

# **TM 9-4940-342-14&P**

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

---

OPERATOR'S, ORGANIZATION, DIRECT SUPPORT, AND

GENERAL SUPPORT MAINTENANCE MANUAL

(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

**CLEANER, STEAM, PRESSURE JET: OIL FIRED,**

**SKID MOUNTED, 600 GALLONS PER HOUR**

**CAPACITY**

(AMERICAN KLEANER MFG. CO. INC., MODEL 6000-OM)

(4920-00-473-6218)

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**HEADQUARTERS, DEPARTMENT OF THE ARMY**

**28 FEBRUARY 1975**

### **WARNING**

Due to extreme pressure velocity at 600 GPH, two operators are recommended to be present during 600 GPH operating procedures.

### **WARNING**

When storing in freezing weather conditions, unit must be drained thoroughly, and it is recommended plumbing system be charged with a 50 percent solution of permanent type antifreeze. Antifreeze should be used when unit is NOT in service for prolonged periods or being transported to extremely cold areas.

### **WARNING**

Do not stand, or allow other personnel to stand, in front of discharge valve outlets during blowdown procedure, avoid contact with hot water and / or steam from outlets.

### **WARNING**

Always turn the unit off and disconnect power cord from power source prior to performing any maintenance. Failure to do so could result in severe injury and possible death to personnel.

### **WARNING**

Disconnect main power to unit before jumping pressure switch contacts and removing jumpers after setting regulator.

### **WARNING**

Before accomplishing any repairs to the steam cleaner, shut unit down and allow to cool. Disconnect power cord. Failure to do so could cause severe injury and possible death to personnel.

### **WARNING**

Unit electrical power must be disconnected and all switches in the OFF position.

### **WARNING**

Before performing any of the following procedures, assure all electrical power to the unit has been disconnected.

### **WARNING**

If while operating this equipment, a flameout occurs, fault isolate the problem prior to trying a restart. Under no conditions should this machine be tried to start more than twice. If excess fuel is present, the burner assembly must be removed and excess fuel evacuated. The disposal of excess fuel and absorbent material must be in accordance with your local safety office, EPA, state, and local OSHA rules and regulations. Do not . . . repeat . . . do not try and start this equipment more than twice as an explosion could occur.

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DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 1 JULY 1999

Operator's, Organization, Direct Support, and  
General Support Maintenance Manual  
(Including Repair Parts and Special Tools List)

**Cleaner, Steam, Pressure Jet: Oil Fired,  
Skid Mounted, 600 Gallons Per Hour  
Capacity**

(AMERICAN KLEANER MFG. CO. INC., MODEL 6000-OM)  
(4920-00-473-6218)

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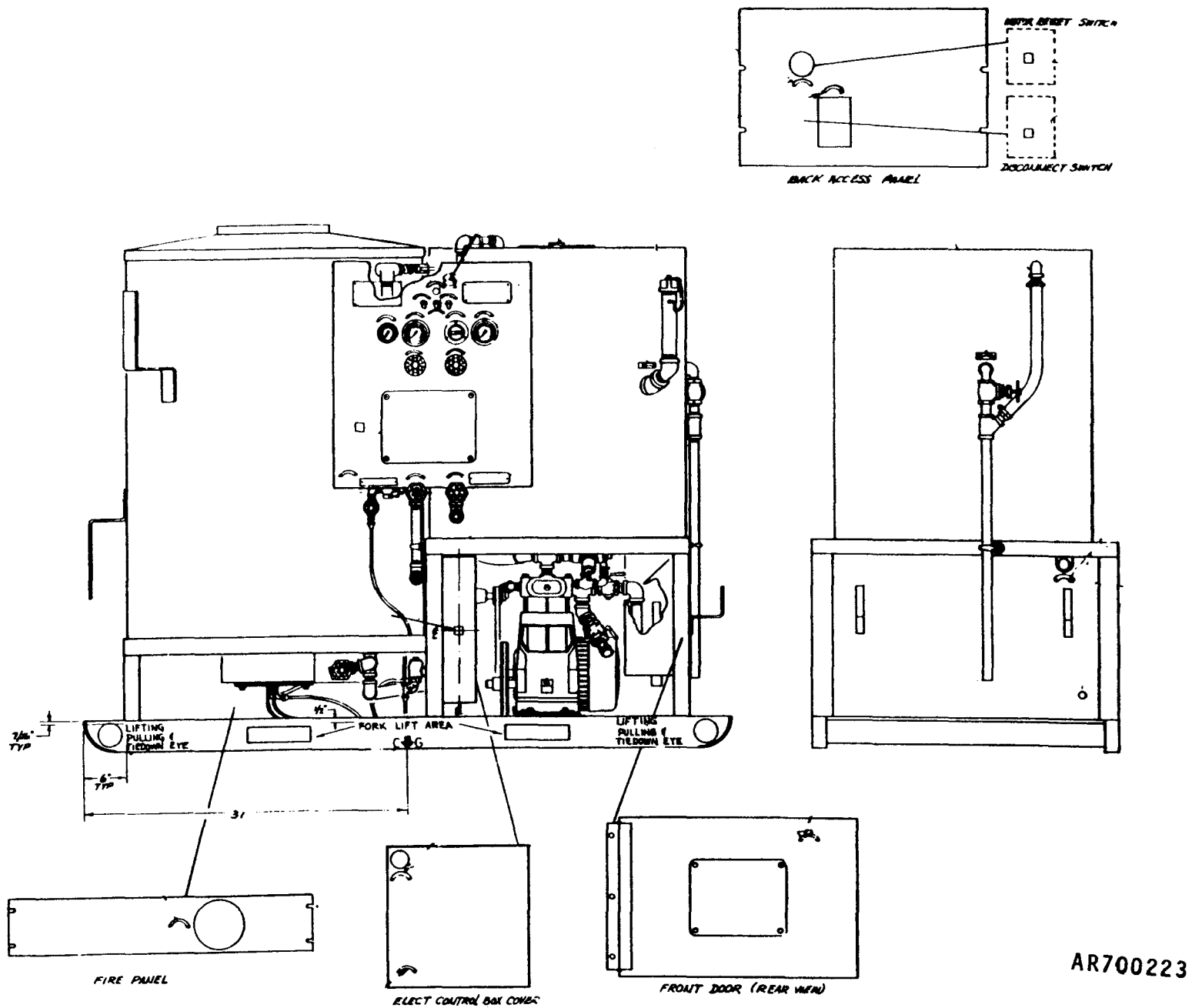
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Figure I-1. Oil fired pressure jet steam cleaner, model 6000-OM.



## CHAPTER 1

### INTRODUCTION

#### Section I. GENERAL

##### 1-1. Scope

*a.* These instructions are published for the use of the personnel to whom the American Kleaner Model 6000-OM Skid Mounted Oil Fired Pressure Jet Steam Cleaner is issued. Chapters 1 through 3 provide information on the operation, daily preventive maintenance services and organizational maintenance of the equipment, accessories, components and attachments. This manual also provides descriptions of the main units and their functions in relationship to other components.

*b.* Appendix A contains reference to other manuals and/or information to assist the operator/crew in operating and maintaining the steam cleaner. Appendix B contains the list of basic issue items authorized the operator of this equipment.

*c.* Numbers in parentheses on illustrations indicate quantity.

*d.* You can help improve this manual. If you find any mistakes, or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2

located in the back of this manual directly to: Director, Armament and Chemical Acquisition and Logistic Activity (ACALA), ATTN: AMSTA-AC-NML, Rock Island, IL 61299-7630. (E-mail: AMSTA-AC-NML@ria.army.mil). A reply will be furnished to you.

*e.* You, the user, are the only one who can tell us what you do not like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Quality Deficiency Report). Mail it direct to: Commander, Armament Research, Development and Engineering Center, ATTN: AMSTA-AR-QAW-A (R), Rock Island, IL 61299-7630. We'll send you a reply. Report all equipment improvement recommendations as prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

##### 1-2. Forms and records

Maintenance forms, records and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

#### Section II. DESCRIPTION AND DATA

##### 1-3. Description

The American kleaner skid mounted oil fired pressure jet steam cleaner, model 6000-OM is a skid base mounted steam cleaner. With a capacity of 600 gallons per hours, either one cleaning nozzle or two nozzles at 300 gallons per hour can be used. The cleaner has a fuel tank, soap solution tank, burner and coils, together with all necessary controls and pumps and connections for using where there is an available pressurized water source or where an auxiliary water supply, such as a lake or stream, must be used.

##### 1-4. Difference between Models

There are no other models.

##### 1-5. Identification and Tabulated Data

###### *a. Identification.*

(1) Army Data Plate. The Army data plate is located on the control panel and specifies the nomenclature, manufacturer, model and serial numbers and capacity.

(2) Operation Plate. The operation plate is located on the control panel and provides abbreviated operating instructions.

###### *b. Tabulated Data.*

###### (1) Distribution.

Manufacturer .....	American Kleaner
Model .....	6000-OM
Serial Number Range.....	50014 through 52124

###### (2) Fuel.

Type.....	Fuel oil of 30 to 38 American Petroleum Institute (API) rating
Tank Capacity.....	50 gallons
Approximate Running Time	4 hours

###### (3) Soap Solution.

Type.....	Cleaning Compound - P-C-437
Tank Capacity.....	75 gallons

###### (4) Hoses, Nozzles and Cables.

Water Supply Hose.....	50 feet long - One (pressure source)
------------------------	--------------------------------------

Water Supply Hose ..... 25 feet long - One  
(auxiliary source)  
Steam hose ..... 50 feet long - Two  
Steam Guns ..... Two  
Nozzles..... Ten  
consisting of the following:  
No.1 Drill Flat Nozzles . Four  
5/16" flat Nozzles..... Two  
No.1 Drill Hex Nozzles. Two  
5/16" Hex Nozzle..... One  
SST High Pressure Nozzle One  
(600 GPH at 300 psi)  
Electric Cable..... 75 feet long with connectors

**(5) Dimensions and Weight.**

Overall Length ..... 81 inches  
Overall Width..... 39 inches  
Overall Height..... 66 inches  
Weight (dry)..... 2,583 pounds  
Weight (with fuel and soap  
solution) ..... 3,400 pounds

**(6) Power Requirements.**

Voltage..... 220-Volt AC, 3 phase, 60 Hz, 30  
amps

**(7) Water Requirements.**

Size Line (pressure)..... ¾ inch  
Size Line (suction) ..... 1 inch  
PSI..... 25 to 125

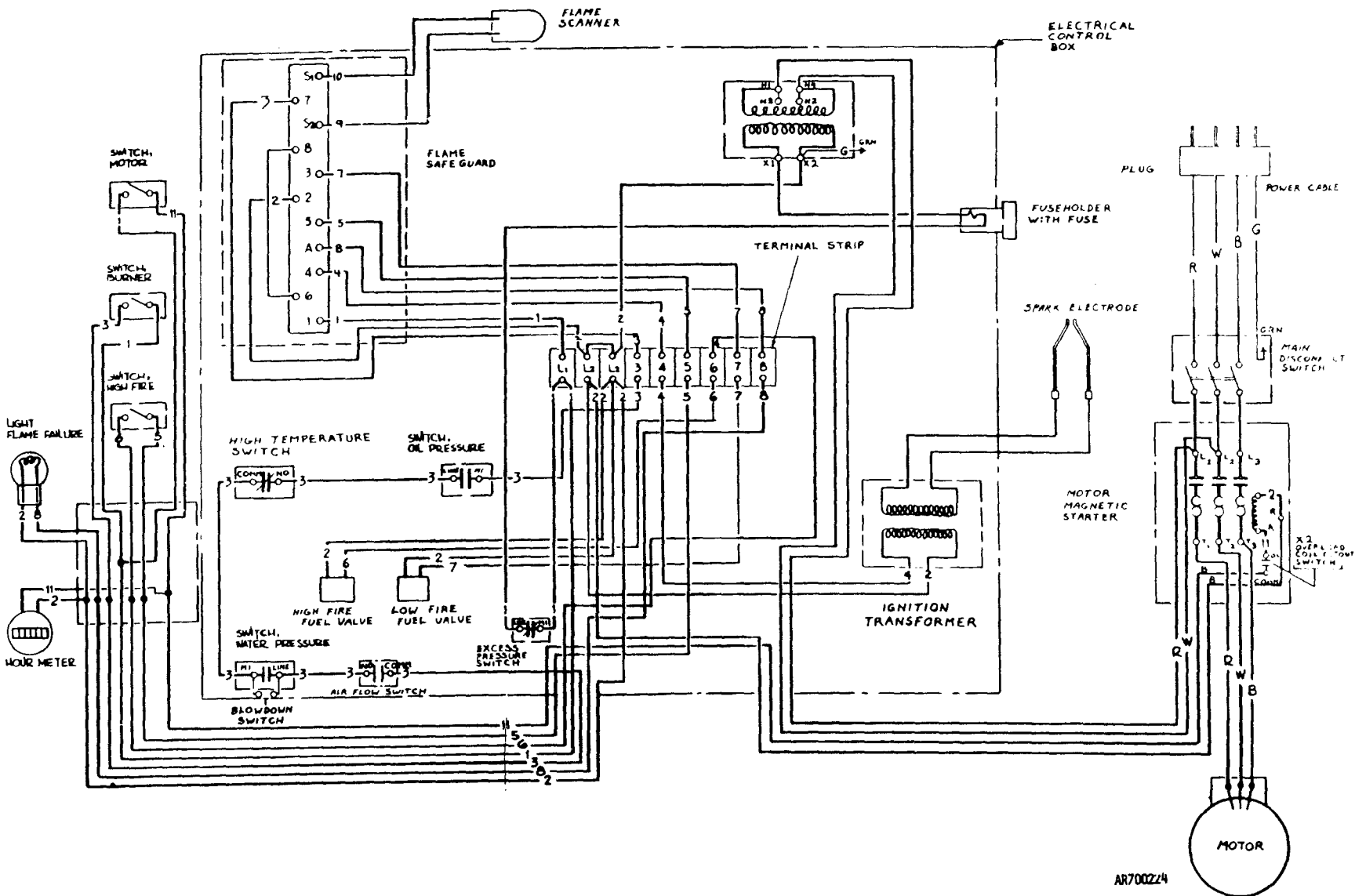
**(8) Cleaner Characteristics.**

One Cleaning Gun..... 600 gallons per hour  
Two Cleaning Guns..... 300 gallons per hour each  
Vapor Temperature ..... up to 325°F  
Hot Water Temperature up to 180-200°F

**(9) Wiring Diagram. Refer to fig 1-2.**

**(10) Maintenance and Operating Supplies.**

Refer to Appendix B for a complete list of  
maintenance and operating supplies required for  
initial operation.







## CHAPTER 2

## OPERATING INSTRUCTIONS

## Section I. SERVICE UPON RECEIPT OF MATERIAL

**2-1. Inspecting and Servicing the Equipment**

*a.* Upon receipt of steam cleaner, the operator shall perform the following inspections and service the equipment.

(1) Remove all packing, tape and material used to protect during shipment.

(2) Verify that all equipment is accounted for per paragraph 4-3.

(3) Be sure unit is level.

(4) Unit shall be installed in an area free of inflammable or dangerous gases.

(5) Cleaner shall be protected from down-drafts and excessive winds.

(6) Connect to ample water supply, either a local site water pressure source or to an auxiliary source, such as a lake, river, reservoir, etc.

(7) Connect to a 220-volt AC, 3 phase, 60 Hz, 30 amps power source.

(8) Check all fuel lines for loose connections.

(9) Fill fuel oil tank and check for leaks.

(10) Check oil level in water pump crankcase.

(11) Check soap level in soap tank, add soap solution as required.

(12) Operators should be familiar with this manual prior to operating cleaner.

*b.* Unit is now ready for service.

**2-2. Equipment Conversions**

*a.* Three variations of this equipment are possible: one is 600 GPH (one gun) and the second is 300 GPH per gun (two guns). The third is the high pressure. No special requirements are applicable to these variations.

*b.* The instructions contained herein explain how to operate in any configuration the operation requires.

## Section II. MOVEMENT TO A NEW WORKSITE

**2-3. Dismantling for Movement**

*a.* Prior to moving the equipment, the following shall be accomplished.

(1) In the event the cleaner will be near flames during transportation and/or if weight is a consideration of transport mode, then remove fuel oil.

(2) Remove soap.

(3) Disconnect and stow all water and steam hoses.

(4) Disconnect from power source.

(5) Drain water reservoir.

(6) Drain heating coils.

(7) Secure heating coil vent stack and/ or downdraft diverter, if so equipped.

*b.* Unit is now ready for transportation.

**2-4. Reinstallation after Movement**

*a.* Prepare for use after movement in accordance with paragraph 2-1.

*b.* Unit is now prepared for movement.

## Section III. CONTROLS AND INSTRUMENTS

**2-5. General**

*a.* This section describes the various controls and instruments and provides the operator/crew sufficient information and instruments to insure proper operation of the steam cleaner.

*b.* The operator should read all instructions contained herein prior to operation.

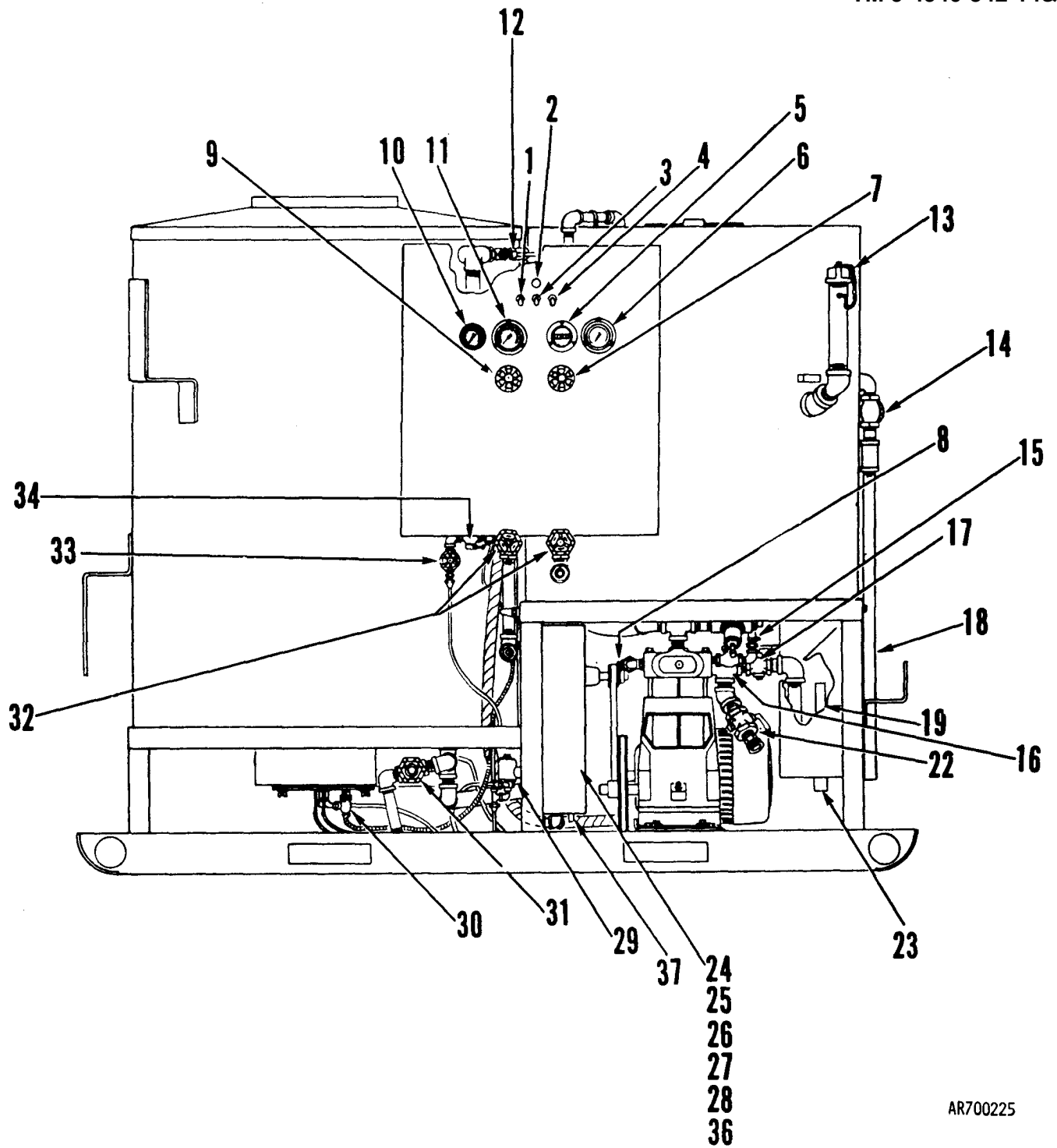
**2-6. Controls and Instruments**

*a.* All controls and instruments are described in table 2-1 and illustrated in figure 2-1.

*b.* The operator should be familiar with all controls prior to operating the equipment.

Table 2-1. Operating Controls and Instruments

Figure 2-1 index no.	Control	Function
-1	Burner switch "Low"	Turns the low fire burner ignition ON and OFF.
-2	Burner flameout reset light	Indicates flame out, due to a malfunction of burner.
-3	Burner switch "High"	Turns the high fire burner ignition ON and OFF.
-4	Pump control switch	Turns the pump motor, fuel pump and blower ON and OFF.
-5	Hourmeter	Indicates elapsed time pump control switch has been ON to the steam cleaner.
-6	Back pressure gage	Indicates back pressure of the water at the coil inlet.
-7	Soap control valve	Controls the amount of soap being mixed to the pump inlet water supply.
-8	Selector valve	Controls the water volume going into the coils, if closed (vertical) 600 GPH.
-9	Soap fill and stir valve	Allows soap tank to be filled with water prior to burner operation and agitated (hot) after burner operation.
-10	Temperature gage	Indicates the steam temperature at the outlet side of the coils.
-11	Steam pressure gage	Indicates the outlet steam pressure.
-12	Pressure relief valve	Releases excessive steam pressure. Set at 400 psi.
-13	Fuel fill spout	Burner fuel is added through this port.
-14	Solution tank drain	For draining soap solution.
-15	Soap check valve	Prevents supply water from backing up into soap tank.
-16	By-pass valve	Provides a safety in event of excessive water pressure from pump, returns excess water to suction side of pump. Set at 370 psi.
-17	Shut-off valve (reservoir)	Shuts off and allows the suction of water from auxiliary supply. Shut off only when using auxiliary source (22).
-18	Water inlet connection	Pressurized water source is connected to this location.
-19	Float valve assembly	Controls amount of water from outside pressurized water source in reservoir.
-20	Disconnect switch	Turns ON and OFF the main (220 volts) power source to cleaner.
-21	Motor reset switch	Prevents an overload of cleaner circuits. Manually reset in the event of an overload.
-22	Auxiliary water valve and connector.	Permits the use of auxiliary water supply.
-23	Reservoir overflow and drain	Allows excess water in reservoir to spill out. Remove pipe nipple to drain.
-24	Excessive discharge pressure switch	Monitors discharge pressure and shuts unit down after an excess pressure rise. Set at 350 psi.
-25	Burner/reset switch	Manually resets after a shutdown of main burner in the event of a flameout.
-26	High temperature switch	Manually reset overtemperature switch after an overtemperature condition has occurred. Set at 370°F.
-27	Air pressure switch	Shuts down unit in event of insufficient air pressure and automatically resets. Set at 1.5 inch (WCP).
-28	Low water pressure switch	Senses inadequate water supply to coil. If water supply is inadequate, it shuts down the fuel to burners. Set at 15 psi minimum to actuate (close contacts).
-29	Oil solenoid valves (2)	Turns ON and OFF the oil burners automatically. FWD valve is high fire burner. AFT valve is low fire burner.
-30	Oil pressure switch	Shuts down burner if oil pressure drops below 45 psi. Allows burner to fire when 85 psi is achieved by fuel pump. Controls oil valves (29). Excess oil is recirculated to oil tank when burners are turned down.
-31	Air dome drain valve	Used to drain air cushion chamber daily or after every 4 hours of operation. This valve is a drain valve from coils and is used to discharge excess water from the coils, cleaning and descaling of the coils.
-32	Discharge valves (2)	Controls steam discharge for one or two gun operation. One valve must be open at all times.
-33	On-fuel-off valve	Manually turns ON and OFF the fuel oil to burners.
-34	Pressure and temperature control high-low valve (thermostat)	Controls flow of oil through oil valves (29) and is controlling the steam temperature by regulating amount of fuel. Adjustment by turning CW decreases temperature, CCW increases temperature. Set at 325°, for vapor operation, or set lower for hot rinse at approximately 185-200°.
-35	Soap fill port	Soap is placed in soap tank through this port.
-36	Fuse	Control circuit protection 6 amp fuse.
-37	Blow-down switch	Overrides low water pressure switch (28) to permit burner operation during the blowdown of coils.
-38	Air dome vent	Provides venting of air dome during draining operation.
-39	Fuel strainer valve	Fuel tank shut-off valve between tank and strainer.
-40	Fuel tank drain valve	To drain excess fuel from fuel tank.



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Figure 2-1. Operating controls and instruments (sheet 1 of 3).

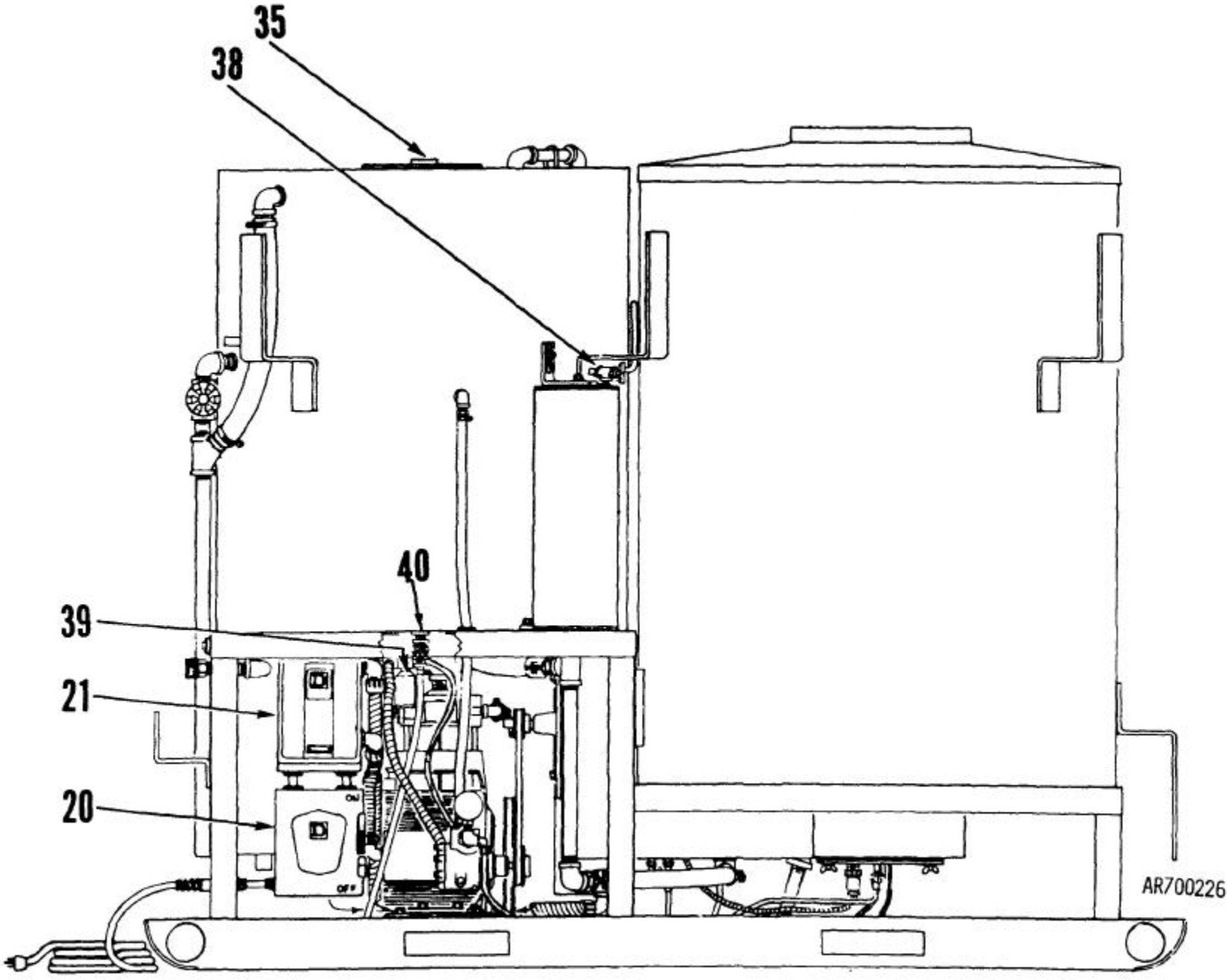


Figure 2-1. Operating controls and instruments (sheet 2 of 3).

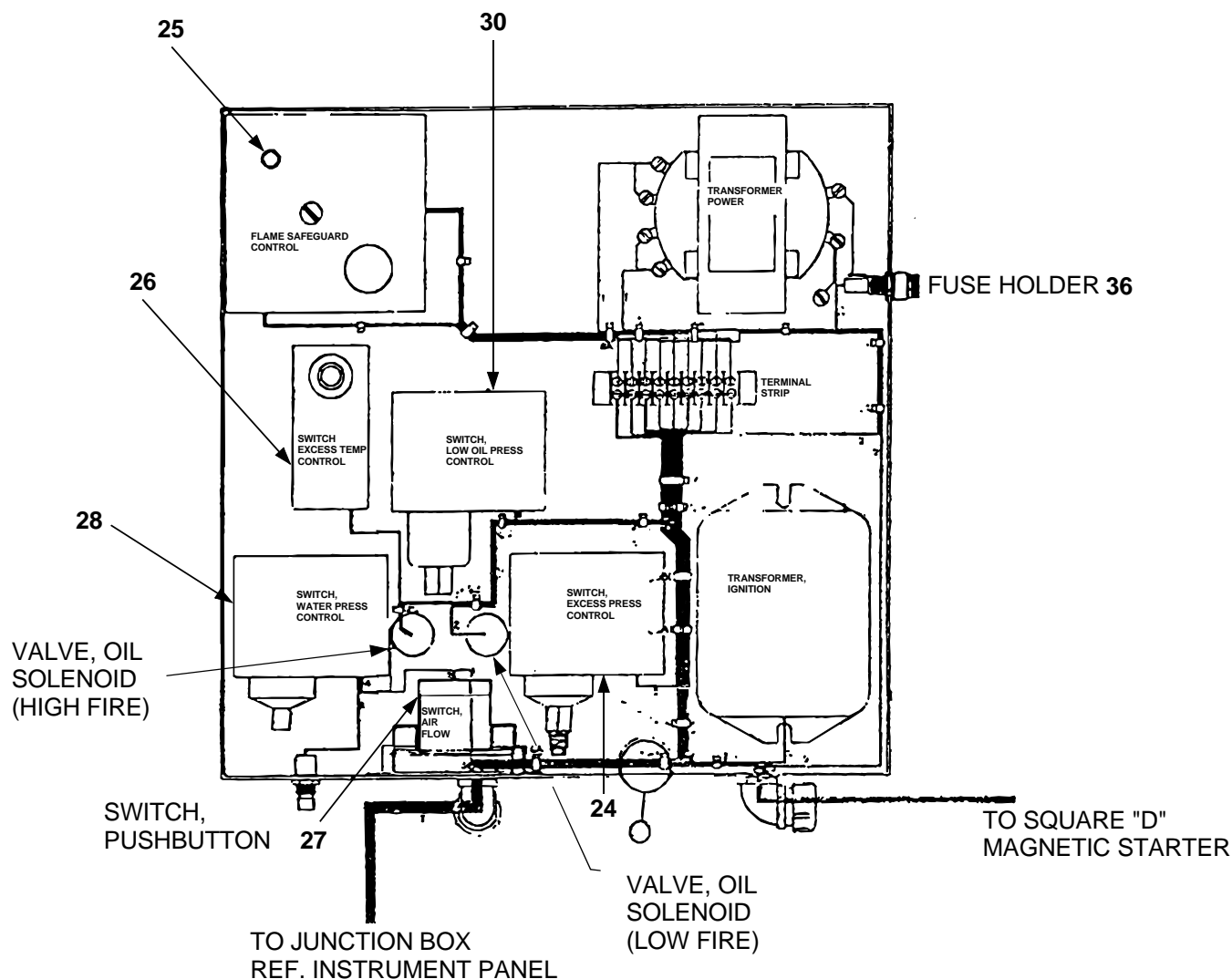


Figure 2-1. Operating controls and instruments (sheet 3 of 3).

## Section IV. OPERATION UNDER USUAL CONDITIONS

### 2-7. General

a. The instructions in this section are for the information and guidance of personnel responsible for operation of the cleaner system.

b. The operator must know how to perform every operation of which the steam cleaner is capable. This section contains instructions on starting and stopping the steam cleaner, on operation of the steam cleaner and coordinating the basic motions 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.

### 2-8. Starting

#### NOTE

Prior to starting the steam cleaner, refer to operation, paragraph 2-11 to determine the operation mode desired and prepare accordingly.

a. Close all service valves (fig 2-1, indexes 7, 9, 14, 17, 22, 31, 32, 33 and 38).

b. Be sure switches (fig 2-1, indexes 1, 3 and 4) are OFF.

c. Set electrical disconnect switch (20) to ON (lever up), check that motor reset switch (21) has been reset if required.

d. Set selector valve (8) to low volume position (lever horizontal) that provides 300 GPH.

e. Open shut-off valve (17) if using water under pressure as source, or open auxiliary water valve (22) if using standing water not under pressure.

f. Open one of the discharge valves (32).

g. Open on-fuel-off valve (33) and strainer valve (39).

h. Turn on pump control switch (4), allow water to run out of cleaning nozzle for a minimum of 6 minutes.

i. Secure cleaning nozzle to prevent whipping.

j. Turn on low burner switch (1). Cleaner should start, providing 300 GPH of solution.

**NOTE**

If starting after a flame failure, an automatic seven-second purge period is required. If burner starts and then shuts down, and the indicator light (2) is on, then this indicates a flame failure lockout. Reset burner reset switch (25).

**WARNING**

If while operating this equipment, a flameout occurs, fault isolate the problem prior to trying a restart. Under no conditions should this machine be tried to start more than twice. If excess fuel is present, the burner assembly must be removed and excess fuel evacuated. The disposal of excess fuel and absorbent material must be in accordance with your local safety office, EPA, state, and local OSHA rules and regulations. Do not . . . repeat . . . do not try and start this equipment more than twice as an explosion could occur.

k. Open soap control valve (7), wait a few minutes until soap appears at cleaning nozzle, and adjust to desired mixture. Approximately ¼ to ½ turn open is recommended starting point. Adjust counterclockwise to increase concentration.

**NOTE**

Refer to paragraph 2-9 for instructions on how to add soap solution. The soap concentration can be varied as follows:

Minimum (5% concentration) two lbs soap to five gallons water.

Minimum (10% concentration) four lbs soap to five gallons water.

Each mark (hole) on soap tank gage is equivalent to 1½ gallons.

l. If more volume is required, move lever of selector valve (8) to HIGH position (vertical) and turn on high burner switch (3). This provides 600 GPH.

**WARNING**

Due to extreme pressure velocity at 600 GPH two operators are recommended to be present during 600 GPH operating procedures.

**NOTE**

Low burner switch (1) remains on.

m. If one cleaner gun is to be used, the unit may be operated in either the HIGH (600 GPH) (with a 5/16-

inch nozzle) or LOW (300 GPH) (with a no. 1 drill nozzle) position. When using two cleaning guns the HIGH position should be used per paragraph 2-11.

n. Adjust temperature and pressure control valve (34) for either Vapor or Rinse. For vapor set at approximately 325° and lower temperature for hot water rinse.

**2-9. Adding Soap Solution**

a. Accomplish steps a through i of paragraph 2-8.

b. Open soap fill and stir valve (9), close discharge valves (32).

c. Fill tank at soap fill port (35) until tank is 2/3 full (or 2/3 of remaining capacity, if adding to partially full tank) with water.

d. Turn off pump control switch (4), close soap fill and stir valve (9) and open discharge valves (32).

e. Turn on low burner switch (1). Cleaner should start providing 300 GPH.

f. While cleaner is coming up to operating temperature and pressure, add required quantity of soap solution.

(1) Minimum (5% concentration) two lbs soap to five gallons water.

(2) Minimum (10% concentration) four lbs soap to five gallons water.

(3) Each mark (hole) on soap tank gage is equivalent to 1½ gallons.

g. When cleaner is up to pressure (steam), repeat step b of this paragraph and allow hot discharge water to fill and stir (mix) compound.

h. When solution tank is full, open discharge valves (32) and close soap fill and stir valve (9).

i. Cleaner is now ready for normal operation. Refer to appropriate instructions.

**2-10. Stopping (Refer to Fig 2-1)**

a. Secure cleaning nozzle to avoid whipping.

b. Turn off low burner switch (1) and high burner switch (3) and allow unit to run until temperature on temperature gage (10) indicates 100° F or less.

c. Turn off pump control switch (4).

d. Turn off soap control valve (7).

**NOTE**

Unit is now ready for restart. If not going to be used in less than a half-hour, close all valves (8, 9, 14, 22, 32 and 33) and turn off disconnect switch (20) (lever down).

**2-11. Operation of Equipment**

a. There are five different modes of operation for the steam cleaner, 300 GPH per each gun, one or two guns with steam vapor, 600 GPH one gun with steam vapor, and hot or cold rinse. The instructions for each of these follows.

b. For 300 GPH, one gun with steam vapor operation proceed as follows.

(1) Attach one cleaning gun and hose with a number 1 drill hex or flat high pressure vapor nozzle installed to discharge valve (32). Open valve and close other valve.

(2) Set selector valve (8) at its horizontal position.

(3) Start unit. Turn pump control switch (4) to ON.

(4) Set pressure and temperature control valve (34) to approximately 325°.

c. For 300 GPH, two gun steam vapor operation, proceed as follows.

(1) Attach two cleaning guns and hoses with a number 1 drill hex or flat high pressure vapor nozzle installed on the discharge valves (32). Open both valves.

(2) Set selector valve (8) at its vertical position.

(3) Start unit.

(4) Set pressure and temperature control valve (34) to approximately 325°.

d. For 600 GPH, one gun steam vapor operation, proceed as follows.

#### WARNING

Due to extreme pressure velocity at 600 GPH, two operators are recommended to be present during 600 GPH operating procedures.

(1) Attach one cleaning gun and hose with a 5/16-inch hex or flat high pressure vapor nozzle installed to one discharge valve (32). Open this valve and close the other valve.

(2) Set selector valve (8) at its vertical position.

(3) Start unit.

(4) Set pressure and temperature control valve (34) to approximately 325°.

e. For 600 GPH, 1 gun hot rinse operation, proceed as follows.

(1) Attach one cleaning gun and hose with a 25° high pressure rinse nozzle installed to one discharge valve (32). Open this valve and close the other valve.

(2) Set selector valve (8) at its vertical position.

(3) Start unit.

