	4
01121	S17T		19	16

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CAGEC	PART NUMBER	STOCK NUMBER	FIG,	ITEM
3S227	S311AMO2VAC9		36	17
3S227	5313AM02V2AV1		36	18
01121	S588		19	7
99680	UVM-LA		18	1
72144	UVM2A-30		14	4
23270	VJ-8		28	1
45809	W-4-F		17	2
20969	WA19-4	5330-00-073-7985	21	2
20969	WA38		21	3
01121	X-217866		19	13
01121	X-217947		19	18
01121	X-310322	5930-00-392-3811	19	15
01121	X-335123		19	8
50380	XT-K		11	16
95984	X02705	4730-01-086-0909	37	8
31923	X02720		37	14
31923	X02803		37	7
31923	X04220	5977-01-084-0900	37	11
01121	Z-27666		19	17
45809	ZC-51		17	15
45809	ZFS-8		16	22
81348	ZZ-T-381M/GRP-3/ 9.00-20/F/TBMS		6	19
31923	0001		36	25
3S227	0189		36	15
3S227	0191		36	16
3S227	0194		36	22
45809	02		17	1
45809	02-AS		17	13
45809	02-BODY		17	12
45809	02SW		17	6
35227	02010		36	2
82370	0311		1	2
82370	0312		1	2
82370	0313		1	4
82370	0314		1	6
82370	0416		1	1
82370	0419		1	1
82370	0524		1	7
3S227	05422		36	9
82370	0601		1	5
82370	0603		1	8
82370	0607		1	9
82370	0608		1	10
82370	0609		1	11
82370	0611		1	12
82370	0612		1	13
82370	0613		1	14
82370	0614		2	7
82370	0615		2	8
3S227	08110		36	7

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CAGEC	PART NUMBER	STOCK NUMBER	FIG,	ITEM
22938	1-7394		3	2
38056	10005S-2L		20	4
82370	1017		1	3
35227	10600		36	14
82370	1157		2	3
22938	12-910		3	3
35227	12010		36	5
35227	12200		36	6
01121	125-1		19	6
22938	127-203		5	13
82370	133-203		5	4
64294	13966		34	4
23826	14BF32AAA		13	1
23826	14BF32FAA		12	1
45809	143 ACC		16	28
45809	143ACC		17	16
22938	15-1729		6	26
22938	1509		7	1
22938	1510		7	2
22938	16-12762		3	1
82370	1608		8	7
22938	1642		6	24
22938	17-214		5	7
64294	19858-2		34	20
64294	19859-3		34	14
64294	19862-3	4320-00-864-4915	34	15
64294	19867		34	21
64294	19868-J		34	29
64294	19871-1		34	25
64294	19871-2		34	26
64294	19877		34	10
64294	198784		34	23
72692	2A-700A		35	1
72692	2A-7001		35	2
72692	2A-7002		35	3
72692	2A-7004		35	7
72692	2A-7005		35	4
82370	2A-7006	5330-01-083-7048	35	5
72692	2A-71OSL-200N		35	6
38056	20-6360BHT-04R-025		20	2
73842	20-8-0		6	21
64294	20149		34	19
64294	21192		34	24
64294	21196-2		34	6
64294	21204		34	34
64294	21417		34	18
64294	21507-2		34	17
64294	22R2210	4320-00-898-3998	36	19
35227	22001		36	20
64294	24177		34	32

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CAGEC	PART NUMBER	STOCK NUMBER	FIG,	ITEM
64294	25086		34	30
64294	25121		34	11
64294	25124-8		34	12
64294	25512		34	16
82370	2606		2	1
82370	2607		2	2
82370	2608		2	4
82370	26081		2	9
82370	2609		2	5
82370	2610		2	6
64294	27917		34	2
64294	27942-4		34	5
64294	29521-49		34	28
64294	29521-78		34	13
64294	29521-78A		34	22
64294	29526-19		34	1
64294	2953324		34	8
64294	295432		34	33
22938	3-13		6	15
22938	3-410	4730-00-808-3833	7	8
38056	30-63608HT-04R-0		20	2
3S227	312-25ABO-418		36	10
64294	32672		34	3
22938	35X194		6	23
64294	35548		34	27
71400	357004		14	2
58923	3622GHB		22	1
64294	37232		34	7
60038	3982	3110-00-100-3115	6	7
22938	4-13A		6	16
22938	4-804		7	5
50380	400638-1-C		11	4
38740	403733-B		11	3
50380	403733-C		11	18
50380	403989-49-AC		11	15
82370	4042		20	3
50380	405850-95-D		11	6
50380	405850-95-E		11	19
50380	411276-1-AC		11	10
50380	411286-30-BE		11	14
50380	411294-1-B		11	5
82390	416-A		37	5
82370	417-A		37	1
82370	418-A		37	2
82370	428-A		38	1
82370	429-A		38	2
82370	430-A		38	3
82370	431-A		38	4
82370	432-A		32	2
82370	4355		32	4
82370	4356		32	4

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CAGEC	PART NUMBER	STOCK NUMBER	FIG,	ITEM
60038	454	3110-00-100-0316	6	10
22938	455088		6	5
22938	46-64R		6	9
60038	462		6	11
23826	49052209001		12	13
23826	49EA14EFF		12	2
95026	5-1723		6	25
23826	50D25621		12	12
23826	50D54688-F		12	11
23826	50054688-1		12	14
22938	51-614		6	8
22938	51-876-03		6	1
3S227	52020	4530-01-090-0216	37	9
82370	543 T-4-4		5	5
45809	555HKLP-110-5 FT	685-01-085-4612	16	26
22938	555SR		6	22
22938	6-804		7	6
50380	602515-66-RA		11	17
45809	665HBP-110-5 FT	6685-01-085-4611	17	14
82370	6857		8	6
95026	7-1599		6	18
35S227	7-3/8"		36	11
95026	7-8123		4	1
82370	700-5		8	3
82370	701-1		8	5
82370	701-6		8	4
23826	75 AF14	6110-01-007-6028	12	9
23826	75 OF14	6110-01-035-5418	12	9
23826	75AF14	6110-01-007-6028	13	8
23826	75BF14		13	8
23826	75D73070A		12	4
23826	75073070A		13	3
53080	75458-A		11	2
31923	7804		37	12
53080	78547-1-G		11	8
53080	78566-1-A		11	7
95984	7905		37	15
95984	7906		37	6
95984	7910		37	4
23274	800		28	10
23274	801		28	2
23274	802		28	5
23274	803		28	6
23274	804		28	3
23274	805		28	4
82370	806-VJ8		28	8
23274	807		28	7
23274	808		28	9
82370	81-203		5	6
63477	8123-11		4	2
63477	8123-12		4	2

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CAGEC	PART NUMBER	STOCK NUMBER	FIG,	ITEM
63477	8123-15		4	5
63477	8123-16		4	6
63477	8123-17		4	7
63477	8123-18		4	10
63477	8123-19		4	10
63477	8123-20		4	14
63477	8123-31		4	16
63477	8123-32		4	17
63477	8123-33		4	18
63477	8123-36		4	23
63477	8123-37		4	24
63477	8123-38		4	25
63477	8123-39		4	25
63477	8123-40		4	28
63477	8123-41		4	29
63477	8123-42		4	30
63477	8123-43		4	28
63477	8123-44		4	29
63477	6123-45		4	31
63477	8123-46		4	32
63477	8123-47		4	33
63477	8123-54		4	34
63477	8123-55		4	22
63477	8123-58		4	15
63477	8123-60		4	11
63477	8123-65		4	12
63477	8123-66		4	13
3S227	8217		36	24
22938	82370		5	14
01121	836T-T252J	5930-01-013-5096	19	1
3S227	8504		36	23
50330	85871-1-AA		11	11
50380	85891-4-B		11	9
50380	858921-A		11	13
81348	9.00-20/TR443/TR 463/TR175A/TB	2610-00-269-7383	6	20
22938	9-857		5	8
03538	9T5882809	5950-01-280-3765	14	3

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FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
1	1		82370	0416
1	1		82370	0419
1	2		82370	0311
1	2		82370	0312
1	3		82370	1017
1	4		82370	0313
1	5		82370	0601
1	6		82370	0314
1	7		82370	0524
1	8		82370	0603
1	9		82370	0607
1	10		82370	0608
1	11		82370	0609
1	12		82370	0611
1	13		82370	0612
1	14		82370	0613
2	1		82370	2606
2	2		82370	2607
2	3		82370	1157
2	4		82370	2608
2	5		82370	2609
2	6		82370	2610
2	7		82370	0614
2	8		82370	0615
2	9		82370	26081
3	1		229381	6-12762
3	2		22938	1-7394
3	3		22938	12-910
4	1		63477	RH-FF195784
	1		95026	7-8123
4	2		63477	8123-11
4	2		63477	8123-12
4	3	5305-00-269-3240	96906	MS90727-64
4	4		96906	MS35338-46
4	5		63477	8123-15
4	6		63477	8123-16
4	7		63477	8123-17
4	8	5310-00-407-9566	96906	MSS35338-45
4	9	5310-00-880-7746	96906	MS51968-5
4	10		63477	8123-18
4	10		63477	8123-19
4	11		63477	8123-60
4	12		63477	8123-65
4	13		63477	8123-66
4	14		63477	8123-20
4	15		63477	8123-58
4	16		63477	8123-31
4	17		63477	8123-32
4	18		63477	8123-33
4	19	5310-00-768-0319	96906	MSS51968-2
4	20	5305-00-068-0515	96906	MS90727-8