(4) Set pressure and temperature control valve (34) to approximately 185-200°.

f. For 600 GPH, 1 gun cold rinse operation, proceed as follows.

#### WARNING

Due to extreme pressure velocity at 600 GPH, two operators are recommended to be present during operating at 600 GPH.

(1) If a complete cold rinse is desired, attach one cleaning gun and hose with a 25° high pressure rinse nozzle installed to one discharge valve (32). Open this valve and close other valve.

(2) Set the selector valve (8) at its vertical position.

(3) Start unit.

(4) Set pressure and temperature control valve (34) to desired temperature, or leave burner off (see para 2-8, step j).

## Section V. OPERATION UNDER UNUSUAL CONDITIONS

### 2-12. Operation in Extreme Cold

a. In extreme cold, the unit must be placed where running water is available and where incoming water lines are insulated.

#### NOTE

Care should be exercised in placing hoses or pipes where they will not freeze and stop water from flowing

b. Place an automatic damper in the stack to prevent cold air from coming down and freezing the coil when the cleaner is not in operation.

c. Enclose the cleaner in a small room with temperature above the freezing point. Heat of the room should be thermostatically controlled to minimize damage caused by unexpected cold weather.

d. After every operation in cold weather, drain all fluids from steam cleaner and hoses.

(1) Drain soap through solution tank drain valve (14).

(2) Drain water through the reservoir overflow and drain (23).

(3) Drain heating coil through air dome drain valve (31) and discharge valves (32).

(4) Drain pump through valves (17 and 22).

#### WARNING

When storing in freezing weather conditions unit must be drained thoroughly, and it is recommended plumbing system be charged with a 50 percent solution of permanent type antifreeze. Antifreeze should be used when unit is NOT in service for prolonged periods or being transported to extremely cold areas.

### 2-13. Operation in Extreme Heat

a. There are no precautions to be taken when operating the steam cleaner under extremely hot conditions.

- b.* Set room temperature control if applicable.

**2-14. Operation in Dusty or Sandy Areas**

- a.* Cover fuel oil ports to prevent sand and dust from entering.
- b.* Install a cover over reservoir or clean filter in water line after reservoir to prevent dust and sand from blocking pump inlet.
- c.* Cover soap tank.
- d.* Remove excess dust and sand from steam cleaner at least once a day, while cleaner is in use.

**2-15. Operation under Rainy or Humid Conditions**

- a.* Verify electrical ground.
- b.* Care should be taken to avoid water from entering electrical areas.
- c.* Place rain hat over heater vent to prevent water from entering heater section.

**2-16. Operation in Salt Water Areas**

- a.* Do not use salt water as a water source for the steam cleaner.

- b.* After every operation, rinse the steam cleaner off with fresh water.

**2-17. Operation in Snow**

- a.* Keep snow removed from immediate area of steam cleaner.
- b.* Follow instructions for use in extreme cold, discussed in paragraph 2-12.

**2-18. Operation in Mud**

- a.* Care should be exercised to prevent mud from getting into burners and water sources.
- b.* Verify electrical ground.

**2-19. Operation at High Altitude**

- a.* When locating the steam cleaner at higher altitude it may be necessary to adjust the blower intake air gate for a proper combustion-air mixture.
- b.* Allow 5% additional air requirement for each 1000 feet of altitude above sea level.



## CHAPTER 3

## OPERATOR'S MAINTENANCE INSTRUCTIONS

## Section I. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

**3-1. Lubrication Instructions**

There are no lubrication requirements for the oil fired steam cleaner model 6000-OM.

**3-2. General**

To insure that the steam cleaner is ready for operation at all times, it must be inspected systematically, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services to be performed are listed and described in paragraphs 3-3 and 3-4. The item numbers indicate the sequence of inspection requirements. Defects discovered during operation of the equipment shall be noted for future correction, to be made as soon as operation has ceased.

Operation shall be stopped immediately if a deficiency is noted which would damage the equipment if the operation were continued. All deficiencies and shortcomings will be recorded, together with the corrective action taken, on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

**3-3. Operator Preventive Maintenance Services**

Table 3-1 contains a listing of preventive maintenance services which must be performed by the operator. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to table 3-1 for the preventive maintenance services.

Table 3-1. Operational Preventive Maintenance Checks and Services

B - Before operation D - During operation A - After operation

Interval and Sequence No			Item to be inspected procedure	Work Time (M H)
B	D	A		
			NOTE	
			Visually inspect, concurrently with the daily checks and services, for proper fuel oil and detergent levels and fuel leaks.	
1	31	45	Drain air dome every four (4) hours during operation.	0.2
2			Check oil level in water pump.	0.1
3			Check fuel oil filter.	0.1
4	32		Blow down unit every eight (8) hours during continuous operation.	0.2
5			Check soap solution level.	0.1
6	33		Check fuel oil level.	0.1
7	34		Inspect hose assemblies for leaks and frays.	0.1
8			Inspect gun assemblies for clogged nozzles.	0.1
9	35		Inspect water tank assembly for leaks and signs of rust.	0.1
10	36		Inspect plumbing assembly for leaks and loose joints.	0.1
11			Inspect water pump assembly for leaks.	0.1
12	37		Inspect motor assembly for loose mounting and frayed wiring.	0.1
13	38		Inspect oil pump assembly for leaks and tightness of hardware.	0.1
14			Inspect coil inlet assembly for leaks.	0.1
15	39		Inspect burner plate assembly for burned ignitors and tightness of hardware.	0.3
16	40		Inspect coil outlet assembly for leaks.	0.1
17			Inspect pressure gages for broken and cracked glass, check for leaks and tightness of fittings.	0.1
18			Inspect hourmeter for legible numbers and broken glass.	0.1
19			Inspect light assembly for broken bulb.	0.1
			Inspect toggle switches for tightness of hardware and loose connections.	0.1

Table 3-1. Operational Preventive Maintenance Checks and Services - Continued

B - Before operation D - During operation A - After operation

Interval and Sequence no.			Item to be inspected procedure	Work time (M H)
B	D	A		
20			Inspect oil cap assembly for open vent.	0.1
21			Inspect soap tank assembly, for leaks.	0.1
22	41		Inspect air dome outlet assembly for leaks.	0.1
23			Inspect blower wheel assembly for distortion and adjustment.	0.1
24			Inspect power cord for frays.	0.1
25			Inspect switch assembly for tightness of electrical connections.	0.1
26	42		Inspect fuel filter for cleanliness and leaks.	0.1
27			Inspect filter drain assembly for leaks.	0.1
28	43		Inspect soap tank overflow assembly for leaks.	0.1
29			Check all unit hardware for tightness.	0.3
30	44		Check all tubing assemblies for tightness and leaks.	0.1

### 3-4. Daily/ Weekly Preventive Maintenance Services

Table 3-2 contains a listing of preventive maintenance services which must be performed

by operating maintenance personnel at daily or weekly intervals. The item numbers are listed consecutively and indicate the sequence of minimum requirements.

Table 3-2. Daily/Weekly Preventive Maintenance Checks and Services

D - Daily W - Weekly

Interval and Sequence no.			Item to be inspected procedure	Work time (M H)
D	W			
	1		Blow-down unit.	0.2
	2		Service the cleaning guns.	0.1

### 3-5. Servicing the Hose Assemblies

Servicing of the hose assemblies is limited to cleaning and removal of any foreign matter.

### 3-6. Servicing the Cleaning Gun Assembly (Refer to Fig C-2)

a. The cleaning gun is composed of gun handle, swivel assembly, gun grip extension and nozzles. Each nozzle has a nozzle restrictor.

b. The cleaning gun and nozzles are a most important component of the cleaner. A damaged or leaky gun, frozen swivel, improper nozzle and/or nozzle restrictor can greatly reduce the cleaning effectiveness and increase the physical effort necessary to complete any cleaning task. As an important component it should be kept in prime condition at all times.

c. Keep cleaning gun and swivel properly adjusted. Replace nozzles and nozzle restrictors if damaged or worn.

(1) To clean gun, remove nozzle, turn on cleaner and flush gun for a few minutes. Check nozzle for condition and nozzle orifice for proper restrictor size.

(2) Tighten swivel packing glands by tightening packing gland nut until a slight drag is felt when rotating gun grip extension or, if leaking, until leaking ceases.

d. To replace packing in swivel assembly, the packing glands must be replaced when simple tightening of packing gland nut will not stop leaking without locking rotation.

(1) Unscrew packing gland cap and remove gun grip extension from gun handle. Pull out packing ring bushing and the three chevron packings from swivel body.

(2) Install new packings, bushing with recess facing collar or brass swivel bushing. Reinsert and screw on packing gland cap.

(3) Tighten packing gland cap until a slight drag is felt when rotating gun grip extension or, if leaking, until leaking ceases.

#### NOTE

If any pipe fittings are broken or replaced including nozzles, use teflon tape on all threads upon reassembly.

## Section II. TROUBLESHOOTING

### 3-7. General (Refer to Table 3-3)

*a.* This section contains troubleshooting information for locating and correcting most of the operating troubles, which may develop in the steam cleaner. Each malfunction for an individual component, unit or system is followed by a list of tests or inspections, which will aid in determining probable causes and corrective actions. The tests/inspections and corrective actions should be performed in the order listed.

*b.* This manual does not list all malfunctions that may occur, nor all tests, inspections or corrective actions. If a malfunction is not listed or is not corrected by the listed corrective actions, notify the maintenance supervisor and/or refer to higher maintenance level.

#### NOTE

Before using table 3-3, all applicable operating checks shall be performed.

Table 3-3. Troubleshooting

Malfunction	Probable Causes	Corrective Action
1. Burner will not ignite.	<i>a.</i> Check power to unit and that main switch is not off. <i>b.</i> On-fuel-off valve is closed. <i>c.</i> Burner flameout not reset. <i>d.</i> High temperature switch not reset. <i>e.</i> Insufficient and/or wrong type of fuel	<i>a.</i> If there is no power to unit, determine problem and correct it. Turn on the main switch. <i>b.</i> Open the on-fuel-off valve at least one full turn. <i>c.</i> Reset flameout control. <i>d.</i> Reset high temperature switch. <i>e.</i> Change and/or add proper fuel.
2. Low pressure at guns.	<i>a.</i> Inadequate water supply to pumps, <i>b.</i> Inadequate water supply to equipment. <i>c.</i> Improper size of cleaning gun nozzle or nozzle is worn. <i>d.</i> Soap agitator valve open, belts slipping, by-pass regulator leaking.	<i>a.</i> Check reservoir and float for proper level. Normal level is 1" to 2" below overflow pipe. <i>b.</i> Check water supply for capability of 650 GPH. <i>c.</i> Check for large or worn nozzle, as improper nozzle will cause operating pressure to decrease. <i>d.</i> Inspect all lines for leaks and tighten as required. Check soap agitator valve, close and reset, check belts and tighten as required.
3. Excessive operating pressure at guns.	<i>a.</i> Improper nozzle size on gun. Excessive back pressure discharges system.	<i>a.</i> Nozzles are too small and will not allow proper pressure range, change to proper size. Inspect gun and hose for any restrictions.
4. Unit operates roughly.	<i>b.</i> Improper operational mode	<i>b.</i> Correct operational mode.
5. Burner cuts off too soon.	<i>a.</i> Air dome needs draining. <i>a.</i> Fuel supply too low. <i>b.</i> Improper thermostat setting. <i>c.</i> Improper operational mode.	<i>a.</i> Drain air dome. <i>a.</i> Replenish fuel supply. <i>b.</i> Adjust thermostat. <i>c.</i> Correct operational mode.
6. Operating temperature too high.	<i>a.</i> Inlet air dome drain valve left open. <i>b.</i> Improper thermostat adjustment. <i>c.</i> Lack of water to coils. <i>d.</i> Improper operational mode.	<i>a.</i> Close air dome drain valve. <i>b.</i> Correct thermostat adjustment. <i>c.</i> Water supply off. Water pump not operating. Restriction in water supply system. <i>d.</i> Correct operational mode.

## Section III. MAINTENANCE PROCEDURES

### 3-8. General

The maintenance procedures listed in this section should be performed by the operator prior to operation of the steam cleaner.

**3-9.** Drain air dome by opening air dome drain valve and air dome vent valve when unit is in OFF position. When completely drained, close air

dome drain valve. (refer to fig 2-1, item 31 and 38.)

**3-10.** To check oil level in water pump, remove oil fill plug. If oil level is below oil fill plug opening, add SAE 20 non-detergent oil.

**3-11.** To check fuel oil filter, close fuel valve, remove element, and clean out any accumulated sediment and water. Replace element and secure. (refer to fig 2-1, item 39.)

**3-12.** To blow down unit proceed as follows (refer to fig 2-1).

a. Blow down unit after each day's use or every 8 hours of operation as follows:

(1) Stop the cleaner as described in operation procedures.

(2) Remove steam hoses from both discharge outlets and close discharge valves (32).

(3) Place selector valve (8) in open (horizontal) position and open air dome drain valve (31).

(4) Turn on pump control switch (4) and burner switch low (1).

(5) Depress and hold blow-down switch (37). After a purge delay, the low fire burner will ignite. Hold blow-down switch and allow burner to operate for approximately 30 seconds.

(6) Release blow-down switch (37) and shut off burner switch low (1) and pump control switch (4).

(7) Steam and residue should discharge from the air dome drain valve. When the flow of steam and residue has stopped, close the air dome drain valve (31).

(8) Place selector valve (8) in closed (vertical) position.

(9) Open discharge valves (32) and turn on pump control switch (4). Dry steam and residue should discharge from both discharge valve hose outlets.

### **WARNING**

Do not stand, or allow other personnel to stand, in front of discharge valve outlets during preceding procedure and avoid contact with hot water and/or steam from outlets.

(10) When all steam and residue are flushed out of discharge valve outlets and water is cool, shut off pump control switch (4).

(11) Reconnect steam hose to discharge valve outlets. The cleaner is now ready for normal operation.

### **NOTE**

If coil outlet temperature on gage (10) exceeds 370°F in step 10, the over temperature switch (26) will have to be reset before the cleaner can be fired.

### **NOTE**

If repeated blow-down operations fail to reduce scale buildup (excessive back pressure), an acid washing of coils shall be accomplished.

**3-13.** When repair of light assembly is required, remove the light bulb and replace (refer to fig 2-1).

**3-14.** The oil cap assembly is replaced when inspection determines the need for repairs (refer to fig 2-1).

## CHAPTER 4

## ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

## Section I. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT

**4-1. Special Tools and Equipment**

There are no special tools and equipment required for organizational maintenance.

**4-2. Maintenance Repair Parts**

Repair parts and equipment are listed and illustrated in the repair parts and special tools list covering organizational maintenance for this equipment in appendix C of this manual.

**WARNING**

Always turn the unit off and disconnect power cord from power source prior to performing any maintenance. Failure to do so could result in severe injury and possible death to personnel.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES  
(MONTHLY AND QUARTERLY)**4-3. General**

To insure that the steam cleaner is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services to be performed are listed and described in paragraph 4-4. The item numbers indicate the sequence of inspection requirements. Defects discovered during the maintenance performance shall be noted for future correction. All deficiencies and malfunctions shall be recorded together with the corrective action taken on DA

Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

**4-4. Monthly/ Quarterly Preventive Maintenance Services**

Table 4-1 contains a listing of preventive maintenance services which must be performed by organizational maintenance personnel at monthly or quarterly intervals. The item numbers are listed consecutively and indicate the sequence of minimum requirements.

Table 4-1. Monthly/Quarterly Preventive Maintenance Checks and Services

			<i>M - Monthly</i>	<i>Q - Quarterly</i>	
Interval and Sequence no.			Item to be inspected		Work time (M H)
M	Q				
1			Drain and clean water supply reservoir.		0.1
2			Clean pump inlet screen.		0.1
3			Check belts for proper tension, alignment, cracks or breaks.		0.2
4			Inspect all valve, plumbing and fittings for leaks.		0.2
	8		Check water pump crankcase oil first time at monthly maintenance then quarterly.		0.1
5			Check cleaning gun swivel assembly, steam hose, hose spuds and clamps for tightness.		0.2
6			Check soap solution tank, coil inlet and outlet pressure gages, temperature gage and fuel pressure gage for operating condition.		0.2
7			Check burner plate, clean flame sensor.		0.3

## Section III. TROUBLESHOOTING

### 4-5. General

a. This section contains troubleshooting information for locating and correcting most of the troubles which may develop in the steam cleaner. Each malfunction for an individual component, unit or system is followed by a list of probable causes and corrective actions. Maintenance personnel should check out the probable causes

for a malfunction and perform the corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all probable causes or corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, the maintenance supervisor shall be notified or refer to the next higher maintenance level.

Table 4-2. Troubleshooting

Malfunction	Probable Causes	Corrective Action
1. Fuel lines broken, clogged or otherwise obstructed.	Inspect fuel lines.	Repair problem or replace damaged line.
2. Burner cuts off too soon.	Restriction in fuel inlet lines, fuel filter or burner nozzles.	Inspect fuel lines, clean filter or nozzles.
3. Excessive smoke in burner exhaust.	Dirty burner nozzles and for fuel filter.	Clean fuel filter, remove and clean fuel nozzles. Adjust air gate.
4. Improper fuel being used.	Insufficient air.	Change fuel if required.
5. Improper venting.	Check for proper fuel.	Repair or replace as necessary.
	Check venting requirement.	

## Section IV. MAINTENANCE AND ADJUSTMENT OF STEAM CLEANER

### 4-6. General

a. This section contains maintenance and adjustment information covering the various components and/or systems on the steam cleaner. Maintenance to be performed covers these areas related to the normal maintenance and/or repair required after operation when the unit is being prepared for major repairs. Maintenance personnel should determine the related malfunction and perform the corrective actions as indicated.

b. This section cannot list all maintenance or adjustments required due to the various operational modes and surrounding conditions of the unit. Should maintenance arise which is not covered in this section notify maintenance supervisor or higher maintenance.

### 4-7. Draining or Cleaning Water Supply Tank (Refer to Fig C-6)

To drain or clean the water supply tank, shut off water supply to cleaner and unscrew overflow tube. If cleaning is required flush tank with clear water removing any accumulated deposits on bottom of tank. Replace overflow pipe, turn on water supply and inspect for leaks at overflow, nipple threads.

### 4-8. Water Pump Belt Tension (Refer to Fig C-7)

Tension on water pump belt should be only tight enough to prevent slippage during unit operation.

#### NOTE

If water pump to motor belt requires adjustment, refer to next higher level of maintenance.

### 4-9. Coil Back Pressure Test (Refer to Fig 2-1)

a. Periodic checks must be taken to ascertain scale buildup in heater coil and plumbing assemblies.

b. To determine amount of restriction proceed as follows:

(1) Stop the cleaner as described in Operating Procedures, Section II.

(2) Remove cleaning gun nozzles.

(3) Open discharge valves (32), place selector valve (8) in closed (vertical) position.

(4) Turn pump control switch (4) to ON and with water flowing, observe pressure differential between back pressure gage (6) and steam pressure gage (11).

(5) If pressure differential is over 100 psi and blowdown procedure does not reduce pressure differential to normal, the cleaner should be descaled.

### 4-10. Loose or Leaky Connections

Any leaks which may develop in the system should be tightened, repaired or replaced when the unit is in the OFF position. Select a wrench of proper size and type, and tighten fitting in a

clockwise rotation. Should a fitting be removed for inspection a sealant must be used when installation is performed.

#### **4-11. Tightening Hose Spud Clamps (Refer to Fig C-1)**

a. At the first signs of leaking hoses, loose spuds, and clamps, the steam cleaner operation should be discontinued and repairs made.

b. Fittings should be inspected for cracks and hose ends inspected for any concealed damage when coupled. Always tighten two bolt clamps evenly, securing alternately until tight.

#### **4-12. Pressure and Temperature Gage Repair (Refer to Fig 2-1)**

a. Cracked, leaking or inaccurate pressure or temperature on a gage is cause for replacement. These gages are factory calibrated and field adjustment cannot be accomplished.

b. Remove gage by disconnecting copper tube line, three screws, washers and nuts fastening gage to panel. Remove gage snubber from defective gage and install on replacement gage. Reinstall gage on panel and secure with screws. Replace copper tube line.

#### **4-13. Hose Assemblies Repair (Refer to Fig C-1)**

Hose assemblies cannot be repaired, if inspection reveals leaks. Hose must be replaced immediately. If leaks appear around the coupling area inspect and tighten per instructions in paragraph 4-10.

#### **NOTE**

The cleaner gun and nozzles are a most important component of the cleaner and a damaged or leaky gun, a frozen swivel, improper nozzle and/or nozzle restriction can greatly reduce the cleaning effectiveness and increase the physical effort necessary to complete any cleaning task. As an important component it should be kept in prime condition at all times.

#### **4-14. Gun Assembly Repair (Refer to Figs C-1 and C-2)**

#### **NOTE**

Gun assemblies can be cleaned and repaired to extent of component replacement and swivel repairs. Repair gun and nozzles with unit in the OFF position.

a. To clean guns (refer to fig C-2), remove nozzle, turn on cleaner and flush gun for a few minutes. Check nozzle for condition and nozzle orifice for proper restriction size.

b. Tighten leaky swivel glands (refer to fig C-3) by tightening packing gland nut until a slight

drag is felt when rotating gun grip extension or, if leaking, until leaking ceases.

c. Swivel repair (refer to fig C-3) is accomplished by replacing packing in swivel assembly. The packing glands must be replaced when simple tightening of packing gland nut will not stop leaking without locking rotation.

(1) Unscrew packing gland cap and remove gun grip extension from gun handle. Pull out packing ring bushing and the three packings from swivel body.

(2) Install new packings, bushing with recess facing collar or brass swivel bushing, reinsert and screw on packing gland cap.

(3) Tighten packing gland cap until slight drag is felt when rotating gun grip extension or, if leaking, until leaking ceases.

#### **4-15. Water Tank Assembly (Refer to Fig C-6)**

The water tank assembly can be repaired by using standard procedures to seal any leaks. Float valve, rod, ball and inlet connectors are removable and must be sealed if removed or replaced.

#### **4-16. Water Pump Crankcase Oil (Refer to Fig C-7)**

a. The water pump assembly should be filled with S. A. E. 20 non-detergent oil and drained after the first 100 hours. Following the first 100 hours of operation drain each 750 hours thereafter of recorded operation.

b. To drain oil, remove drain plug located under pump which is accessible through pump and motor mounting plate. When oil flow ceases reinstall plug, secure and inspect for leaks.

#### **4-17. Blower and Fuel Pump Belt Tension (Refer to Fig C-7)**

a. The fuel pump is mounted on a slotted base and need not be removed for belt adjustment. As the blower and fuel pump are driven by one common V-belt, only one adjustment is required.

b. To check belt tension proceed as follows:

(1) Turn off main power supply to unit.

(2) Remove rear access panel by removing the four fastening screws.

(3) Loosen the two bolts and nuts supporting fuel pump to mounting base.

(4) Apply tension to fuel pump (towards back of unit) until desired tension is achieved. Proper tension of belt may be verified by twisting belt  $\frac{1}{2}$  to  $\frac{3}{4}$  turn in either direction.

#### **CAUTION**

Do not over tighten belt as premature pump and blower failure may occur.

(5) When proper tension is achieved secure mounting bolts, nuts and align pulleys while tightening.

(6) Rotate belt by hand to check for unusual drag or binding and reinstall back access panel, securing with mounting screws.

#### **4-18. Oil Pump Assembly (Refer to Fig C-11)**

*a.* Periodically it is advisable to remove the oil pump filter screen and clean with solvent to remove all foreign matter.

*b.* To remove oil pump filter screen, proceed as follows:

(1) Remove the eight cover mounting bolts and separate cover from body, exposing filter screen.

(2) Remove filter screen and clean.

(3) Reinstall screen and secure cover with eight locating bolts.

#### **4-19. Burner Adjustment and Cleaning (Refer to Fig C-16)**

*a.* The burner plate assembly may be removed by disconnecting the two spark electrode leads, intake copper tube lines, flame scanner and three wing nuts.

*b.* Gently lower assembly from blower duct being careful not to drop or bump spark electrodes.

*c.* Wipe off complete assembly and remove the two burner nozzles for disassembly and cleaning of external screens.

*d.* Reinstall nozzles and proceed to inspect spark electrodes for cracks, pits or signs of arcing to burner plate.

*e.* If electrode replacement is not required adjust to specifications as referenced and reinstall burner assembly.

*f.* Prior to connecting flame scanner wipe off lens with clean rag and secure finger tight only.

#### **4-20. Fuel Nozzles-Removal and Cleaning (Refer to Fig C-16)**

*a.* The burner assembly consists of two fuel nozzles, each nozzle consisting of a filter screen stem, spinner core and body with orifice.

*b.* To remove and clean fuel nozzles proceed as follows:

(1) Fuel nozzles should be removed and cleaned every three or four months or after each 250 hours of unit operation. If fuel is contaminated, greater frequency may be required.

(2) Remove burner assembly, see paragraph 4-19 and remove nozzles utilizing two wrenches.

(3) Remove nozzle screen and spinner core and clean in solvent, blowing down with air pressure.

#### **4-21. Coil Inlet Assembly (Refer to Fig C-14)**

The coil inlet plumbing assembly should be inspected for leaks, loose fittings and connections. Should inspection reveal any problems, repair per instructions in paragraph 4-10, loose or leaking connections.

#### **4-22. Coil Outlet Assembly (Refer to Fig C-17)**

*a.* The coil outlet plumbing assembly should be inspected for leaks, loose fittings and connectors and repaired per paragraph 4-10.

*b.* A leaking discharge or soap tank fill valve may be repaired by loosening valve bonnet and removing stem assembly.

*c.* Valve seat, teflon disk, may be turned over to utilize the new surface.

*d.* Leaks around the stem packing gland cap may be corrected by tightening the packing gland nut when the valve is in a partially open position.

#### **4-23. Preheat Coil Assembly (Refer to Fig C-18)**

*a.* Inspect preheat coil assembly for excessive corrosion on support straps.

*b.* Clean surface and repaint, if necessary.

#### **4-24. Generating Coil (Inner) (Refer to Fig C-18)**

*a.* Inspect generating coil (inner) for leaks, broken or cracked welds and any excessive vibration. Should inspection reveal any problems use standard welding procedures for repair.

*b.* Inspect coil for excessive soot buildup or restrictions which may prevent normal venting of combustion chamber. When the findings are confirmed or questionable, it is advisable to request assistance from the next higher level of maintenance to further determine method of corrections.

#### **4-25. Draining Soap Tank (Refer to Fig C-31)**

Soap tank draining is accomplished by opening drain valve and flushing hardened soap deposits which may have accumulated on tank bottom. Soap tank stir and fill valve and soap control valve should be closed so deposits do not enter plumbing system.

#### **4-26. Flame Safeguard Control (Refer to Figs 4-1 and 4-2)**

*a.* To aid in troubleshooting the flame safeguard control, the following functional description is provided.

(1) When the main disconnect switch is closed, 220V to 110V stepdown transformer is powered providing 110V AC to the control circuitry.

(2) Power from the X1 terminal of the transformer secondary flows through circuit No. 1, protective fuse, normally closed excess



pressure switch (set to open at 350 psi) to terminal No. 1 of the flame safeguard control.

(3) Flame safeguard transformer T2 is powered from terminal No. 1 energizing the flame detector network.

(4) When the pump control switch is closed

the motor starter coil circuit No. 11 is powered from control circuit No. 1. If overload switch X2 is closed (magnetic starter reset) the magnetic coil will be energized pulling in the motor starter contacts and starting the motor.

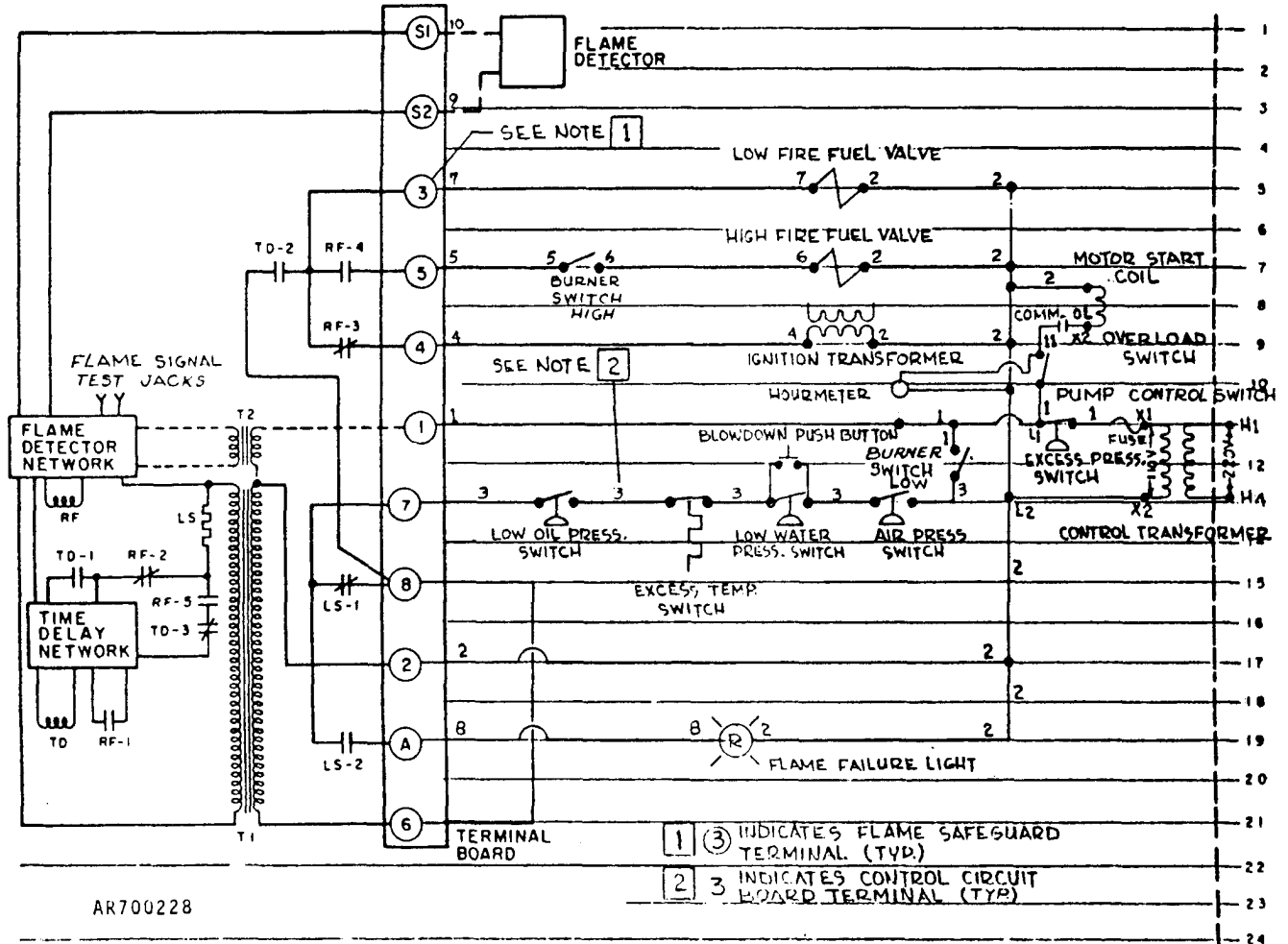
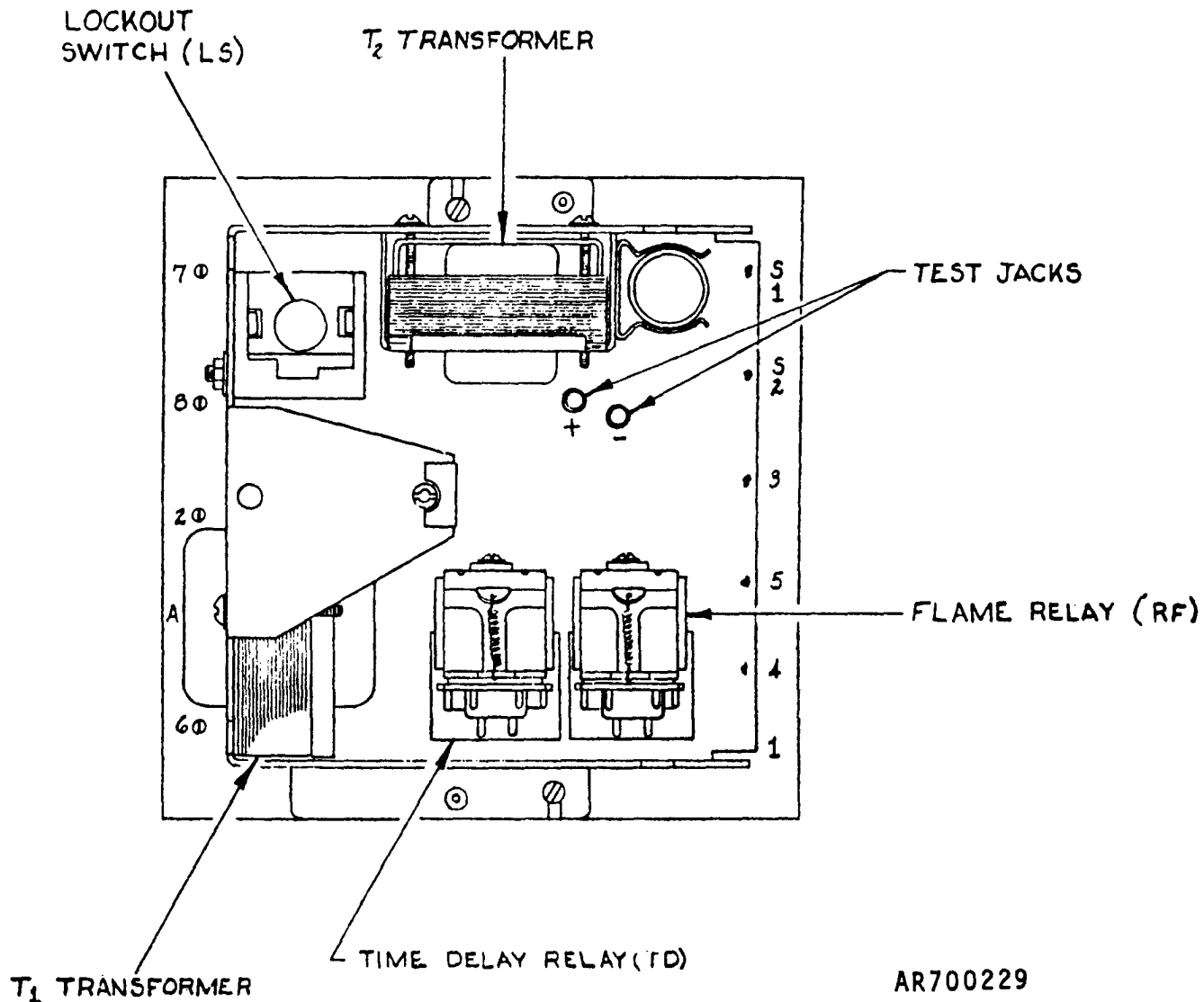


Figure 4-1. Control schematic.



AR700229

Figure 4-2. Flame safeguard control.

(5) At the same time the pump control switch is closed, the hourmeter will be energized and begin recording unit operating time.

(6) After the motor has been started and water flow, air flow and oil flow have been established, the burner switch low may be closed.

(7) When the burner switch low is closed, limit control circuit no. 3 is powered from control circuit no. 1.

(a) Normally open air pressure switch closes with 0.15-in WC air pressure.

(b) Normally open low water pressure switch closes with 15 psig water pressure.

(c) Normally closed excess temperature switch opens at 370°F.

**NOTE**

After the switch has opened, it requires manual reset to close.

(d) Normally open low oil pressure switch opens circuit with 45 psig oil pressure.

(8) When all of the above circuit switches have been satisfied, terminal no. 7 of the flame safeguard control will be powered through limit control circuit. At this time the flame safeguard should establish ignition with the combustion chamber. If all the switches have been verified as working properly, the flame safeguard has been reset (depressed), and the unit fails to ignite, notify the maintenance supervisor or higher maintenance level.

#### 4-27. Fuel Control Valve (Thermostat Adjustment) (Refer to Fig 2-1)

a. All units have been tested at the factory and operated on the various operational modes. Temperature valves are given in chapter 2 of this manual and fuel control valve adjustment will be required for proper settings. While this control is extremely reliable, it can be damaged by dirty fuels (abrasion), water in fuel (corrosion), and deposits on thermal tube assembly (scale). If scaling is suspected, the cleaner should be checked for back pressure (see paragraph 4-9, coil back pressure test).

b. Except for visual checking for scale deposits on the thermal tube and replacement of complete control, it is not necessary to remove the fuel control valve to clean or replace O-ring seals or seat disk.

c. Thermostat should be adjusted by using a small screwdriver and placing blade into slotted stem on thermostat. Turn from left to right to decrease temperature, right to left to increase temperature. Make small adjustments 1/8 turn or less and allow for temperature to restabilize before making added adjustment.

#### CAUTION

Do not attempt to regulate discharge temperature by altering fuel pump pressure, nor restricting fuel oil flow at burner ON-OFF valve. Control with fuel control valve only.

#### NOTE

The thermostat is very sensitive and care must be used not to bend, drop, bump or over adjust it.

#### 4-28. Float Valve Adjustment (Refer to Fig C-6)

The float valve should be set to maintain a water level of approximately one to two inches below overflow tube. To adjust, loosen wing screw on float valve ratchet arm and move to next notch, according to water level required. If notch relocates too high or too low, gently bend float ball rod arm until desired setting is acquired.

#### 4-29. Soap Metering Valve Adjustment (Refer to Fig C-4)

Soap is introduced into the pumping system through the pump intake check valve and strength is controlled by the soap control valve. For a stronger or weaker soap selection at cleaning gun(s) turn valve handle counterclockwise to increase amount of soap, clockwise to decrease amount of soap.

#### 4-30. Pressure Regulator Adjustment (Refer to Fig C-8 and C-13)

a. The pressure regulator is utilized as a backup

control to the excess pressure switch, so in the event of coil blockage all water is bypassed from the water pump.

b. Adjust the pressure regulator as follows:

#### WARNING

Disconnect main power to unit before jumping pressure switch contacts and removing jumper after setting regulator.

#### NOTE

The terminal on the excess pressure switch will have to be jumped or range increased above 370 psi while setting pressure regulator. Set regulator, then reset excess pressure switch.

(1) To adjust regulator, loosen adjusting bolt nut and turn bolt clockwise to increase pressure and counterclockwise to decrease the pressure. The hex nut locks adjustment bolt to prevent any rotation during operation.

(2) The pressure setting should be made as follows:

(a) Back adjusting bolt out to relieve spring tension.

(b) Start and run the cleaner at the desired pressure and temperature.

(c) Close the discharge valves.

(d) Adjust the regulator to 370 psi relieving pressure per preceding instructions and secure adjusting locknut.

(e) Open cleaning gun discharge valves, and reset excess pressure switch to 350 psi setting and remove jumper wires.

#### 4-31. Air Blower Adjustment (Refer to Fig C-4)

a. The cleaner is equipped with a closed, forced draft oil burner system and is adjustable by opening and closing air gate.

b. With cleaner in full operation as a steam cleaner, loosen clamping screws on sliding air gate and adjust accordingly.

c. Slide air gate to close opening until dark smoke appears at heater shell hat opening. Slowly open air gate until smoke clears.

#### NOTE

A slight haze is acceptable to excessive cleandraft exhaust discharge.

d. Tighten clamping screws on sliding air gate being careful not to move air gate from established position.

#### NOTE

If adjustment of air gate fails to correct excessive smoking, check air blower fan. If dirty, remove and clean. Also, check for excessively worn or dirty burner nozzles. Check for proper type of fuel.



## CHAPTER 5

### DIRECT SUPPORT AND GENERAL SUPPORT

### MAINTENANCE INSTRUCTIONS

#### Section I. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT

##### 5-1. Special Tools and Equipment

There are not special tools and equipment required for the maintenance of the steam cleaner.

##### 5-2. Repair Parts and Equipment

Repair parts and equipment are listed and illustrated in the repair parts and special tools list covering direct support and general support

maintenance for the steam cleaner in appendix C of this manual.

#### WARNING

Before accomplishing any repairs to the steam cleaner, shut unit down and allow to cool. Disconnect power cord, failure to do so could cause severe injury and possible death to personnel.

#### Section II. TROUBLESHOOTING

##### 5-3. General

*a.* This section contains troubleshooting information for locating and correcting most of the malfunctions which may develop in the steam cleaner. Each malfunction for an individual component, unit or system is followed by a list of probable causes and corrective actions. Maintenance personnel should check out the probable

causes for a malfunction and perform the corrective actions in the order listed.

*b.* This manual cannot list in table 5-1 all the malfunctions that may occur, nor all probable causes and corrective actions. If a malfunction is not listed or is not corrected by the listed corrective actions, the maintenance supervisor shall be notified.

*Table 5-1. Troubleshooting*

Malfunction	Probable Causes	Corrective Action
1. Pump control switch closed, motor does not start.	<p><i>a.</i> 115V control circuit fuse blown.</p> <p><i>b.</i> Magnetic motor starter overload switch X2 open.</p> <p><i>c.</i> Power supply to steam cleaner interrupted.</p> <p><i>d.</i> Excess pressure switch open.</p> <p><i>e.</i> Defective stepdown transformer.</p>	<p><i>a.</i> Remove and inspect 6 amp fuse. Determine cause of blown fuse (short circuit, overload, grounded conductor). Repair fault and replace fuse.</p> <p><i>b.</i> Depress magnetic starter reset button. Switch X2 should close and the motor start. Stop motor, determine cause of condition causing overloading of motor before continuing operation (binding or obstruction in pumps).</p> <p><i>c.</i> Zero voltage at terminals L1 and L2 of magnetic motor starter. Check for 220V AC potential at the power supply source.</p> <p><i>d.</i> Zero voltage between circuit 1 and 2 at control terminal board. See malfunction 7.</p> <p><i>e.</i> Low or zero voltage across the transformer primary terminals H1 and H4 should be 220-240V AC. Check terminals for tightness.</p>

Table 5-1. Troubleshooting - Continued

Malfunction	Probable Causes	Corrective Action
1. Pump control switch closed, motor does not start-Continued	<p><i>e.</i> Defective stepdown transformer - Continued</p> <p><i>f.</i> Motor single phasing.</p> <p><i>g.</i> Wire loose, broken or shorted.</p> <p><i>h.</i> Defective motor start switch.</p> <p><i>i.</i> Magnetic starter coil defective.</p> <p><i>j.</i> Motor mechanically bound.</p>	<p>Check red and black power leads for continuity. Tighten or replace. Low or zero voltage across transformer secondary terminals X1 and X2 should be 110-120V AC. Check terminals at transformer secondary for tightness. Tighten or replace as necessary. Continuity check across primary and secondary coils indicate open coil. Replace transformer.</p> <p><i>f.</i> Motor will emit a high hysteresis hum and will not rotate. Check 3 phase power supply conductors, motor, disconnect switch, magnetic starter for shorts, grounds or loose terminals. Inspect magnetic starter heater elements for correct installation and tightness. Check for dirty magnetic starter contacts. Repair or replace damaged parts or conductors.</p> <p><i>g.</i> Zero voltage at transformer primary. Check continuity of primary conductors. Replace or repair as necessary. Zero voltage between 115V control circuits 1 and 2 at control terminal board. Check continuity of control conductor. Replace or repair as necessary. Zero voltage between 115V control circuit 11 and 2 at magnetic starter. Check continuity of the control circuits 11 and 2 conductors. Replace or repair as necessary.</p> <p><i>h.</i> Continuity check across switch shows open when the switch is closed. Replace switch.</p> <p><i>i.</i> Continuity check across coil indicates open. Replace the coil.</p> <p><i>j.</i> Motor shaft does not rotate by hand. Repair or replace motor as necessary.</p>
2. Low fire switch closed, burner does not ignite.	<p><i>a.</i> Air pressure switch contacts open.</p> <p><i>b.</i> Low water pressure switch contacts open.</p> <p><i>c.</i> Excess temperature switch contacts open.</p> <p><i>d.</i> Low oil pressure switch contacts open.</p>	<p><i>a.</i> Zero voltage between 115V control circuits 3 and 2 at control circuit board. Zero voltage between NO contact of switch and control circuit at terminal board. See malfunction 3.</p> <p><i>b.</i> Same as step <i>a.</i> Zero voltage between M1 contact of switch and control circuit 2 at terminal board. Depress switch by-pass push button, if burner lights contacts are open. See malfunction 4.</p> <p><i>c.</i> Same as step <i>a.</i> Zero voltage between NO contact of switch and control circuit 2 at terminal board. See malfunction 5.</p> <p><i>d.</i> Same as step <i>a.</i> Zero voltage between M1 contact of switch and control circuit 2 at terminal board. See malfunction 6.</p>

Table 5-1. Troubleshooting - Continued

Malfunction	Probable Causes	Corrective Action
2. Low fire switch closed, burner does not ignite - Continued	<p><i>e.</i> Fuel valve or lines restricted or plugged.</p> <p><i>f.</i> Fuel valve solenoid coil loose or burned out (open).</p> <p><i>g.</i> Flame failure lockout.</p> <p><i>h.</i> Flame safeguard contacts dirty.</p> <p><i>i.</i> Defective ignition transformer.</p> <p><i>j.</i> Wire loose or broken.</p> <p><i>k.</i> Low fire start switch defective.</p> <p><i>l.</i> Electrode wires loose, broken, disconnected or shorted.</p> <p><i>m.</i> Electrodes out of alignment.</p>	<p><i>e.</i> Disconnect fuel tubing to burner at burner. Turn low fire switch on and observe fuel flow from line. Visually inspect fuel lines for leaks or crimping. Disconnect fuel supply line from pump to fuel valve at valve, observe fuel flow from line. Replace or repair fuel line as necessary.</p> <p><i>f.</i> Check tightness of coil retaining nut. Tighten nut. Disconnect control circuits 6 and 2 (high fire) or 7 and 2 (low fire) to solenoid coil from lower control terminal board. Check continuity across the coil. If coil shows open, replace coil.</p> <p><i>g.</i> Red flame failure light on. Determine cause of flame failure, see malfunction 8. Flame signal below 2V DC. Remedy cause and depress failure reset button before restart.</p> <p><i>h.</i> See service of flame safeguard. Use a burnishing tool or fine crocus cloth to clean contacts. Never use a file or sandpaper to clean contacts.</p> <p><i>i.</i> Low or zero voltage between control circuits 4 and 2 at control terminal board. Check for loose or broken conductor in circuits 4 and 2 to transformer. Repair or replace as necessary. Remove electrode wires from burner and hold terminals 1/8-inch apart. Turn on low fire switch and observe if an electrical arc develops between electrode wire terminals. If electrode wires are good (see step <i>m</i>) and there is no arc, check continuity across transformer secondary. Replace as necessary.</p> <p><i>j.</i> Check conductors of control circuits 3 and 1 from control terminal board to low fire switch and limit switches for tightness and continuity. Check conductors of control circuits 1, 2, 3, 4 and 7 from control terminal board to flame safeguard terminal board for tightness and continuity. Tighten, repair or replace conductors as necessary.</p> <p><i>k.</i> See malfunction 1, step <i>h</i>.</p> <p><i>l.</i> Check terminals for tightness at ignition transformer and burner. Observe that terminals are not grounding out to any adjacent metallic parts or burner. Check wires for continuity. Tighten, repair or replace conductors as necessary.</p> <p><i>m.</i> Remove burner and check that gap of electrodes is adjusted to 1/16 to 3/32-inch. Adjust electrodes to proper dimensions. Connect to ignition transformer and cycle low fire switch. Observe spark is sufficient to light burner.</p>

Table 5-1. Troubleshooting - Continued

Malfunction	Probable Causes	Corrective Action
2. Low fire switch closed, burner does not ignite - Continued	<p><i>n.</i> Electrode cracked.</p> <p><i>o.</i> Air in fuel line.</p> <p><i>p.</i> Time delay contact block mechanically bound.</p>	<p><i>n.</i> Remove burner and cycle low fire start switch. Observe spark, if spark is weak remove and inspect electrodes. Replace cracked electrodes.</p> <p><i>o.</i> Burner cycles, oil pressure gage fluctuates (see malfunction 2, step <i>f</i>). Allow burner to recycle until oil displaces air and ignites.</p> <p><i>p.</i> Observe block to see if cocked on guides. Free block to work freely on the guides.</p>
2A. High fire switch closed, burner does not ignite.	<p><i>a.</i> Fuel valve or lines restricted or plugged.</p> <p><i>b.</i> Fuel valve solenoid coil loose or burned out.</p> <p><i>c.</i> Burner nozzle is plugged.</p> <p><i>d.</i> Flame safeguard contacts dirty.</p> <p><i>e.</i> Wire loose or broken.</p> <p><i>f.</i> Air in fuel lines, occurring when unit is restarted after fuel lines disassembled.</p> <p><i>g.</i> Defective high fire start switch.</p>	<p><i>a.</i> See malfunction 2, step <i>e</i>.</p> <p><i>b.</i> See malfunction 2, step <i>f</i>.</p> <p><i>c.</i> Remove burner and inspect nozzles. Remove nozzle and clean orifice, nozzle strainer and supply pipe.</p> <p><i>d.</i> See malfunction 2, step <i>h</i>.</p> <p><i>e.</i> Check conductors of control circuits 5 and 6 from control terminal board to high fire switch for tightness and continuity. Check conductor of circuit 5 from terminal board to flame safeguard for tightness and continuity. Tighten, repair or replace conductors as necessary.</p> <p><i>f.</i> With high fire switch turned on, oil supply pressure will drop causing low fire burner to trip out. Restart low and high fire until all air is displaced by oil.</p> <p><i>g.</i> See malfunction 1, step <i>h</i>.</p>
3. Air pressure switch contacts open, inadequate air. (Switch closes at 0.15 WC)	<p><i>a.</i> Blower inlet obstructed.</p> <p><i>b.</i> Air sensing static tube plugged.</p> <p><i>c.</i> Static tube not aligned.</p> <p><i>d.</i> Switch setting incorrect.</p>	<p><i>a.</i> Visually inspect blower inlet. Remove obstruction.</p> <p><i>b.</i> Remove ¼-inch copper tubing from air flow switch and connect water tube manometer to tubing. Start fan, if manometer does not read at least 0.15-inch the switch will not close. Clear static tubing by blowing air through tube from switch side.</p> <p><i>c.</i> Same as malfunction 3, step <i>b</i>. Remove burner and align opening of tube to face toward the blower end of air duct. Assure tube is centered in duct. Rest air sensing is toward blower and slightly downward.</p> <p><i>d.</i> Switch will not shut down burner when obstruction is placed in front of blower housing. Increase set point by turning adjustment clockwise. Check the trip point by covering blower inlet. When setting switch by this method, hold cover over inlet for only a few seconds or until black smoke emits from exhaust. If switch is set properly burner will trip instantly. Switch will not allow burner to ignite because setting is</p>



Table 5-1. Troubleshooting - Continued

Malfunction	Probable Causes	Corrective Action
3. Air pressure switch contacts open. Inadequate air. (Switch closes at 0.15 WC) - Continued	<p><i>d.</i> Switch setting incorrect - Continued</p> <p><i>e.</i> Switch diaphragm ruptured.</p> <p><i>f.</i> Fan rotation incorrect.</p> <p><i>g.</i> Fan belt loose.</p> <p><i>h.</i> Improper air gate adjustment.</p> <p><i>i.</i> Blower cage loose on shaft.</p> <p><i>j.</i> Blower drive pulley loose on shaft.</p>	<p>too high. Decrease set point by turning adjustment counterclockwise until burner ignites. Test trip out point as indicated in this corrective action.</p> <p><i>e.</i> Air will emit from open vent side of switch. Replace switch.</p> <p><i>f.</i> Observe motor rotation. Should be clockwise when viewed from front (pulley end) of motor. Correct rotation by reversing any two of the three 3-phase power leads.</p> <p><i>g.</i> Inspect belt for tightness. If it can be twisted more than 2/3 of a turn, tighten belt by adjusting oil pump in slots in mounting base.</p> <p><i>h.</i> Inspect air gate. Open air gate until sufficient air for combustion is available. Observe exhaust; black smoke, insufficient air; white smoke, too much air.</p> <p><i>i.</i> Remove air gate and blower intake screen. Inspect, align and tighten cage with setscrews in cage.</p> <p><i>j.</i> Inspect pulley. Remove belt and tighten pulley with setscrew in pulley.</p>
4. Inadequate water supply, low water pressure switch open (needs 15 psig to close) (refer to malfunction 1).	<p><i>a.</i> Water supply tank empty or partially full.</p> <p><i>b.</i> Pump on-off suction valve closed or partially open.</p> <p><i>c.</i> Suction valves, lift and water tank, open at same time.</p> <p><i>d.</i> Water tank pump suction nipple off or loose.</p> <p><i>e.</i> Pump suction strainer is plugged.</p> <p><i>f.</i> Air leaks in pump suction piping.</p> <p><i>g.</i> Soap solution metering valve closed (lift suction connection only).</p> <p><i>h.</i> Soap solution tank dry (air being drawn into pump cylinder).</p> <p><i>i.</i> Ruptured bellows on pressure switch.</p> <p><i>j.</i> Sensing connection for pressure switch plugged.</p> <p><i>k.</i> Switch setting incorrect.</p> <p><i>l.</i> Air dome drain valve open.</p>	<p><i>a.</i> Observe water level in tank. Check adjustment of float valve and for adequate pressure and volume of water at supply source.</p> <p><i>b.</i> Inspect position of valve handle and that valve is in full open position.</p> <p><i>c.</i> Inspect position of valve handles. Leave valve to the desired suction source open, close other valve.</p> <p><i>d.</i> Inspect nipple, replace and/or tighten nipple.</p> <p><i>e.</i> Remove and inspect strainer, clean and replace.</p> <p><i>f.</i> Inspect piping for loose fittings, hoses, hose clamps, etc. Inspect suction valve bonnets for tightness. Tighten fittings.</p> <p><i>g.</i> Inspect valve position. Open valve.</p> <p><i>h.</i> Observe tank solution level. Fill soap solution tank.</p> <p><i>i.</i> Water leakage around switch bellows assembly. Replace pressure switch.</p> <p><i>j.</i> Remove capillary connection and fitting at sensing connection on pipe cross of coil inlet assembly and inspect for foreign material. Start water pump and flush out connection and replace.</p> <p><i>h.</i> Observe set point indicator on scale. Cut-in setting should be 20 psi, cutout setting 5 psi.</p> <p><i>i.</i> Observe valve position. Water will emit from drain. Close valve.</p>

Table 5-1. Troubleshooting - Continued

Malfunction	Probable Causes	Corrective Action
4. Inadequate water supply, low water pressure switch open (needs 15 psig to close) (refer to malfunction 1). - Continued	<i>m.</i> Pump belt loose.	<i>m.</i> Inspect belt for tightness, if belt can be twisted 2/3 of a turn tighten by adjusting motor and oil pump in slots in mounting base.
5. Excess temperature switch open (outlet temperature exceeds 370°F).	<i>a.</i> Improper thermostat setting (too high).	<i>a.</i> Observe outlet temperature gage, Switch opens at 370°F. Lower thermostat to desired operating temperature and manually reset switch.
	<i>b.</i> Insufficient amount of water flowing through coil.	<i>b.</i> See malfunction 4.
	<i>c.</i> Switch setting incorrect.	<i>c.</i> Observe dial set point adjustment. Switch should be set after operating unit at high fire condition for approximately 1/2-hour. Set point to trip burner at 370°F.
	<i>d.</i> Switch not reset after high outlet temperature condition (may occur after coil blowdown).	<i>d.</i> Manually reset switch.
6. Low oil pressure switch open, inadequate fuel supply pressure (closes at 45 psi at thermostat outlet).	<i>a.</i> Improper thermostat setting (too low or closed).	<i>a.</i> Observe position of thermostat and open (turn counterclockwise to open).
	<i>b.</i> Fuel on-off supply closed (pump discharge valve).	<i>b.</i> Observe valve position and open.
	<i>c.</i> Fuel pump suction strainer valve closed.	<i>c.</i> Zero pressure on pump discharge gage. Open the valve.
	<i>d.</i> Fuel strainer dirty.	<i>d.</i> Zero or low pressure on pump discharge gage. Shut strainer suction valve. Clean or replace strainer.
	<i>e.</i> Oil pump rotation incorrect.	<i>e.</i> Observe motor rotation. Should be clockwise when viewed from front (pulley end) of motor. Correct rotation by reversing any two of the three 3-phase power leads.
	<i>f.</i> Sensing connection for fuel pressure switch plugged.	<i>f.</i> Remove 1/4-inch copper tubing from switch and connection at high fire valve and turn on oil pump. Observe oil flow from connection at valve. Inspect for foreign material and clean from the connection at high fire valve. Blow the 1/4-inch tubing capillary out with air.
	<i>g.</i> Fuel tank empty.	<i>g.</i> Oil pressure discharge gage will drop in pressure trying to ignite low fire burner. Refill tank.
	<i>h.</i> Fuel pump recirculating by-pass adjusted improperly.	<i>h.</i> Oil discharge pressure gage indicates low or high pressure (should be set 110-120 psi). With pump running, remove protective cap from adjusting screw. Insert screwdriver and turn clockwise to increase pressure and counterclockwise to decrease pressure.
	<i>i.</i> Fuel lines leaking, broken or plugged.	<i>i.</i> Inspect piping for crimps, breaks or leaks and repair or replace as necessary. Disconnect oil supply piping to fuel valves, turn on pump, observe oil flow. Continue procedure on oil tubing connections from valve to pump until the plugged section is located, and blow clear with air or replace as necessary.

Table 5-1. Troubleshooting - Continued

Malfunction	Probable Causes	Corrective Action
6. Low oil pressure switch open, inadequate fuel supply pressure (closes at 45 psi at thermostat outlet) - Continued	<ul style="list-style-type: none"> <li><i>j.</i> Oil pressure switch bellows ruptured.</li> <li><i>k.</i> Fuel pump worn.</li> </ul>	<ul style="list-style-type: none"> <li><i>j.</i> Oil emitting from pressure switch bellow, assembly, replace pressure switch.</li> <li><i>k.</i> Remove pump, disassemble and inspect seals, impeller, housing, bearing, etc. for wear or breakage. Replace defective parts or pump as necessary.</li> </ul>
7. Excess pressure switch open (at 350 psi outlet pressure).	<ul style="list-style-type: none"> <li><i>a.</i> One discharge valve closed when on two gun operation.</li> <li><i>b.</i> Both discharge valves closed or throttled.</li> <li><i>c.</i> Improper thermostat setting, causing excessive pressure-temperature rise in coil.</li> <li><i>d.</i> Check valve in switch stuck in closed position locking high pressure in bellows assembly.</li> <li><i>e.</i> Improper nozzle size on gun or guns for operation mode.</li> <li><i>f.</i> Excessive scale buildup in nozzles, restriction in guns or hoses.</li> </ul>	<ul style="list-style-type: none"> <li><i>a.</i> Observe valve positions, assure both discharge valves are open.</li> <li><i>b.</i> Observe valve positions, assure both discharge valves fully open.</li> <li><i>c.</i> Observe temperature and outlet pressure gages. Refer to operating instructions for correct temperature setting for desired operational mode.</li> <li><i>d.</i> Remove sensing connection from switch. Remove switch and inspect check valve in bellows inlet assembly for freedom of movement or foreign material. Start pump and flush the sensing connections. Clean check valve, assuring it moves freely. Replace switch as necessary.</li> <li><i>e.</i> Inspect nozzles in use, Refer to operating instructions for nozzle size used on desired operational mode.</li> <li><i>f.</i> Remove, inspect and descale nozzles and guns. Pump water thru hose and observe if flow is free. Blow air thru hose or replace hose as necessary.</li> </ul>
8. Flame failure "Red Indicator Light On". (Flame signal voltage below 2V DC).	<ul style="list-style-type: none"> <li><i>a.</i> Dirty scanner ultraviolet bulb.</li> <li><i>b.</i> Burner nozzle loose or off adapter.</li> <li><i>c.</i> Burner nozzle connected to wrong fuel valve (low fire and high fire valves).</li> <li><i>d.</i> Electrodes out of alignment.</li> <li><i>e.</i> Electrodes out of alignment.</li> <li><i>f.</i> Electrodes cracked.</li> <li><i>g.</i> Burner nozzles dirty, plugged or worn.</li> <li><i>h.</i> Defective scanners.</li> <li><i>i.</i> Oil or paint in scanner sight tube.</li> </ul>	<ul style="list-style-type: none"> <li><i>a.</i> Remove scanner, inspect bulb and clean with a soft cloth with non-caustic detergent.</li> <li><i>b.</i> Remove burner and inspect nozzles. Tighten or replace nozzles as necessary.</li> <li><i>c.</i> Remove burner and inspect nozzles, correcting nozzles and fuel tubing as necessary. Assure fuel tubing from fuel valve is connected to proper burner. 10 GPH nozzle should be on low fire burner (farthest away from scanner sight tube). 5 GPH nozzle should be on high fire burner (closest to sight tube).</li> <li><i>d.</i> Remove burner and check that electrodes are adjusted to 1/16 to 3/32-inch. Adjust electrodes to proper dimensions or replace as necessary.</li> <li><i>e.</i> See malfunction 2, step <i>m</i>.</li> <li><i>f.</i> See malfunction 2, step <i>n</i>.</li> <li><i>g.</i> Remove burner and inspect nozzles. Clean, repair or replace as necessary.</li> <li><i>h.</i> Scanner does not detect flame (zero voltage at flame safeguard test jacks). Replace scanner.</li> <li><i>i.</i> Remove burner and inspect sight tube, clean off all oil and paint with alcohol.</li> </ul>

Table 5-1. Troubleshooting - Continued

Malfunction	Probable Causes	Corrective Action
8. Flame failure "Red Indicator Light On". (Flame signal voltage below 2V DC) - Continued	<ul style="list-style-type: none"> <li><i>j.</i> Fuel piping broken, loose or plugged.</li> <li><i>k.</i> Water in fuel.</li> <li><i>l.</i> Excessive smoke.</li> <li><i>m.</i> Flame safeguard contacts dirty.</li> <li><i>n.</i> Defective flame safeguard relay.</li> <li><i>o.</i> Flame relay contact block mechanically bound.</li> </ul>	<ul style="list-style-type: none"> <li><i>j.</i> See malfunction 6, step <i>i</i>.</li> <li><i>k.</i> Obtain fuel sample from fuel tank drain and check for water. Drain and refill fuel tank.</li> <li><i>l.</i> Adjust air gate for proper air combustion.</li> <li><i>m.</i> See malfunction 2, step <i>h</i>.</li> <li><i>n.</i> See service of flame safeguard and replace safeguard.</li> <li><i>o.</i> Inspect contact block, if cocked on guides, free block to open and close freely.</li> </ul>
9. Low nozzle pressure at gun or guns.	<ul style="list-style-type: none"> <li><i>a.</i> Inadequate water supply.</li> <li><i>b.</i> Improper nozzle size on gun or guns for desired operational mode.</li> <li><i>c.</i> Pump by-pass selector valve open on two gun, high pressure or 600 gph operational modes.</li> <li><i>d.</i> Worn vapor or rinse nozzles.</li> <li><i>e.</i> Soap agitator valve open.</li> <li><i>f.</i> Pump by-pass valve setting too low or valve leaking.</li> <li><i>g.</i> Worn check valves, springs or cups in water pump.</li> <li><i>h.</i> Faulty bearings or loose connecting rod in pump.</li> <li><i>i.</i> Coil outlet safety relief valve leaking.</li> <li><i>j.</i> Restriction in pump suction filter or suction inlet line.</li> </ul>	<ul style="list-style-type: none"> <li><i>a.</i> See malfunction 4.</li> <li><i>b.</i> Inspect nozzles. Refer to operating instructions for correct nozzle size for desired operational mode.</li> <li><i>c.</i> Observe position of selector valve. Close valve on two-gun, high pressure or 600 gph operational modes.</li> <li><i>d.</i> Remove and inspect nozzles, replace as necessary.</li> <li><i>e.</i> Observe valve position, close valve.</li> <li><i>f.</i> Turn valve adjusting screw clockwise to increase pressure. Use coil outlet gage to set relieving pressure. Valve should be set at 370 psi. Excess pressure switch must be jumped to set valve, as it opens at 350 psi and will shut down pump. Set valve to proper relieving pressure. Remove and disassemble valve. Inspect valve, seat and O-ring for any foreign materials or damage. Repair or replace valve parts as necessary.</li> <li><i>g.</i> Remove pump head assembly and valve assembly. Inspect valves, springs and cups for wear or damage. Replace parts as necessary.</li> <li><i>h.</i> Pump operates noisily. Remove pump and disassemble. Inspect for metal shavings in crankcase. Remove and inspect connecting rods. Inspect bearings and race bearings for damage or wear. Replace or repair parts as necessary.</li> <li><i>i.</i> Water emitting from valve. Reset, repair or replace valve as necessary. Valve set to relieve at 400 psig.</li> <li><i>j.</i> Clean intake filter and hoses or clear restrictions.</li> </ul>
10. Low operating temperature.	<ul style="list-style-type: none"> <li><i>a.</i> Improper thermostat setting.</li> <li><i>b.</i> Inadequate oil supply to burner.</li> <li><i>c.</i> Dirty or restricted burner nozzles.</li> <li><i>d.</i> Scale buildup in coil.</li> </ul>	<ul style="list-style-type: none"> <li><i>a.</i> Outlet temperature gage indicates low temperature. Increase temperature by turning the thermostat adjusting screw counterclockwise.</li> <li><i>b.</i> See malfunction 6.</li> <li><i>c.</i> See malfunction 9, step <i>g</i>.</li> <li><i>d.</i> Remove cleaning gun nozzles and conduct back pressure check. If differential pressure between back</li> </ul>

Table 5-1. Troubleshooting - Continued

Malfunction	Probable cause	Corrective action
10. Low operating temperature - Continued	<i>d.</i> Scale buildup in coil - Continued  <i>e.</i> Soot buildup in coil.  <i>f.</i> Combustion air adjusted incorrectly. <i>g.</i> Copper tube lines or regulator are leaking or cracked. <i>h.</i> Improper venting of combustion chamber (excessive wind).	pressure gage and outlet pressure gage exceeds 100 psi unit should be descaled.  <i>e.</i> Inspect coil and remove burner and heater shell hat. Wash soot off coil. <i>f.</i> See malfunction 3, step <i>h.</i> <i>g.</i> Locate and repair leaks or replace lines. <i>h.</i> Check for excessive downdraft vent stack restriction.
11. Excessive smoke in burner exhaust.	<i>a.</i> Combustion air adjusted incorrectly. <i>b.</i> Blower inlet dirty or obstructed, or dirty blower. <i>c.</i> Incorrect blower rotation. <i>d.</i> Dirty fuel strainer. <i>e.</i> Water in fuel. <i>f.</i> Dirty or worn burner nozzles. <i>g.</i> Improper fuel being used.  <i>h.</i> Excessive soot buildup in coil or combustion chamber.	<i>a.</i> See malfunction 3, step <i>h.</i>  <i>b.</i> Inspect blower inlet. Clean inlet and remove obstruction. Clean blower. <i>c.</i> See malfunction 3, step <i>f.</i> <i>d.</i> See malfunction 6, step <i>d.</i> <i>e.</i> See malfunction 8, step <i>k.</i> <i>f.</i> See malfunction 8, step <i>g.</i> <i>g.</i> Use only fuels having 30-38 API rating. <i>h.</i> See malfunction 10, step <i>e.</i>
12. Unit operates rough, coil hammers and vibrates.	<i>a.</i> Air dome needs draining.  <i>b.</i> Back pressure in heating coils excessive (scale buildup).  <i>c.</i> Faulty bearings in water pump.  <i>d.</i> Pump and motor belts are slipping.	<i>a.</i> Coil outlet and back pressure gages pulsate. Drain air dome every 4 hours. (see daily maintenance instructions.) <i>b.</i> Coil outlet and back pressure gages pulsate. Run back pressure check. Descale unit. <i>c.</i> Coil outlet and back pressure gages pulsate. See malfunction 9, step <i>h.</i> <i>d.</i> Refer to belt adjustment and tighten in accordance with recommendations.

### Section III. GENERAL MAINTENANCE

#### 5-4. Maintenance and Adjustments

#### 5-5. General

This section provides the procedures for maintenance and adjustments that are required to keep the steam cleaner operating properly.

#### 5-6. Coil Descaling Procedure (Acid Washing)

*a.* Under all operating conditions, natural mineral deposits in water will form scale deposits within the heating coils, requiring periodic removal.

*b.* The descaling procedure is accomplished as follows:

(1) Remove nozzle from cleaning gun. Turn off water supply to cleaner and close soap solution metering valve.

(2) Disconnect coil inlet hose (water supply hose from water pump to air dome inlet pipe

assembly) and attach auxiliary descale pump and tank. (Not required when using unit water supply tank.)

#### CAUTION

For extremely frequent descaling, it is advisable to use auxiliary descale pump and tank.

(3) Fill auxiliary or unit tank 1/3 full of water and affix cleaning gun in a manner that, with descale pump in operation, water is circulating from descale tank through heating coil, steam hose and cleaning gun back to descale tank.

(4) Be sure there is adequate water level in descale tank to maintain acid pump prime. Returning water is filtered through the screening to avoid recirculating scale chips during acid wash procedure.

(5) With water recirculating, add inhibited descaling acid at the rate of one pint every five minutes. If badly scaled, every ten minutes until at least three gallons have been added. Allow acid solution to recirculate at least three hours.

(6) Test acid solution for strength periodically, or if foaming subsides. A pinch of ordinary baking soda will foam when dropped into active acid solution. Keep recirculating active acid solution until all foaming from gun discharge ceases and/or scale chips no longer appear on filter screen.

(7) When descaling operation is completed, a pump descale tank dry and flush entire system with clear water for a full five minutes. Detach auxiliary acid pump system and reconnect cleaner's water pump to air dome inlet piping.

(8) Clean pump intake filter screen.

(9) To put cleaner back into operation, starting procedure described in Chapter 2.

**NOTE**

It is recommended the water pump be cleaned and inspected after the descaling operation. See water pump servicing instruction.

**5-7. Checking Ignition Transformer (Refer to Fig C-13)**

a. Check for adequate spark by momentarily short circuiting the transformer. Using a screwdriver (insulated handle), touch transformer terminals, a  $\frac{3}{4}$ -inch spark should be obtained. If no spark or less than  $\frac{1}{2}$ -inch spark and power is available at transformer primary, the transformer secondary is defective and should be replaced.

b. Check burner assembly for possible high voltage leaks in the electrode insulators. If in doubt, replace electrodes.

**5-8. Flame Safeguard Control (Refer to Fig C-13 and Para 4-26)**

a. Test the flame safeguard control as follows:

- (1) Obtain a 20,000 ohm per volt DC volt-meter.
- (2) Set the voltmeter on the 10 volt DC scale.
- (3) Remove the cover by loosening the retaining screw.

(4) Insert the probes until they come in contact with the test jack (refer to fig 4-2 for location).

(5) The voltage signal will be as follows:

No flame present .....	0 voltages
Relay pull-in .....	2 volts DC
Normal .....	4 volts DC
Maximum .....	5 volts DC

(6) Replace cover.

(7) With steam cleaner operating, remove UV scanner from sight tube and cover scanner lens. Flame safeguard control should shutdown unit and

positive fuel cutoff when the fuel valve is de-energized.

b. Clean relay contacts using a burnishing tool or fine crocus cloth, never a file or sandpaper.

**5-9. Belt Adjustment, Motor to Solution Pump (Refer to Fig C-7)**

a. The water pump, motor assembly is mounted on a slotted base and need not be removed for belt tightening or replacement.

b. To adjust V-belt, proceed as follows:

(1) With unit in an OFF position, disconnect main power supply to cleaner.

(2) Inspect slot adjustment available on pump mounting base and if adequate, loosen pump mounting bolts and adjust pump to proper  $\frac{2}{3}$  twist for proper belt tension. If proper adjustment is not available, proceed as follows:

(a) Remove rear access panel by removing four fastening screws.

(b) Loosen fuel pump mounting bolts and relieve belt tension.

(c) Loosen the four bolts and nuts supporting motor to base.

(d) Slide motor back until belt has proper tension, normally  $\frac{2}{3}$  twist when tight. Inspect motor and pump pulleys for proper alignment and secure mounting bolts and nuts.

(e) Slide fuel pump back until belt has proper tension, normally  $\frac{2}{3}$  twist when tight. Inspect fuel pump, motor and blower pulleys for proper alignment and secure mounting bolts and nuts.

(f) Replace rear access panel and turn on main power to steam cleaner.

**5-10. Low Oil Pressure Switch Adjustment (Refer to Fig C-13)**

a. With oil pump operating, fuel on-off valve closed, take a reading on fuel pump discharge gage and set to proper requirements, 110-120 psi.

b. Turn oil pump off, remove fuel pressure gage. Install on outlet of thermostat control valve tee and insert pipe plug in fuel pump gage port.

c. Start unit, open on-off valve, turn on low fire start switch and ignite burner. Permit discharge temperature to reach 325°F as indicated on outlet temperature gage. As burner modulates on and off, note pressure burner cuts out and in as indicated on fuel oil pressure test gage.

d. Set cut-in on pressure switch (right hand screw) by turning screw clockwise to raise pressure setting, counterclockwise to decrease pressure setting. Switch must be adjusted so burner ignition is achieved when fuel pressure is between 50 psi to 60 psi.

e. Set cutout on pressure switch (left hand

screw) by turning screw clockwise to decrease pressure setting, counterclockwise to increase pressure setting. Switch must be adjusted so burner fuel supply cuts off should pressure drop below 45 psi. Burners are susceptible to flame failure should fuel pressure drop below 40 psi.

#### **5-11. Air Pressure Switch Adjustment (Refer to Fig C-13)**

- a.* Remove electrical control box cover.
- b.* Remove air flow switch cover.
- c.* Start unit (turn on pump control switch).
- d.* Turn on low fire start switch, allow low fire burner to ignite.
- e.* Place obstruction in front of blower inlet. Hold obstruction over inlet for only a few seconds or until black smoke begins to emit from exhaust. If air flow switch is set properly, burner should be shut down.
- f.* If burner does not shut down, increase setting of air flow switch by turning adjustment screw clockwise.
- g.* Check air flow switch trip point again by repeating step *e* in this paragraph. Repeat steps *e* and *f* until burner shutdown occurs immediately after obstruction is placed over blower inlet. If switch setting is too high, burner will not ignite when low fire switch is turned on.
- h.* Decrease set point by turning adjustment clockwise until burner ignites.
- i.* Test air flow switch trip point after decreasing set point by repeating steps *e* and *f*.
- j.* Replace switch cover.
- k.* Replace electrical control box cover.

#### **5-12. Low Water Pressure Switch Adjustment (Refer to Fig C-13)**

- a.* Remove electrical control box cover.
- b.* Observe settings on dial indicator of switch, cut-in setting should be 20 psi, cut-out setting should be 5 psi.
- c.* If settings in step *b* are not as indicated, set cut-in on pressure switch (right hand screw) by turning screw clockwise to raise pressure setting, counterclockwise to decrease pressure setting.
- d.* Set cut-out on pressure switch (left hand screw) by turning screw clockwise to decrease pressure setting, counterclockwise to increase pressure setting.
- e.* Start unit and initiate low fire ignition.
- f.* After low fire has been established, shut off water supply to water tank. Water tank should pump dry, coil back pressure and outlet pressures drop to zero psi and fire shut off.
- g.* If fire does not shut off, increase cut-in

setting slightly and repeat step *f* above until fire shuts off.

*h.* If switch setting is too high, fire will not ignite. Decrease switch setting until fire ignites, then perform steps *f* and *g* of this paragraph to test fire shut-off point.

- i.* Replace electrical control box cover.

#### **5-13. Excess Pressure Switch Adjustment (Refer to Fig C-13)**

- a.* Remove electrical control box cover.
- b.* Observe settings on dial indicator of switch, cut-out setting should be 350 psi, cut-in setting should be 150 psi.
- c.* If settings in step *b* of this paragraph are not as indicated, set cut-out on pressure switch (right hand screw) by turning screw clockwise to raise pressure setting, counterclockwise to decrease pressure setting.
- d.* Set cut-in on pressure setting, counterclockwise to increase pressure setting.
- e.* Start unit and develop water flow through switch.
- f.* Slowly close discharge valve(s) and observe pressure on coil outlet gage.
- g.* When pressure gage reaches 350 psig, motor should shut off.
- h.* When pressure drops to 150 psig, unit motor should automatically restart.
- i.* If motor does not stop and start at pressures specified in steps *g* and *h* of this paragraph, readjust switch as indicated in steps *c* and *d* of this paragraph and retest until proper settings are achieved.
- j.* Replace electrical control box cover.

#### **5-14. Excess Temperature Switch (Refer to Fig C-13)**

- a.* Remove electrical control box cover.
- b.* Set dial indicator on switch to 370°F.
- c.* Start unit and initiate high fire, two gun, 300 GPH operational mode at 325°F.
- d.* After ½ hour operation at this mode, increase thermostat setting until coil outlet temperature gage reads 370°F.
- e.* If fire goes not trip, slowly decrease dial setting on switch until fire shuts off.
- f.* Allow temperature to drop and reset switch.
- g.* Fire unit at high fire to 370°F to see if switch cut-out setting repeats itself.
- h.* If setting does not repeat, perform steps *e* and *f* of this paragraph until proper setting is reached.
- i.* Replace electrical control box cover.

## Section IV. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS AND ASSEMBLIES

### 5-15. Outlet Coil Assembly (Refer to Fig C-17)

*a. Removal.* The coil outlet assembly need not be removed for normal component or valve repairs unless failure occurs in valve body assembly or in pipe fittings. If removal is necessary proceed as follows:

(1) Remove four instrument panel screws on right side of mounting bracket.

(2) Remove valve handles which may interfere with the panel when pivoted on hinge assembly.