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
4	21	5310-00-582-5965	96906	MS35338-44
4	22		63477	8123-55
4	23		63477	8123-36
4	24		63477	8123-37
4	25		63477	8123-38
4	25		63477	8123-39
4	26	5306-00-226-4824	96906	MS90728-31
4	27	5310-00-407-9566	96906	MS35338-45
4	28		63477	8123-40
4	28		63477	8123-43
4	29		63477	8123-41
4	29		63477	8123-44
4	30		63477	8123-42
4	31		63477	8123-45
4	32		63477	8123-46
4	33		63477	8123-47
4	34		63477	8123-54
4	35	5305-00-269-3240	96906	MS90727-64
4	36	5310-00-637-9541	96906	MS35338-46
4	37	5310-00-732-0559	96906	MS51968-3
5	1		63477	AD35779
5	2		16662	AF46227
5	3		16662	AE838
5	4		82370	133-203
5	5		82370	543 T-4-4
5	6		82370	81-203
5	7		22938	17-214
5	8		22938	9-857
5	9		22938	NPT-300
5	10		22938	OS-WTX-WLN-04
5	11		63477	AC77770
5	12		63477	ACT7771
5	13		22938	127-203
5	14		22938	82370
5	15		82370	MS51503A6Z
5	16		96906	MS5150816Z
5	17		82370	DS-CTX-04
6	1		22938	51-876-03
6	2	5305-00-071-2069	80204	81821dH050C150N
6	3	5310-00-732-0560	96906	MS51968-14
6	4	5310-00-584-5272	96906	MS35338-48
6	5		22938	455088
6	6		65282	A10283X
6	7	3110-00-100-3115	60038	3982
6	8		22938	51-614
6	9		22938	46-64R
6		3110-00-100-0316	60038	454
6	11		60038	462
6	12		96906	MS35338-7
6	13	5310-00-842-7634	96906	MS35692-109
6	14	5315-00-187-9591	96906	MS24665-689

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
6	15		22938	3-13
6	16		22938	4-13A
6	17	5305-00-068-0500	96906	MS90725-3
6	18		95026	7-1599
6	19		81348	ZZ-T-381M/GRP-3/ 9.00-20/F/TBMS
6	20	2610-00-269-7383	81348	9.00-20/TR443/TR 463/TR175A/TB
6	21		73842	20-8-0
6	22		22938	5556R
6	23		22938	35X194
6	24		22938	1642
6	25		95026	5-1723
6	26		22938	15-1729
7	1		22938	1509
7	2		22938	1510
7	3	5305-00-727-2283	96906	MS90727-
7	4	5305-00-068-7837	96906	MS90728-5
7	5		22938	4-804
7	6		22938	6-804
7	7	5315-00-214-1664	96906	MS24665-495
7	8	4730-00-808-3833	22938	3-410
8	1	5310-00-820-6653	96906	MS35338-50
8	2	5310-00-763-8920	96906	MS51967-20
8	3		82370	700-5
8	4		82370	701-6
8	5		82370	701-1
8	6		82370	6857
8	7		82370	1608
8	8	5310-00-637-9541	96906	MS35338-46
8	9	5305-00-071-2508	80204	81821BH025C038N
9	1	5995-01-116-4734	82370	8111
9	2		82370	8112
9	3		82370	8113
9	4		82370	8114
10	1	5975-01-094-8316	82370	8103
10	2		82370	B108
10	3		82370	B109
10	4		82370	8104
10	5		82370	8105
10	6		82370	B107
10	7		82370	B106
11	1		50380	P2IG340F
11	2		53080	75458-A
11	3		38740	403733-B
11	4		50380	400638-1-C
11	5		50380	411294-1-B
11	6		50330	405850-95-D
11	7		53080	78566-1-A
11	8		53080	78547-1-G
11	9		50380	85891-4-B

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
11	10		50380	411276-1-AC
11	11		50380	85871-1-AA
11	12		53080	E/S 583022
11	13		50380	858921-A
11	14		50380	411286-30-BE
11	15		50380	403989-49-AC
11	16		50380	XT-K
11	17		50380	602515-66-RA
11	18		50380	403733-C
11	19		50380	405850-95-E
12	1		23826	14BF32FAA
12	2		23826	49EA14EFF
12	3		23826	025551-001
12	4		23826	75D73070A
12	5		23826	D24817-001
12	6		23826	DS4826-001
12	7		23826	054873-001
12	8		23826	025013-001
12	9	6110-01-007-6028	23826	75 AF14
12	9	6110-01-035-5418	23826	75 DF14
12	10		23826	DS4670-001
12	11		23826	50054688-F
12	12		23826	50025621
12	13		23826	49052209001
12	14		23826	50054688-1
12	15		23826	073062-001
12	16		23826	D73116-021
12	17		23826	D024827-001
12	18		23826	D73060-001
12	19		23826	NPN
13	1		23826	14BF32AAA
13	2		23826	025551-001
13	3		23826	75073070A
13	4		23826	024817-001
13	5		23826	024826-001
13	6		23826	054873-001
13	7		23826	025013-001
13	8		23826	75BF14
13	8	6110-01-007-6028	23826	75AF14
13	9		23826	DS4670-001
13	10		23826	073062-001
13	11		23826	073116-022
13	12		23826	024827-001
13	13		23826	073060-001
13	14		23826	NPN
14	1		71400	FRN-6
14	2		71400	357004
14	3	5950-01-280-3765	03538	9T58B2809
14	4		72144	UVM2A-30
15	1		39305	M0D-69
15	2		39305	M0-69-17

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
15	3		39305	MD-69-16
15	4		39305	MD-69-15
15	5		39305	MO-69-13
15	6		39305	M0O-69-11
15	7		39305	MD-69-10
15	8		39305	MD-69-9
15	9		39305	MD-69-8
15	10		39305	MD-69-7
15	11		39305	MD-69-6
15	12		39305	MD-69-5
15	13		39305	MD-69-1
15	14		39305	M0D-69-2
15	15		39305	M0-69-4
15	16		39305	MO-69-3
15	17		39305	MD-69-12
15	18		39305	MD-69-14
16	1		45809	MF47
16	2		45809	MFS-S12
16	3		45809	MFS-43
16	4		45809	MFS-57
16	5		45809	NPN
16	6		45809	MFS-19
16	7	5330-00-928-7029	45809	MFS-58
16	8		45809	NPN
16	9		45809	LF-12
16	10		45809	LF-11
16	11		45809	MA-35
16	12		45809	N027
16	13		45809	QMF-555F
16	14		45809	AHB3TB3
16	15		45809	NPN
16		5305-00-984-4984	96906	MS35206-227
16	17		45809	MFS-44
16	18		45809	MFS-48
16	19		45809	MFS-56
16	20		45809	MFS-42
16	21	5305-00-088-9044	96906	MS35207-260
16	22		45809	ZFS-8
16	23		45809	MFS-21
16	24	5305-00-164-7082	96906	MS51849-11
16	25	5305-00-984-6191	96906	MS35206-243
16	26	6685-01-085-4612	45809	555HKLP-110-5 FT
16	27		45809	MFS-67
16	28		45809	143 ACC
16	29		45809	NPN
16	30		45809	MFS-63
16	31		45809	MFS-S9
16	32		45809	MFS-49
16	33		45809	NPN
16	34	5305-00-984-4983	96906	MS35206-226
16	35	5310-00-543-5060	96906	MS35338-39

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
17	1		45809	02
17	2		45809	W-4-F,
17	3	5305-00-227-1543	96906	M5S51849-33
17	4		45809	SM-12
17	5	5305-01-030-8753	96906	MS51849-32
17	6		45809	02SW
17	7		45809	MA-35
17	8		45809	MA-11
17	9	5305-00-984-6210	96906	M535206-263
17	10		45809	MA-9
17	11		45809	M4-408
17	12		45809	02-BODY
17	13		45809	02-AS
17	14	6685-01-085-4611	45809	665HBP-110-5 FT
17	15		45809	ZC-51
17	16		45809	143ACC
18	1		99680	UVM-1A
19	1	5930-01-013-5096	01121	836T-T252J
19	2		01121	B-27654
19	3		01121	F-19597
19	4		01121	F-19596
19	5		01121	M-6012
19	6		01121	125-1
19	7		01121	S58B
19	8		01121	X-335123
19	9		01121	F-19597
19	10	5305-00-481-6598	01121	M-6011
19	11		01121	B-27673
19	12		01121	8-27669
19	13		01121	X-217866
19	14		01211	F-19598
19	15	5930-00-392-3811	01121	X-310322
19	16		01121	S17T
19	17		01121	Z-27666
19	18		01121	X-217947
19	19		01121	F-19599
20	1		81966	J7164
20	2		38056	20-6360BHT-04R-0 25
20	2		38056	30-6360BHT-04R-0
20	3		82370	4042
20	4		38056	1000S-2L
21	1		20969	N09S
21	2	5330-00-073-7985	20969	WA19-4
21	3		20969	WA38
21	4		20969	NO 9-5/8X30
22	1		58923	3622GHB
22	2		58923	G49-06225
22	3		58923	P23-10
22	4		58923	011-90
22	5		58923	D30-32

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
22	6		58923	01-1158
22	7	5315-01-058-6908	58923	030-9
22	8	3020-00-825-0758	64731	P6-278
22	9	5330-00-824-5364	64731	Dll-338
22	10		58923	048-34
22	11		58923	N3-177
22	12	5365-01-054-0797	58923	G56-12
22	13	5305-01-059-1850	58923	G49-24
22	14		58923	G49-037100
22	15		64731	P6-277
22	16	4320-00-824-5363	64731	01-1077
22	17		58923	G44-062
22	18		58923	P1-175
22	19		58923	N2-406
22	20		58923	G5-58
22	21		58923	G5-257
22	22		58923	G45-100
22	23		58923	G40-147
22	24		64731	083-5
22	25		58923	04201
22	26		58923	D42-2
22	27		64731	N43-1
22	28		58923	G8-246
22	29		58923	G67-043275
22	30		58923	P10-178
22	31		58923	D441-755
22	32		58923	G41-76
22	33		58923	G41-20
23	1		58923	N41-1
23	2		58923	G49-031075
23	3		58923	G8-71
23	4		58923	P4-384
23	5	5330-00-960-8965	64731	011-277
23	6		58923	D83-22
23	7		58923	G41-78
23	8	5315-01-058-6908	58923	030-9
23	9		58923	G62-9
23	10		58923	G12-85
23	11	4730-01-058-6938	58923	G61-239
23	12		58923	P49-2
23	13		58923	G41-76
23	14		64731	G40-30
23	15		58923	037-64
23	16	5330-00-960-8966	64731	011-278
23	17		58923	P22-13
23	18		58923	011-276
23	19	5310-00-809-4061	96906	MS27183-15
23	20		58923	G49-037125
23	21		58923	G8-72
23	22		58923	037-120
23	23	5365-01-054-0797	58923	G56-12