(3) Swing panel away from steam cleaner and disconnect gage tube lines, fuel control tube lines, overheat bulb WEL, steam hoses and screw mounted electric switch box.

(4) Remove clamps securing piping assembly to unit and nipple for soap tank fill valve entering tank.

(5) Remove heater shell cover and separate coil outlet union. Remove nipple to coil outlet assembly and gently lift assembly away from unit being careful not to damage copper tube lines or electrical wires.

*b. Installation.* To install outlet coil assembly, reverse procedures in paragraph 5-15a, steps (1) through (5). Use teflon tape or pipe dope on all pipe fittings and align assembly to panel hole location.

#### NOTE

When mounting electrical switch box be careful wires are not pinched between panel and junction box.

### 5-16. Coil Inlet Assembly (Refer to Fig C-14)

*a. Removal.* The coil inlet assembly consists of a drain valve, copper tube and hose connector and necessary plumbing hardware. To remove assembly proceed as follows:

(1) Disconnect copper tube line, inlet hose, drain nipple on outlet of valve, valve and street elbow into cross.

(2) Unscrew cross assembly carefully not to damage copper tube lines or electrical cables in close proximity to assembly.

(3) Lift assembly free from steam cleaner.

*b. Installation.* To install coil inlet assembly reverse procedures in paragraph 5-16a, steps (1) through (3). Use teflon tape or pipe dope on all fittings before securing. Secure all connections and reconnect tube and hose assemblies.

### 5-17. Inner Coil (Refer to Fig C-18)

*a. Removal.* The inner coil may be removed separately from the preheat section without interference to the combustion chamber or related assemblies. To remove proceed as follows:

(1) Remove heater shell hat from shell assembly.

(2) Disconnect and remove copper tubing connecting the inner coil to preheat section.

(3) Separate union and remove nipple connecting inner coil to outlet assembly.

(4) Remove bolts, nuts and washers securing inner coil to preheat mounting tabs.

(5) Using a forklift or crane, lift inner coil from the chamber.

*b. Installation.* To install the inner coil proceed as follows:

(1) Using a forklift or crane, lift inner coil and gently lower into preheat coil.

(2) Align inner coil to preheat coil (inner coil must be concentric to preheat coil).

(3) To achieve proper alignment flat washers may be used between the inner and preheat coil tabs.

(4) Connect copper tubing between inner and outer preheat section.

(5) Install connector nipple from inner coil to coil outlet assembly and secure union connection.

(6) Replace heater shell hat and secure with screws.

### 5-18. Preheat Coil (Refer to Fig C-18)

*a. Removal.* The preheat coil is an integral part of the heater shell and combustion chamber fire box and must be removed as a complete unit. To remove proceed as follows:

(1) Follow instructions in paragraph 5-17a, steps (1) through (5) for inner coil removal.

(2) Follow instructions in paragraph 5-15a, steps (1) through (5) for outlet coil assembly removal.

(3) Remove the four screws securing the instrument panel on hinge assembly (heater shell).

(4) Remove burner plate assembly per paragraph 4-19.

(5) Follow instructions in paragraph 5-16a, steps (1) through (3) for coil inlet removal.

(6) Remove six 1/2-inch hex nuts supporting heater shell to flame assembly.

(7) Remove three 3/8-inch hex nuts located



in burner volute supporting center section of heater shell to frame assembly.

(8) Using a forklift or crane, lift preheat coil assembly from chassis being careful not to destroy gasket located between heater shell and frame.

*b. Installation.* For ease of installation it is advisable to position front of heater shell in proper relative position to location on frame prior to lifting. To install proceed as follows:

(1) Using a forklift or crane, raise heater shell and install gasket over mounting bolts. (If lifting attachments are unsafe, gasket may be placed on chassis mounting plate before heater shell assembly mounting bolts are lowered through gasket holes.)

(2) Lower heater shell onto chassis mounting plate and guide mounting bolts through plate holes.

(3) Install and secure the three 3/8-inch nuts and six 1/2-inch nuts supporting heater shell to chassis assembly.

(4) Reverse procedures in paragraph 5-18a, steps (1) through (8) for preheat coil removal.

#### **5-19. Hourmeter (Refer to Fig 2-1)**

*a. Removal.* The hourmeter may be removed without the need of instrument panel disassembly. To remove hourmeter proceed as follows:

(1) Disconnect main power supply to unit and turn all switches OFF.

(2) Remove the four screws mounting the electrical junction box located on back side of panel.

(3) Disconnect the electrical wires from hourmeter to power source by removing wire nuts and separating wires.

(4) Remove the three hourmeter mounting screws, nuts, lockwashers, while supporting hourmeter in location.

(5) Gently remove hourmeter from panel in forward motion using care not to snag electrical wires.

*b. Installation.* Reverse the procedures in paragraph 5-19a, steps (1) through (5).

#### **5-20. Soap Tank Outlet Assembly (Refer to Fig C-23)**

*a. Removal.* Should the soap control valve assembly need repairs and require removal, proceed as follows:

(1) Remove valve handles on those valves which may interfere with instrument panel when swinging away from unit.

(2) Remove the four instrument panel

mounting screws and swing panel away from unit exposing soap control valve assembly.

(3) Drain soap tank of all liquids and remove check valve cap on soap intake check valve to main water pump.

(4) Loosen clamp and remove hose assembly at soap control valve connection.

(5) Unscrew soap control valve assembly from soap tank mounting nipple.

*b. Installation.* To install soap control valve assembly reverse procedures in paragraph 5-20a, steps (1) through (5).

#### **5-21. Air Dome Outlet Assembly (Refer to Fig C-25)**

*a. Removal.* The air dome outlet plumbing assembly may be removed without disturbing the air dome location. To remove proceed as follows:

(1) Remove clamps and spuds from pump to air dome hose assembly and from air dome to coil inlet assembly where connected to air dome plumbing.

(2) Unscrew air dome plumbing assembly from air dome chamber.

*b. Installation.* To install outlet assembly reverse procedure in paragraph 5-21a, steps (1) and (2) and seal all joints with teflon tape or pipe dope.

#### **5-22. Air Dome (Refer to Fig C-4)**

*a. Removal.* When air dome removal is required follow procedures in paragraph 5-21a, steps (1) and (2) and proceed as follows:

(1) Disconnect copper tube line located on top of air dome vent assembly.

(2) Remove the two 3/8-inch nuts, washers and one 1/4 -20 nut, washer and screw on mounting brackets.

(3) Gently lift air dome until air dome outlet coupling clears hole in chassis mounting plate.

*b. Installation.* To install air dome reverse procedures in paragraph 5-22a, steps (1) through (3) and use teflon tape or pipe dope on all pipe connections.

#### **5-23. Wheel Assembly Blower (Refer to Fig C-26)**

*a. Removal.* The wheel assembly blower consists of a blower cage, blower bearing and blower bearing case assembly, all of which must be removed as a unit. For removal proceed as follows:

(1) Remove clamp and hose from water pump to air dome assembly at air dome. Reposition hose spud or air dome assembly to permit clearance of blower case assembly.

(2) Loosen fuel pump mounting bolts and relieve belt tension then remove belt from blower pulley.

(3) Remove three ¼ -20 hex nuts and washers securing blower mounting plate to blower housing and gently remove blower assembly from housing. Blower assembly must be removed by guiding blower cage clean of housing clearance hole.

**NOTE**

Blower cages are balanced for concentric operation and must not be bumped, dropped or subjected to any unusual pressure.

*b. Installation.* To install blower assembly, reverse procedures in paragraph 5-23a, steps (1) through (3) and proceed as follows:

(1) Adjust blower belt in accordance with paragraph 4-22.

**5-24. Blower Cage (Squirrel) (Refer to Fig C-26)**

*a. Removal.* The blower cage need not be removed for tightening of cage to blower bearing. Cage setscrew may be secured by removing air gate plate and intake screen allowing entrance to cage assembly from outside of unit. If removal is required proceed as follows:

**CAUTION**

Unit electrical power must be disconnected and all switches in the OFF position.

(1) Follow procedures in paragraph 5-23a, steps (1) through (3).

(2) Loosen blower cage setscrew located in hub and slip cage clear of bearing shaft.

*b. Installation.* To install blower cage on bearing shaft reverse procedure in paragraph 5-24a, step (2) and proceed with wheel assembly blower installation, paragraph 5-23b.

**5-25. Blower Bearing (Refer to Fig C-26)**

*a. Removal.* To remove the blower bearing follow procedures in paragraph 5-24a, steps (1) and (2) and proceed as follows:

(1) Remove blower drive pulley on bearing shaft.

(2) Remove snapping retaining bearing within blower case plate.

(3) Press out old bearing by placing flat surface (hub up) of casting on flat surface of arbor press allowing clearance for bearing to be removed. If press is not available, bearing may be removed by tapping on end of gearing shaft with block of wood or brass mallet.

*b. Installation.* To install blower bearing reverse procedures in paragraph 5-25a, steps (1) through (3). Long end of bearing shaft must be

inserted into blower casting first to achieve proper extension for mounting of drive pulley.

**5-26. Oil Tank Drain Assembly (Refer to Fig C-30)**

*a. Removal.* Should repairs or replacements be necessary on the oil tank drain assembly proceed as follows:

(1) Drain all fuel from fuel tank.

(2) Unscrew drain valve and related plumbing from tank.

(3) Remove hose spud fitting from valve outlet.

*b. Installation.* To install oil tank drain assembly reverse procedures in paragraph 5-26a, steps (1) through (3).

**5-27. Soap Tank Overflow Assembly (Refer to Fig C-4)**

*a. Removal.* To remove the overflow assembly proceed as follows:

(1) Remove overflow nipple support clamp, overflow hose clamps and unscrew assembly in counterclockwise direction.

(2) Valve replacement may be accomplished by removing inlet and outlet fittings.

*b. Installation.* To install overflow assembly reverse procedures in paragraph 5-27a, steps (1) and (2) and seal all joints with teflon tape or pipe dope.

**5-28. Air Dome Vent (Refer to Fig C-32)**

*a. Removal.* To remove the air dome, vent disconnect copper tube line and unscrew valve or assembly.

*b. Installation.* To reinstall, tighten fittings and connect copper tubing.

**5-29. Oil and Soap Tank (Refer to Fig C-4)**

*a. Removal.* Should oil and soap tank removal be necessary observe the following procedures:

(1) Remove valve handles on valves which may interfere with opening of instrument panel and remove four mounting screws on panel right side.

(2) Swing panel away from unit and remove soap control valve assembly, clamp, nipple and elbows on top of soap tank, fuel fill spout assembly, overflow soap tank assembly, fuel drain assembly and fuel filter assembly.

(3) Remove fuel pump bypass hose and clamp at fuel tank connection.

(4) Remove nuts, washers and bracket securing air dome to soap tank.

(5) Remove seven nuts securing tank to chassis mounting plate.

(6) Using a forklift or crane, lift tank from

chassis, screw nuts back on bolts to protect threads and block tank for safe repairs.

*b. Installation.* To install tank reverse procedures in paragraph 5-29a, steps (1) through (6) and use teflon tape or pipe dope on all pipe fittings.

### **5-30. Oil, Solution Pump and Motor Assembly (Refer to Fig C-7)**

*a. Removal.* To remove the assembly proceed as follows:

- (1) Disconnect main power to steam cleaner.
- (2) Disconnect and tag electrical wires for motor at magnetic starter and remove electrical cable.
- (3) Loosen hose clamp on pump discharge hose at air dome assembly and remove hose from hose spud.
- (4) Remove 8-inch water suction nipple which extends into water tank and/or section inlet hose if attached.
- (5) Loosen and remove blower belt.
- (6) Remove hose clamp and hose from solution pump soap inlet connection.
- (7) Close fuel filter flow valve and remove fuel intake hose at filter and fuel by-pass hose on oil tank (back side).
- (8) Remove oil pump outlet copper tube line.
- (9) Remove four bolts and nuts securing base plate to chassis.
- (10) Slide water pump, oil pump and motor assembly through front of steam cleaner.

*b. Installation.* To install the complete assembly reverse procedures in paragraph 5-30a, steps (1) through (10).

### **5-31. Water Pump (Refer to Fig C-9)**

*a. Removal.* To remove water pump proceed as follows:

- (1) Accomplish procedures in paragraph 5-30a, steps (1) through (10).
- (2) Remove four pump mounting bolts and nuts and washers and lift pump from base plate. Lift pump free.

*b. Installation.* To install water pump proceed as follows:

- (1) Replace water pump on base, secure in place with four nuts, bolts and washers.
- (2) Accomplish procedures in paragraph 5-30a, steps (1) through (10) in the reverse order.

### **5-32. Motor (Refer to Fig C-10)**

*a. Removal.* To remove the motor proceed as follows:

- (1) Accomplish procedures in paragraph 5-30a, steps (1) through (10).

(2) Remove four bolts, washers and nuts securing motor to mounting plate.

*b. Installation.* To install the motor proceed as follows:

- (1) Place motor on base plates, securing in place with four bolts, washers and nuts.
- (2) Align and tighten motor to pump belt.
- (3) Accomplish procedures in paragraph 5-30a, steps (1) through (10) in the reverse order.

### **5-33. Oil Pump Assembly (Refer to Fig C-11)**

*a. Removal.* To remove oil pump proceed as follows:

- (1) Remove oil pump intake hose, by-pass return hose and outlet copper tubing.
- (2) Remove two bolts, washers and nuts securing pump to mounting plate and remove belt.

*b. Installation.* To install oil pump proceed as follows:

- (1) Connect outlet copper tubing, by-pass return hose and fuel intake hose, secure and open fuel filter valve.
- (2) Place pump on mounting base and snug in place with two bolts, washers and nuts aligning and tensioning belt while securing in position.

### **WARNING**

Before performing any of the following procedures, assure all electrical power to the unit has been disconnected.

### **5-34. High Fire Fuel Solenoid Valve (Refer to Fig C-13)**

*a. Removal.* To remove the high fire fuel solenoid valve proceed as follows:

- (1) Remove front fire panel and electrical control box cover.
- (2) Disconnect three copper tubing connections to valve.
- (3) Disconnect valve electrical leads no. 2, and 6 from lower half of electrical control box terminal board.
- (4) Loosen and remove valve assembly retaining jam nut inside electrical box.
- (5) Lift valve from back of electrical control.

*b. Installation.* To install high fire fuel solenoid valve proceed as follows:

- (1) Inset ½-inch pipe nipple portion of valve assembly through opening in back of electrical control box. High fire valve fits in opening closest to front of unit.
- (2) Secure valve to box with electrical jam nut on ½-inch pipe nipple on inside of box.
- (3) Connect valve electrical leads to control terminal board terminals 2 and 6.

(4) Connect fuel supply, fuel to burner and oil pressure switch sensing copper tubing connections to valve assembly.

(5) Install front fire panel and electrical control box cover.

**5-35. Low Fire Fuel Solenoid Valve (Refer to Fig C-13)**

*a. Removal.* To remove the low fire fuel solenoid valve proceed as follows:

(1) Accomplish procedures in paragraph 5-34a, steps (1) and (2).

(2) Disconnect valve electrical leads no. 2 and 7 from lower half of electrical control box terminal board.

(3) Accomplish procedures in paragraph 5-34a, steps (4) and (5).

*b. Installation.* To install low fire fuel solenoid valve proceed as follows:

(1) Accomplish procedures in paragraph 5-34b, steps (1) and (2).

(2) Connect valve electrical leads to control terminal board terminals 2 and 7.

(3) Connect fuel supply from thermostat, fuel supply to high fire valve and fuel to burner tubing connection to valve assembly.

(4) Install front fire panel and electrical control box cover.

**5-36. Control Power Transformer (Refer to Fig C-13)**

*a. Removal.* To remove control power transformer proceed as follows:

(1) Remove electrical control box cover.

(2) Remove conductors from primary and secondary terminals of transformer.

(3) Loosen and remove four mounting screws, nuts and lockwashers securing transformer to box.

(4) Remove transformer from box.

*b. Installation.* To install the control power transformer proceed as follows:

(1) Align transformer base mounting holes with control box mounting holes.

(2) Secure transformer to box with four mounting screws, nuts and lockwashers.

(3) Connect electrical conductors to transformer primary and secondary.

(4) Replace electrical control box cover.

**5-37. Ignition Transformer (Refer to Fig C-13)**

*a. Removal.* To remove the ignition transformer proceed as follows:

(1) Remove front fire panel and electrical control box cover.

(2) Disconnect ignition transformer electrical

leads no. 2 and 4 from lower half of electrical control box terminal board.

(3) Disconnect ignition electrodes from transformer secondary prongs on back side of box.

(4) Loosen and remove upper transformer mounting screw, nut and lockwasher.

(5) Loosen lower transformer mounting screw.

(6) Slide transformer up and out from lower mounting screw, remove from box.

*b. Installation.* To install the ignition transformer accomplish procedures in paragraph 5-37a, steps (1) through (6) in the reverse order.

**5-38. Excess Pressure Switch (Refer to Fig C-13)**

*a. Removal.* To remove excess pressure switch proceed as follows:

(1) Remove front fire panel and electrical control box cover.

(2) Remove switch cover.

(3) Disconnect electrical leads at switch terminals.

(4) Disconnect switch sensing connection to switch bellows assembly.

(5) Remove two switch mounting screws from back side of box.

(6) Remove switch from box.

*b. Installation.* To install the excess pressure switch proceed as follows:

(1) Align switch with mounting holes in box.

(2) Accomplish procedures in paragraph 5-38a, steps (1) through (5) in the reverse order.

**5-39. Water Pressure Switch (Refer to Fig C-13)**

*a. Removal.* To remove the water pressure switch proceed as follows:

(1) Remove front fire panel and electrical control box cover.

(2) Remove switch cover.

(3) Disconnect electrical leads at switch terminals.

(4) Disconnect switch sensing capillary at connection to coil inlet assembly.

(5) Remove two switch mounting screws from back side of box.

(6) Remove switch together with attached capillary from box.

*b. Installation.* To install the water pressure switch proceed as follows:

(1) Align switch with mounting holes in box.

(2) Secure switch with two mounting screws, insert screws from back side of box.

(3) Route switch pressure sensing capillary through hole provided in bottom panel of box and

connect at pressure connection on coil inlet assembly.

(4) Connect electrical leads to switch terminals.

(5) Replace switch cover.

(6) Replace front fire panel and electrical control box cover.

#### **5-40. Low Oil Pressure Switch (Refer to Fig C-13)**

*a. Removal.* To remove the low oil pressure switch proceed as follows:

(1) Remove front fire panel and electrical control box cover.

(2) Remove switch cover.

(3) Disconnect electrical leads at switch terminals.

(4) Disconnect switch sensing connections to switch bellows assembly.

(5) Loosen two electrical control box mounting bolts at rear panel (panel with fuse).

(6) Remove two electrical control box mounting bolts on front side of box (below flame safeguard and low water pressure switch).

(7) Pivot control box out from unit chassis to gain access to oil pressure switch mounting screws at back side of box.

(8) Remove the two oil pressure switch mounting screws.

(9) Remove the oil pressure switch from the box.

*b. Installation.* To install the low oil pressure switch accomplish the procedures in paragraph 5-40a, steps (1) through (9) in reverse order.

#### **5-41. Low Air Pressure Switch (Refer to Fig C-13)**

*a. Removal.* To remove the low air pressure switch proceed as follows:

(1) Remove electrical control box cover.

(2) Remove switch cover.

(3) Disconnect electrical leads at switch terminals.

(4) Disconnect switch air sensing connection at switch diaphragm.

(5) Remove two nuts and lockwashers on bottom side of control box.

(6) Remove switch from control box.

*b. Installation.* To install the low air pressure switch accomplish the procedures in paragraph 5-41a, steps (1) through (6).

#### **5-42. Excess Temperature Switch (Refer to Fig C-13)**

*a. Removal.* To remove the excess temperature switch proceed as follows:

(1) Remove front fire panel and electrical control box cover.

(2) Loosen setscrew at bulb WEL on coil outlet assembly and remove thermocouple bulb WEL.

(3) Route thermocouple bulb and wire through hole in back of electrical control box into box.

(4) Remove switch cover.

(5) Disconnect electrical leads at switch terminals.

(6) Remove two switch mounting screws from back side of box.

(7) Remove switch, thermocouple wire and thermocouple bulb from box.

*b. Installation.* To install the excess temperature switch proceed as follows:

(1) Align switch with mounting holes in box.

(2) Secure switch with two mounting screws, insert screws from back side of box.

(3) Route thermocouple bulb and wire through hole in back of box to bulb WEL on coil outlet assembly.

(4) Insert thermocouple bulb and backing strip in WEL. Secure with setscrews.

(5) Connect electrical leads to switch terminals.

(6) Replace switch cover.

(7) Replace front fire panel and electrical control box cover.

#### **5-43. Flame Safeguard Relay Chassis (Refer to Fig C-13)**

*a. Removal.* To remove the flame safeguard relay chassis proceed as follows:

(1) Remove electrical control box cover.

(2) Remove flame safeguard cover.

(3) Loosen two captive relay mounting screws located at the top and bottom toward back of relay.

(4) When screws are free of relay mounting base, remove relay from box.

*b. Installation.* To install the flame safeguard relay chassis accomplish the procedures in paragraph 5-43a, steps (1) through (4) in reverse order.

#### **5-44. Flame Scanner (Refer to Fig C-13)**

*a. Removal.* To remove the flame scanner proceed as follows:

(1) Perform procedure in paragraph 5-43a, steps (1) through (4).

(2) Disconnect scanner leads at terminals S1 and S2 of flame relay terminal board.

- (3) Loosen scanner cable squeeze connector at back of electrical control box.
- (4) Remove front fire panel.
- (5) Disconnect scanner from scanner sight tube.
- (6) Remove scanner from unit.

*b. Installation.* To install the flame scanner proceed as follows:

- (1) Route flame scanner cable through squeeze connector at back of electrical control box.
- (2) Connect scanner leads to terminals S1 and S2 of relay terminal board.
- (3) Tighten squeeze connector around scanner cable.
- (4) Connect scanner to sight tube on burner.
- (5) Perform procedures in paragraph 5-43b.
- (6) Replace front fire panel.

#### **5-45. Flame Safeguard Mounting Base (Refer to Fig C-13)**

*a. Removal.* To remove the flame safeguard mounting base proceed as follows:

- (1) Accomplish procedures in paragraph 5-43a, steps (1) through (4).
- (2) Disconnect all electrical leads to flame relay terminal board. Withdraw leads through knockouts in base.
- (3) Remove scanner cable squeeze connector and jam nut from back of base.
- (4) Remove four mounting nuts and lockwashers from base.
- (5) Remove base from box.

*b. Installation.* To install the flame safeguard mounting base proceed as follows:

- (1) Align base with mounting holes in box.
- (2) Secure base with four mounting screws, nuts and lockwashers.
- (3) Install scanner cable squeeze connector in hole provided at back of base. Tighten in place with jam nut.
- (4) Route flame scanner electrical leads through knockouts in base. Connect leads to terminal board.

#### **5-46. Fuse Holder (Refer to Fig C-13)**

*a. Removal.* To remove the fuse holder proceed as follows:

- (1) Remove electrical control box cover.
- (2) Cut electrical leads at soldered connections of fuse holder.
- (3) Remove locknut retaining fuse holder in place.
- (4) Remove fuse holder from box.

*b. Installation.* To install the fuse holder proceed as follows:

- (1) Install fuse holder in hole provided in side panel.
- (2) Secure fuse holder with locknut.
- (3) Strip insulation on electrical leads to fuse holder 1/4-inch and solder to fuse holder terminals.
- (4) Replace electrical control box cover.

#### **5-47. Blowdown Pushbutton (Refer to Fig C-13)**

*a. Removal.* To remove the blowdown pushbutton proceed as follows:

- (1) Remove electrical control box cover.
- (2) Disconnect electrical leads at pushbutton terminals.
- (3) Remove locknut retaining pushbutton in place.
- (4) Remove pushbutton from box.

*b. Installation.* To install the pushbutton accomplish procedures in paragraph 5-47a, steps (1) through (4) in reverse order.

#### **5-48. Magnetic Starter and Breaker Switch Assembly (Refer to Fig C-28)**

*a. Removal.* To remove the magnetic starter and breaker switch assembly proceed as follows:

- (1) Remove rear machinery access panel.
- (2) Disconnect power cord from disconnect switch.
- (3) Loosen squeeze connector at disconnect switch and remove power cord from switch.
- (4) Disconnect motor power leads at magnetic starter.
- (5) Remove liquidtight connector from magnetic starter to motor at magnetic starter.
- (6) Disconnect control transformer primary leads at magnetic starter terminals L1 and L2.
- (7) Disconnect magnetic coil control power conductors no. 2 and 11.
- (8) Remove liquidtight connector from magnetic starter to electrical control box at magnetic starter.
- (9) Remove three mounting screws, nuts and lockwashers securing switch mounting plate assembly to soap and fuel tank mounting plate.
- (10) Remove starter and breaker switch assembly from unit.

*b. Installation.* To install magnetic starter and breaker switch assembly.

- (1) Align assembly to three mounting holes in soap and fuel tank mounting plate.
- (2) Secure assembly with mounting screws, nuts and lockwashers.
- (3) Connect liquidtight connector from control box to magnetic starter. Secure with electrical jam nut.

(4) Connect magnetic coil control power conductors no. 2 and 11 to coil terminals.

(5) Connect control transformer primary leads to magnetic starter terminals L1 and L2.

(6) Connect liquidtight connector from magnetic starter. Secure with electrical jam nut.

(7) Connect motor power leads at magnetic starter.

(8) Route power cord through squeeze connector at disconnect switch. Tighten squeeze connector around power cord.

(9) Connect power cord to terminals on disconnect switch.

(10) Replace rear machinery panel.

#### **5-49. Disconnect Switch from Magnetic Starter (Refer to Fig C-28)**

*a. Removal.* To remove the disconnect switch from magnetic starter proceed as follows:

(1) Disconnect power leads at T1, T2 and T3 of disconnect switch.

(2) Remove electrical jam nuts for off-set connector at magnetic starter.

(3) Separate magnetic starter from disconnect switch.

*b. Installation.* Install the disconnect switch to the magnetic starter proceed as follows:

(1) Insert off-set connectors into holes provided in the bottom of the magnetic starter.

(2) Install electrical jam nuts on connectors and take up firmly.

(3) Connect power leads from L1, L2 and L3 of magnetic starter to terminals T1, T2 and T3 of disconnect switch respectfully.

#### **5-50. Control Terminal Board (Refer to Fig C-13)**

*a. Removal.* To remove the control terminal board proceed as follows:

(1) Remove electrical control box cover.

(2) Disconnect all electrical leads to terminal board.

(3) Remove two terminal board mounting nuts and lockwashers.

*b. Installation.* To install the control terminal board proceed as follows:

(1) Install terminal board on two mounting screws.

(2) Secure with mounting nuts and lockwashers.

(3) Connect electrical leads to terminal board.

(4) Replace electrical control box cover.





## CHAPTER 6

## REPAIR OF STEAM CLEANER

**6-1. Plumbing Assembly**

Repairs on plumbing assemblies require the same procedures normally utilized on equal or similar applications. All fittings shall be replaced with new components, all pipe joints sealed with teflon tape or pipe dope. No attempts shall be made to patch, plug, solder or weld leaks nor shall fittings be distorted or altered in any way for the purpose of forced installation.

**6-2. Water Pump Repair (Refer to Fig C-9)**

a. The following steps have been provided to assist the operator in the normal care and maintenance of the pumping system. Specifications and procedures must be followed to assure maximum pump operation and unit life.

**CAUTION**

Disconnect the power source before performing any service on the pump.

**(1) General care of the pump.**

(a) Drain and refill the pump crankcase with clean SAE 20 non-detergent oil after the first 100 hours of operation. Following the first 100 hours of operation, for best results, always change the oil every 750 hours of operation.

(b) Keep all piping and mounting bolts tight.

(c) Replace all worn parts promptly with exact replacement parts.

**(2) Care in freezing weather.****CAUTION**

Precaution must be taken to avoid damage to the pump from liquid allowed to freeze in the valve chamber.

(a) Drain all connecting piping.

(b) Remove cap screw, clamp, valve cover and valve disc and spring assemblies to drain the valve chamber, when freezing temperatures are expected. Remove top discharge valves or raise them to be sure that no liquid is trapped under the inner suction valves.

**(3) Servicing the plunger packings.**

(a) Release the valve chamber from the pump case by removing the three cap screws using a 9/16-inch wrench.

(b) Lift the chamber free of the cylinders. Remove the cap screws, cup washers and plunger packings (cups).

(c) Lift the cylinders from the pump case.

(d) Inspect the O-rings and umbrellas. If either of these parts are damaged, they should be replaced. A pocketknife can be used for easiest removal of the umbrellas.

**NOTE**

Clean all parts thoroughly and replace worn parts with exact replacement parts.

(e) Reassembling plunger packings, inspect bottom gasket and replace if necessary.

**NOTE**

If it is necessary to replace one gasket at either top or bottom of cylinders, then both top and bottom gaskets should be replaced.

**NOTE**

For easier installation of the umbrella, immerse in hot water for approximately two to three minutes to soften.

(f) Fold the plastic umbrellas to insert them through openings and over ends of crosshead rods.

(g) Press tops of umbrellas to place pilot washers over ends of rods with groove up.

(h) Place O-rings and packing holders in position on ends of crosshead rods.

(i) Place cylinders in position in the mounting plate recess.

(j) Oil the plunger packings and place them in the open end of the cylinders, with the bottom cup down, top cup up. Use the thumb to press the packings into each cylinder, firmly and squarely on the plunger rod end.

(k) Turn the pump by hand to raise each plunger rod to the top of the stroke, as needed.

(l) Place the cup washers with the ribbed side against the plunger packing inside the cups of the packing.

(m) Secure packing and washers to plunger rods with cap screws, tightening them until the washers and cups seat firmly on the plunger rods.

(n) Inspect top cylinder gaskets and replace both if either shows a defect. Holding them in place in the valve chamber by using a heavy oil or grease if necessary.

(o) Return the valve chamber to position over the cylinder making sure that gaskets and

cylinders are properly positioned in the recesses top and bottom.

(p) Retighten cap screws alternately and evenly until the parts are snugly seated.

(4) *Servicing the pump valves.*

(a) Remove the cap screw and clamp bar from the rear of the valve chamber and lift out the valve covers and O-rings attached.

(b) Remove the discharge valve springs and seat assemblies and valve cages.

(c) Insert the round end of a valve seat puller thru the opening at the center of the valve seats and loosen seats from the valve chamber with a rocking motion of the tool.

(d) Remove the valve seats from the recesses with opposite end (curved end) of tool.

(e) Repeat the four preceding steps to remove the suction valve parts which are identical to the discharge valve parts and are located immediately under them in the valve chamber.

(f) Clean all parts and inspect them. Replace all worn parts as needed.

(5) *Reassembling the valve parts.*

**NOTE**

Valve seats may be used either side up, thus, if one side shows wear, the opposite side may be used to provide a new seat.

(a) With the O-ring in place on each valve seat, place a few drops of light oil on the ring and seat. Place each squarely in the bottom of the recess in the valve chamber.

(b) Place the valve cages on the valve seats and the springs and disk assemblies inside each cage.

(c) Repeat steps (a) and (b) to install the outer discharge valve parts.

(d) Place the valve covers (with O-rings on bottom groove) over each valve assembly.

(e) Replace clamp bar and cap screw. Tighten the cap screw only snugly as over-tightening can damage valve parts. Use 12 to 15 foot-pounds torque.

(6) *Servicing the crankshaft.*

(a) Remove pipe plug and drain oil from pump case.

(b) Disconnect piping and remove pump from base.

(c) Remove cap screws, cup washers and mounting base carefully to protect gasket.

(d) Remove cap screws from the connecting rod assemblies. Use a center punch or other suitable instrument to mark caps and rods for proper rematching when they are reassembled.

(e) Remove oil slinger from the crankshaft.

(f) Push the connecting rods and crosshead

assemblies into the pump case to clear the crankshaft.

(g) Remove the driven sheave from the crankshaft extension.

(h) Remove snaprings.

(i) Place a wood block against either end of the crankshaft and drive the shaft from the pump case.

**CAUTION**

Never pound directly on bearings when removing or replacing them on the crankshaft. A block of wood, with a suitable sized opening or block supports to assure reasonable equal support around the bearing, in a press is best for this important work.

(j) After inspecting and replacing all worn parts, press new bearing (if needed) against the shoulders on the crankshaft.

(k) With the crankshaft and bearing assemblies in place in the pump case, place the oil seals, carefully, over the ends of the crankshaft with the lip of the seals facing the inside of the pump case.

(l) Seat the snaprings in grooves in the bearing housings against the oil seals and tap the crankshaft to allow a slight end play in the crankshaft.

(m) Reassemble the connecting rods and crosshead, being sure to rematch the rod and cap properly as marked when disassembled.

(n) Complete the reassembly by reversing steps (a) through (h), being sure to replace drain plug.

(o) Remove  $\frac{3}{4}$ " fill plug and fill the crankcase with clean SAE 20 non-detergent oil to the filler plug level.

(p) Turn the pump a few revolutions by hand to be sure all parts are running freely before using the pump.

(7) *Servicing the crossheads.*

(a) Remove the valve chamber, cylinders and plunger packings as described in paragraph (3), servicing the plunger packings, steps (a) and (b).

(b) Remove O-ring seal, back-up washer and the crosshead umbrellas.

(c) Remove the mounting base and the connecting rods as described in paragraph (6), servicing the crankshaft, steps (a) through (d).

(d) Turn the crankshaft by hand to allow removal of the crossheads, being sure that all parts are reassembled in the exact former position.

(e) Reverse steps (a) through (c) when reassembling the crossheads, being sure that all

parts are reassembled in the exact former position.

### 6-3. Motor Assembly (Refer to Fig C-10)

a. The motor should be inspected and defective components replaced.

b. To repair the motor proceed as follows:

(1) Remove pulley setscrew(s) and slide pulley clear from motor shaft.

(2) Remove motor electrical box cover, tag electrical wires for proper reinstallation and proceed to remove electrical wire nuts.

(3) Remove electrical cable connector nut located inside of motor of motor junction box.

(4) Inspect motor components and replace as required.

### 6-4. Fuel Pump Repair (Refer to Fig C-12)

a. The fuel pump is designed to give years of trouble-free service with minimum maintenance, providing that only clean filtered kerosine, fuel oils or diesel are used and fuel is kept free of water. Never attempt to use gasoline or solvents of any type or fuels containing gasoline, drain oils or solvents. Avoid operating fuel pump without fuel in supply tank.

b. Fuel pump is equipped with a two-pipe system, fuel supply line and fuel return line, which provides self-priming and air purging oil fuel system. Keep both lines open, clean and free of any leaks.

(1) The fuel pump is factory set to operate at 100-125 psi on fuel pressure service gage. Any appreciable collapse of pressure indicates excessive by-pass at by-pass plug, missing or damaged valve gasket, worn piston assembly seal or worn gear set.

(2) The fuel pump has a cut-off valve designed to stop all oil flow to fuel nozzles when pump pressure drops below approximately 85 pounds. This prevents fuel dribble at nozzle during shutdown or startup. If unit smokes during fire ON or OFF operation, cutoff valve could be leaking. To check, temporarily remove fuel pressure gage and plug pressure gage port. Remove tube fittings to burner nozzle and install fuel pressure gage in its place. Operate fuel pump in ON position at pump motor switch, then shut switch OFF. The gage should hold approximately 85 psi or more. If pressure drops below the cut-off point the valve assembly should be disassembled, cleaned or replaced, if necessary.

c. If seal leakage is suspected, the seal assembly may be disassembled by removing the three 10-24 screws from retainer ring, lifting off retainer, seal spring and removing seal diaphragm. If required, the drive shaft, gear set

and thrustwasher can be removed for inspection or replacement.

d. Before reassembly, dry the seal chamber above the shoulder in the pump body. To make sure there is some end play in shaft after reassembly, pull on the shaft. Also make sure that the tab on the thrustwasher mates with either seal drain hole in pump body prior to reassembly of seal.

e. The fuel pump is equipped with an internal filter and it should not be necessary to clean or service it until five or six months after unit is in service. This is due to the effective self-cleaning action of the rotary filter.

f. To inspect or clean filter, remove filter cover by removing the six 10-24 screws. Carefully pry cover off, taking care not to damage the front cover gasket. Wipe inside of cover clean, if necessary and replace.

### 6-5. Flame Safeguard, Scanner and Relay Maintenance (Refer to Para 4-26)

a. With all external limit switches to flame safeguard relay satisfied, terminals of the relay will be powered in the following sequences.

(1) Terminal no. 7 of the flame safeguard control will be powered through limit control circuit no. 3.

(2) Flame safeguard terminal no. 8 is powered through LS-1 (lockout switch). If LS-1 is open, the flame safeguard requires a manual reset.

(3) Terminal no. 8, in turn, powers terminal no. 6 and flame safeguard transformer T1.

(4) With T1 transformer powered, the time delay network is energized through the LS heater and contact RF-2 initiating the seven-second prepurge timing.

(5) After completion of the seven-second purge, the TD (time delay) relay is energized and contact TD-1 closes, locking in the TD relay.

(6) Contact TD-2 also closes, energizing terminal no. 3 and terminal no. 4 through contact RF-3. Contact TD-3 opens.

(7) Terminal no. 3 powers circuit no. 7 to open the low fire fuel valve. At the same time, terminal no. 4 powers circuit no. 4 to power the ignition transformer, producing the spark to ignite the fuel.

(8) When the fire has been established and detected by the UV flame detector, a signal will be transmitted to the flame detector network through terminals S1 and S2.

(9) The flame signal is amplified in the flame detection network and flame relay (RF) is energized.

(10) When the RF relay is energized, contact RF-2 opens and the LS heater circuit is disconnected. Contact RF-3 opens and the ignition transformer is de-energized. Contact RF-4 closes and powers terminal 5.

(11) With terminal 5 energized, burner switch high may be closed, powering the high fire fuel valve through control circuit no. 6.

(12) In the event flame is not detected within 12 seconds after TD relay is energized, the LS heater will trip the lockout switch opening LS-1, which disconnects power to terminal 8, all load terminals and TD-2. LS-2 closes and terminal A (alarm) is energized. The flame failure light is powered through control circuit no. 8. Before restart, the lockout switch (red reset button) will have to be reset.

(13) In the event of flame failure, fuel is interrupted within two seconds. Ignition is not brought back on until after a new seven-second prepurge cycle. If the low fire flame fails to reignite, lockout will occur in 12 seconds.

(14) In the event that the flame relay is energized (flame detected) at any time during the prepurge, RF-1 will close and by-pass the time delay network, bringing it back to 0 seconds, where the timing stops until the flame relay is de-energized.

(15) If the flame relay should remain in an energized position, RF-5 will be closed and the LS heater will be powered through RF-5 and TD-3. Lockout will occur in 12 seconds.

(16) If, during normal operating conditions, any of the limit switches open, terminal no. 7 will be de-energized. The TD relay will de-energized and contact TD-2 will open, closing the fuel valves. After condition which opened the limit switch is rectified, a new seven-second prepurge is required before the low fire fuel solenoid valve and ignition transformer is powered.

**NOTE**

During normal modulation of the burner, the fuel low pressure switch will open causing recycling of the burner.

(17) If the above sequences do not occur in the manner listed and the difficulty has been isolated to the UV scanner and relay, first test for continuity across the scanner leads. If scanner shows open, replace scanner.

(18) If scanner is functional, inspect relay for mechanically bound flame relay or time delay relay (refer to fig 4-2). Inspect relay contact blocks and observe if blocks are cocked on guides. Free contact block and assure block moves contact freely.

(19) Inspect relay for broken or loose conductors, broken solder joints or broken or loose terminals. Repair as necessary.

(20) If difficulty cannot be isolated by the preceding steps, the relay should be replaced.

**6-6. Coil Inlet Assembly (Refer to Fig C-14)**

All fittings and components should be inspected and replaced if found to be defective. No attempts shall be made to patch, plug, solder or weld leaking fittings.

**6-7. Burner Plate Assembly (Refer to Fig C-16)**

The burner plate weld assembly may be repaired when utilizing normal welding procedures for equal or similar components. Plate assembly shall require removal of all components prior to welding or other major repairs. Major damage is cause for replacement.

**6-8. Outlet Coil Assembly (Refer to Fig C-17)**

All fittings and components should be inspected and replaced if found defective. For replacement of valves only, these fittings requiring removal shall be disassembled from assembly. Always start disassembly sequence at component being repaired to minimize fitting removal. No attempts shall be made to patch, plug, solder or weld leaking fittings for distort fittings for forced installation.

**6-9. Outlet Assembly Soap Tank (Refer to Fig C-31)**

A defective valve is cause for rejection and no attempts to repair it shall be made.

**6-10. Air Dome Outlet Assembly (Refer to Fig C-25)**

All fittings should be inspected for defects and replaced if found defective.

**6-11. Wheel Assembly Blower (Refer to Fig C-26)**

The wheel assembly blower may be disassembled for component part replacement only. No attempts shall be made to weld, peen or patch blower plate casting. Blower cage is not repairable and must be replaced if inspection reveals defects.

**6-12. Switch Assembly and Breaker (refer to Fig C-28)**

a. Remove magnetic starter contact block and inspect contacts for cleanliness. If contacts have carbon deposits, clean with burnishing tool or fine crocus cloth.

b. Remove magnetic coil, test continuity across coil. If coil shows open, replace.

c. Check ratchet wheels on thermal overload

elements to assure they are tight in solder pots. If ratchet wheels rotate in solder pots, replace thermal elements.

*d.* Check all screws in magnetic starter for tightness and tighten as necessary.

*e.* Check disconnect switch contact blocks and switch blades for cleanliness. If contact blocks or blades have carbon deposits, clean with burnishing tool or fine crocus cloth.

*f.* Check all screws in disconnect switch for tightness and tighten as necessary.

*g.* Check alignment of switch blades to contact blocks. If misaligned, adjust and align as necessary.

### **6-13. Electrical Circuitry**

For maintenance of electrical control circuits, refer to electrical control drawing.

### **6-14. Fuel Filter Assembly (Refer to Fig C-29)**

The fuel filter assembly should be inspected for damage on ON-OFF valve, inlet, outlet pipe threads and replaced if found defective.

### **6-15. Oil Tank Drain Assembly (Refer to Fig C-30)**

The drain assembly shall be inspected and defective components replaced.

### **6-16. Soap Tank Overflow Assembly (Refer to Fig C-31)**

All fittings and components shall be inspected and replaced as required. Valve stem packing may be tightened, all other failures cause for rejection.

### **6-17. Hardware**

Common hardware items should be replaced with like materials of equal strength compatible with installation requirements.

### **6-18. Tubing Assemblies (Refer to Fig 6-1)**

Copper tube lines should be replaced when inspection reveals cracks, leaks or flaking of internal surface. Tubing should be fabricated to equal configuration as that removed from unit.

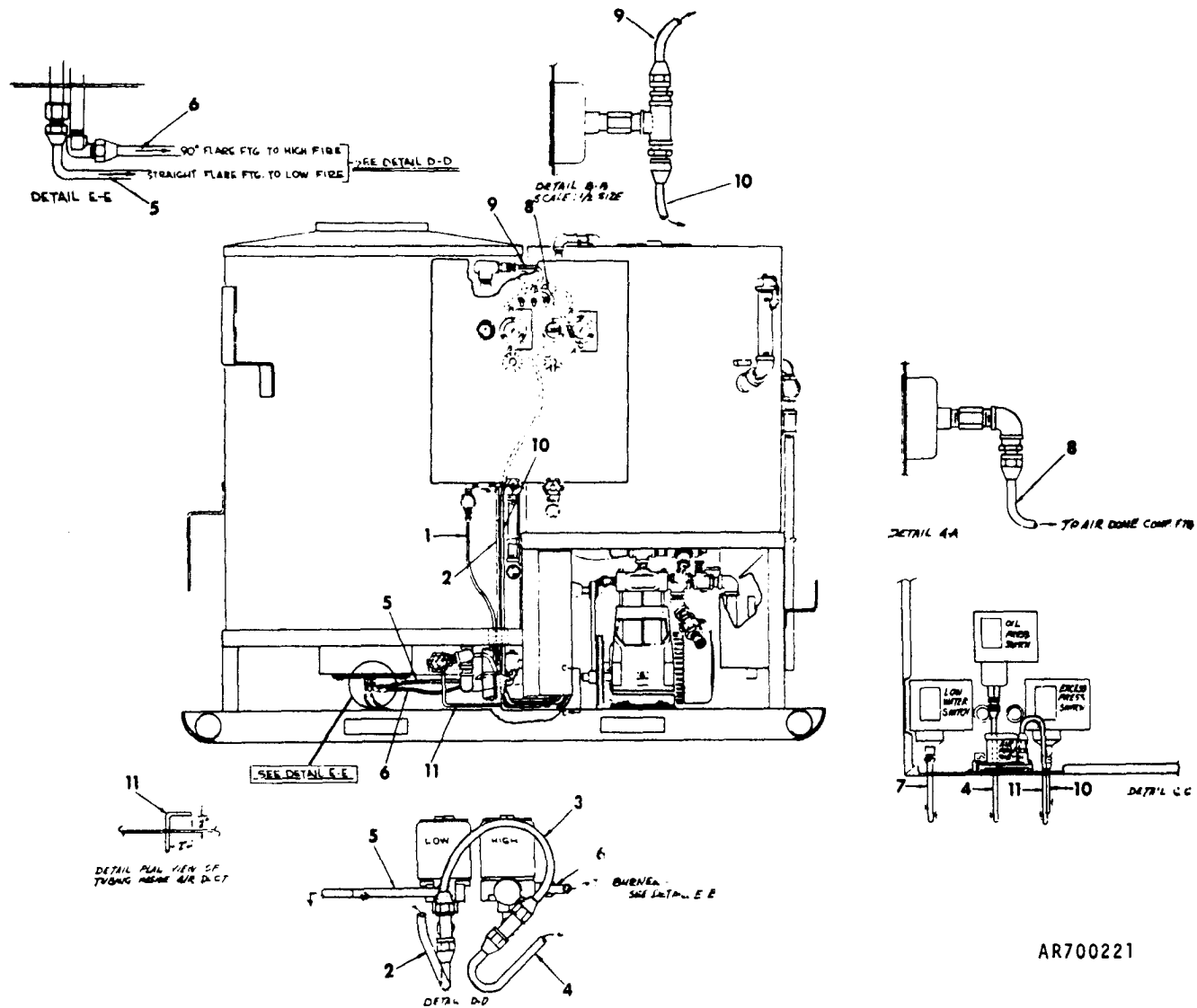
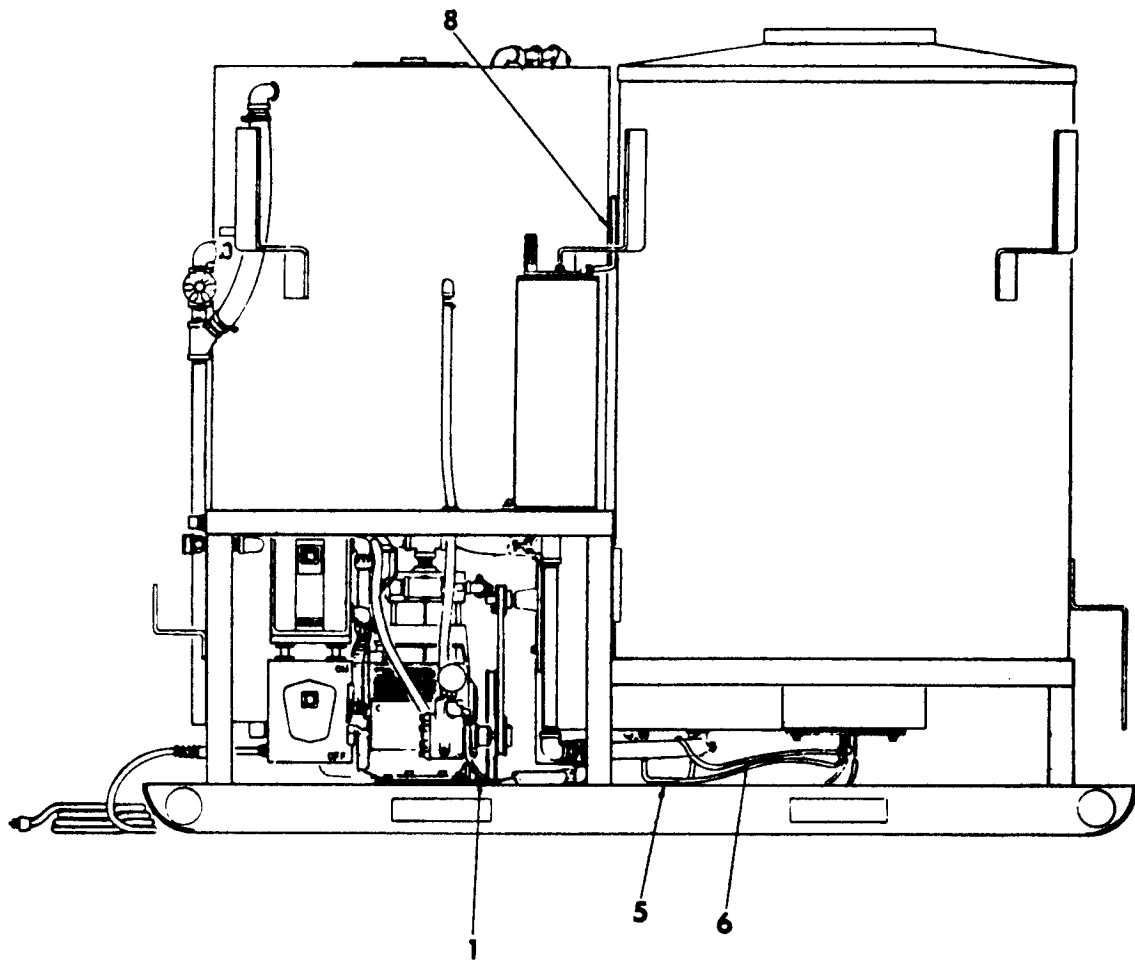


Figure 6-1. Unit assembly, copper tubing (sheet 1 of 2).



AR700222

Figure 6-1. Unit assembly, copper tubing (sheet 2 of 2).





**CHAPTER 7**  
**MATERIAL USED IN CONJUNCTION WITH**  
**STEAM CLEANER**

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Fuel oil .....	30 to 38 American Petroleum Institute (API) rating.
Soap solution.....	Cleaning compound P-C-437



## CHAPTER 8

### ADMINISTRATIVE STORAGE

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#### **8-1. General**

Administrative storage instructions are set forth

in TM 740-90-1. There are no other procedures applicable to the steam cleaner.



**APPENDIX A**

**REFERENCES**

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**TM 38-750**

The Army Management System (TAMMS)

**TM 740-90-1**

Administrative Storage of Equipment



## APPENDIX B

## MAINTENANCE ALLOCATION CHART

## Section I. INTRODUCTION

**B-1. General**

The maintenance allocation chart (MAC) identifies the components and assemblies of the oil fired pressure jet steam cleaner which require maintenance. In addition, it assigns the lowest level of maintenance capable of performing specific maintenance functions.

**B-2. Maintenance Functions**

Those maintenance functions in column 3, section II of this appendix are defined as follows:

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

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

*c. Service.* Operations required periodically to keep an item in proper operating condition, ie, to clean, preserve or paint.

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

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

*f. Calibrate.* To determine the 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, module (component or assembly) in a manner to allow the proper functioning of the equipment/system.

*h. Replace.* The act of substituting a serviceable like-type part, subassembly, module (component or assembly) in a manner to allow the proper functioning of the equipment/system.

*i. Repair.* The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction or failure in a part, subassembly, module (component or assembly), 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 (eg, DMWR) in pertinent 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 material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc) considered in classifying Army equipment components.

**B-3. Explanation of Maintenance Allocation Chart Format**

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

*b. Column 2, Functional Group.* Column 2 lists the next higher assembly group and the item names of components, assemblies, subassemblies and modules within the group for which maintenance is authorized.

*c. Column 3, Maintenance Function.* Column 3 lists the eleven maintenance functions defined in paragraph B-2. Each maintenance function required for an item is specified by the symbol among those listed in the following step *d*, which indicates the level responsible for the required

maintenance. Under this symbol is listed an appropriate work measurement time value (when applicable) as indicated in the following step *e*.

*d. Symbols.* The uppercase letter placed in the appropriate column indicates the lowest level at which that particular maintenance function is to be performed. These symbols are:

C..... Operator/Crew

O..... Organizational  
F..... Direct Support  
H..... General Support  
D..... Depot

*e. Work Measurement Time.* The active repair time required to perform the maintenance function. This time is expressed in manhours and carried to one decimal place (tenths of hours).

Maintenance Allocation Chart

(1)  Group No.	(2)  Functional group  Component assembly nomenclature	(3)  Maintenance functions											(4)  Tools and equipment	(5)  Remarks
		A	B	C	D	E	F	G	H	I	J	K		
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild		
01 CABINET GROUP														
0101	Hose Assy	C 0.2		C 0.1					O 0.5	O 1.0				
0102	Gun Assy	C 0.1		C 0.1					O 0.5	O 1.0				
0103	Cleaner Assy	C 0.5		C 0.5					F 2.0	F 4.0				
0104	Door, Front Assy	C 0.2		C 0.2					O 0.5	O 0.8				
0105	Water Tank Assy	C 0.2		C 0.5					O 1.0	O 1.0				
02 PUMP GROUP														
0201	Plumbing Assy	C 0.5		O 0.5					F 2.0	F 5.0				
0202	Water Pump Assy	C 0.2		C 0.2					H 0.8	H 8.0				
0203	Motor Assy	C 0.1		O 0.2	F 0.2	F 0.2			F 1.0	F 2.0				
0204	Oil Pump Assy	C 0.2		O 0.2					F 1.0	F 4.0				
03 CONTROL BOX GROUP, ELECTRICAL														
0301	Flame Control	O 0.1	O 0.3	O 0.2					H 1.0	H 4.0				
0302	Transformer	O 0.1							H 0.5					
0303	Pressure Switch	O 0.3		O 0.4					F 1.0					
0304	Flame Scanner	O 0.2		O 0.5		O 0.5			H 1.0					
04 HEATER COIL GROUP														
0401	Coil Inlet Assy	C 0.5		O 0.5					F 2.0	F 2.0				
0402	Electrode Lead Assy	C 0.1		C 0.2					F 0.5	F 0.5				
0403	Burner Plate Assy	C 0.3		O 0.5					O 1.0	F 1.0				
0404	Outlet Coil Assy	C 0.5		O 0.5					F 3.0	F 3.0				
0405	Preheat Coil Assy	O 0.5		O 0.5					F 8.0					
05 INSTRUMENT PANEL GROUP														
0501	Pressure Gage	C 0.2	O 0.2	O 0.2					O 0.5					
0502	Light Assy	C 0.1							F 0.5					



## Maintenance Allocation Chart - Continued.

(1)  Group No.	(2)  Functional group  Component assembly nomenclature	(3)  Maintenance Functions										(4)  Tools and equipment	(5)  Remarks	
		A	B	C	D	E	F	G	H	I	J			K
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul			Rebuild
0503	Hourmeter	C 0.2		C 0.2					C 0.3	C 0.5				
0504	Switch, Toggle	C 0.1		C 0.2					O 0.6					
	<b>06 SOAP &amp; FUEL TANK GROUP</b>													
0601	Tank Outlet Assy, Soap	C 0.1		C 0.1					C 0.5	O 0.5				
0602	Cap Assy, Oil	C 0.2		O 0.5					F 1.0	F 1.0				
0603	Outlet Assy, Air Dome	C 0.2		O 0.2					F 1.0	F 1.0				
	<b>07 ELECTRICAL POWER GROUP</b>													
0701	Wheel Assy, Blower	C 0.2		O 0.2	O 0.2				F 0.5	F 1.0				
0702	Power Cord	C 0.2		O 0.2					O 0.5	O 1.0				
0703	Switch Assy & Breaker	C 0.2		O 0.2					F 0.5	F 1.0				
0704	Electrical Circuitry	O 0.5		F 1.0					H 4.0	H 10.0				
	<b>08 FILTER &amp; DRAIN GROUP</b>													
0801	Fuel Filter Assy	C 0.2		C 0.2		C 0.2			C 0.2	F 0.8				
0802	Drain Assy, Oil Tank	C 0.2		O 0.2					F 1.0	F 1.0				
0803	Overflow Assy, Soap Tank	C 0.2		O 0.2					F 1.0	F 1.0				
0804	Airdome Vent	C 0.3		C 0.2					O 0.7	O 0.6				
	<b>09 HARDWARE GROUP</b>													
0901	Hardware Installation	C 0.5		O 0.5					O 1.0	F 2.0				
0902	Tubing Assys.	C 0.5		O 0.5					F 1.0	H 2.0				



## APPENDIX C

## REPAIR PARTS AND SPECIAL TOOLS LIST

## Section I. INTRODUCTION

**C-1. Scope**

This appendix lists repair parts required for operation and the performance of organizational, direct support and general support maintenance of the oil fired pressure jet steam cleaner.

**C-2. General**

This repair parts and special tools list is divided into the following sections:

*a. Basic Issue Items List.* Not applicable.

*b. Items Troop Installed or Authorized List.* Not applicable.

*c. Section II. Repair Parts List.* A list of repair parts authorized for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending numerical sequence, with the parts in each group listed in figure and item number sequence. Bulk materials are listed in NSN sequence.

*d. Special Tools List.* No special tools are required by or authorized for the performance of maintenance at the organizational level.

*e. Section III. National Stock Number and Reference Number Index.* A list, in ascending numerical sequence, of all National stock numbers appearing in the listings, followed by a list, in alphanumeric sequence, of all reference numbers appearing in the listings. National stock numbers and reference numbers are cross-referenced to each illustration figure and item number appearance. This index is followed by a cross-reference list of reference designations to figure and item numbers when applicable.

**C-3. Explanation of Columns**

The following provides an explanation of columns found in the tabular listings of the regular parts list.

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

(1) *Figure number.* Indicates the figure number of the illustration in which the item is shown.

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

*b. Source, Maintenance and Recoverability Codes (SMR).*

(1) *Source code.* Source codes are assigned to support items to indicate the manner of acquiring support items for maintenance, repair or overhaul of end items. Source codes are entered in the first and second positions of the Uniform SMR Code format as follows:

Code	Definition
PA .....	Item procured and stocked for anticipated or known usage.
PB .....	Item procured and stocked for insurance purpose because essentiality dictates that a minimum quantity be available in the supply system.
PC .....	Item procured and stocked and which otherwise would be coded PA except that it is deteriorative in nature.
PD .....	Support item, excluding support equipment, procured for initial issue or outfitting and stocked only for subsequent or additional initial issues or outfittings. Not subject to automatic replenishment.
PE .....	Support equipment procured and stocked for initial issue or outfitting to specified maintenance repair activities.
PF .....	Support equipment which will not be stocked but which will be centrally procured on demand.
PG .....	Item procured and stocked to provide for sustained support for the life of the equipment. It is supplied to an item peculiar to the equipment which, because of probable discontinuance or shutdown of production facilities, would prove uneconomical to reproduce at a later time.
KD .....	An item of depot overhaul/repair kit and not purchased separately. Depot kit defined as a kit that provides items required at the time of overhaul or repair.
KF .....	An item of maintenance kit and not purchased separately. Maintenance kit defined as a kit that provides an item that can be replaced at organizational or intermediate levels of maintenance.
KB .....	Item included in both a depot overhaul/repair kit and a maintenance kit.
MO .....	Item to be manufactured or fabricated at organizational level.
MF .....	Item to be manufactured or fabricated at the direct support maintenance level.

<i>Code</i>	<i>Definition</i>
MH.....	Item to be manufactured or fabricated at the general support maintenance level.
MD.....	Item to be manufactured or fabricated at the depot maintenance level.
AO.....	Item to be assembled at organizational level.
AF.....	Item to be assembled at direct support maintenance level.
AH.....	Item to be assembled at general support maintenance level.
AD.....	Item to be assembled at depot maintenance level.
XA.....	Item is not procured or stocked because the requirements for the item will result in the replacement of the next higher assembly
XB.....	Item is not procured or stocked. If not available through salvage, requisition.
XD.....	A support item that is not stocked. When required, item will be procured through normal supply channels.

**NOTE**

Cannibalization or salvage may be used as a source of supply for any items source coded above except those coded XA or XD.

(1) *Maintenance code.* Maintenance codes are assigned to indicate the levels of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the Uniform SMR Code format as follows:

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

<i>Code</i>	<i>Application/Explanation</i>
C.....	Crew or operator maintenance performed with organizational maintenance.
O.....	Support item is removed, replaced, used at the organizational level.
I.....	Support item is removed, replaced, used by the direct support element of integrated direct support maintenance.
F.....	Support item is removed, replaced, used at the direct support level.
H.....	Support item is removed, replaced, used at the general support level,
D.....	Support items that are removed, replaced, used at depot, mobile depot, specialized repair activity only.

**NOTE**

Codes I and F will be considered the same by direct support units.

(b) The maintenance code entered in the fourth position indicates whether the item is to be repaired and identifies the lowest maintenance level with the capability to perform complete repair (i.e., all authorized maintenance functions). This position will contain one of the following maintenance codes:

<i>Code</i>	<i>Application/Explanation</i>
O.....	The lowest maintenance level capable of complete repair of the support item is the organizational level.
F.....	The lowest maintenance level capable of complete repair of the support item is the direct support level.
H.....	The lowest maintenance level capable of complete repair of the support item is the general support level.
D.....	The lowest maintenance level capable of complete repair of the support item is the depot level, performed by depot, mobile depot or specialized repair activity.
L.....	Repair restricted to designated specialized repair activity.
Z.....	Nonrepairable. No repair is authorized.
B.....	No repair is authorized. The item may be reconditioned by adjusting, lubricating, etc., at the user level. No parts or special tools are procured for the maintenance of this item.

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

<i>Recoverability Codes</i>	<i>Definition</i>
Z.....	Nonrepairable item. When unserviceable, condemn and dispose at the level indicated in position 3.
O.....	Repairable item. When uneconomically repairable, condemn and dispose at organizational level.
F.....	Repairable item. When uneconomically repairable, condemn and dispose at the direct support level.
H.....	Repairable item. When uneconomically repairable, condemn and dispose at the general support level.
D.....	Repairable item. When beyond lower level repair capability, return to depot. Condemnation and disposal not authorized below depot level.
L.....	Repairable item. Repair, condemnation and disposal not authorized below depot/specialized repair activity level.
A.....	Item requires special handling or condemnation procedures because of specific reasons (i.e., precious metal content, high dollar value, critical material or hazardous material). Refer to appropriate manuals directives for specific instructions.

*c. National Stock Number.* Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

*d. Part Number.* 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 a stock numbered item is requisitioned, the repair part received may have a different part number than the part being replaced.

*e. National Supply Code for Manufacturer (NSCM).* The NSCM is a 5-digit numeric code listed in SM 708-42 which is used to identify the manufacturer, distributor or Government agency, etc.

*f. Description.* Indicates the National item name and, if required, a minimum description to identify the item.

*g. Unit of Measure (U/M).* Indicates the standard of the basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr, etc.). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

*h. Quantity Furnished with Equipment (Basic Issue Items Only).* Not applicable.

*i. Quantity Authorized (Items Troop Installed or Authorized Only).* Not applicable.

*j. Quantity Incorporated in Unit.* Indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group or an assembly. A V appearing in this column in lieu of a quantity indicates that no specific quantity is applicable (eg, shims, spacers, etc.).

#### **C-4. Special Information**

The illustrations in this appendix are keyed to the repair parts lists and to assist in maintaining the steam cleaner.

#### **C-5. How to Locate Repair Parts**

*a. When National Stock Number or Reference Number is Unknown.*

(1) *First.* Using the table of contents, determine the functional group or subgroup within which the repair part belongs. This is necessary since illustrations are prepared for functional groups or subgroups and listings are divided in the same groups.

(2) *Second.* Find the illustration covering the functional group or subgroup to which the repair part belongs.

(3) *Third.* Identify the repair part on the illustration and note the illustration figure and item number of the repair part.

(4) *Fourth.* Using the Repair Parts Listing, find the functional group/subgroup to which the repair part belongs and locate the illustration figure and item number noted on the illustration.

*b. When National Stock Number or Reference Number is Known.*

(1) *First.* Using the Index or National Stock Numbers and Reference Numbers, find the pertinent National Stock Number or Reference Number. This index is in the ascending NSN sequence followed by a list of reference numbers in ascending alphanumeric sequence, cross-referenced to the illustration figure number and item number.

(2) *Second.* After finding the figure and item number, locate figure and item number in the repair parts list.

#### **C-6. Abbreviations**

Not applicable.

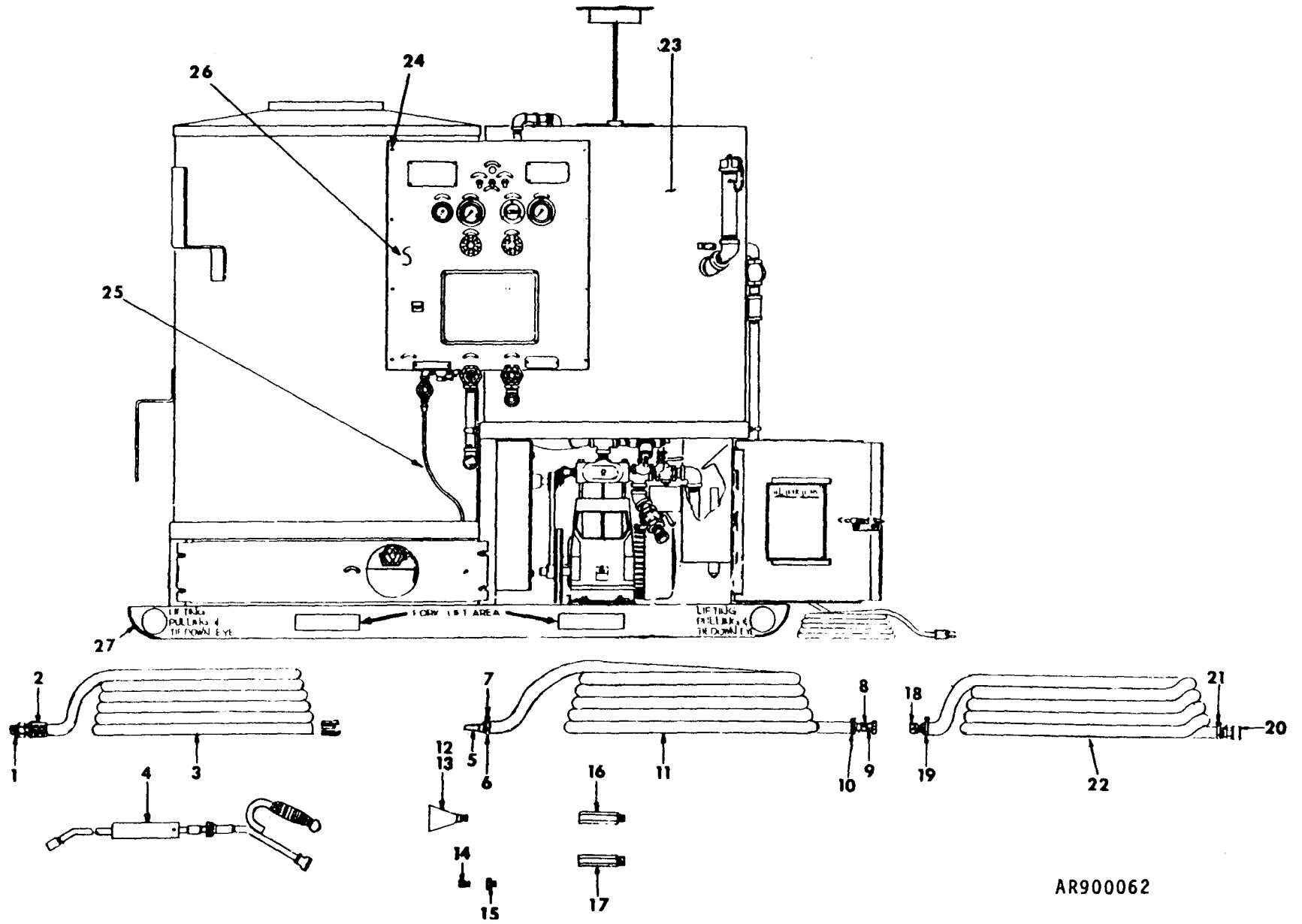


Figure C-1. Oil fired pressure jet steam cleaner.

## Section II. REPAIR PARTS LIST

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  USABLE ON CODE	U/M	QTY INC IN UNIT
						Group 01 CABINET GROUP		
						Group 0101 - HOSE ASSY		
C-1	1	XDOZZ	5940-00-577-3761	¾NPTX¾HOSE	18702	SPUD	EA	2
C-1	2	XDOZZ		BU9	72661	CLAMP	EA	4
C-1	3	XBOZZ		1555-05	94774	HOSE, STEAM PRESSURE, 50 FEET	EA	2
C-1	4	XDOOO		407-1-01	94774	STEAM CLEANING GUN, SWIVEL	EA	2
C-1	5	XDOZZ		1535-05	94774	VALVE, FOOT	EA	1
C-1	6	XDOZZ		1X1¼NPT	18702	BUSHING	EA	1
C-1	7	XDOZZ		36HSS	66295	CLAMP, WORM	EA	1
C-1	8	XDOZZ		1X2-½NPT	18702	NIPPLE	EA	1
C-1	9	XDOZZ		1NPT	18702	UNION, FEMALE	EA	1
C-1	10	XDOZZ		36HSS	66295	CLAMP, WORM	EA	1
C-1	11	XBOZZ		1557-05	94774	HOSE, AIR PRESSURE 25 FEET	EA	1
C-1	12	XDOZZ		679-1-02	94774	NOZZLE, FLAT	EA	4
C-1	13	XDOZZ		679-02	94774	NOZZLE, FLAT	EA	2
C-1	14	XBOZZ		649-35S	94774	NOZZLE, V JET	EA	1
C-1	15	XDOZZ		3/8 To ¼NPT	18702	BUSHING, REDUCE	EA	1
C-1	16	XDOZZ		409-2-04	94774	NOZZLE, HEX	EA	1
C-1	17	XDOZZ		409-3-04	94774	NOZZLE, HEX	EA	2
C-1	18	XDOZZ		¾NPT To ¾- FNPT-HOSE	18702	CONNECTOR, HOSE MALE	EA	1
C-1	19	XDOZZ		16HSS	66295	CLAMP, WORM	EA	2
C-1	20	XDOZZ		¾NPT To ¾- FNPT-HOSE	18702	CONNECTOR, HOSE FEMALE	EA	1
C-1	21	XDOZZ		16HSS	66295	CLAMP, WORM	EA	1
C-1	22	XBOZZ		1556-05	94774	HOSE, AIR PRESSURE, 50 FT., 1 IN. ID	EA	1
C-1	23	XDOZZ		3702-01	94774	CLEANER ASSY	EA	1
C-1	24	XDOZZ		3703-01	94774	HARDWARE INSTALLATION	EA	1
C-1	25	XDHHH		3704-01	94774	UNIT ASSY, COPPER TUBING	EA	1
C-1	26	PAHZZ		14206	79061	TERMINAL LUG	EA	51
C-1	27	XDFZZ		3750-02	94774	CHASSIS ASSY, UNIT FRAME ASSY	EA	1

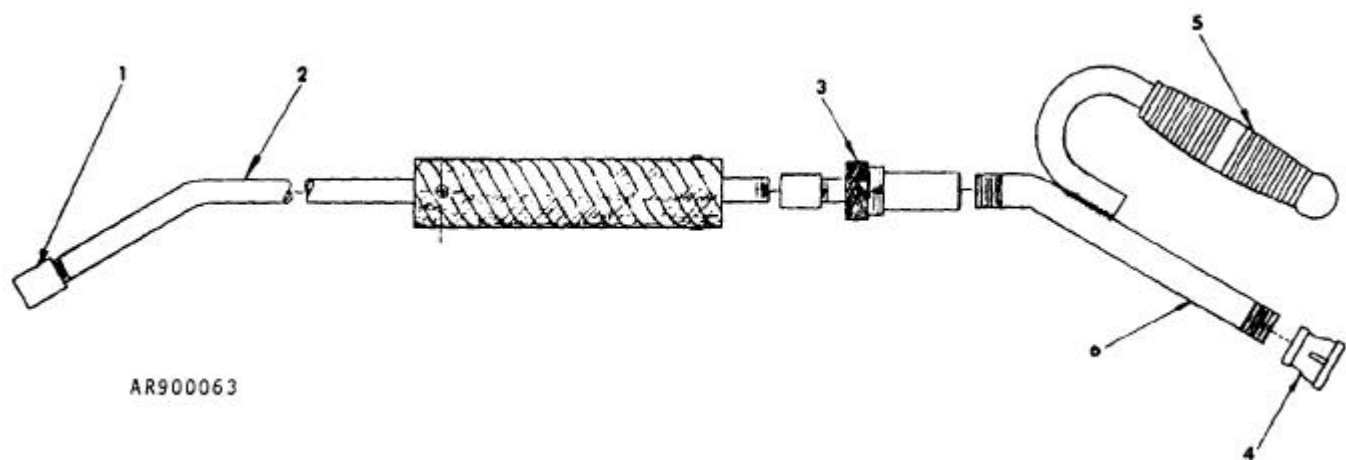
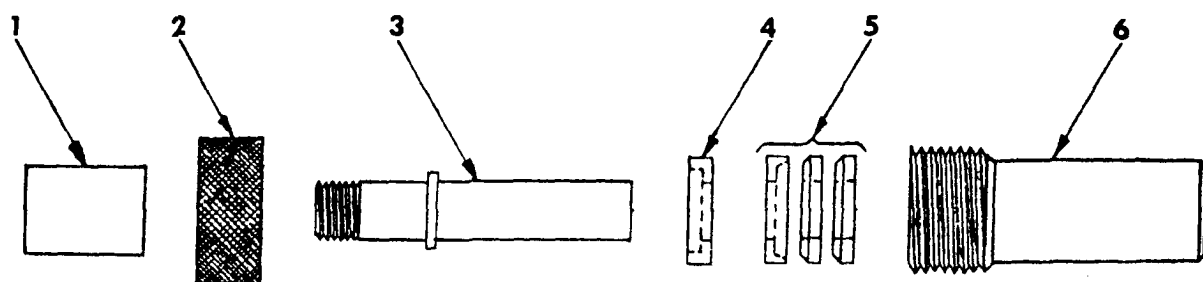


Figure C-2. Steam cleaning gun swivel.



# Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
<b>Group 0102 - STEAM CLEANING GUN SWIVEL</b>								
C-2	1	XDOOZ		3/8IN-NPT	18702	COUPLING, NPT	EA	1
C-2	2	XDOZZ		406-17-02	94774	EXTERNAL, GUN GRIP	EA	1
C-2	3	XDOOO		405A	94774	SWIVEL, COMPLETE	EA	1
C-2	4	XDOZZ		¾X½NPT	18702	REDUCER, BELL	EA	1
C-2	5	XDOZZ		405-11	94774	GRIP, RUBBER	EA	1
C-2	6	XDOZZ		405-13	94774	HANDLE	EA	1

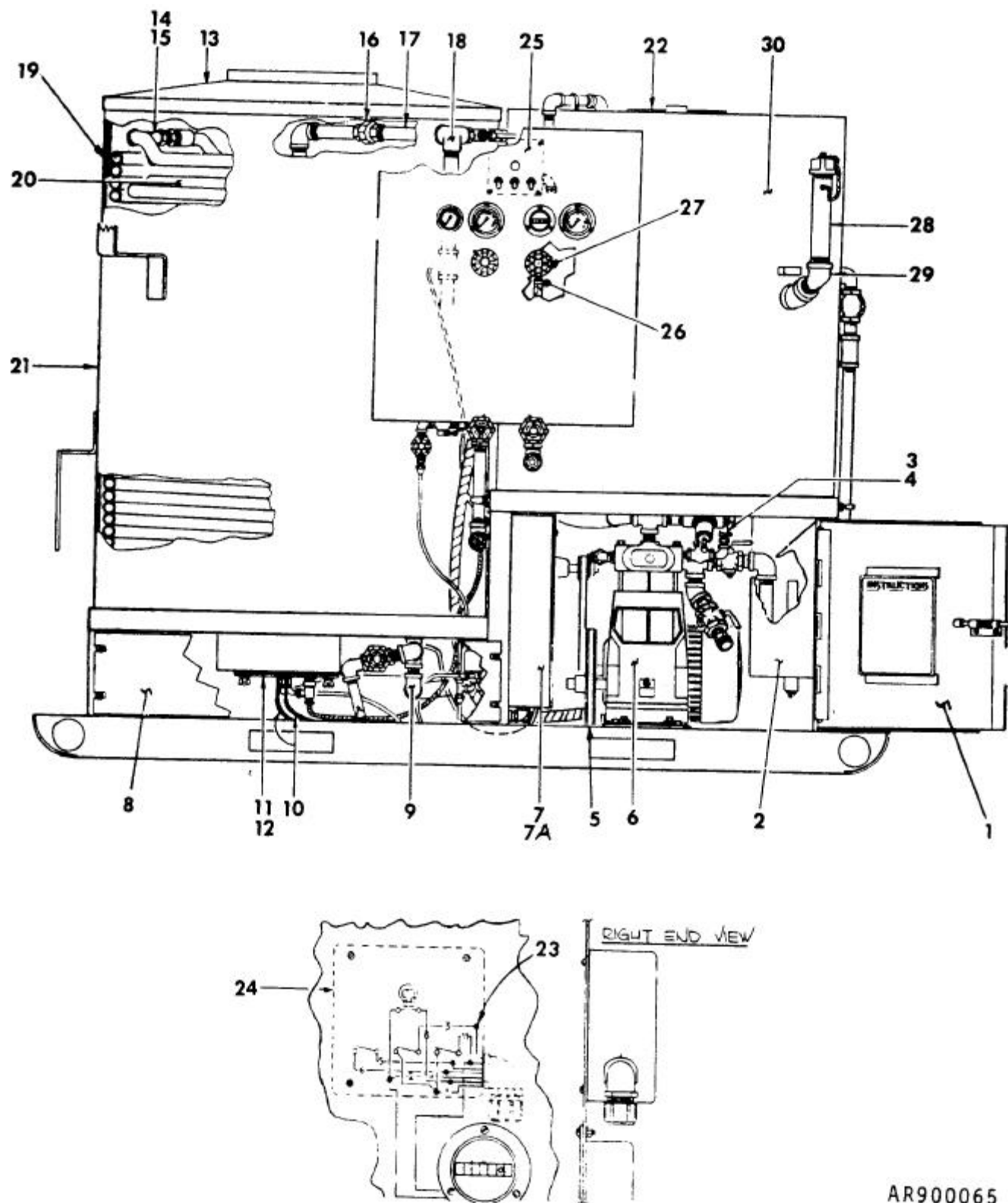


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*Figure C-3. Swivel, complete.*

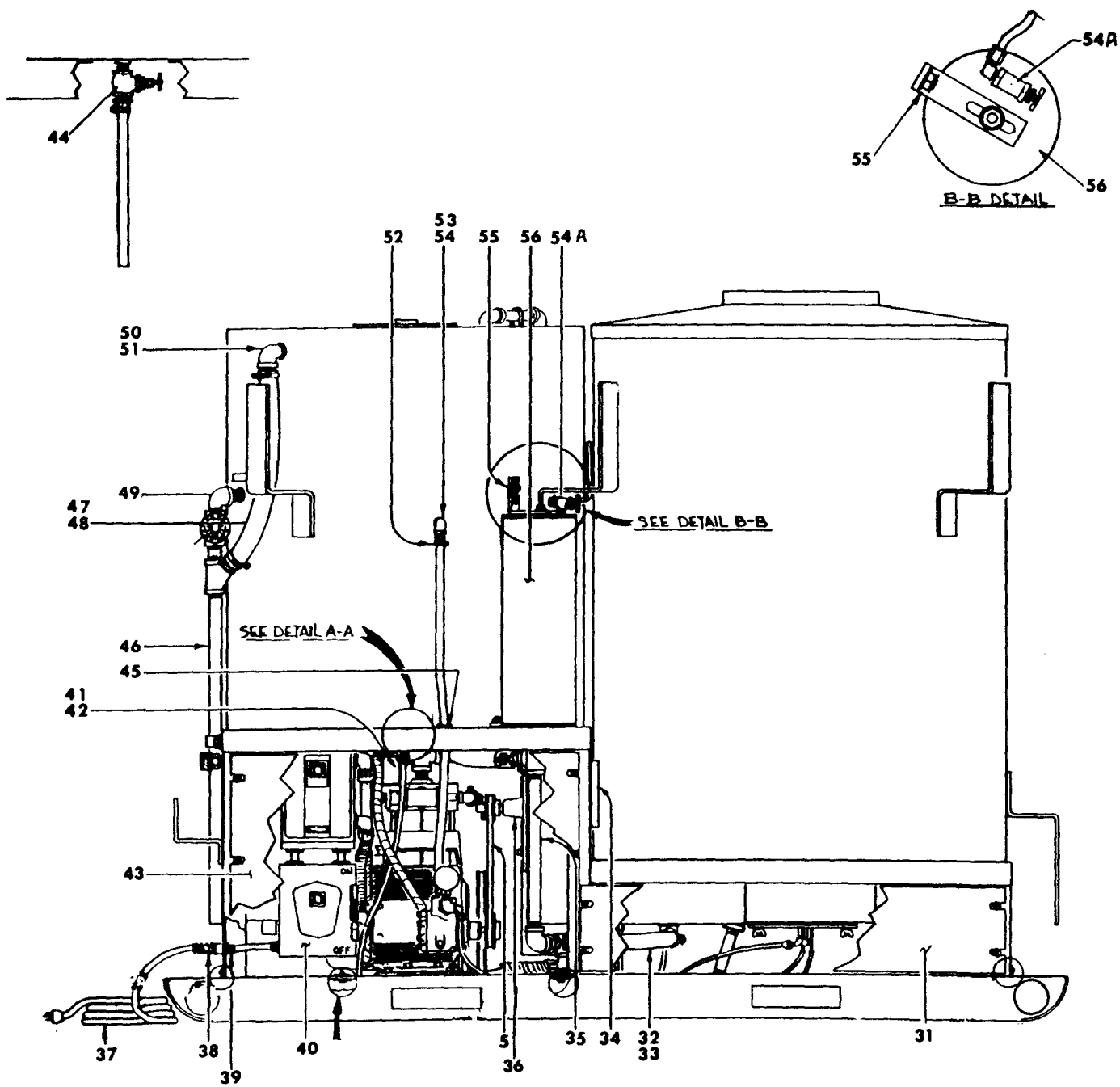
Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  USABLE ON CODE	U/M	QTY INC IN UNIT
Group 0102 – SWIVEL, COMPLETE								
C-3	1	XDOZZ		3/8NPT	18702	COUPLING	EA	1
C-3	2	XDOZZ		405-6	94774	NUT, PACKING	EA	1
C-3	3	XDOZZ		405F	94774	NIPPLE, SWIVEL	EA	1
C-3	4	XBOZZ		405E	94774	BUSHING, PACKING	EA	1
C-3	5	XBOZZ		405D	94774	PACKING	EA	1
C-3	6	XDOZZ		405G	94774	BODY, SWIVEL	EA	1



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Figure C-4. Cleaner assembly (sheet 1 of 3).



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Figure C-4. Cleaner assembly (sheet 2 of 3).

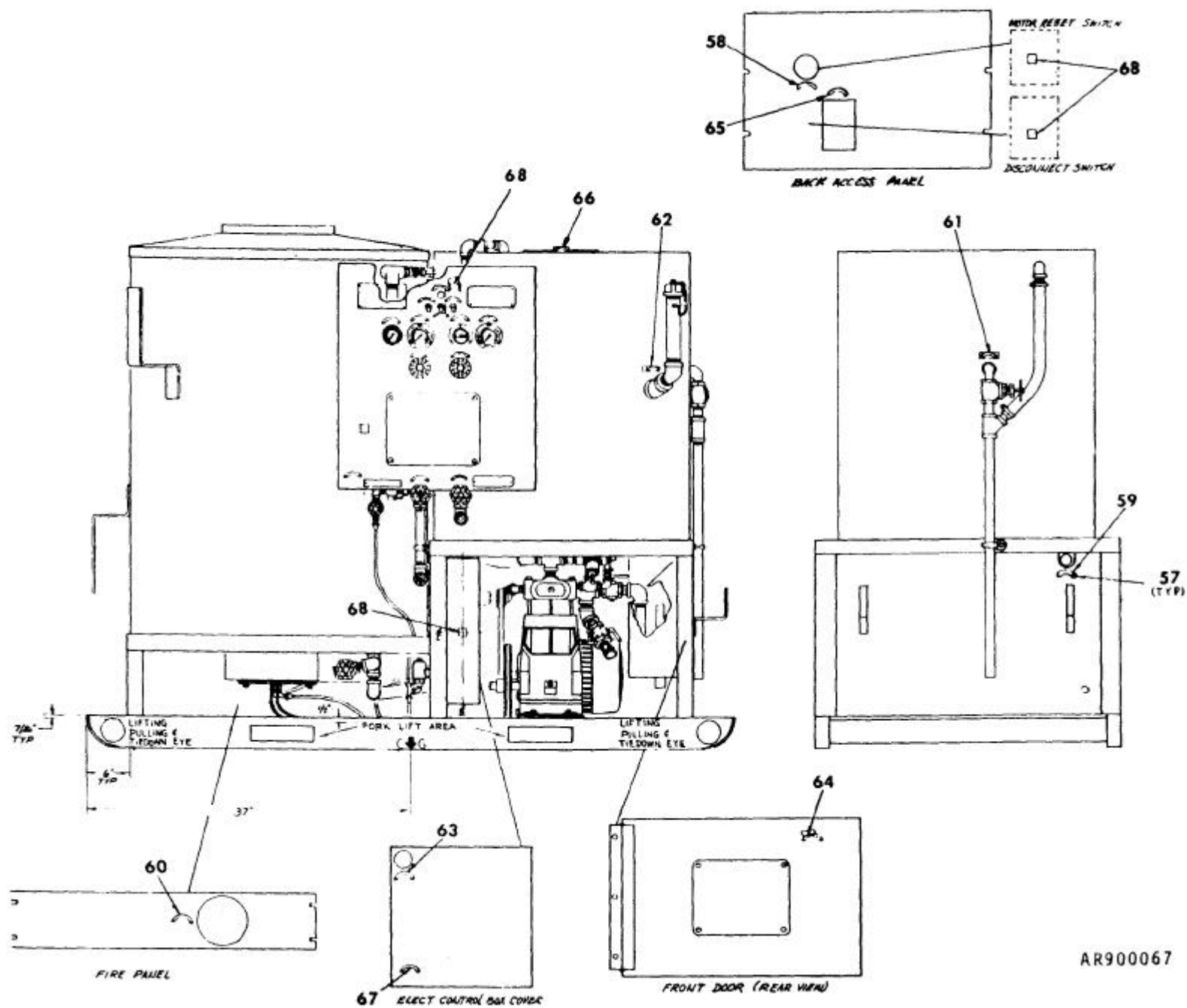


Figure C-4. Clean assembly (sheet 3 of 3).

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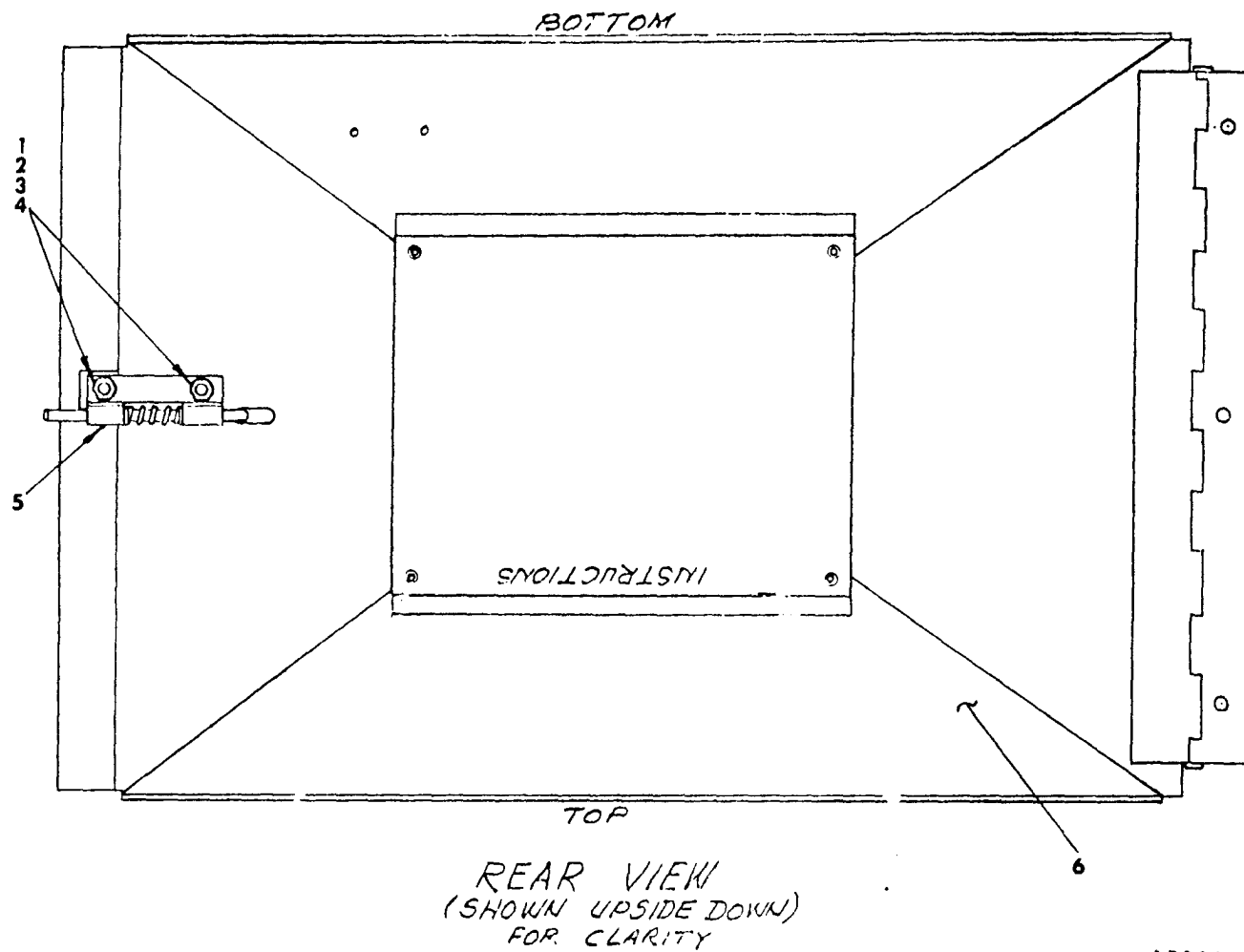
## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
<b>Group 0103 - CLEANER ASSY</b>								
C-4	1	XDOOO	3030-00-080-8817	3711-01	94774	DOOR, FRONT	EA	1
C-4	2	XDOOO		3714-01	94774	TANK ASSY, WATER	EA	1
C-4	3	XBFFZ		3/8ID	24161	HOSE, OIL, RESISTANT 48 IN.	EA	1
C-4	4	XDOZZ		6	66295	CLAMP, WORM	EA	1
C-4	5	PAOZZ		A43	24161	BELT, V	EA	1
C-4	6	XDFHH		3712-01	94774	PUMPS, OIL SOLUTION AND MOTOR ASSY	EA	1
C-4	7	XDOZZ		3786-02	94774	COVER, CONTROL BOX	EA	1
C-4	7A	XDFHH		3706-01	94774	CONTROL BOX ASSY ELECTRICAL	EA	1
C-4	8	XDHZZ		3749-02	94774	PANEL, FRONT	EA	1
C-4	9	XDFFF		3724-01	94774	COIL INLET ASSY	EA	1
C-4	10	XDFFF		3716-1-01	94774	LEAD, ELECTRODE ASSY	EA	2
C-4	11	XDFFF		3716-01	94774	BURNER PLATE ASSY	EA	1
C-4	12	XDFZZ		3789-1-02	94774	GASKET	EA	1
C-4	13	XDOZZ		3709-01	94774	COVER, HEATER	EA	1
C-4	14	XDFZZ		¾NPTX¾TUBE	18702	FITTING	EA	2
C-4	15	XDFZZ		NO NUMBER		TUBING, COPPER W/F NUT, ¾X20	EA	1
C-4	16	XDOZZ		1NPT	18702	UNION	EA	1
C-4	17	XDOZZ		1NPTX8½	18702	NIPPLE	EA	2
C-4	18	XDFFF		3723-01	94774	OUTLET COIL ASSY	EA	1
C-4	19	XDFZZ		1/8X9X116½	18702	INSULATION, ASBESTOS	EA	1
C-4	20	XDFZZ		3730-02	94774	COIL, INNER	EA	1
C-4	21	XDFZZ		3710-02	94774	PREHEAT COIL	EA	1
C-4	22	XDOZZ		3793-02	94774	COVER, SOAP TANK	EA	1
C-4	23	XDHZZ		33	94774	NUT, WIRE	EA	7
C-4	24	XDHZZ		5SDX½	90759	BOX, JUNCTION	EA	1
C-4	25	XDHHH		3713-01	94774	PANEL ASSY, INSTRUMENT	EA	1
C-4	26	XDOZZ		6	66295	CLAMP, WORM	EA	1
C-4	27	XDFFF		3719-01	94774	OUTLET ASSY, SOAP TANK	EA	1
C-4	28	XDOOO		3784-02	94774	CAP ASSY, OIL FILL	EA	1
C-4	29	XDFZZ		45DEG1½NPT	18702	ELBOW	EA	1
C-4	30	XDFZZ		3732-02	94774	TANK ASSY, SOAP & OIL TANK	EA	1
C-4	31	XDOZZ		3749-1-02	94774	PANEL, BACK	EA	1
C-4	32	XDOZZ		B10	72661	CLAMP, HOSE	EA	2
C-4	33	XDFZZ		1ID	18702	HOSE, 1-WIRE BRAID 31 INCHES LONG, 1 IN. ID	EA	1
C-4	34	XDOZZ		3788-02	94774	GATE, AIR ADJUSTMENT	EA	1
C-4	35	XDFFF		3721-01	94774	OUTLET ASSY, AIR DOME	EA	1
C-4	36	XDOOO		3715-01	94774	WHEEL ASSY, BLOWER	EA	1
C-4	37	XDOOO		3705-1-01	94774	POWER CORD	EA	1
C-4	38	XDOZZ		3796-02	94774	STRAIN RELIEF	EA	1

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  USABLE ON CODE	U/M	QTY INC IN UNIT
C-4	39	XDOZZ		6623	03923	CONNECTOR	EA	1
C-4	40	XDFFF		3708-01	94774	SWITCH ASSY, STARTER & BREAKER	EA	1
C-4	41	XDOFF		3707-01	94774	FUEL, FILTER ASSEMBLY	EA	1
C-4	42	XDOZZ		6H	66295	CLAMP, WORM	EA	2
C-4	43	XDOZZ		3748-02	94774	PANEL, BACK	EA	1
C-4	44	XDFFF		3719-1-01	94774	DRAIN ASSY, OIL TANK	EA	1
C-4	45	XDOZZ		SB875-11	28520	BUSHING	EA	1
C-4	46	XDFZZ		¾NPTX30½	18702	NIPPLE	EA	1
C-4	47	XDFZZ		16HS	66295	CLAMP, WORM	EA	2
C-4	48	XBFFZ		1ID	18702	HOSE, 1 IN. IDX19 IN. LONG	EA	1
C-4	49	XDFFF		3722-01	94774	OVERFLOW ASSY, SOAP TANK	EA	1
C-4	50	XDOZZ		¾NPT	18702	NIPPLE, CLOSE	EA	1
C-4	51	XDOZZ		90DEG¾NPT	18702	ELBOW	EA	1
C-4	52	XDOZZ		6H	66295	CLAMP, WORM	EA	1
C-4	53	XDOZZ		3/8NPTX3/8HOSE	18702	SPUD	EA	1
C-4	54	XDOZZ		90DEG3/8NPT	18702	ELBOW	EA	1
C-4	54A	XDFZZ		3729-01	94774	AIRDOME VENT	EA	1
C-4	55	XDFZZ		3779-02	94774	BRACKET, MOUNTING	EA	1
C-4	56	XDFZZ		3775-02	94774	AIR DOME	EA	1
C-4	57	XDOZZ		STST42DSS	27783	RIVET	EA	20
C-4	58	XDOZZ		1616-05	94774	TAG, MOTOR RESET SWITCH	EA	1
C-4	59	XDOZZ		1619-05	94774	TAG, WATER INLET CONNECTION	EA	1
C-4	60	XDOZZ		1627-05	94774	TAG, AIR DOME DRAIN	EA	1
C-4	61	XDOZZ		1628-05	94774	TAG, SOLUTION TANK DRAIN	EA	1
C-4	62	XDOZZ		1630-05	94774	TAG, FUEL FILL SPOUT	EA	1
C-4	63	XDOZZ		1631-05	94774	TAG, BURNER RESET	EA	1
C-4	64	XDOZZ		1632-05	94774	TAG, SELECTOR VALVE	EA	1
C-4	65	XDOZZ		1633-05	94774	TAG, DISCONNECT SWITCH	EA	1
C-4	66	XDOZZ		1635-05	94774	TAG, SOAP FILL PORT	EA	1
C-4	67	XDOZZ		1636-05	94774	TAG, BLOWDOWN SWITCH	EA	1
C-4	68	XDOZZ		1646-05	94774	TAG, MFP	EA	4





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Figure C-5. Door, front.

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
						<b>Group 0104 - DOOR, FRONT</b>		
C-5	1	PAOZZ	5310-00-761-6882	MS51967-2	96906	NUT, HEX	EA	2
C-5	2	PAOZZ	5310-00-682-5930	MS35340-44	96906	WASHER, LOCK	EA	2
C-5	3	PAOZZ	5310-00-809-4058	MS27183-10	96906	WASHER, FLAT	EA	2
C-5	4	XBOZZ		¼-20X½	18702	BOLT, HEX HD.	EA	2
C-5	5	XDOZZ		680-03	94774	LATCH	EA	1
C-5	6	XDOZZ		3747-02	94774	DOOR	EA	1

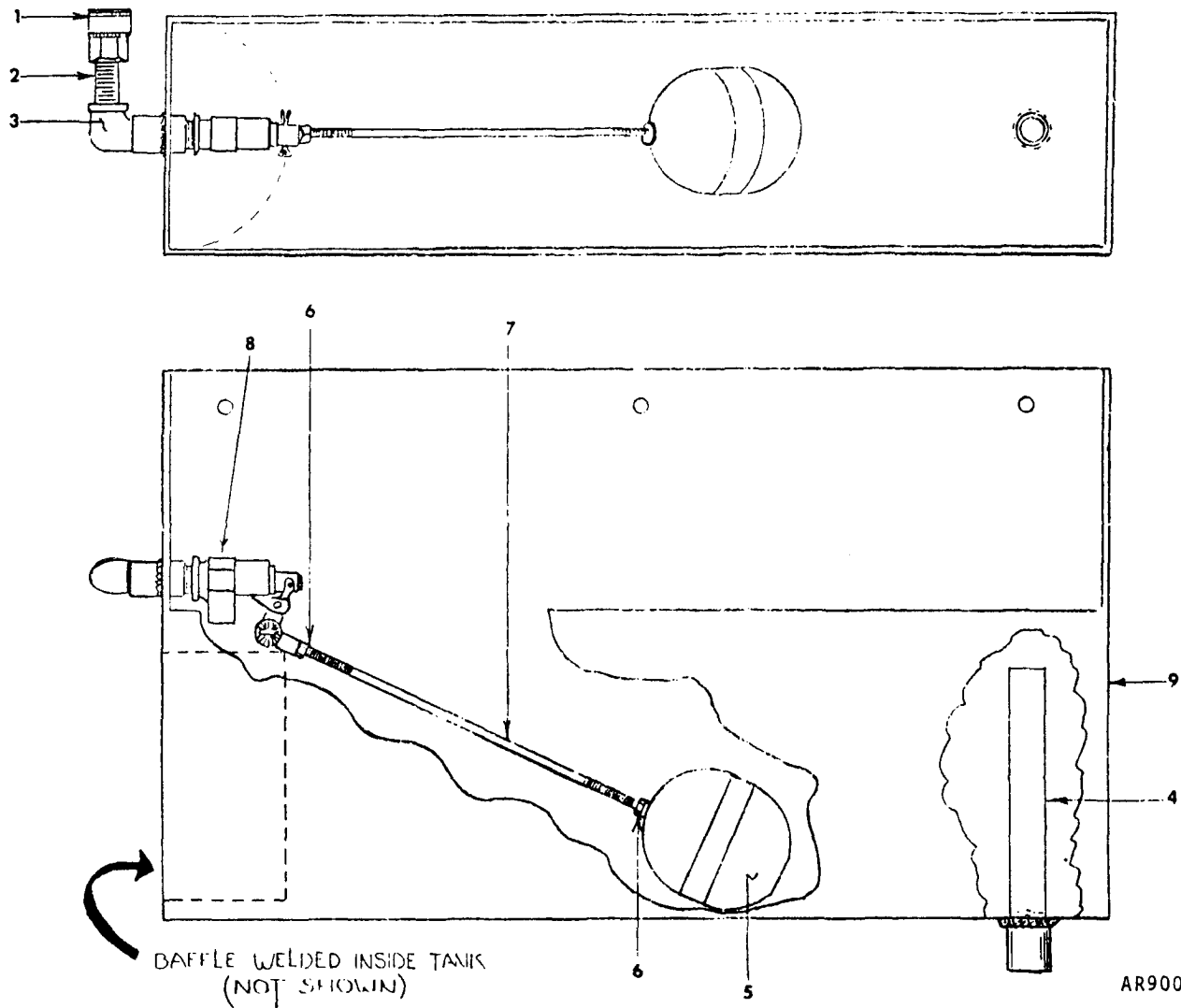
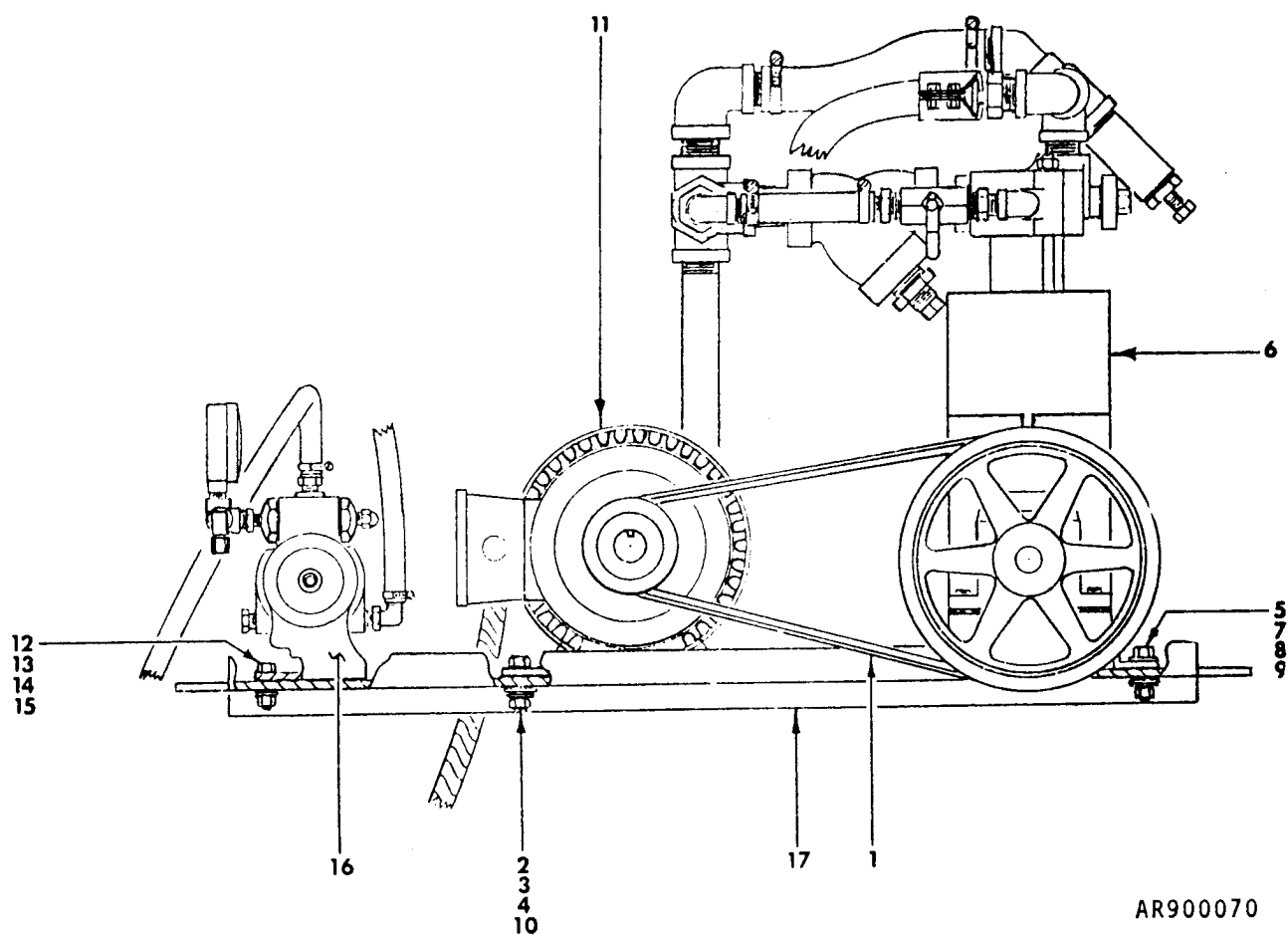


Figure C-6. Tank assembly, water

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
<b>Group 0105 - TANK ASSY, WATER</b>								
C-6	1	XDOZZ	5310-00-761-6882	¾NPT To ¾ HOSE	18702	CONNECTOR, HOSE	EA	1
C-6	2	XDOZZ		¾NPTX4	18702	NIPPLE	EA	1
C-6	3	XDOZZ		90DEG¾X¾	18702	ELBOW, STREET	EA	1
C-6	4	XDOZZ		¾NPTX8TOE	18702	NIPPLE	EA	1
C-6	5	XDOZZ		R440-5-5	03355	FLOAT, BALL	EA	1
C-6	6	PAOZZ		MS51967-2	96906	NUT, HEX	EA	2
C-6	7	XDOZZ		568-05	94774	ROD, FLOAT	EA	1
C-6	8	XDOZZ		R400	03355	VALVE, FLOAT	EA	1
C-6	9	XDOZZ		3737-02	94774	TANK, WATER	EA	1

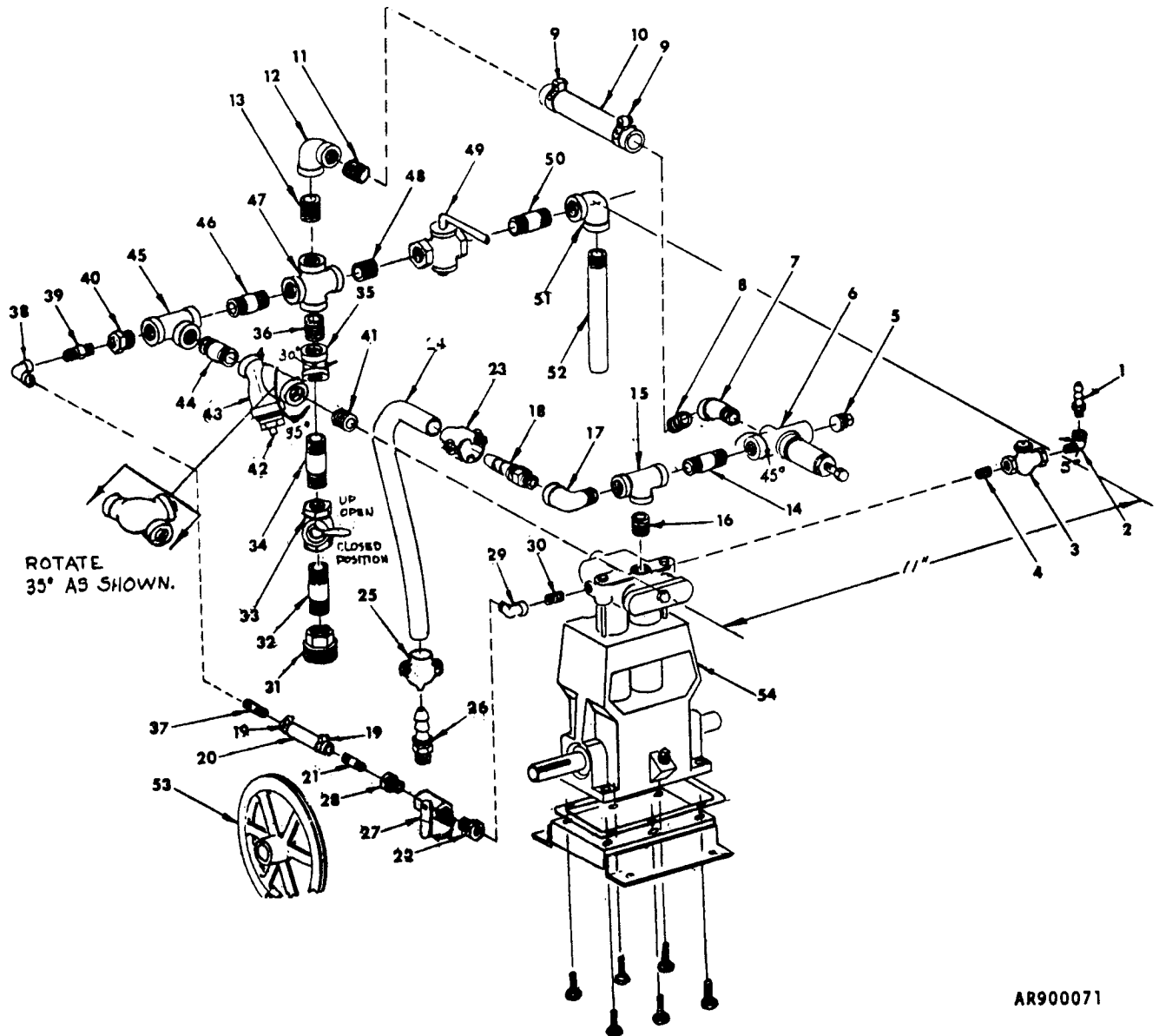


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Figure C-7. Pumps, oil, solution and motor assembly.

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
<b>Group 02 - PUMPS GROUP, OIL SOLUTION AND MOTOR ASSY</b>								
C-7	1	PAOZZ	3030-00-080-8817	A43	24161	BELT, V	EA	1
C-7	2	PAOZZ	5310-00-732-0558	MS51967-8	96906	NUT, HEX	EA	4
C-7	3	PAOZZ	5310-00-959-4675	MS35338-46	96906	WASHER, LOCK	EA	4
C-7	4	PAOZZ	5310-00-080-6004	MS27183-14	96906	WASHER, FLAT	EA	8
C-7	5	PAOZZ	5305-00-269-3211	MS90725-60	96906	BOLT, HEX HD	EA	4
C-7	6	XDFHH		3717-01	94774	SOLUTION PUMP PLUMBING ASSY	EA	1
C-7	7	PAOZZ	5310-00-732-0558	MS51967-8	96906	NUT, HEX	EA	4
C-7	8	PAOZZ	5310-00-959-4675	MS35338-46	96906	WASHER, LOCK	EA	4
C-7	9	PAOZZ	5310-00-080-6004	MS27183-14	96906	WASHER, FLAT	EA	4
C-7	10	XDOZZ		MS90725-62	96906	BOLT, HEX, HD	EA	4
C-7	11	XDFFF		3720-01	94774	MOTOR ASSY, AC	EA	1
C-7	12	PAFZZ	5310-00-880-7744	MS51967-5	96906	NUT, HEX	EA	2
C-7	13	PAPZZ	5310-00-959-4679	MS35340-45	96906	WASHER, LOCK	EA	2
C-7	14	PAFZZ	5310-00-809-3078	MS27183-11	96906	WASHER, FLAT	EA	2
C-7	15	PAFZZ	5306-00-225-8500	MS90725-35	96906	BOLT, HEX HD	EA	2
C-7	16	XDFFF		3718-01	94771	PUMP OIL	EA	1
C-7	17	XDFZZ		3757-02	94771	HOSE, PUMP/MOTOR MOUNTING PLATE	EA	1



AR900071

Figure C-8. Solution pump plumbing assembly.