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
23	24		58923	G49-037100
23	25		58923	G40-10
23	26		58923	G61-71
24	1	3010-01-083-9983	82370	AL-100
24	2		75665	AL-100 1 3/8
24	3		75665	AL-180
24	4		75665	AL-181
24	5		75665	AL-183
24	6		75665	AL-179
24	7		75665	AL-100 1 1/8
24	8		75665	AL-182
25	1		82370	A215
25	2		82370	A222
25	3		82370	A221
25	4		82370	A217
25	5	5330-01-083-6407	82370	A220
25	6		82370	A219
25	7	4730-01-084-2763	82370	RPC-2S
26	2		82370	RPC-1A
26	3		82370	RPC-2
26	4		82370	RPC-3A
26	5		82370	RPC-4A
26	6		82370	RPC-SA
26	7		82370	RPC-6A
26	8		82370	RPC-7A
26	9		82370	RPC-9A
26	10		82370	RPC-1OA
26	11		82370	JC-187-1
26	12		82370	RPC-16A
26	13		82370	RPC-17A
26	14		82370	RPC-18A
26	15		82370	RPC-19A
26	16		82370	RPC-15A
26	17		82370	RPC-14A
26	18		82370	RPC-12A
26	19		82370	RPC-IZA
26	20		82370	RPC-8A
27	1		82370	RPC-l.5S
27	2		82370	RPC-1
27	3		82370	RPC-2A
27	4		82370	RPC-3
27	5		82370	RPC-4
27	6		82370	RPC-5
27	7		82370	RPC-6
27	8		82370	RPC-7
27	9		82370	RPC-9
27	10		82370	RPC-10
27	11		82370	JC-187-1
27	12		82370	RPC-16
27	13		82370	RPC-17

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
27	14		82370	RPC-18
27	15		82370	RPC-19
27	16		82370	RPC-15
27	17		82370	RPC-14
27	18		82370	RPC-12
27	19		82370	RPC-11
27	20		82370	RPC-8
28	1		23270	VJ-8
28	2		23274	801
28	3		23274	804
28	4		23274	805
28	5		23274	802
28	6		23274	803
28	7	23274	807	
28	8		82370	806-VJ8
28	9		23274	808
28	10		23274	800
29	1		82370	N1512
30	1	82370	A214	
30	2		82370	A-214-2
30	3	82370	A-214-3	
30	4		82370	A-214-4
30	5	82370	A223	
30	6	82370	A224	
30	7	82370	A-214-6	
30	8	82370	A-214-1	
31	1	82370	A-205	
31	2	82370	A-206	
31	3	82370	A-230	
31	4	82370	A-203	
31	5	82370	A-204	
31	6	82370	A-202	
32	1	82370	A301	
32	2	82370	432-A	
32	3	82370	A302	
32	4	82370	4355	
32	4	82370	4356	
32	5	82370	A304	
32	6	82370	A303	
32	7	82370	A305	
32	8	82370	A306	
32	9	82370	A307	
32	10	82370	A308	
33	1	82370	A-502	
33	2	82370	A-504	
33	3	82370	A-501	
33	4	82370	A-503	
33	5	82370	A-512	
33	6	82370	A-506	
33	7	82370	A-507	
33	8	82370	A-902	

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
33	9	82370	A-901	
33	10	82370	A-505	
34	1	64294	29526-19	
34	2	64294	27917	
34	3	64294	32672	
34	4	64294	13966	
34	5	64294	27942-4	
34	6	64294	21196-2	
34	7	64294	37232	
34	8	64294	2953324	
34	9	64294	A3706	
34	10	64294	19877	
34	11	64294	25121	
34	12	64294	25124-8	
34	13	64294	29521-78	
34	14	64294	19859-3	
34	15	4320-00-864-4915	6429419862-3	
34	16	64294	25512	
34	17	64294	21507-2	
34	18	64294	21417	
34	19	64294	20149	
34	20	64294	19858-2	
34	21	64294	19867	
34	22	64294	29521-78A	
34	23	64294	198784	
34	24	64294	21192	
34	25	64294	19871-1	
34	26	64294	19871-2	
34	27	64294	35548	
34	28	64294	29521-49	
34	29	64294	19868-J	
34	30	64294	25086	
34	31	64294	P36Q2	
34	32	64294	24177	
34	33	64294	295432	
34	34	64294	21204	
35	1	72692	2A-700A	
35	2	72692	2A-7001	
35	3	72692	2A-7002	
35	4	72692	2A-7005	
35	5	5330-01-083-7048	823702A-7006	
35	6	72692	2A-7105L-200N	
35	7	72692	2A-7004	
36	1	31923	CR2-OB	
36	2	35227	02010	
36	3	3S227	C10550	
36	4	4140-01-355-3514	3S227C20030	
36	5	3S227	12010	
36	6	35S227	12200	
36	7	3S227	08110	
36	8	3S227	C10740	

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
36	9		35227	05422
36	10		35227	312-25AB0-418
36	11		35227	7-3/8"
36	12		3S277	C22040
36	13	4520-01-352-2392	3S227	C20380
36	14		3S227	10600
36	15		3S227	0189
36	16		35227	0191
36	17		35227	S311AM02VAC9
36	18		3S227	S313AM02V2AV1
36	19	4320-00-898-3998	64294	22R221D
36	20		3S227	22001
36	21		3S227	C24020
36	22		35227	0194
36	23		35227	8504
36	24		35227	8217
36	25		31923	0001
36	26		35227	C10590
36	27		31923	C13160
37	1		82370	417-A
37	2		82370	418-A
37	3		31923	C13110
37	4		95984	7910
37	5		82390	416-A
37	6		95984	7906
37	7		31923	X02803
37	8	4730-01-086-0909	95984	X02705
37	9	4530-01-090-0216	3S227	52020
37	10		31923	C23120
37	11	5977-01-084-0900	31923	X04220
37	12		31923	7804
37	13		3S227	F20210
37	14		31923	X02720
37	15		95984	7905
38	1		82370	428-A
38	2		82370	429-A
38	3		82370	430-A
38	4		82370	431-A

-A-

-B-

-C-

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PART II

SUPPLEMENTAL

OPERATING, MAINTENANCE

AND

REPAIR PARTS

INSTRUCTION

FOR

HEATER, HOT OIL, TRAILER MOUNED

MODEL 200 STM 77

SUPPLEMENTAL OPERATING MAINTENANCE AND REPAIR PARTS INSTRUCTIONS FOR

Heater, Hot Oil, Trailer Mounted
2, 100, 000 BTU/HR Output
Model 200STM77

TABLE OF CONTENTS

SUPPLEMENTAL OPERATING MAINTENANCE AND REPAIR PARTS INSTRUCTIONS - SOMARPI

Heater, Hot Oil, Trailer Mounted
2, 100, 000 BTU/HR Output
Oil Fired Electric Motor Driven
Volcanic Heater, Inc. Model 200STM77
NSN 3895-01-063-7892

SECTION I
GENERAL

1-1. Purpose. To provide user and Support Personnel supplemental operating maintenance and repair parts instructions that have special application for the heater, Hot Oil -- Model 200STM77.

1-2. Scope. This publication applies to Department of the Army Units, Organizations, and Activities that use and/or support the Heater, Hot Oil.

1-3. Description. The Heater, Hot Oil is manufactured by Volcanic Heater, Inc. of Alliance Ohio The Hot Oil Heater is a trailer mounted, heavy duty, high output heater. It normally is used with two asphalt melters operating in parallel or with a heavy duty asphalt plant and is designed to heat transfer oil and pump this oil to the external systems requiring heat. External electrical power and fuel must be provided for operation. The power requirement is 15KW, 3 phase 60 Hertz at 230 volts.

1-4. Procurement Status. The procurement was awarded under Contract DSA 700-77-C-8295.

1-5. Equipment Publications.
Initially two sets of the manufacturer's commercial publications will be shipped to the organization receiving the heater.

1-6. Personnel and Training.

a. MOS Requirements:

(1) Operator: 62H-10, 20 General Construction Machine Operator.

(2) Organizational Maintenance: 62B-10, 20 Engineer Equipment Repairman.

(3) Direct and General Support Maintenance: 62B-10, 20, 30, Engineer Equipment Repairman 44B20 Metal Body Repairman.

b. New Equipment Training: New Equipment Training Teams (NETTs) are available to major field commands. Request for NETTs should be for- warded to Commander, US Army Tank-Automotive Command (TACOM), ATTN: DRSTA-MLT, Warren, MI 48090.Training teams should be requested only when trained personnel are not available in the command to operate and/or maintain the heater.

1-7. Logistics Assistance.

a. Tank-Automotive Command Field Maintenance Technicians stationed at CONUS and OCONUS installations will be fully qualified and available to furnish on-site training and/or assistance concurrent with receipt of the heater.

b. Assistance can be obtained by contacting the Logistics Assistance Office listed in Appendix B of AR 700-4.

1-8. Warranty. This equipment was not procured under warranty.

1-9. Reporting. Reports of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms), and forwarded direct to Commander, US Army Tank-Automotive Command, ATTN: DRSTA-MVB, Warren, MI 48090.

SECTION II

MAINTENANCE

2-1. Maintenance Concept. The heater will not require any new or special maintenance considerations. All maintenance functions can be accomplished within the current maintenance concepts established for construction equipment.

a. Operator/Crew Maintenance: Operator and crew maintenance is limited to daily preventive maintenance checks and services.

b. Organizational Maintenance: Organizational Maintenance consists of scheduled preventive maintenance services, minor repairs and adjustments.

c. Direct Support Maintenance: Direct Support. Maintenance consists of repairs on-site or in a direct support unit's shop. Repairs are accomplished with a minimum of tools and test equipment: the assemblies and end items thus repaired are returned to their users.

d. General Support Maintenance: General Support Maintenance over- hauls selected assemblies and repairs items designated by the area support command for return to stock.

e. Depot Maintenance: Depot Maintenance overhauls end items and selected major assemblies when they are required to satisfy overall Army requirements. Overhaul of the end item may also be performed by contract with manufacturer.

2-2. Maintenance Allocation Chart. Maintenance will be performed as necessary by the category indicated in the Maintenance Allocation Chart (MAC) (Appendix C) to retain or restore serviceability. All authorized maintenance within the capability of a using organization will be accomplished before referring the item to support maintenance. Higher categories will perform the maintenance functions of lower categories when required or directed by the appropriate Commanders. Using and support units may exceed their authorized scope and functions in the MAC when approval is granted by the next higher support maintenance Commander.

2-3. Equipment Improvement Recommendations (EIR). Equipment Improvement Recommendations will be submitted in accordance with TM 38-750.

2-4. Equipment Readiness Reporting. Readiness reporting will be accomplished as required by the current TM 38-750.

2-5. Maintenance Expenditure Limits. The average life expectancy for the heater is 11 years.

PERCENT OF REPAIR	YEARS
65%	1980
50%	1983
45%	1985
40%	1987
35%	1988
30%	1989
20%	1990
10%	1991

2-6. Shipment and Storage.

a. Shipment and Storage. Refer to TB 740-94-2 for procedures covering preservation of equipment for shipment and storage.

b. Administrative Storage. Refer to TM 740-90-1 for instructions covering administrative storage of equipment.

2-7. Destruction to Prevent Enemy Use. Refer to TM 750-244-3 for procedures covering destruction of equipment to prevent enemy use.

2-8. Fire Protection.

a. A hand operated fire extinguisher may be installed at the discretion of the using unit.

b. Approved hand-portable fire extinguishers are listed in TM 5-4200-200-10.

2-9. Basic Issue Items Lists (BILL). See Appendix B for a list of items which accompany the end item or are required for operation and/or operator's maintenance.

2-10. Maintenance and Operating Supply List. Refer to Appendix E.

2-11. Special Tools and Equipment. No special tools or equipment are required for operation and maintenance of the heater.

2-12. Facilities. No special maintenance facilities are required for the heater.

2-13. Support Equipment.

a. An electrical supply to the heater with a 15 kW, 3 phase, 60 Hertz at 230 volts capability is required.

b. An external fuel source.

2-14. Maintenance Forms and Records Operational maintenance and historical records will be maintained as required by the current TM 38-750.

SECTION III

REPAIR PARTS SUPPLY

3-1. General.

a. .The basic policies and procedures in AR 710-2, AR 725-50 and DA Circular 700-27 are generally applicable to repair parts management for construction equipment.

b. Manufacturer's parts manuals are furnished with the heater instead of Department of the Army Repair Parts and Special Tool List (RPSTL).

c. National Stock Number (NSNs) are initially assigned only to PLL/ASL parts and major assemblies, i.e., engines, transmissions, etc. Additional NSNs are assigned by the supply support activities as demands warrant.

d. Automated Processing (AUTODIN) of Federal Supply Code Manufacturer (FSCM) part number requisitions, without edit for matching NSNs and exception data, is authorized.

e. Proper use of assigned project codes on part number requisitions are essential.

f. Repair parts are available from commercial sources and may be purchased locally in accordance with AR 710-2, AR 734-110 and DA Circular 700-27.

g. Initial Prescribed Load List (PLL) and Authorized Stock List (ASL) will be distributed by US Army Tank-Automotive Command (TACCM) , ATTN: DRSTA-FH.

3-2. Prescribed Load List (PLL).The PLL distributed by TACOM is an estimated 15 days supply recommended for initial stockage at organizational maintenance. Management of PLL items will be governed by the provisions of AR710-2 and local command procedures. Selection of PLL parts for shipment to CONUS/OCONUS units is based upon the receiving Command's recommendation after their review of the TACOM prepared list. Organizations and activities in CONUS/OCONUS. will establish PLL stocks through normal requisitioning process.

3-3. Authorized Stockage List (ASL).The ASL distributed by TACOM is an estimated 45 days supply of repair parts for support units and activities. The ASL parts will be shipped according to the recommendations of the receiving Commands, after they have reviewed the initial list distributed by TACOM. Support units and activities in CONUS/ OCONUS will establish ASL stocks through requisitioning process.

3-4. Requisitioning Repair Parts.

a. Using Units/Organizations: Requisitions (DA Form 2765 Series) will be prepared according to AR 710-2 and local command directives. Units in CONUS will use Project Code "BGW" in block 19. Units OCONUS will enter in block 19 Project Code "JZC". See Appendix-G.

b. Support Units and Activities:

(1) General: ALL MILSTRIP requisitions (DD Form 1348 Series) pre- pared for repair parts will include distribution and Project Codes, see Appendix H, I and J.

(2) Distribution Code: Supply customers in CONUS will use code 'F" in card column 54. -Customer OCONUS will use the appropriate code from Appendix P, Paragraph P-3a(1) AR 725-50.

(3) Project Codes: The applicable Project Code will be entered in card columns 57-59 of requisitions for NSI parts, whether CONUS or OCONUS customers. Project Code "BGW" will be used by CONUS customers when requisitioning part numbered parts. Supply customers OCONUS will use Project Code "JZC" for part numbered parts.

3-5. Submitting Requisitions.

a. Using Units and Organizations will summit DA Form 2765 Series requisitions to-designated support units or activities in accordance with local procedure.

b. Support units and activities will forward MILSTRIP requisitions for NSN parts through the Defense Automated Addressing System (DAAS) to the Managing Supply Support Activity. Requisitions for part numbered part will be forwarded through DAAS to the Defense Construction Supply Center (DCSC).

NOTE: When the manufacturer's part number and Federal Supply Code for Manufacturer (FSCM) exceed the space in card columns 8 through 22 of A02/AOB requisitions, prepared an A05/AOE requisition (DD Form 1348-6) and mail it to Commander, Defense Construction Supply Center, ATTN: DCSC-OSR, Columbus, OH 43215.

APPENDIX A

EQUIPMENT PUBLICATIONS

DA EQUIPMENT PUBLICATIONS		
NOMENCLATURE	EQUIPMENT PUBLICATION NUMBER	DATE AVAILABLE
Utilization of Engineer Construction Equipment Volume D-1 Asphalt and Concrete Equipment *NOTE* Supervisors and operators should refer to TM5-331D to get the most use from this equipment.	TM 5-331D	21 April 69

APPENDIX B

BASIC ISSUE ITMS LIST

MFR PART NO.	MFR FED CODE	DESCRIPTION	UNIT OF ISSUE	QUANTITY FURNISHED W/EQUIP
B101	82370	Chock Block	ea	2
B103	82370	Grounding Rods	ea	2
B102	82370	Chain	ea	2
.M!L-H-18163	77218	Hose Liquid Transfer	ea	4
B10	582370	Wire Ground	ea	2
B109	82370	Clamp Ground	ea	2
B111	82370	Power Adapter Cable	ea	1
602SS	82370	Unions, STEEL 2"	ea	4
		Intervehicular Harness (12V)	ea	1
		Intervehicular Harness (24V)	ea	1
3/8-50	82370	Fuel Hose, 50	ea	1

ITEMS TROOP INSTALLED OR AUTHORIZED LIST				
(1) SMR CODE	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION REF No & MFR CODE USESABLE ON CODES	(4) UNIT OF MEAS	(5) QTY AUTH
		NOTE: The following items are authorized but not issued with. the heater.		
	7520-00-559-9618	Case, Cotton Duck: MIL-B-11743 (81349)	ea	1
	7510-00-889-3494	Log Book Binder: MIL-B-43064	ea	1
	4210-00-889-2221	Extinguisher, Fire Dry Chemical	ea	1

APPENDIX C

MAINTENANCE ALLOCATION CHART
FOR
Heater, Hot Oil, Trailer Mounted
2, 100, 000(TUS Model 200STM77

Section I. INTRODUCTION

1. General: This Maintenance Allocation Chart designates responsibility for performance of Maintenance functions to specific Maintenance categories.

2. Maintenance functions:

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

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

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

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

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

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

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

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

i. Repair: The application of maintenance services or other maintenance actions to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

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

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

3.Column entries: Columns used in the Maintenance allocation chart are explained below:

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

b. Column 2. Component/Assembly: Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3. Maintenance Functions: Column 3 lists the functions to be performed on the item listed in. Column 2.

d. Column 4. Maintenance Category: Column 4 specifies, by the listing of a "work time" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "work time" figures will be shown for each category. The number of, manhours specified by the "work time" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/ quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the Maintenance Allocation Chart.

e. Column 5. Tools and Equipment: Column 5 specifies by code those common tool sets (not individual tools) and Special tools, test, and support equipment required to perform the designated function. f. Column 6. Remarks: Column 6 contains an alphabetic code which leads to the remark in Section IV, Remarks, which is pertinent to the item opposite the particular code.