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  USABLE ON CODE	U/M	QTY INC IN UNIT
<b>Group 0201 - SOLUTION PUMP PLUMBING ASSY</b>								
C-8	1	XDFHH		3/8NPTX3/8 HOSE	18702	SPUD	EA	1
C-8	2	XDFZZ		90DEGX3/8	18702	ELBOW, STREET	EA	1
C-8	3	XDFZZ		214	75336	VALVE, CHECK	EA	1
C-8	4	XDFZZ		3/8NPT	18702	NIPPLE, CLOSE	EA	1
C-8	5	XDFZZ		3/4NPT	18702	PLUG, PIPE	EA	1
C-8	6	XDFZZ		17527B1	42223	BYPASS	EA	1
C-8	7	XDFZZ		45DEG3/4NPT ST	18702	ELBOW	EA	1
C-8	8	XDFZZ		3/4NPT	18702	NIPPLE, CLOSE	EA	1
C-8	9	XDOZZ		16HSS	66295	CLAMP, WORM	EA	2
C-8	10	XBFZZ		1ID	18702	HOSE SUCTION, 7 INCHES	EA	1
C-8	11	XDOZZ		3/4NPT	18702	NIPPLE, CLOSE	EA	1
C-8	12	XDFZZ		90DEG3/4X1	18702	ELBOW, REDUCER	EA	1
C-8	13	XDOZZ		1NPT	18702	NIPPLE, CLOSE	EA	1
C-8	14	XDFZZ		3/4NPTX2	18702	NIPPLE	EA	1
C-8	15	XDFZZ		3/4NPT	18702	TEE	EA	1
C-8	16	XDOZZ		3/4NPT	18702	NIPPLE, CLOSE	EA	1
C-8	17	XDFZZ		90DEG3/4NPT	18702	ELBOW, STREET	EA	1
C-8	18	XDFZZ		3516	72661	SPUD	EA	1
C-8	19	XDOZZ		12HSS	66295	CLAMP, WORM	EA	2
C-8	20	XBFZZ		5/8ID	18702	HOSE, FABRIC BRAIDED 4 1/2-INCH	EA	1
C-8	21	XDOZZ		3/8NPT	18702	NIPPLE, CLOSE	EA	1
C-8	22	XDFZZ		1/2X3/8NPT	18702	BUSHING, HEX	EA	1
C-8	23	XDFZZ		B10	72661	CLAMP, BOLT	EA	1
C-8	24	MFFZZ		1ID	18702	HOSE, WIRE BRAID, 28 INCHES	EA	1
C-8	25	XDOZZ		B10	72661	CLAMP, BOLT	EA	1
C-8	26	XDOZZ		3516	72661	SPUD	EA	1
C-8	27	XDFZZ		S126BRRT 1/2	82666	VALVE, BALL	EA	1
C-8	28	XDOZZ		1/2X3/8NPT	18702	BUSHING, HEX	EA	1
C-8	29	XDOZZ		90DEG3/8NPT	18702	ELBOW, STREET	EA	1
C-8	30	XDOZZ		3/8NPT	18702	NIPPLE, CLOSE	EA	1
C-8	31	XDOZZ		1NPT	18702	UNION	EA	1
C-8	32	XDFZZ		1NPTX3	18702	NIPPLE	EA	1
C-8	33	XDFZZ		1565-05	94774	VALVE, COCK	EA	1
C-8	34	XDFZZ		1NPTX2	18702	NIPPLE	EA	1
C-8	35	XDFZZ		45DEG1NPT	18702	ELBOW	EA	1
C-8	36	XDOZZ		1NPT	18702	NIPPLE, CLOSE	EA	1
C-8	37	XDOZZ		3/8NPTX1-1	18702	NIPPLE	EA	1
C-8	38	XDOZZ		90DEG3/8NPT	18702	ELBOW	EA	1



C-8	39	XDOZZ	3/8NPTX1½	18702	NIPPLE	EA	1
C-8	40	XDFZZ	1X3/8NPT	18702	BUSHING, HEX	EA	1
C-8	41	XDOZZ	1NPT	18702	NIPPLE CLOSE	EA	1
C-8	42	XDFZZ	½NPT	18702	PLUG, PIPE	EA	1
C-8	43	XDFZZ	FIG 6-1-1	03933	FILTER, WATER	EA	1
C-8	44	XDOZZ	1NPTX2	18702	NIPPLE	EA	1
C-8	45	XDFZZ	1NPT	18702	TEE	EA	1
C-8	46	XDOZZ	1NPTX2	18702	NIPPLE	EA	1
C-8	47	XDFZZ	1NPT	18702	CROSS	EA	1
C-8	48	XDOZZ	1NPT	18702	NIPPLE, CLOSE	EA	1
C-8	49	XDOZZ	1565-05	94774	VALVE, COCK	EA	1
C-8	50	XDOZZ	1NPTX2	18702	NIPPLE	EA	1
C-8	51	XDFZZ	90DEG1NPT	18702	ELBOW	EA	1
C-8	52	XDFZZ	1NPTX8TOE	18702	NIPPLE	EA	1
C-8	53	XDFZZ	7805-5043	24161	PULLEY, V-BELT	EA	1
C-8	54	XDFHH	625A38-10-3SL	94774	PUMP ASSY, WATER	EA	1

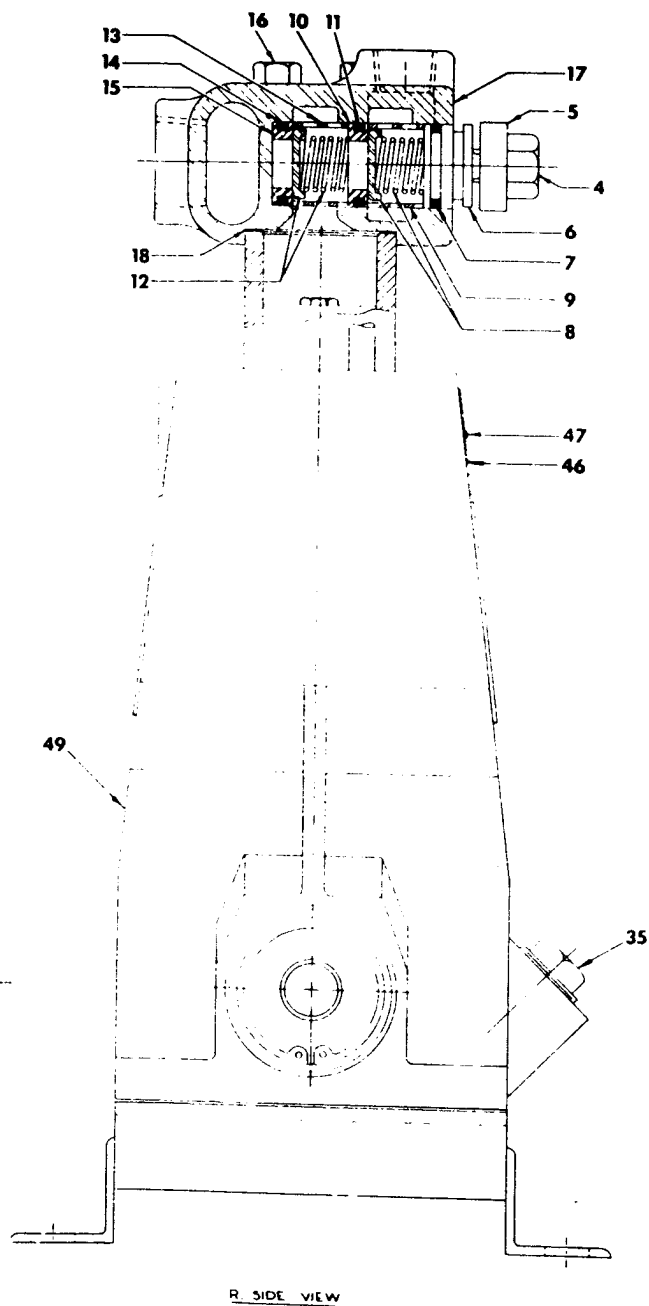
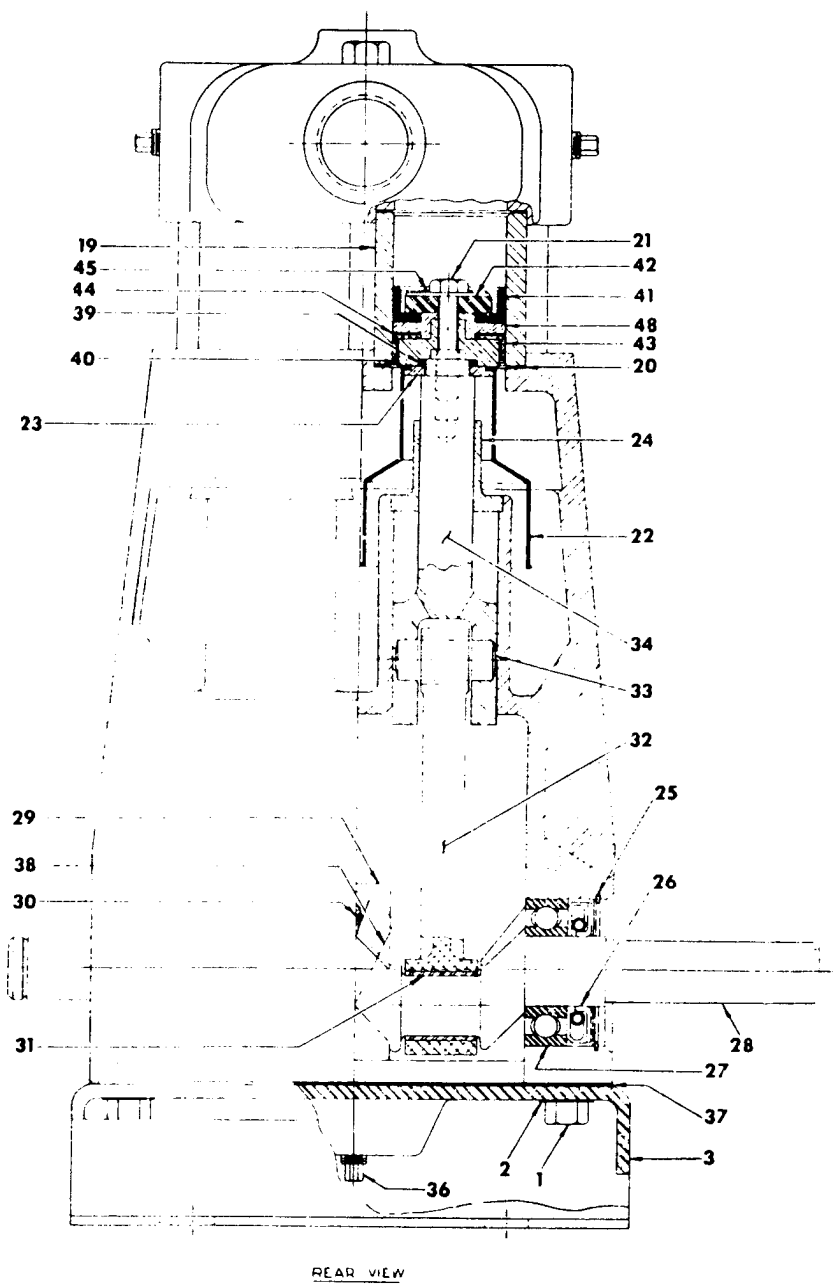


Figure C-9. Pump assembly, water.

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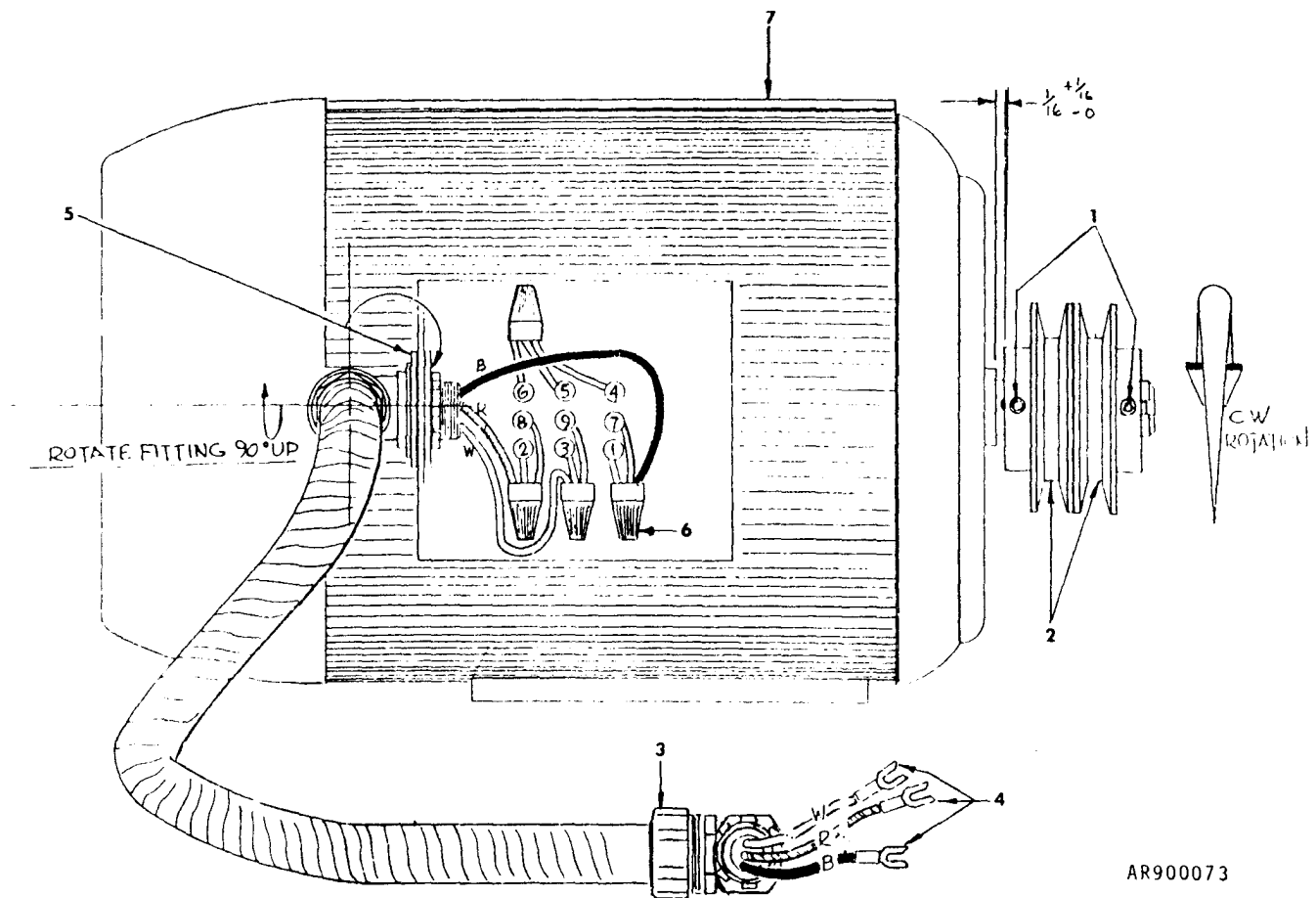
## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)  SMR CODE	(3)  NATIONAL STOCK NUMBER	(4)  PART NUMBER	(5)  FSCM	(6)  DESCRIPTION  <i>USABLE ON CODE</i>	(7)  U/M	(8) QTY INC IN UNIT
(a) FIG NO.	(b) ITEM NO.							
Group 0202 - PUMP ASSY, WATER								
C-9	1	XBFZZ	3110-00-004-1488	3/8-16X¾	18702	BOLT, HEX	EA	6
C-9	2	XBFZZ		3/8	18702	WASHER, CUP	EA	6
C-9	3	XDFZZ		625-1255297-03	94774	PLATE, MTG	EA	1
C-9	4	XBHZZ		½ -13X1½	18702	SCREW, CAP HEX	EA	1
C-9	5	XDHZZ		625-1255887	94774	CLAMP, COVER	EA	1
C-9	6	XBHZZ		625-1219614	94774	COVER, VALVE	EA	2
C-9	7	KHHZZ		625-1177394	94774	PACKING, PREFORMED 1-3/16 INCH OD	EA	2
C-9	8	KHHZZ		625-1222355	94774	DISC, SPRING	EA	2
C-9	9	XBHZZ		625-1219610	94774	CAGE, VALVE	EA	2
C-9	10	XBHZZ		625-1219615	94774	SEAT, VALVE	EA	2
C-9	11	KHHZZ		625-1177394	94774	PACKING PREFORMED 1-3/16 INCH OD	EA	2
C-9	12	KHHZZ		625-1222355	94774	DISC, SPRING	EA	2
C-9	13	XBHZZ		625-1219610	94774	CAGE, VALVE	EA	2
C-9	14	KHHZZ		625-1177394	94774	PACKING, PREFORMED 1-3/16 INCH OD	EA	2
C-9	15	XBHZZ		625-1219615	94774	SEAT, VALVE	EA	2
C-9	16	XBHZZ		3/8-16X¾	18702	SCREW, CAP, HEX	EA	3
C-9	17	XDHZZ		3726-04	94774	CHAMBER, VALVE	EA	1
C-9	18	KHHZZ		625-A91684	94774	GASKET	EA	2
C-9	19	XDHZZ		625-1241364	94774	CYLINDER	EA	2
C-9	20	KHHZZ		625-A91684	94774	GASKET	EA	2
C-9	21	XBHZZ		5/16-18X1½	18702	SCREW, CAP STAINLESS STEEL	EA	2
C-9	22	XDHZZ		625-1279148	94774	UMBRELLA	EA	2
C-9	23	XDHZZ		625-1269388	94774	WASHER, UMBRELLA	EA	2
C-9	24	XBHZZ		625-1218743	94774	SLEEVE, CROSSHEAD	EA	2
C-9	25	XDHZZ		625-5000-206	94774	RING, RETAINING	EA	2
C-9	26	XDHZZ		625-1219669	94774	SEAL, OIL	EA	2
C-9	27	PAHZZ		3205	43334	BEARING	EA	2
C-9	28	XDHZZ		625-1244980	94774	CRANKSHAFT	EA	1
C-9	29	XDHZZ		625-1280807	94774	SLINGER, OIL	EA	1
C-9	30	XBHZZ		10-24X½	18702	SCREW, MACH	EA	1
C-9	31	XBHZZ		625-1280908	94774	INSERT, BEARING	EA	4
C-9	32	XBHZZ		625-1263906	94774	ROD, CONNECTING	EA	2
C-9	33	XBHZZ		625-1219650	94774	PIN, WRIST	EA	2
C-9	34	XBHZZ		625-1216823	94774	CROSSHEAD	EA	2
C-9	35	XDOZZ		¾NPT	18702	PLUG, PIPE, MALE	EA	1
C-9	36	XDHZZ		625-1105666	94774	PIPE, PLUG, MALE ¼ INCH GALVANIZED	EA	1
C-9	37	XBHZZ		625-1219606	94774	GASKET	EA	1
C-9	38	XDHZZ		625-1272419	94774	NUT, SPEED	EA	1
C-9	39	KHHZZ		625-1185360	94774	O-RING	EA	2
C-9	40	XDHZZ		625-1247238	94774	PACKING, BRASS, PILOT	EA	2
C-9	41	KHHZZ		625-1244781	94774	PACKING, PREFORMED	EA	2
C-9	42	KHHZZ		625-1244881	94774	WASHER	EA	2

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## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
C-9	43	KHHZZ		625-1255223	94774	PACKING, PREFORMED	EA	2
C-9	44	KHHZZ		625-1255224	94774	WASHER	EA	2
C-9	45	XDHZZ		625-1284515	94774	WASHER, 5/16 SPECIAL SST	EA	2
C-9	46	XDHZZ		625-1276367	94774	PLATE, IDENTIFICATION	EA	1
C-9	47	XDHZZ		625-1187413	94774	SCREW, DRIVE	EA	2
C-9	48	XDHZZ		625-1247237	94774	WASHER, BRASS	EA	2
C-9	49	XDHZZ		625-1267611	94774	CASE, PUMP	EA	1
C-9		XBHZZ		625K1	94774	PARTS KIT, CHECK VALVE	EA	1
C-9	7			625-1177394	94774	PACKING, PREFORMFD 1-3/16 INCH OD	EA	2
C-9	8			625-1222355	94774	DISC, SPRING	EA	2
C-9	11			625-1177394	94774	PACKING PREFORMFD 1-3/16 INCH OD	EA	2
C-9	12			625-1222355	94774	DISC, SPRING	EA	2
C-9	14			625-1177394	94774	PACKING, PREFORMED 1-3/16 INCH OD	EA	2
C-9		XBHZZ		625K2	94774	PARTS KIT, CUP	EA	1
C-9	18			625-A91684	94774	GASKET	EA	2
C-9	20			625-A91684	94774	GASKET	EA	2
C-9	37			625-1219606	94774	GASKET	EA	1
C-9	39			625-1185360	94774	O-RING	EA	2
C-9	41			625-1244781	94774	PACKING, PREFORMED	EA	2
C-9	42			625-1244881	94774	WASHER	EA	2
C-9	43			625-1255223	94774	PACKING, PREFORMED	EA	2

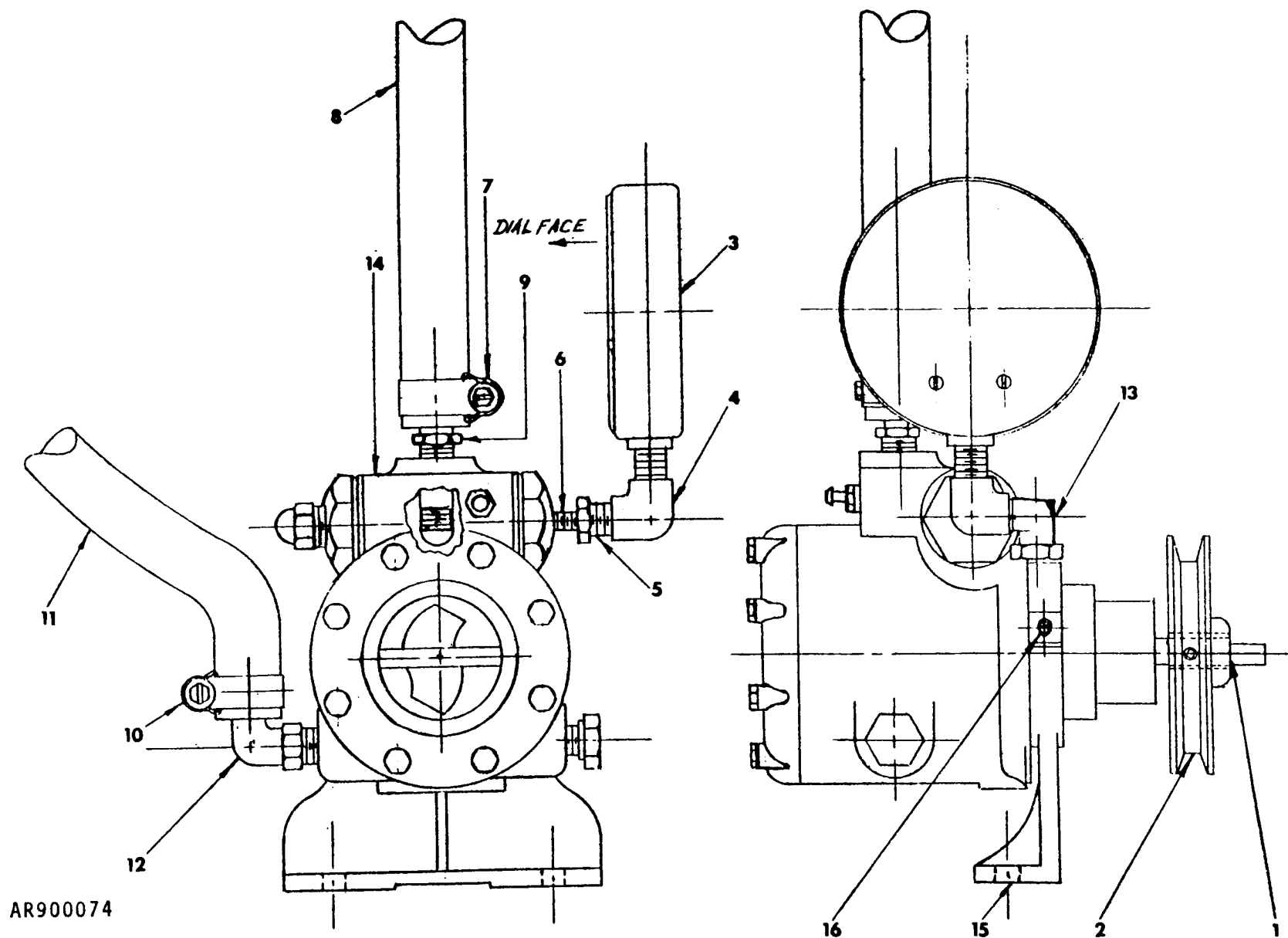


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Figure C-10. Motor assembly, AC.

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
<b>Group 0203 - MOTOR ASSY</b>								
C-10	1	XBFZZ	5975-00-578-3643 5940-00-881-1424	5/16-18X3/8	18702	SCREW, SET	EA	2
C-10	2	XDFZZ		BC31-1-1/8	24161	PULLEY, BELT	EA	2
C-10	3	PAFZZ		5252	59730	BOX, CONNECTOR, ELECTRICAL	EA	2
C-10	4	PAFZZ		13310	79061	TERMINAL, LUG	EA	3
C-10	5	XDFZZ		21¾ TO ½	18702	WASHER, REDUCER	EA	2
C-10	6	XDFZZ		44	24398	NUT, WIRE	EA	4
C-10	7	XDFZZ		3496TEFC184	80072	MOTOR, AC	EA	1



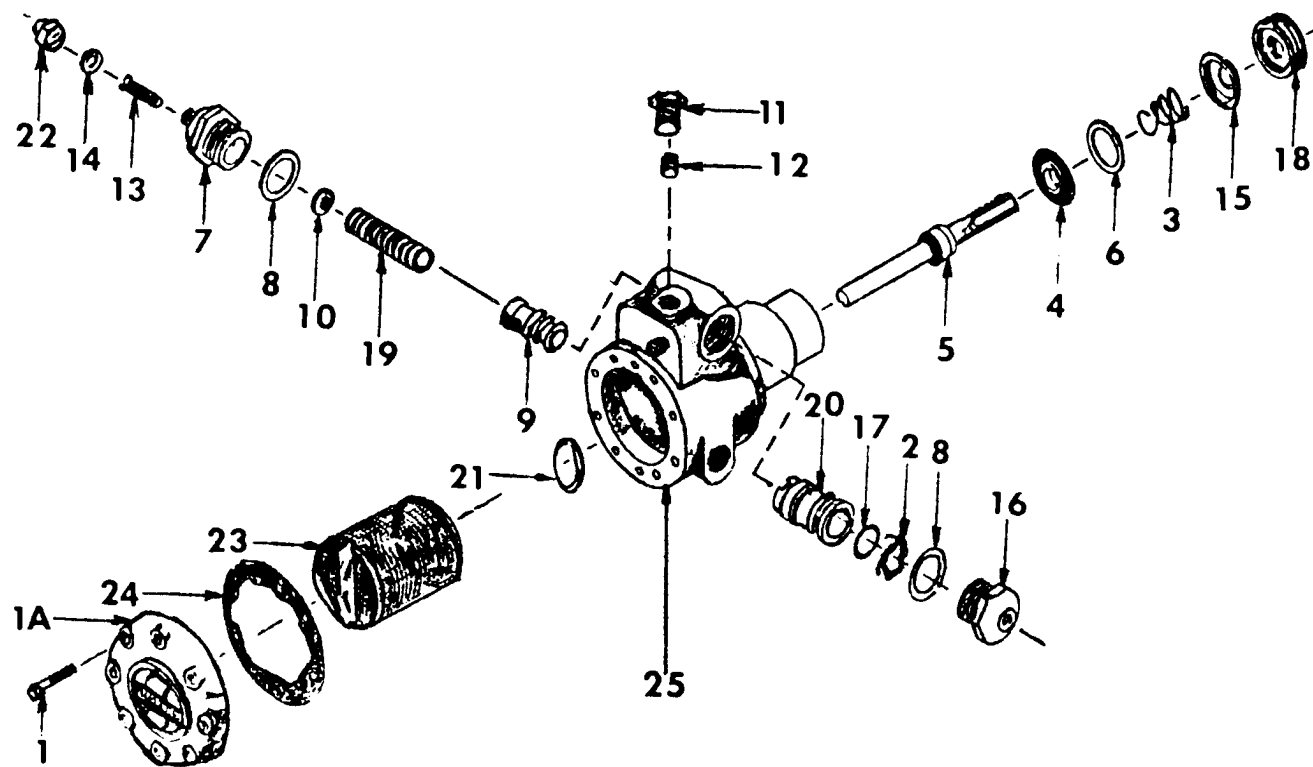
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Figure C-11. Pump, oil.

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  USABLE ON CODE	U/M	QTY INC IN UNIT
<b>Group 0204 - PUMP ASSEMBLY, OIL</b>								
C-11	1	XDFZZ		1462-03	94774	BUSHING		
C-11	2	XDFZZ		BC32X5/8	24161	PULLEY, BELT	EA	1
C-11	3	XDFZZ		422	94774	GAGE, OIL PRESSURE	EA	1
C-11	4	XDFZZ		1/2NPT	18702	ELBOW, SIDE OUTLET	EA	1
C-11	5	XDFZZ		1/8X1/4NPT	18702	BUSHING, HEX	EA	1
C-11	6	XDFZZ		1/8NPT	18702	NIPPLE, CLOSE	EA	1
C-11	7	XDOZZ		6	66295	CLAMP, WORM	EA	1
C-11	8	MFFZZ		3/8 ID	18702	HOSE, FUEL, 32 INCHES	EA	1
C-11	9	XDFZZ		1/4NPTX3/8 HOSE	18702	SPUD, BRASS	EA	1
C-11	10	XDOZZ		6	66295	CLAMP, WORM	EA	1
C-11	11	XBFZZ		3/8 ID	18702	HOSE, FUEL, 19 INCHES	EA	1
C-11	12	XDFZZ		1/4NPTX3/8 HOSE	18702	SPUD, ELBOW	EA	1
C-11	13	XDFZZ		90DEG 1/4NPTX1/4 TUBE	18702	ELBOW	EA	1
C-11	14	XDFFF		90DEG H5PA200CW	99166	PUMP, OIL	EA	1
C-11	16	XDOZZ		103902	99166	BRACKET, MTG	EA	1
C-11	16	XDOZZ		1/4-20X1/4	18702	SCREW, SET	EA	1





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Figure C-12. Pump, oil.

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
<b>Group 0204 - PUMP ASSEMBLY, OIL</b>								
C-12	1	XDFZZ		111401	99166	SCREW, CAP	EA	8
C-12	1A	XDOZZ		128443	99166	COVER	EA	1
C-12	2	XDFZZ		121732	99166	RETAINER, SEAL	EA	1
C-12	3	PAFZZ	5360-00-472-6224	100301	99166	SPRING, SEAL	EA	1
C-12	4	PAFZZ	5330-00-374-6104	100319	99166	SEAL	EA	1
C-12	5	PAFZZ	4520-00-976-2259	116907	99166	SHAFT, DRIVE	EA	1
C-12	6	PAFZZ	5340-00-472-6194	101861	99166	WASHER, THRUST	EA	1
C-12	7	PAFZZ	5305-00-472-6234	103379	99166	PLUG AND GUIDE	EA	1
C-12	8	PAFZZ	5530-00-527-7560	100901	99166	GASKET, VALVE	EA	2
C-12	9	XDFZZ		128393	99166	PISTON	EA	1
C-12	10	PAFZZ	4320-00-472-6227	100931	99166	SPRING, SEAT	EA	1
C-12	11	XDFZZ		24816	99166	PORT, PLUG	EA	1
C-12	12	PAFZZ	4730-00-472-6209	24800	99166	PLUG	EA	1
C-12	13	PAFZZ	5305-00-637-0730	101001	99166	SCREW	EA	1
C-12	14	PAFZZ	5330-00-472-6189	100371	99166	GASKET	EA	1
C-12	15	PAFZZ	3895-00-374-6103	100291	99166	CUP, SHAFT BEARING	EA	1
C-12	16	PAFZZ	4730-00-360-5272	109777	99166	PLUG	EA	1
C-12	17	KFFZZ	5310-00-037-4935	25815	99166	WASHER, FLAT	EA	1
C-12	18	PAFZZ	4320-00-028-3862	100031	99166	CAP, SEAL	EA	1
C-12	19	PAFZZ	5360-00-197-5883	101641	99166	SPRING, HELICAL	EA	1
C-12	20	KFFZZ		128433	99166	SLEEVE, PISTON	EA	1
C-12	21	PAFZZ	4330-00-461-3964	122822	99166	DIAPHRAGM, STEAM CLEANER	EA	1
C-12	22	PAFZZ	5310-00-472-6204	100241	99166	NUT, PLAIN CAP	EA	1
C-12	23	XDFZZ		131129	99166	FILTER	EA	1
C-12	24	PAFZZ	5330-00-375-1690	110441	99166	GASKET	EA	1
C-12	25	XDFZZ		NO NUMBER	99166	BODY, PUMP	EA	1

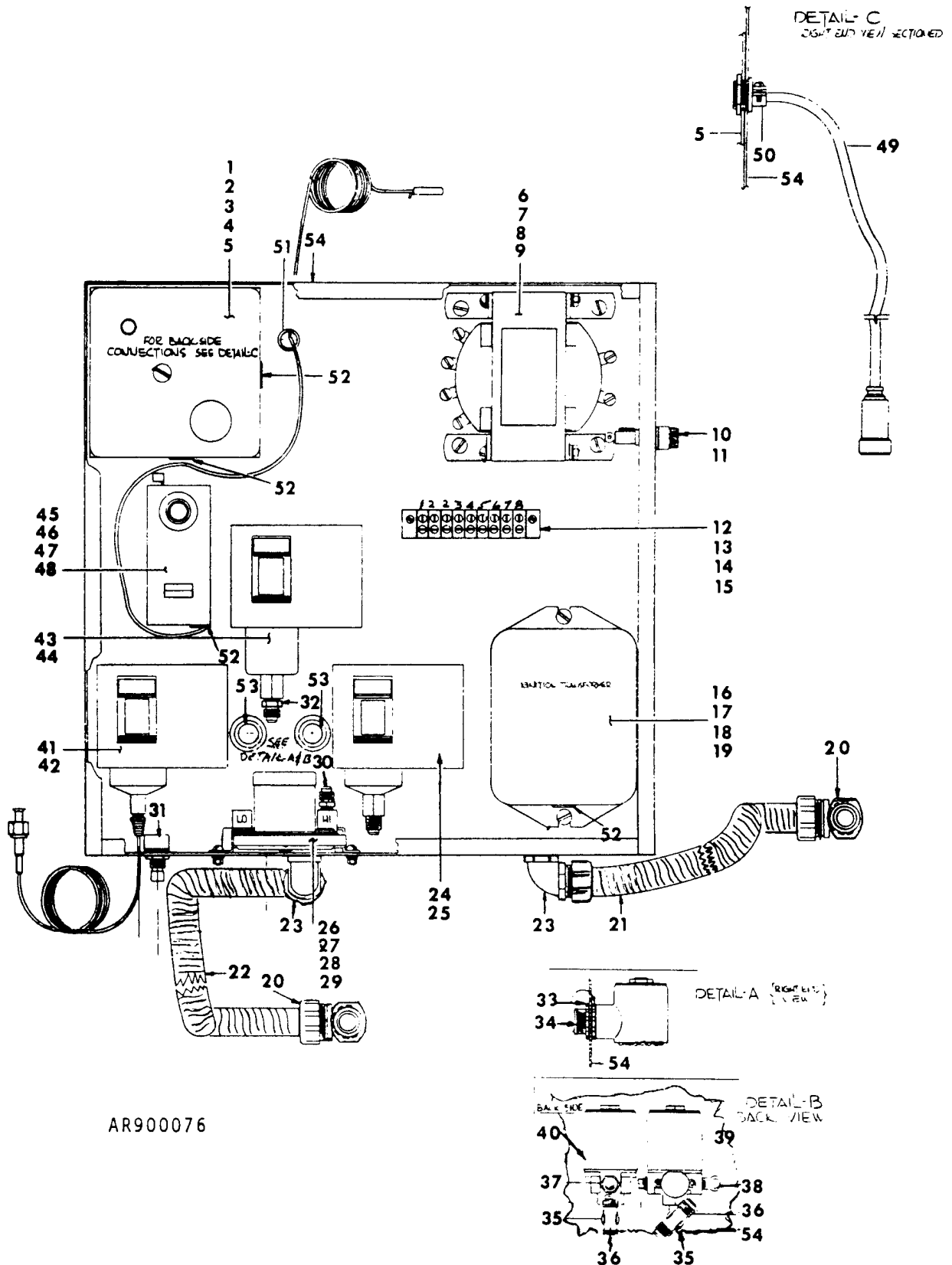


Figure C-13. Control box assembly, electrical.

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FLG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  USABLE ON CODE	U/M	QTY INC IN UNIT
<b>Group 03 - CONTROL BOX ASSY ELECTRICAL</b>								
C-13	1	PAFZZ		MS17187	96906	NUT, HEX		
C-13	2	PAFZZ	5110-00-721-7809	MS35340-43	95906	WASHER, LOCK	EA	4
C-13	3	PAFZZ	5305-00-775-5193	10-32X3/8	18702	SCREW, RD HD	EA	4
C-13	4	XBHZZ		UVM-2A	91875	CONTROL, FLAME	EA	4
C-13	5	XDHZZ		61-3060	91875	BASE, CONTROL	EA	1
C-13	6	PAOZZ	5310-00-761-6882	MS51967-2	96906	NUT, HEX	EA	1
C-13	7	PAHZZ	5310-00-682-5930	MS35340-44	96906	WASHER, LOCK	EA	4
C-13	8	PAHZZ	5305-00-159-5450	¼-20X½	18702	SCREW, FIL HD	EA	4
C-13	9			636-1191	75138	TRANSFORMER, POWER	EA	4
C-13	10			AGC-6AMP	71400	FUSE	EA	1
C-13	11	XDHZZ		HKP¼X½	71400	HOLDER, FUSE	EA	1
C-13	12	PAHZZ	5310-00-421-9608	MS51858-4	96906	NUT, HEX	EA	1
C-13	13	PAHZZ	5310-00-809-3365	MS35340-42	96906	WASHER, LOCK	EA	2
C-13	14	PAHZZ	5305-00-834-8231	8-32X½	18702	SCREW, RD HD	EA	2
C-13	15	XDHZZ		CR151D10109	04314	STRIP, TERMINAL	EA	2
C-13	16	PAOZZ	5310-00-761-6882	MS51967-2	96906	NUT, HEX	EA	1
C-13	17	PAOZZ	5310-00-682-5930	MS35340-44	96906	WASHER, LOCK	EA	2
C-13	18	PAOZZ	5305-00-159-5450	¼-20X½	18702	SCREW, FIL HD	EA	2
C-13	19	XDHZZ		TYPE312-25- ABO-1V	64294	TRANSFORMER, IGNITION	EA	2
C-13	20	XBHZZ		5252	59730	CONNECTOR	EA	1
C-13	21	XDHZZ		½IN	18702	CONDUIT, FLEX	EA	2
C-13	22	XDHZZ		½IN	18702	CONDUIT, FLEX	EA	1
C-13	23	XBHZZ		5252	59730	CONNECTOR	EA	1
C-13	24	PAOZZ	5305-00-775-5193	10-32X3/8	18702	SCREW, RD HD	EA	2
C-13	25	XDHZZ		P7OCA15	06541	SWITCH, PRESSURE	EA	2
C-13	26	XDOZZ		MS17187	96906	NUT, HEX	EA	1
C-13	27	PAOZZ	5310-00-721-7809	MS35340-43	96906	WASHER, LOCK	EA	2
C-13	28	PAOZZ	5305-00-775-5193	10-32X3/8	18702	SCREW, RD HD	EA	2
C-13	29	XDHZZ		1910-0	18964	SWITCH, PRESSURE	EA	2
C-13	30	XDHZZ		1/8NPTX¼	18702	FITTING	EA	1
C-13	31	XDHZZ		110SPM-OFF	73559	SWITCH, PUSHBUTTON	EA	1
C-13	32	XDHZZ		¼NPTX¼	18702	FITTING	EA	1
C-13	33	PAHZZ	4030-00-911-5123	½	18702	NUT, JAM	EA	1
C-13	34	XDHZZ		½NPT	18702	NIPPLE, CLOSE	EA	4
C-13	35	XDHZZ		90DEG1/8NPT	18702	ELBOW, STREET	EA	2
C-13	36	XDHZZ		1/8NPTX¼X¼	18702	TEE	EA	2
C-13	37	XDHZZ		1/8NPTX¼	18702	FITTING	EA	2
C-13	38	XDHZZ		1/8NPTX¼	18702	FITTING	EA	1
C-13	39	XDHZZ		90DEG K281FA312	72663	VALVE, SOLENOID	EA	1

C-13	40	XDHZZ		K271FA312	72663	VALVE, SOLENOID	EA	1
C-13	41	PAOZZ	5305-00-775-5193	10-32X3/8	18702	SCREW, RD HD	EA	2
C-13	42	XDHZZ		P79AA47	06541	SWITCH, PRESSURE	EA	1
C-13	43	PAOZZ	5305-00-775-5193	10-32X3/8	18702	SCREW, RD HD	EA	2
C-13	44	XDHZZ		P70AA15	06541	SWITCH, PRESSURE	EA	1
C-13	45	XDOZZ		MS17187	96906	NUT, HEX	EA	2
C-13	46	PAOZZ	5310-00-721-7809	MS35340-43	96906	WASHER, LOCK	EA	2
C-13	47	PAOZZ	5305-00-775-5193	10-32X3/8	18702	SCREW, RD HD	EA	2
C-13	48	XBHZZ		A19ADB11	06541	SWITCH, TEMPERATURE	EA	1
C-13	49	XBHZZ		UV1A-36	91875	FLAME SCANNER	EA	1
C-13	50	XDHZZ		6623	03923	CONNECTOR	EA	1
C-13	51	XDHZZ		SB500-6	28520	GROMMET	EA	1
C-13	52	XDHZZ		SB875-11	28250	GROMMET	EA	4
C-13	53	XDHZZ		SB562-7	28250	GROMMET	EA	2
C-13	54	XDHZZ		3785-02	94774	BOX, ELECTRICAL	EA	1

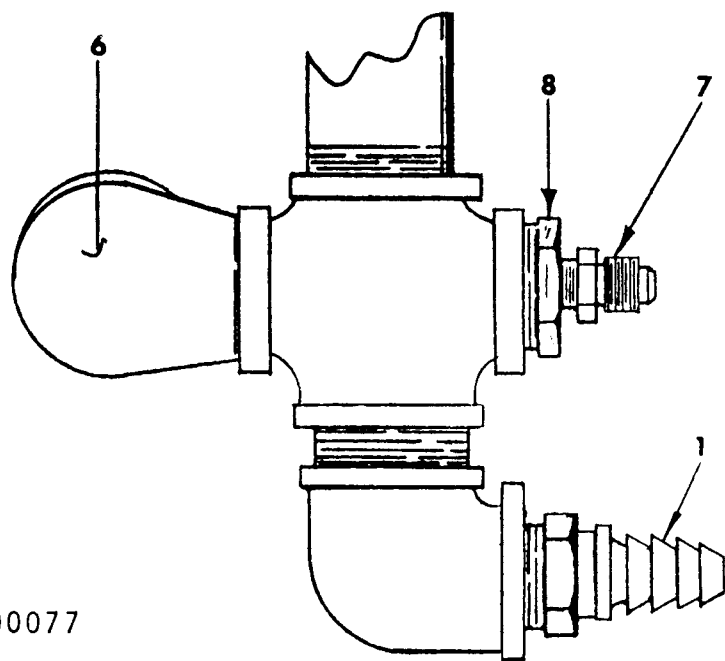
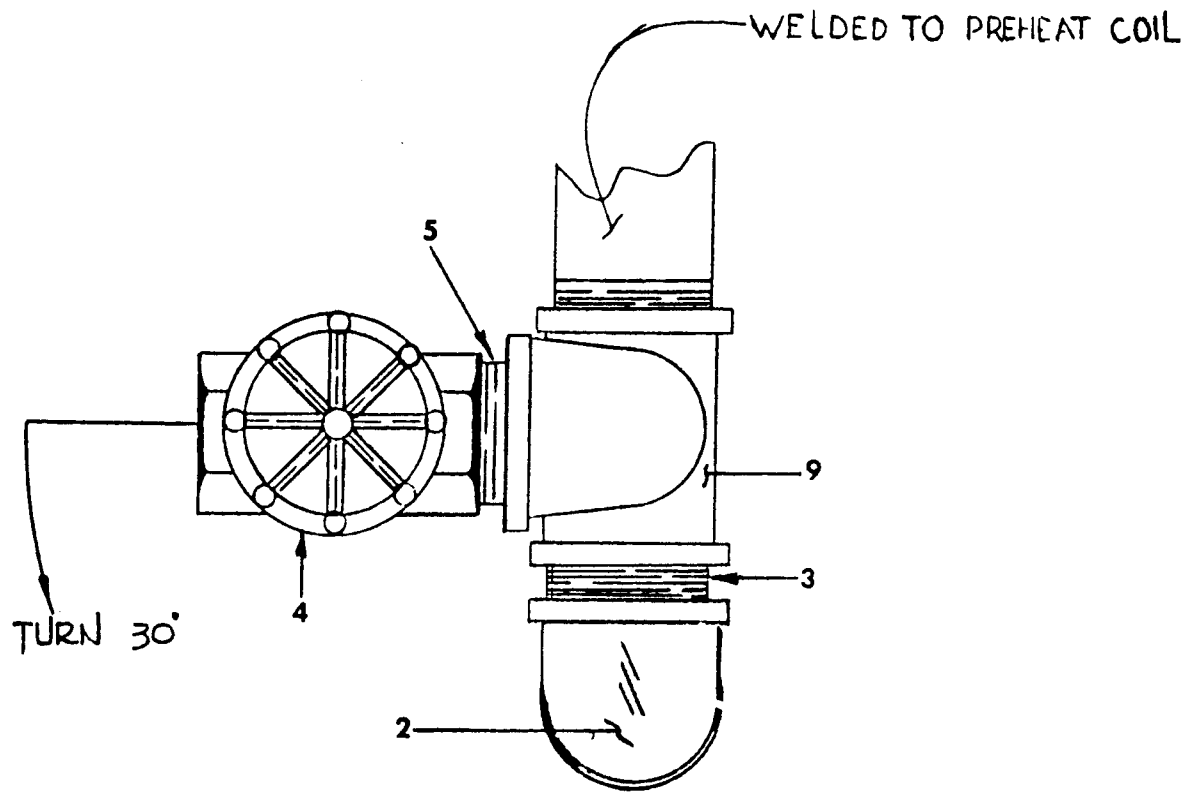
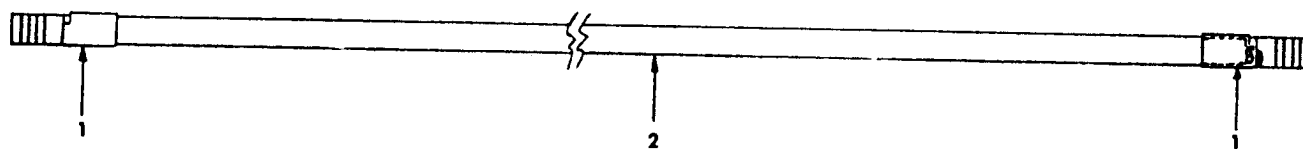


Figure C-14. Coil inlet assembly.