HEATER, HOT OIL, TRAILER MOUNTED
Section II. MAINTENANCE ALLOCATION CHART
2, 100, 000 BTU/HR

(1) Group number	(2) Component/assembly	(3) Maint. function	(4) Maint. category C	O	F	H	D	(5) Tool/ equipment	(6) Remarks
06	ELECTRICAL SYSTEM								
0608	Junction Box, Veh	Replace		.2				1,5	
		Repair		.3					
0609	Taillights/Markers	Replace		.1				1,5	
		Repair		.2					
0613	Chassis Wiring Harness	Replace			3.0			1,2,5	
		Repair		.5					
	Inter -Vehicular	Replace		.1					
	Harness	Repair			.7				
11	REAR AXLE								
1100	Rear axle assy	Replace		2.0				1,2,3,4	
		Repair		1.0					
12	BRAKES (Air Over Hyd)								
1202	Brake Assy	Replace		1.0				1	
		Repair		.5					
	Brake Shoes	Inspect		.4					
		Replace			.8				
		Repair			1.0				
1204	Master Cylinder (Hyd)Test	Test	.1						
		Service	.1					1	
		Replace		.8					
		Repair		1.0					
	Wheel Cylinder	Inspect		.5					
		Replace		.5					
		Repair							
	Lines, Fittings, Hoses	Replace		.7					
		Repair		.3					
1208	Air Reservoir-	Service	.2					1,2	
		Replace		1.0					
		Repair			.5				

*The subcolumns are as follows:
C--operator/crew F--direct support D-depot
O--organizational H--general support

HEATER HOT OIL, TRAILER MOUNTED
Section II. MAINTENANCE ALLOCATION CHART

(1) Group number	(2) Component/assembly	(3) Maint. function	(4) Maint. category C	O	F	H	D	(5) Tool/ equipment	(6) Remarks
	Relay Valve Assy	Test			.1				
		Service		.1					
		Replace		.2					
	Lines, Fittings, Hoses	Replace		.7					
		Repair		.3					
13	WHEELS								
1311	Wheel Assy	Inspect		.1					
		Replace		.6				1, 2, 3, 4	
	Wheel Bearings	Inspect		.1					
		Replace		1.0					
	Brake Drum	Inspect		.1					
		Replace		.8					
		Repair			1.5				
1313	Tires and Tubes	Service	.1					1	
		Replace		.5					
		Repair		.7					
15	FRAME AND TOWING ATTACHMENTS								
1501	Frame	Repair			3.0			2	
1503	Lunette	Replace	1.0					1, 2	
		Repair			.6				
1507	Leveling Jack	Replace		.4				1, 2	
		Repair			.3				
16	SPRINGS AND SHOCKS								
1601	Springs	Replace		1.2				1	
		Repair		.8					
1604	Shock Absorbers	Inspect		.1					
		Replace		1.1				1	
18	BODY, CAB, HOOD, HULL								

*The subcolumns are as follows:
C--operator/crew F--direct support D-depot
O--organizational H--general support

HEATER, HOT OIL, TRAILER MDUNTED
Section II. MAINTENANCE ALJ)OCATION CHART
2, 100, 000 BTU/HR

(1) Group number	(2) Component/assembly	(3) Maint. function	(4) Maint. category C	O	F	H	D	(5) Tool/ equipment	(6) Remarks
1802	Fenders	Replace		1.0				1	
		Repair		.5					
1808	Stowage Boxes	Replace		.5				1	
		Repair		.3					
	Cable Reel	Replace		3					
		Repair		.3					
22	ACCESSORY ITEMS								
2202	Chock Blocks	Replace		.1				1	
2210	Data Plates	Replace		.1				1	
40	ELECTRIC MOTORS								
4000	Motor, Pump	Test		.5					
		Replace		.5				1, 2, 5’	
		Repair			1.0				
4009	Control Panel	Inspect	.1						
		Replace		1.				1, 2, 5	
		Repair			3.0				
42	ELECTRICAL EQUIP								
4201	Transformer	Test		.1					
		Replace			.3			1, 2, 5	
4202	Electrical Controls	Test.		.5					
		Replace		.7				1, 2, 5	
		Repair			2.0				
4203	Cutoff Devices Fuse/	Test		.1					
	Fuse Block	Replace		.2				1, 5	
	Program Controller	Test		.1					
		Replace		.5					
	Cutoff, Low Fluid	Test		.1					
	Level	Replace		.3					

*The subcolumns are as follows:
C--operator/crew F--direct support D-depot
O --organizational H--general support

HEATER, HOT OIL, TRAILER MOUNTED
Section II. MAINTENANCE ALLOCATION CHART
2, 100, 000 BTU/HR

(1)	(2)	(3)	(4)					(5)	(6)
			Maint. category						
Group number	Component/assembly	Maint. function	C	O	F	H	D	Tool/ equipment	Remarks
4206	Thermostat, Automatic	Test		.2				1, 2, 5	
	and Manual Controller	Replace		.2					
	Temp	Repair			.4				
4209	Flame Detector	Inspect		.3					
		Replace		.3				1,2,5	
47	GAGES	Repair			.4			1, 2, 5	
4702	Oil Temperature	Replace		.1				1	
	Fuel Oil Pressure	Replace		.1					
	Liquid Level (Sight)	Replace		.3					
55	PUMP								
5500	Pump Circulating	Inspect		.1					
		Test			.4				
		Service	.1					1, 2	
		Replace		.4					
		Repair			1.5				
5507	Reduction Gear	Inspect		.1					
		Replace		.2				1, 2	
		Repair			.5				
5511	Coupling Drive	Inspect		.1					
		Replace	.	5				1	
5513	Valves, Lines, Fittings	Inspect		.1					
	Strainer	Replace		.5				1	
		Repair		.3					
60	HEATING UNIT								
6001	Vent Piping	Replace		.8				1	
	Plate, Rear: View Assy	Replace		.5					
6004	Fuel Pump	Test			.1				
		Adjust		.2				1, 2	
		Replace		.3					
		Repair			.5				

*The subcolumns are as follows:
C--operator/crew F--direct support D-depot
O --organizational H--general support

HEATER, HOT OIL, TRAILER MOUNTED
Section II. MAINTENANCE ALLOCATION CHART
2, 100, 00 BTU/HR

(1) Group number	(2) Component/assembly	(3) Maint. function	(4) Maint. category C	O	F	H	D	(5) Tool/ equipment	(6) Remarks
	Fuel Strainer	Service	.1						
		Replace		.2					
	Lines and Fittings	Replace		.3					
6005	Burner Assy	Inspect	.1						
		Replace		.7				1	
		Repair		1.3					
	Burner Head	Replace		.2					
	Blower	Test		.1					
		Replace		.3					
		Repair		.5					
	Transformer Igniter,	Test		.1					
	Nozzle and Electorde	Adjust	.1						
		Replace		.3					
	Damper Control	Inspect	.1						
		Adjust	.2						
		Replace		.5					
6006	Motor Assy and Blower	Test		.1					
		Replace		1.5				1, 2, 5	
		Repair			2.5				
6010	Exhaust Stack	Replace		1.0				1	
		Repair		.5					
6011	Combustion Chamber	Inspect		.5					
		Replace			3.5			1, 2	
6013	Heat Exchanger	Inspect		.5					
		Replace			5.0			1, 2	

*The subcolumns are as follows:
C--operator/crew F--direct support D-depot
O --organizational H--general support

MAINTENANCE ALLOCATION CHART FOR
Heater, Hot Oil, Trailer Mounted 2, 100, 000
BTUS Model 200STM77
(MD SOP 700-5)

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) TOOL OR TEST EQUIPMENT REF CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL/NATO STOCK NUMBER	(5) TOOL NUMBER
		Unless otherwise noted, all maintenance functions can be accomplished with the tools contained in the following common tool sets.		
1	O, F, H	Shop Equip Contact Maint. TRK MTD (SC 4940-97-CL-E-05)	4940-00-294-9518	T10138
1	O, F, H	Shop Equip Org Repair, Light TRK MID (SC 4940-97-CL-E04)	4940-00-294-9516	T13152
1	O, F, H	Tool Kit Automotive Maint, Org Maint Common #1 (SC 4910-95-CL-A74)	4910-00-754-0654	W32593
1	O, F, H	Tool Kit Automotive Maint, Org Maint Common #2 (SC 4910-95-CL-A72)	4910-00-754-0650	W32730
1	O, F, H	rook Kit, Light Weight (SC 5180-90-CL-N26)	5180-00-177-7033	W33004
1	O, F, H	3hop Equip Auto Maint and repair Org Maint Supp #1 'SC 4910-95-CL-A73)	4910-00-754-0653	W32867
1	O, F, H	Shop Equip Welding Field Maint (SC 3470-95-CL-A08)	3470-00-357-7268	T16714
1	O, F, H	Tool Set, Veh Full Traded Sugg #2 SC 4940-95-CL-A08	4940-00-754-0743	W65747
2	F, H	Shop Equip Gen Purp Repair 3emitrlr MTD (SC 4940-97-3L-E03)	4940-00-287-4894	T10549
2	F, H	Tool Kit Automotive, Fuel And Elec Sys Repair (SC 4910-95-CL-A50)	4910-00-754-0655	W32456
2	F, H	Tool Kit, Master Mechanic And Equip Maint and Repair SC 5180-90-CL-N05	5180-00-699-5273	W45060

MAINTENANCE ALLOCATION CHART FOR
Heater, Hot Oil, Trailer Mounted 2, 100, 000
BTUS Model 200STM77
(MD SOP 700-5)

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) TOOL OR TEST EQUIPMENT REF CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL/NATO STOCK NUMBER	(5) TOOL NUMBER
2	F, H	Shop Set, Fuel and Elec Sys Field Maint Basic (SC 4910-95-CL-AO1)	4910-00-754-0714	T30414
2	F, H	Shop Set, Fuel and Elec Sys Field Maint Basic Supp #2 (SC 4910-95-CL-A65)	4910-00-390-7775	T30688
2	F, H	Shop Equip Machine Shop, Field Maint Basic (SC 3470-95-CL-A02)	3470-00-754-0708	T15644
2	F, H	Measuring and Lay Out Tool Set Mach (SC 5280-95-CL-A025	5280-00-511-1950	W44512
2	F, H	Tool Kit Body and Fender Repair	5180-00-754-0643	W33689
3	F, H	Wrench Set Socket, 3/4" Drive Hex Type	5310-00-754-0743	W65747
4	F, H	Wrench Torque, 3/4" Drive 500 lb. Cap	5120-00-542-5577	Y84966
5	0, F, H	Multimeter	6625-00-999-7465	M80242

APPENDIX D

INITIAL RECOMMENDATION
PRESCRIBED LOAD LIST (PLL)
AUTHORIZED STOCKAGE LIST (ASL)

END ITEM: HEATER, HOT OIL, TRAILER MOUNTED		MAKE: Volcanic Heater	MODEL: 200 STM77
MFR PART NO:	NSN: 3895-01-063-7892	SERIAL NUMBER RANGE ——— TO ———	DATE Feb 80

SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	PART DESCRIPTION	U/M	QTY OF PARTS REQ'D FOR NO. OF END ITEMS			
						PLL	ASL		
						1-5	1-5	6-20	21-50
PAOZZ	5920-00-252-1961	F15B250V6A FRN-6	81349 71400	Fuse Fuse (Volcanic's Number)	Ea	1	2	2	3
PAOZZ	3010-01-083-9983	AL-100	82370	Coupling Flexible Pump Drive	Ea		1	1	1
PAOZZ	4730-01-084-2763	A218	82370	Basket Strainer (Hot Oil)	Ea	1	1	2	2
PAOZZ	5330-01-083-6407	A220	82370	Gasket Strainer (Hot Oil)	Ea	1	1	2	2
PAOZZ	4330-01-085-5598	2A-7003	82370	Strainer Fuel (Refill)	Ea	2	2	2	2
PAOZZ	5330-01-083-7048	2A-7006	82370	Gasket Fuel Strainer	Ea	2	2	2	2
PAOZZ	4530-01-090-0216	52020	30069	Oil Nozzle F80 BPS-80°	Ea	1	1	1	1
PAOZZ	5977-01-084-0900	X04220	30069	Ignition Electrode	Ea	2	2	2	2

APPENDIX E

MAINTENANCE AND OPERATING SUPPLY LIST

NOMENCLATURE: Heater, Hot Oil, Trailer MTD	MAKE: Volcanic Heater, Inc.	MODEL: 200STM 77
MFR PART NO:	NSN: 3895-01-063-7892	SERIAL NO. RANGE: _____TO_____	DATE: Nov 78

(1) COMPONENT APPLICATION	(2) MFR PART NO. OR NAT'L STOCK NO.	(3) DESCRIPTION	(4) QTY REQ F/INITIAL OPN	(5) QTY REQ F/8 HRS OPN	(6) NOTES
Surge Tank Reservoir Expansion Tank	9150-00-965-2304	Lubricating Oil (Transfer Oil) General Purpose 55 gal. Drum MIL-L-22851 Type 3	230 gal.	As Required	(1) Heat transfer oil is not consumed. (2) Same user systems may require additional oil to be added.
External Fuel	9140-00-286-5294	Fuel, Oil, Diesel #2, Bulk	As Required	As Required	(3) Maximum fuel consumption is 26 gal per hour of continual operation.

APPENDIX F

PREVENTIVE MAINTENANCE CHECKS AND SERVICES

1. Do your before (B) PREVENTIVE MAINTENANCE just before you operate the Heater Hot Oil. Pay attention to the CAUTIONS and WARNINGS.

2. Do your during (D) PREVENTIVE MAINTENANCE during operation. (During operation means to monitor the Heater and its related components while they are actually being operated).

3. Do your after (A) PREVENTIVE MAINTENANCE right after operating the Heater. Pay attention to the CAUTIONS and WARNINGS.

4. Do your (W) PREVENTIVE MAINTENANCE weekly.

5. Do your (M) PREVENTIVE MAINTENANCE once a month.

6. If something doesn't work, troubleshoot it with the instructions in this manual or notify your supervisor.

7. Always do your PREVENTIVE MAINTENANCE in the same order, so it gets to be a habit. Once you've had some practice, you'll spot anything wrong in a hurry.

8. If anything looks wrong and you can't fix it, write it on your DA Form 2404 (Equipment Inspection and Maintenance Worksheet). If you find some- thing seriously wrong, report it to organizational maintenance RIGHT NOW.

9. When you do your PREVENTIVE MAINTENANCE, take along the tools you need to make all the checks. You always need a rag or two.

10. Keep it clean: Dirt, grease, oil, and debris only get in the way and may cover up a serious problem. Clean as you work and as needed. Use dry-cleaning solvent (SD-2) on all metal surfaces. Use soap and water when you clean rubber or plastic material.

WARNING

DRY CLEANING SOLVENT, SD-2, USED TO CLEAN PARTS IS POTENTIALLY DANGEROUS TO PERSONNEL AND PROPERTY. DO NOT USE NEAR OPEN FLAME OR EXCESSIVE HEAT. FLASH POINT OF SOLVENT IS 1000F - 1380F.

11. Bolts, nuts, and screws: Check them all for obvious looseness, missing, bent or broken condition. You can't try them all with a tool of course. But look for chipped paint, bare metal, or rust around bolt heads. If you find one you think is loose, tighten it, and report it to organizational maintenance.

12. Welds: Look for loose or chipped paint, rust or gaps where parts are welded together. If you find a bad weld, report it to organizational maintenance.

13. Electric wires and connectors: Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors and make sure the wires are in good shape.

14. Hoses and fluid lines: Look for wear, damage, and leaks, and make sure clamps and fittings are tight. Wet spots show leaks, of course. But a stain around a fitting or connector can mean a leak. If a leak comes from a loose fitting or connector tighten it. If something is broken or worn out, report it to organizational maintenance.

15. It is necessary for you to know how fluid leakage affects the status of your equipment. The following are definitions of the types/ classes of leakage you need to know to be able to determine the status of your equipment. Learn, then be familiar with them and REMEMBER - WHEN IN DOUBT, NOTIFY YOUR SUPERVISORI

Leakage Definitions for Crew/Operator PMCS

CLASS I	Seepage of fluid (as indicated by wetness r discoloration) not great enough to form drops.
CLASS II	Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked/inspected.
CLASS III	Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

CAUTION

EQUIPMENT OPERATION IS ALLOWABLE WITH MINOR LEAKAGES (CLASS I OR II). OF COURSE, CONSIDERATION MUST BE GIVEN TO THE FLUID CAPACITY IN THE ITEM/SYSTEM BEING CHECKED/INSPECTED. WHEN IN DOUBT, NOTIFY YOUR SUPERVISOR.

WHEN OPERATING WITH CLASS I OR II LEAKS, CONTINUE TO CHECK FLUID LEVELS AS REQUIRED IN YOUR PMCS.

CLASS III LEAKS SHOULD BE REPORTED TO YOUR SUPERVISOR OR TO ORGANIZATION- AL MAINTENANCE.

Operator/Crew Preventive Maintenance Checks and Services

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

Item No.	Interval B	D	A	W	M	ITEM TO BE INSPECTED Procedure: Check For And Have Repaired, Filled or Adjusted As Needed Available If:	FOR READINESS REPORTING Equipment is Not Ready
						NOTE PERFORM WEEKLY AS WELL AS BEFORE PMCS'S IF a. You are the assigned operator but have not operated the equipment since the last weekly PMCS.	
1.						GENERAL:	
	•					a. Check for loose wiring.	
	•					b. Check for damaged piping.	
	•	•				c. Check for evidence of fluid leakage (oil, fuel)	Class III leaks found.
2.						SURGE, COLD SEAL AND EXPANSION TANK	
	•					Check level of heat transfer oil. Fill or drain as necessary.	
3.						TIRES:	
	•					a. Check for cuts and general condition.	One or more tire missing, flat and/or unserviceable.
					•	b. Check for correct air pressure 65 PSI (29.48 Kg's)	
4.						HOT FLUID STRAINERS:	
	•		•			Service, drain water and sedimate.	
5.						GROUNDING ROD AND TERMINAL	
	•					Check for proper grounding and tight connections.	
6.						CONTROLS AND INSTRUMENTS:	
	•	•				Check for proper indication and operation.	

Operator/Crew Preventive Maintenance Checks and Services
B-Before D-During A-After W-Weekly M-Monthly

Item No.	Interval B	D	A	W	M	ITEM TO BE INSPECTED Procedure: Check For And Have Repaired, Filled or Adjusted As Needed	FOR READINESS REPORTING Equipment is Not Ready Available If:
		•				(1) Hot oil temperature gauge (1000 to 4500F)	
		•				(2) Hot oil pressure gauge (7 to 50 PSI)	
		•				(3) Fuel oil pressure gauge (O to 600 PSI)	
		•				(4) Liquid level sight gauge (nearly full)	
		•				(5) Temperature controller (set by operator)	
7.						PUMP DRIVE COUPLING	
	•					Check for loose hardware.	

Operator/Crew Preventive Maintenance Checks and Services

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

REPORTING Item No.	Interval Q	S	A	B	H	MI	ITEM TO BE INSPECTED Procedure: Check For And Have Repaired, Filled or Adjusted As Needed	FOR READINESS Equipment is Not Ready Available If:
1.		•					GENERAL. a) Check for loose wiring b) Check for damaged piping c) Check for evidence of fuel leakage (oil, fuel)	
2.				•			Wheel Bearings Clean and repack(refer to LO)	
3.					1000		Gear Reduction Unit (refer to LO)	
4.					6000		Pump Motor (refer to LO)	
5.				•			Spring Shackles (refer to LO)	
6.			•				Gages Check for operation	
7.			•				Drawbar and Frame Clean and check for excessive wear, corrosion, cracks, bent, or deformed parts.	
8		•					Circulating Pump Motor Lighten loose connections, check alignment of motor and pump drive coupling.	
9.		•					Fuel Oil Strainers Replace filter elements and gaskets.	
10.		•					*Fuel Oil Pump Inspect for leaks and operation. Adjust pump pressure (300psi) if necessary.	

Operator/Crew Preventive Maintenance Checks and Services

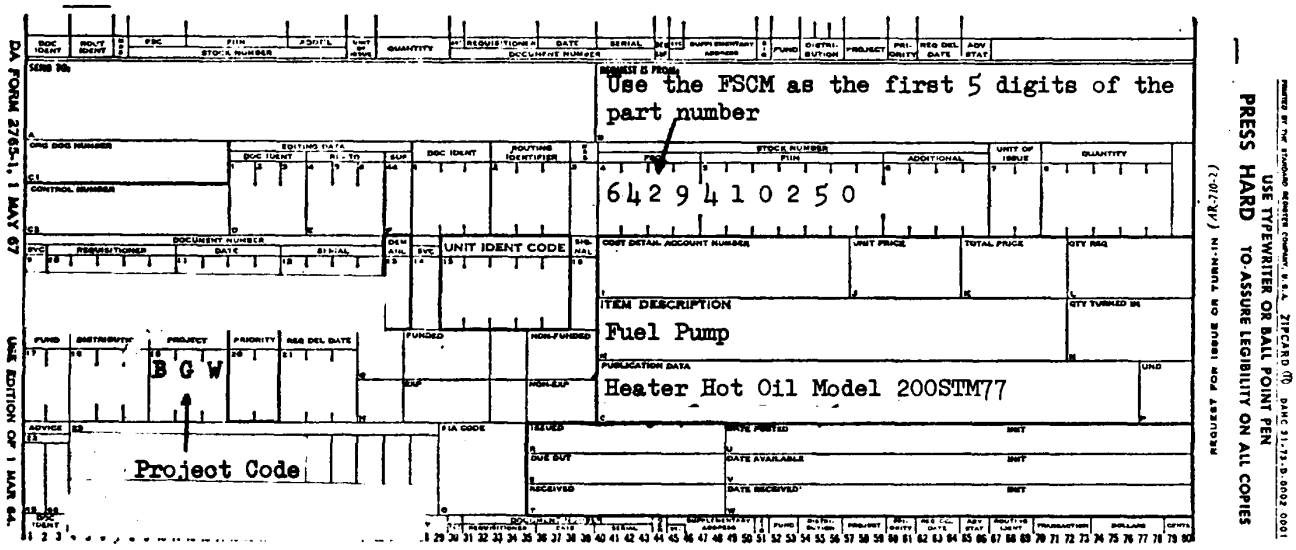
B-Before D-During A-After W-Weekly M-Monthly

REPORTING Item No.	Interval Q	S	A	B	H	MI	ITEM TO BE INSPECTED Procedure: Check For And Have Repaired, Filled or Adjusted As Needed	FOR READINESS Equipment is Not Ready Available If:
11.	•						Nozzle and Electrode Assembly Clean and inspect for oil leaks. Check electrodes for damage and correct adjustment.	
12.			•				Air/Hydraulic Brake System Check for worn or leaking air lines, air tank and relay valve.	

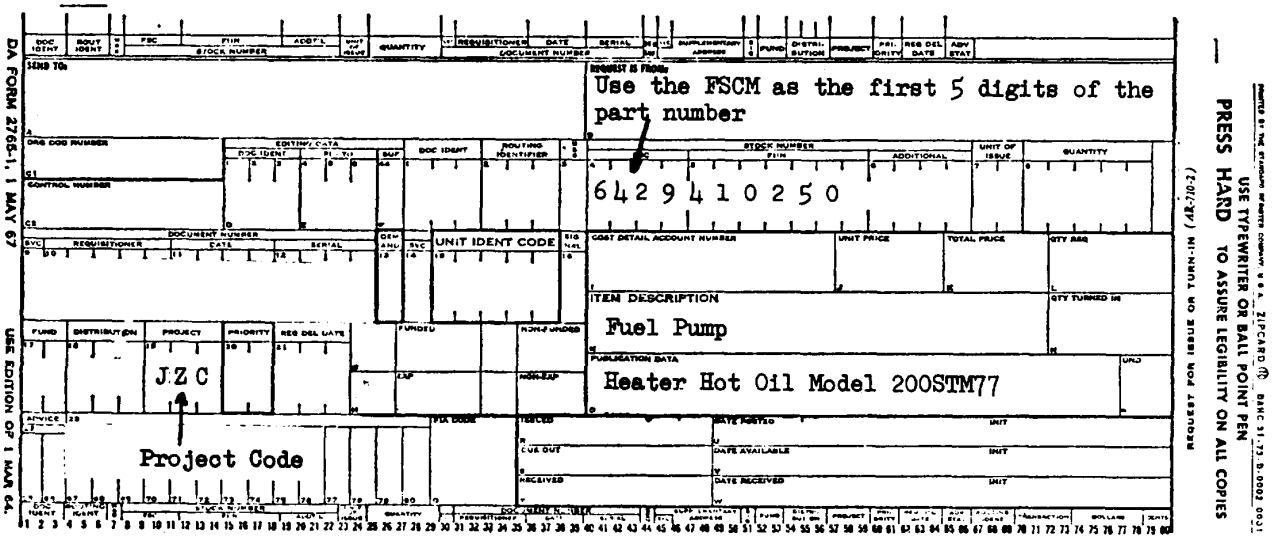
APPENDIX G

SAMPLE FORMAT - DA FORM 2765 PART NUMBER REQUEST

(CONUS REQUESTER)

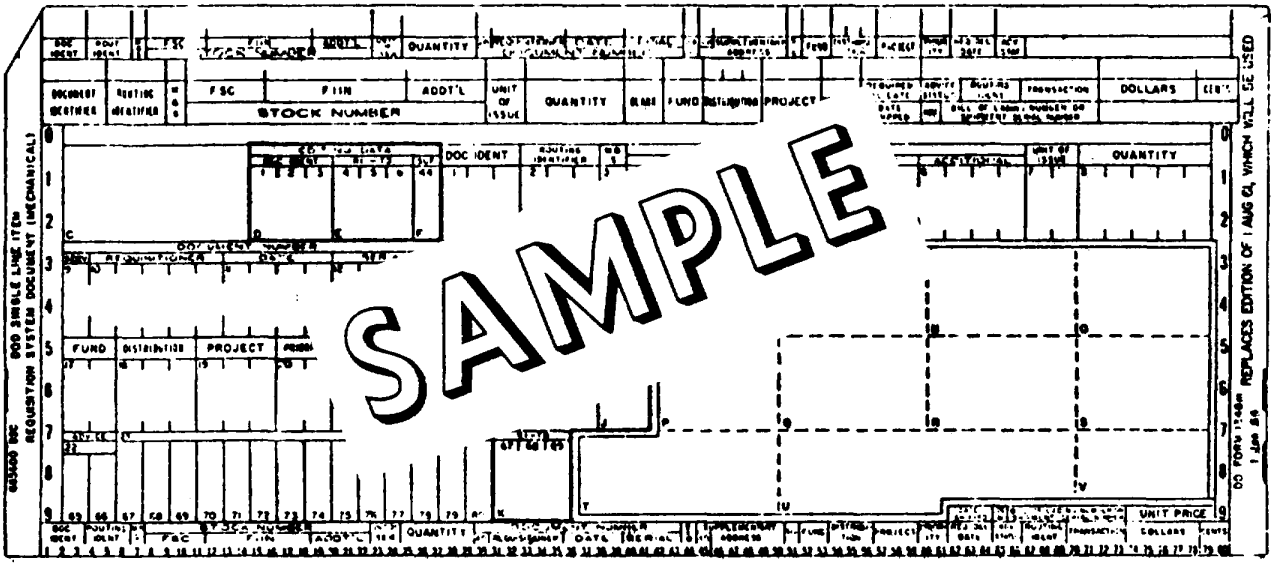


(OCONUS REQUESTER)



APPENDIX H

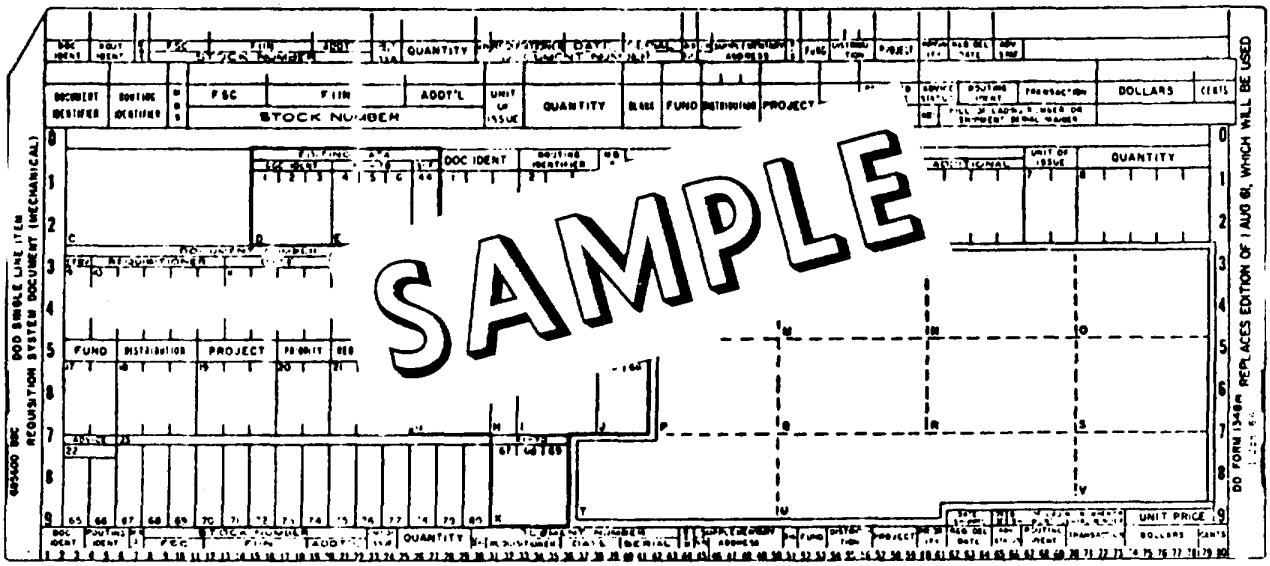
SAMPLE FORMAT - MILSTRIP REQUISITION(NSN)



Card Column	Description of Data	Mandatory Entry for CCE
1-3	Document Identifier Code	A0A - CONUS A11 - Overseas
4-6	Routing Identifier Code	
7	Media/Status Code	
8-22	NSN	
23-24	Unit of Issue	
25-29	Quantity	
30-43	Document Number	
44	Demand Code	
45-50	Supplementary Address	
51	Signal Code	
52-53	Fund Code	
54-56	Distribution Code CC-54	"F" for CONUS; see AR 725-50 for OCONUS
	CC-55-56	
57-59	Project Code	
60-61	Priority Code	
62-64	Required Delivery Date	
65-66	Advice Code	

APPENDIX I

SAMPLE FORMAT - MILSTRIP REQUISITION (NON-NSN)

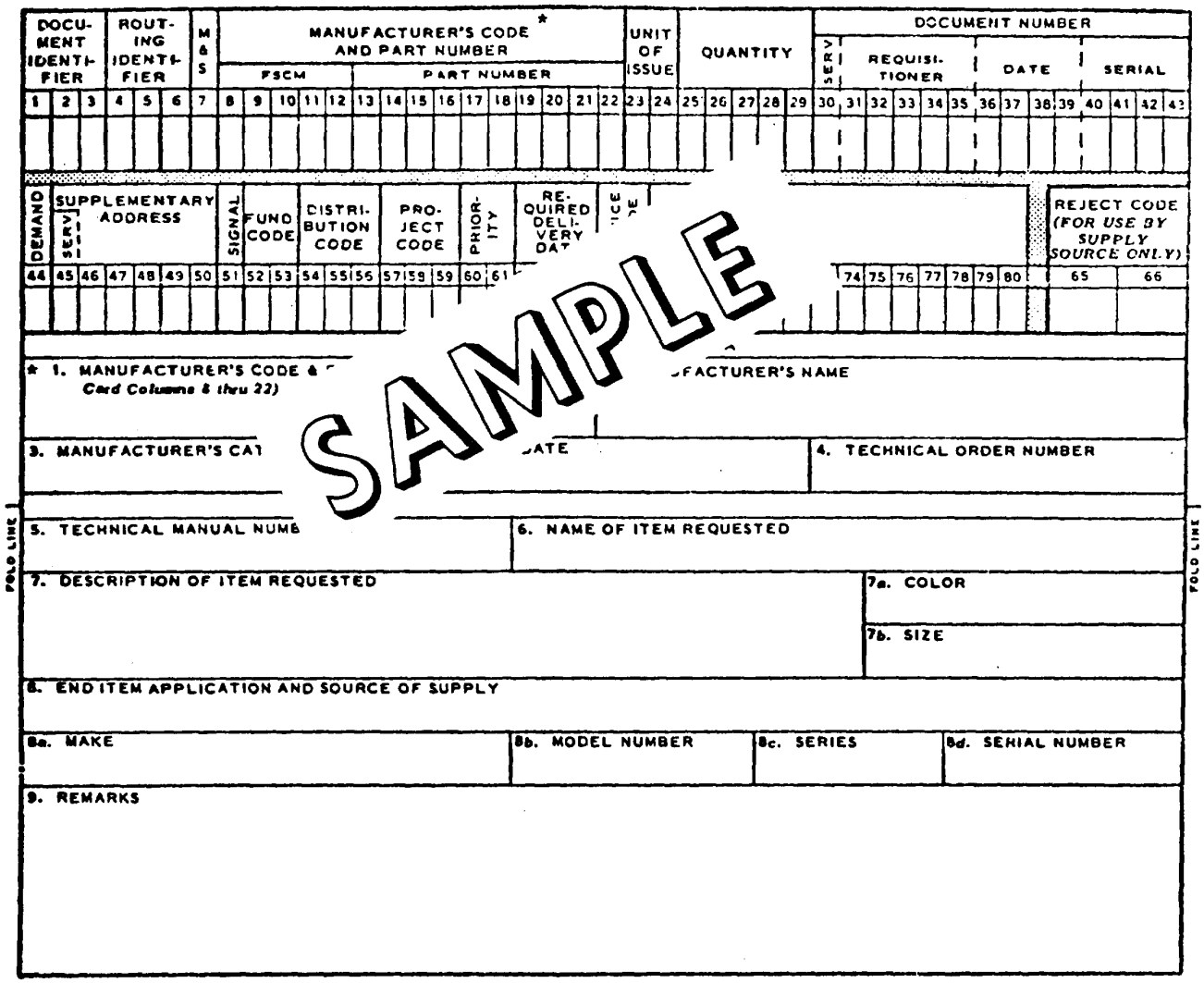


Card Column	Description of Data	Mandatory Entry for CCE
1-3	Document Identifier Code	A0B - CONUS A02 - Overseas
4-6	Routing Identifier Code Always S9C	
7	Media/Status Code	
8-22	FSCM and Part Number	
23-24	Unit of Issue	
25-29	Quantity	
30-43	Document Number	
44	Demand Code	
45-50	Supplementary Address	
51	Signal Code	
52-53	Fund Code	
54-56	Distribution Code CC-54	"F" for CONUS; see AR 725-50 for OCONUS
	CC-55-56	
57-59	Project Code	
60-61	Priority Code	
62-64	Required Delivery Date	
65-66	Advice Code	

CARD COLUMN	DESCRIPTION 'OF DATA	MANDATORY ENTRY FOR CCE
67-69	Blank	
70	Identification code applicable to entry in cc 71-80. A - Technical order or Technical Manual. B - End Item Identification C - Noun Description D- Drawing or Specification No.	
71-80	Reference Identification	Identification of reference specified in cc 70

APPENDIX J

SAMPLE FORMAT - MILSTRIP REQUISITION (NON-NSN)(MANUAL)



DD FORM 1 JAN 71 1348-6 NON-NSN REQUISITION *(MANUAL)*

INSTRUCTIONS

This form will only be used in those cases where the manufacturer's code and part number exceed the spaces allocated in card columns 8 - 22 of the requisition.

CARD COLUMN	DESCRIPTION DATA		MANDATORY ENTRY FOR CCE
1 - 3	Document Identifier Code		A0E-CONUS A05-OCONUS
4 - 6	Routing Identifier Code		Always S9C
7	Media Status Code		
8 - 22	PSCM and Part Number		Leave Blank In Block 1 under Identification Data
23-24	Unit of Issue		
25-29	quantity		
30-43	Document Number		
44	Demand Code		
45-50	Supplementary Address		
51	Signal Code		
52-53	Fund Code		
54-56	Distribution Code CC 54	"P' for CONUS. (See AR 725-50 for OCONUS)	
	CC 55-56		
57-59	Project Code		
60-61	Priority Code		
62-64	Required Delivery Date		
65-66	Advice Code		
67-80			Blank

IDENTIFICATION DATA - Lower half of DD Form 1348-6, complete Blocks 1 thru 9.

By Order of the Secretary of the Army:

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

Official:

ROBERT M. JOYCE
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25B, Operator Maintenance requirements for Mixer, Bituminous.

✡ U.S. GOVERNMENT PRINTING OFFICE: 1981-750002/1193

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches

1 Meter = 100 Centimeters = 1,000 Millimeters = 39.37 Inches

1 Kilometer = 1,000 Meters = 0.621 Miles

SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches

1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet

1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

CUBIC MEASURE

1 Cu Centimeter = 1,000 Cu Millimeters = 0.06 Cu Inches

1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces

1 Liter = 1,000 Milliliters = 33.82 Fluid Ounces

TEMPERATURE

5/9 (°F -32) = °C

212° Fahrenheit is equivalent to 100° Celsius

90° Fahrenheit is equivalent to 32.2° Celsius

32° Fahrenheit is equivalent to 0° Celsius

9/5 C° +32 = F°

WEIGHTS

1 Gram = 0.001 Kilograms = 1,000 Milligrams = 0.035 Ounces

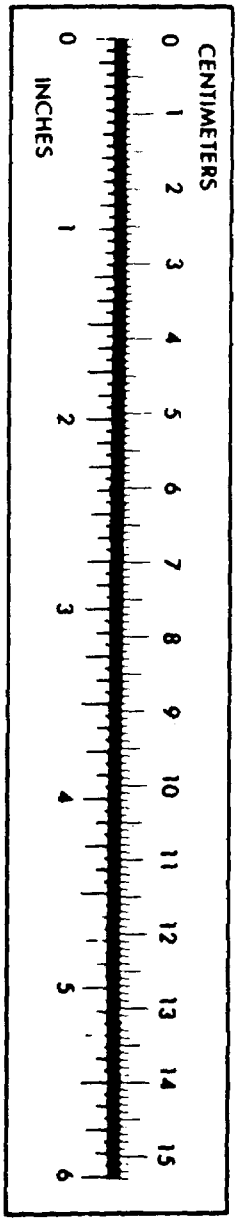
1 Kilogram = 1,000 Grams = 2.2 Lb.

1 Metric Ton = 1,000 Kilograms = 1 Megagram = 1.1 Short Tons

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds Per Square Inch	Kilopascals	6.895
Miles Per Gallon	Kilometers Per Liter	0.425
Miles Per Hour	Kilometers Per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds Per Square Inch	0.145
Kilometers Per Liter	Miles Per Gallon	2.354
Kilometers Per Hour	Miles Per Hour	0.621



TEAR ALONG PERFORATED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

THEN. . JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO	TABLE NO.

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

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER	SIGN HERE:

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ▸ ARE OBSOLETE.

P.S.—IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

PIN: 049779-000