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## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
<b>Group 04 - HEATER COIL GROUP</b>								
<b>Group 0401 - COIL INLET ASSY</b>								
C-14	1	XDFZZ		¾NPTX1HOSE	18702	SPUD	EA	1
C-14	2	XDOZZ		90DEG¾NPT	18702	ELBOW	EA	1
C-14	3	XDOZZ		¾NPT	18702	NIPPLE, CLOSE	EA	1
C-14	4	XDFZZ		701-¾	79911	VALVE	EA	1
C-14	5	XDOZZ		¾NPT	18702	NIPPLE, CLOSE	EA	1
C-14	6	XDHZZ		¾NPT	18702	ELBOW, STREET	EA	1
C-14	7	XDHZZ		¼NPTX¼TUBE	18702	FITTING	EA	1
C-14	8	XDHZZ		¾TO¼NPT	18702	BUSHING	EA	1
C-14	9	XDHZZ		¾NPT	18702	CROSS	EA	1



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*Figure C-15. Lead assembly, electrode.*



Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  USABLE ON CODE	U/M	QTY INC IN UNIT
C-15	1	XDFZZ		5303	01637	Group 0402 – LEAD ASSY, ELECTRODE	EA	2
C-15	2	XDFZZ		14-1	72663	TERMINAL LEAD, ELECTRODE	EA	1

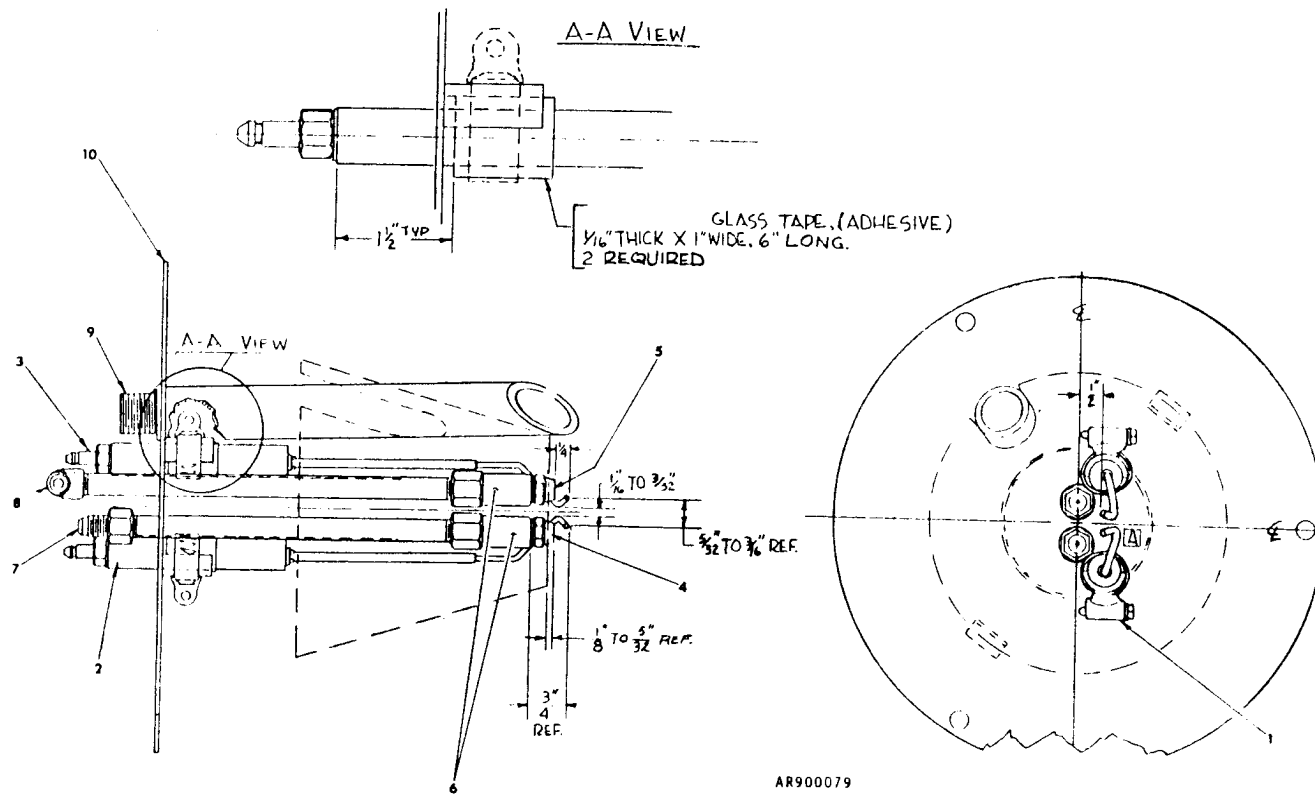


Figure C-16. Burner plate assembly.

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
<b>Group 0403 - BURNER PLATE ASSY</b>								
C-16	1	XDOZZ		6H	66295	CLAMP, WORM	EA	2
C-16	2	XBFZZ		1543-1-05	94774	ELECTRODE, IGNITION LH	EA	1
C-16	3	XBFZZ		1543-05	94774	ELECTRODE, IGNITION RH	EA	1
C-16	4	XDFZZ		1541-05	94774	NOZZLE, BURNER 10 GPH 90° B	EA	1
C-16	5	XDFZZ		1542-05	94774	NOZZLE, BURNER 5.0 GPH 90° B	EA	1
C-16	6	XDFZZ		28737-1	71895	ADAPTER	EA	2
C-16	7	XDFZZ		1/8NPTX1/4TUBE	18702	FITTING	EA	1
C-16	8	XDFZZ		1/8NPTX1/4TUBE 90DEG	18702	FITTING	EA	1
C-16	9	XDFZZ		1/2NPT	18702	NIPPLE, CLOSE	EA	1
C-16	10	XDFZZ		3791-1-02	94774	PLATE, BURNER	EA	1

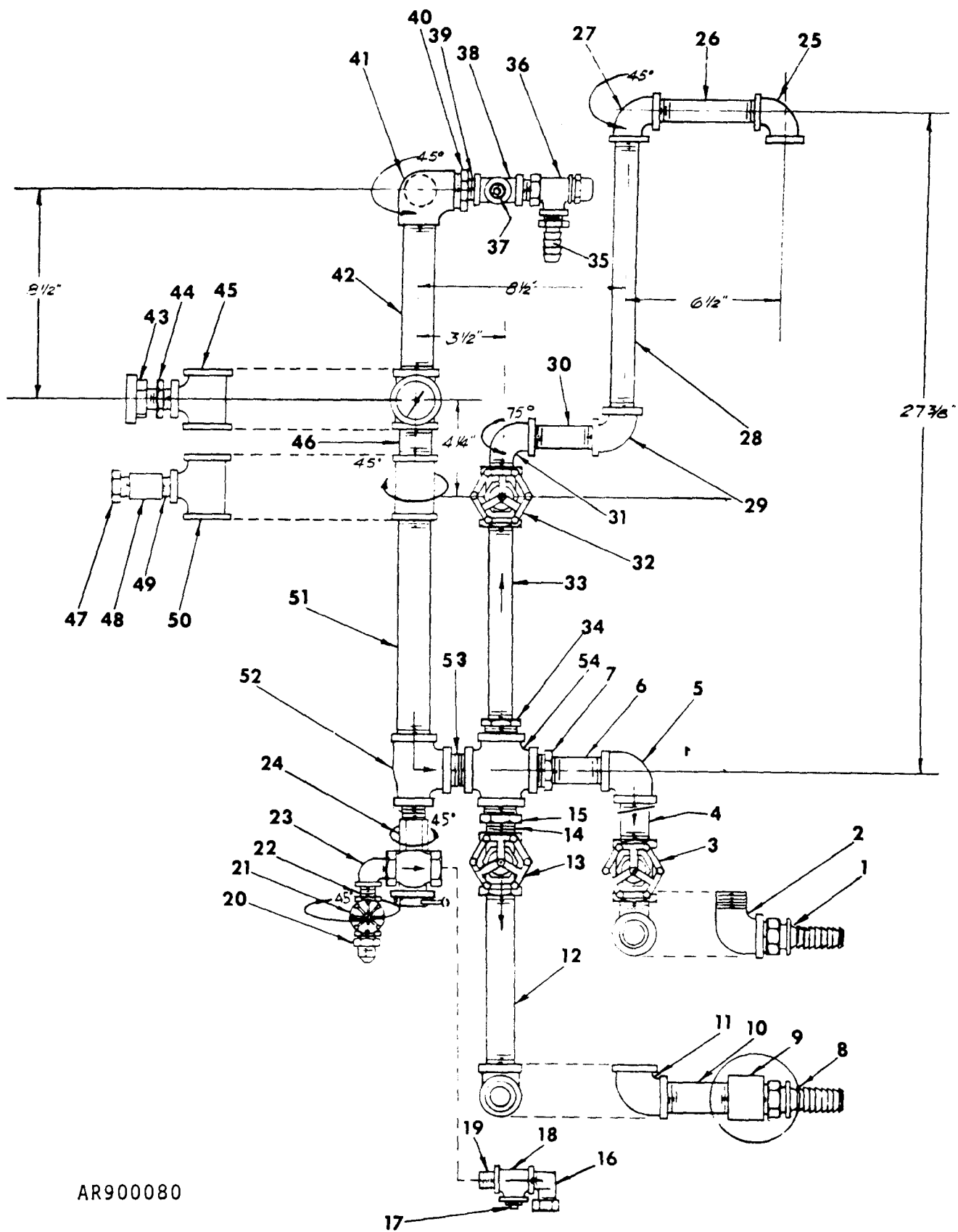


Figure C-17. Outlet coil assembly.

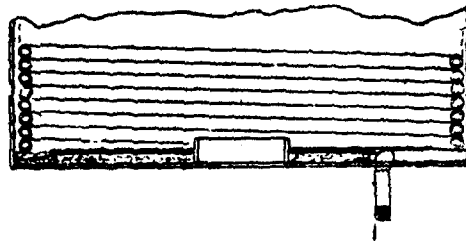
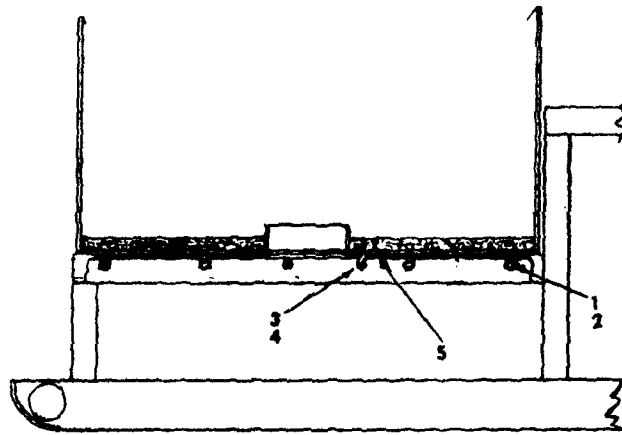
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## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)  SMR CODE	(3)  NATIONAL STOCK NUMBER	(4)  PART NUMBER	(5)  FSCM	(6)  DESCRIPTION  <i>USABLE ON CODE</i>	(7)  U/M	(8) QTY INC IN UNIT
(a) FIG NO.	(b) ITEM NO.							
Group 0404 - COIL OUTLET ASSY								
C-17	1	XDFZZ		¾NPTX¾HOSE	18702	SPUD	EA	1
C-17	2	XDFZZ		90DEG¾NPT	18702	ELBOW, STREET	EA	1
C-17	3	XDFZZ		701-¾NPT	79911	VALVE	EA	1
C-17	4	XDFZZ		¾NPTX2½	18702	NIPPLE	EA	1
C-17	5	XDFZZ		90DEG¾NPT	18702	ELBOW	EA	1
C-17	6	XDFZZ		¾NPTX3	18702	NIPPLE	EA	1
C-17	7	XDFZZ		1X¾NPT	18702	BUSHING, HEX	EA	1
C-17	8	XDOZZ		¾NPTX¾HOSE	18702	SPUD	EA	1
C-17	9	XDFZZ		¾NPT	18702	COUPLING	EA	1
C-17	10	XDFZZ		¾NPTX3½	18702	NIPPLE	EA	1
C-17	11	XDOZZ		90DEG¾NPT	18702	ELBOW	EA	1
C-17	12	XDFZZ		¾NPTX8	18702	NIPPLE	EA	1
C-17	13	XDFZZ		701-¾	79911	VALVE	EA	1
C-17	14	XDOZZ		¾NPT	18702	NIPPLE, CLOSE	EA	1
C-17	15	XDOZZ		1X¾NPT	18702	BUSHING, HEX	EA	1
C-17	16	XDFZZ		¼NPTX¼TUBE	18702	FITTING	EA	1
C-17	17	XDFZZ		¼NPT	18702	PLUG, PIPE	EA	1
C-17	18	XDFZZ		¼NPT	18702	TEE	EA	1
C-17	19	XDFZZ		¼NPT	18702	NIPPLE, CLOSE	EA	1
C-17	20	XDOZZ		¼NPTX¼TUBE	18702	FITTING	EA	1
C-17	21	XDFZZ		¼NPT	18702	VALVE, NEEDLE	EA	1
C-17	22	XDOZZ		¼NPT	18702	NIPPLE, CLOSE	EA	1
C-17	23	XDOZZ		90DEG¼NPT	18702	ELBOW, STREET	EA	1
C-17	24	XDFZZ		2125-01	94774	VALVE, TEMPERATURE	EA	1
C-17	25	XDFZZ		90DEG½NPT	18702	ELBOW	EA	1
C-17	26	XDFZZ		½NPTX5	18702	NIPPLE	EA	1
C-17	27	XDOZZ		90DEG½NPT	18702	ELBOW	EA	1
C-17	28	XDFZZ		½NPTX11½	18702	NIPPLE	EA	1
C-17	29	XDOZZ		90DEG½NPT	18702	ELBOW	EA	1
C-17	30	XDFZZ		½NPTX3½	18702	NIPPLE	EA	1
C-17	31	XDOZZ		90DEG½NPT	18702	ELBOW, STREET	EA	1
C-17	32	XDFZZ		701½NPT	79911	VALVE	EA	1
C-17	33	XDFZZ		½NPTX9	18702	NIPPLE	EA	1
C-17	34	XDFZZ		1X½NPT	18702	BUSHING, HEX	EA	1
C-17	35	XDFZZ		½NPTX½HOSE	18702	SPUD	EA	1
C-17	36	XDFZZ		FIG 120	96106	VALVE, PRESSURE	EA	1
C-17	37	XDOZZ		¼NPTX¼TUBE	18702	FITTING	EA	1
C-17	38	XDFZZ		½NPTX½NPTX ¼NPT	18702	TEE	EA	1
C-17	39	XDOZZ		½NPT	18702	NIPPLE, CLOSE	EA	1
C-17	40	XDOZZ		1X½NPT	18702	BUSHING, HEX	EA	1

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
C-17	41	XDOZZ		90DEG1NPT	18702	ELBOW, SIDE OUTLET	EA	1
C-17	42	XDFZZ		1NPTX7	18702	NIPPLE	EA	1
C-17	43	XDFZZ		573-05	94774	GAGE, TEMPERATURE	EA	1
C-17	44	XDFZZ		½X¼NPT	18702	BUSHING, HEX	EA	1
C-17	45	XDFZZ		1NPT½NPTX 1NPT	18702	TEE	EA	1
C-17	46	XDFZZ		1NPTX2	18702	NIPPLE	EA	1
C-17	47	XDHZZ		1407-05	94774	SWITCH, WEL BULB OVERHEAT	EA	1
C-17	48	XDFZZ		½NPT	18702	COUPLING	EA	1
C-17	49	XDOZZ		½NPT	18702	NIPPLE, CLOSE	EA	1
C-17	50	XDOZZ		1NPTX1NPTX½	18702	TEE	EA	1
C-17	51	XDFZZ		1NPTX10½	19702	NIPPLE	EA	1
C-17	52	XDFZZ		1NPTX½NPT	18702	TEE	EA	1
C-17	53	XDOZZ		1NPT	18702	NIPPLE, CLOSE	EA	1
C-17	54	XDOZZ		1NPT	18702	CROSS	EA	1



AR900081

Figure C-18. Preheat coil (sheet 1 of 2).

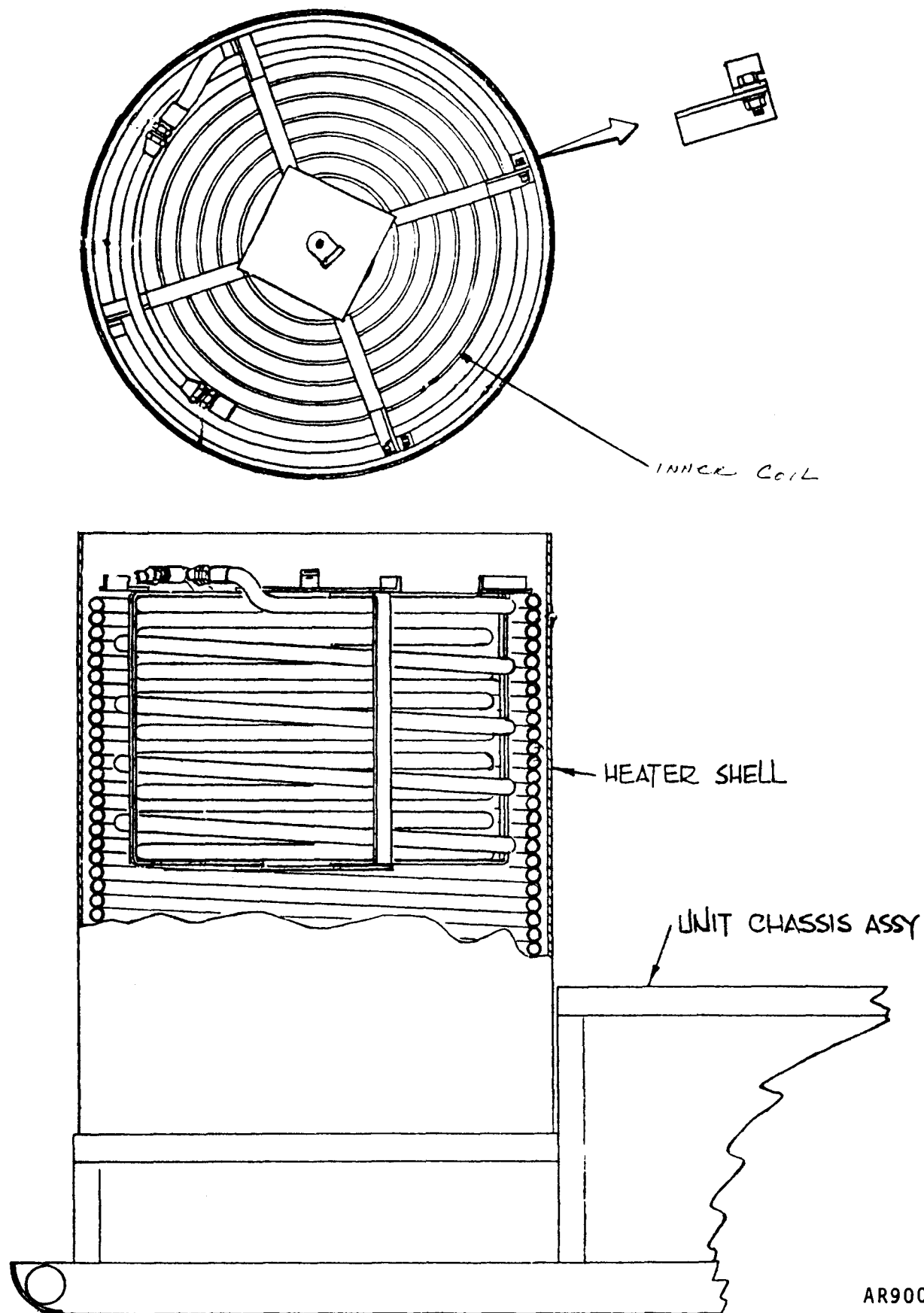


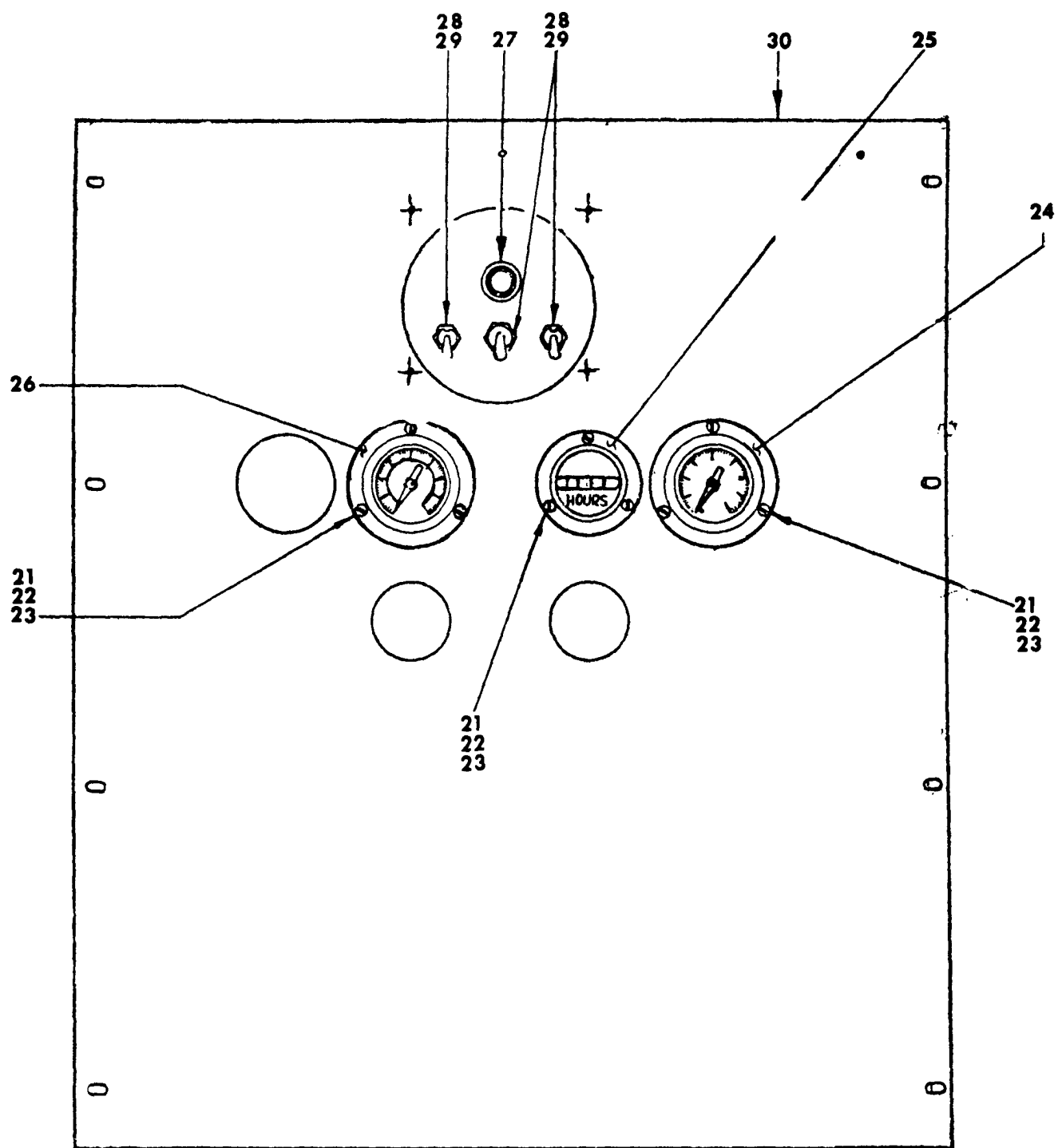
Figure C-18. Preheat coil (sheet 2 of 2).

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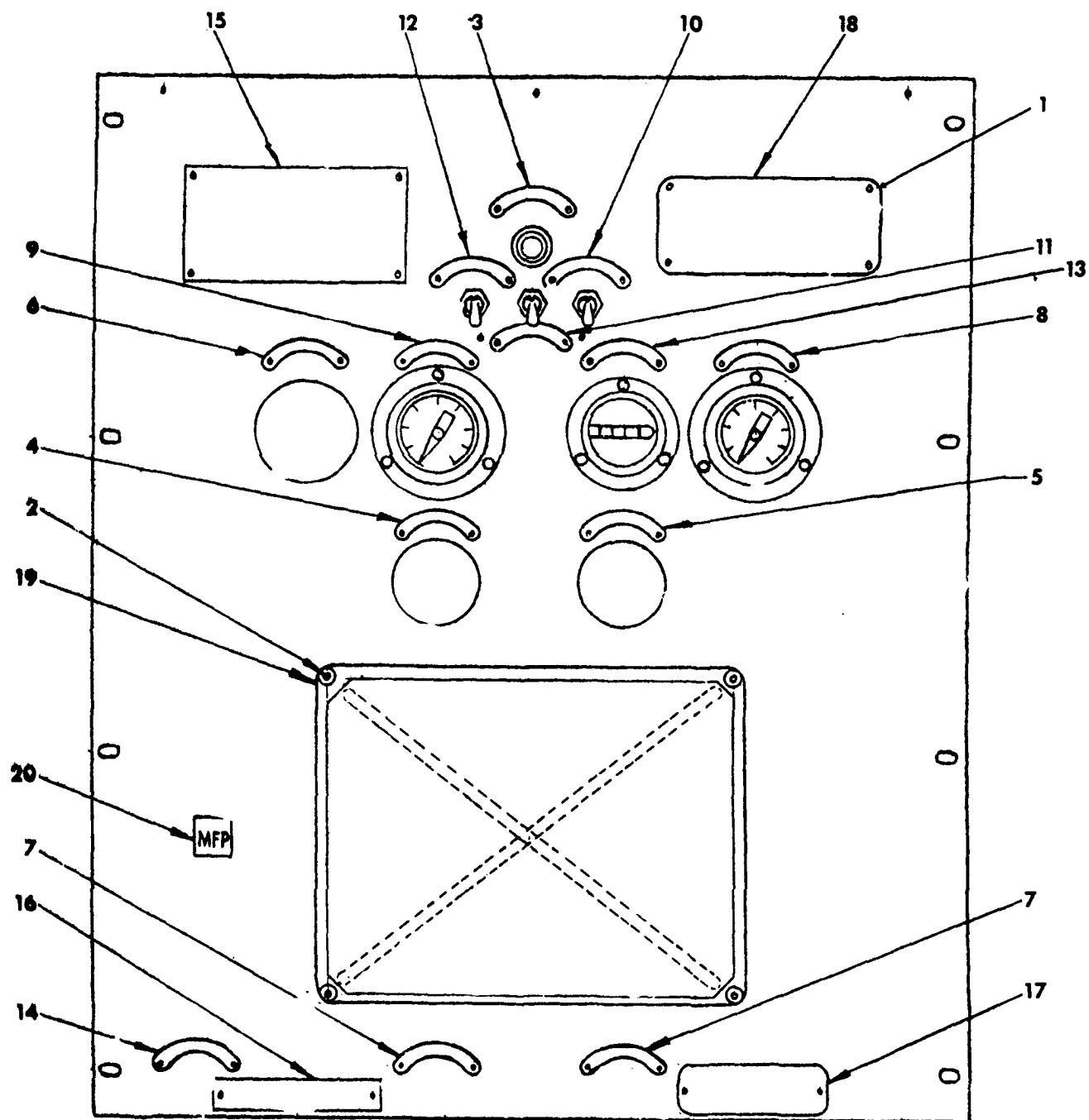
## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
<b>Group 0405 - PREHEAT COIL</b>								
C-18	1	PAFZZ	5310-00-768-0318	MS51967-14	96906	NUT, HEX	EA	6
C-18	2	PAFZZ	5310-00-834-7606	MS35340-48	96906	WASHER, LOCK	EA	6
C-18	3	PAOZZ	5310-00-732-0558	MS51967-8	96906	NUT, HEX	EA	3
C-18	4	PAOZZ	5310-00-959-4675	MS35338-46	96906	WASHER, LOCK	EA	3
C-18	5	XDFZZ		3789-02	94774	GASKET	EA	1



AR700204

Figure C-19. Panel assembly, instrument (sheet 1 of 2).

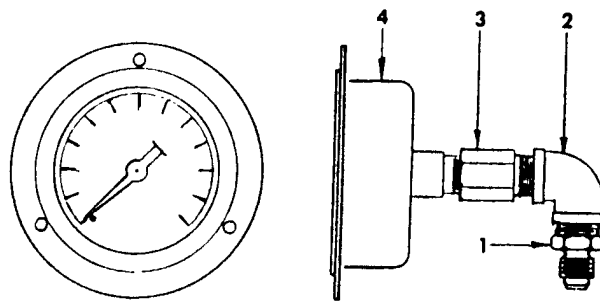


AR700205

Figure C-19. Panel assembly, instrument (sheet 2 of 2).

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)  SMR CODE	(3)  NATIONAL STOCK NUMBER	(4)  PART NUMBER	(5)  FSCM	(6)  DESCRIPTION  <i>USABLE ON CODE</i>	(7)  U/M	(8) QTY INC IN UNIT
(a) FIG NO.	(b) ITEM NO.							
						Group 05 - PANEL ASSY, INSTRUMENT		
C-19	1	XDOZZ	5310-00-218-2180 5310-00-839-3770 5305-00-546-5630	STST42DSS	27783	RIVET	EA	42
C-19	2	XBFZZ		No. 6	18702	WASHER, BRASS	EA	4
C-19	3	XDOZZ		1615-05	94774	TAG, BURNER FLAME OUT-RESET	EA	1
C-19	4	XDOZZ		1617-05	94774	TAG, SOAP FILL & STIR VALVE	EA	1
C-19	5	XDOZZ		1618-05	94774	TAG, SOAP CONTROL VALVE	EA	1
C-19	6	XDOZZ		1620-05	94774	TAG, TEMPERATURE GAGE	EA	1
C-19	7	XDOZZ		1621-05	94774	TAG, DISCHARGE VALVE	EA	2
C-19	8	XDOZZ		1622-05	94774	TAG, BACK PRESSURE GAGE	EA	1
C-19	9	XDOZZ		1623-05	94774	TAG, STEAM PRESSURE GAGE	EA	1
C-19	10	XDOZZ		1624-05	94774	TAG, PUMP CONTROL SWITCH	EA	1
C-19	11	XDOZZ		1625-05	94774	TAG, BURNER SWITCH-LOW	EA	1
C-19	12	XDOZZ		1626-05	94774	TAG, BURNER SWITCH-HIGH	EA	1
C-19	13	XDOZZ		1629-05	94774	TAG, HOURMETER	EA	1
C-19	14	XDOZZ		1634-05	94774	TAG, ON-FUEL-OFF	EA	1
C-19	15	XDOZZ		1640-05	94774	TAG, CLEANER ID	EA	1
C-19	16	XDOZZ		1641-05	94774	TAG, PRESSURE & TEMPERATURE CONTROL	EA	1
C-19	17	XDOZZ		1642-05	94774	TAG, USE STEAM CLEANING, ETC.	EA	1
C-19	18	XDOZZ		1643-05	94774	TAG, USE LIGHT DIESEL, OIL, ETC.	EA	1
C-19	19	XDOZZ		1645-05	94774	PLATE, DATA	EA	1
C-19	20	XDOZZ		1646-05	94774	DECAL, MFP	EA	1
C-19	21	PAFZZ	5930-00-642-9658	MS51858-3	96906	NUT, HEX	EA	9
C-19	22	PAFZZ		MS35340-41	96906	WASHER, LOCK	EA	9
C-19	23	PAFZZ		6-32X½	18702	SCREW, RD HD	EA	9
C-19	24	XDFZZ		3713-2-01	94774	GAGE ASSY, PRESSURE	EA	1
C-19	25	XDFZZ		200-10N	07446	METER, HOUR	EA	1
C-19	26	XDFZZ		3713-3-01	94774	GAGE ASSY, PRESSURE	EA	1
C-19	27	XDOOO		3713-1-01	94774	LIGHT ASSY	EA	1
C-19	28	XDFFZ		N1030	18858	BOOT, SWITCH	EA	3
C-19	29	PAFZZ		111-16-73	73559	SWITCH, TOGGLE	EA	3
C-19	30	XDFZZ		3772-02	94774	PANEL, INSTRUMENT	EA	1

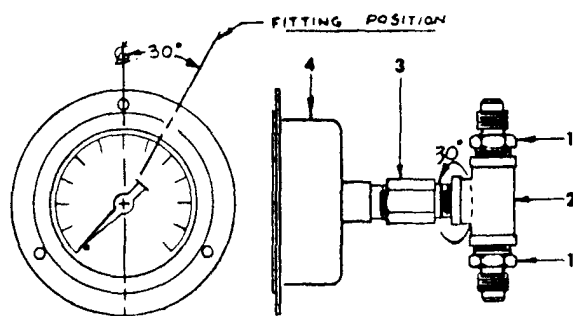


AR700206

*Figure C-20. Gage assembly, back pressure.*

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
						<b>Group 0501 – GAGE ASSY, BACK PRESSURE</b>		
C-20	1	XBFZZ		¼NPTX¼TUBE	18702	FITTING	EA	1
C-20	2	XBFZZ		90DEG¼NPT	18702	ELBOW	EA	1
C-20	3	XBFZZ		2402-47-¼	04286	DAMPENER, GAGE	EA	1
C-20	4	XBFZZ		FIG 23D	72100	GAGE, PRESS	EA	1



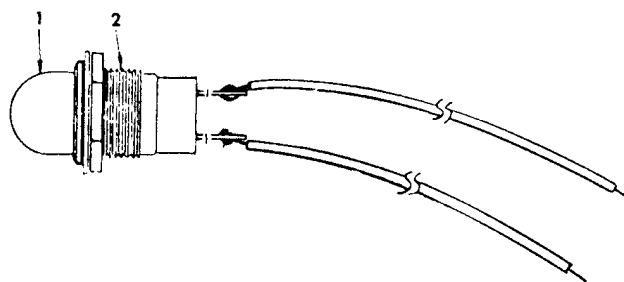
AR700207

Figure C-21. Gage assembly, steam pressure.

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
						<b>Group 0501 - GAGE ASSY, STEAM PRESSURE</b>		
C-21	1	XBFZZ		¼NPTX¼TUBE	18702	FITTING	EA	2
C-21	2	XBFZZ		¼NPT	18702	TEE	EA	1
C-21	3	XBFZZ		2402-47-¼	04286	DAMPENER, GAGE	EA	1
C-21	4	XBFZZ		FIG 23D	72100	GAGE, PRESSURE	EA	1



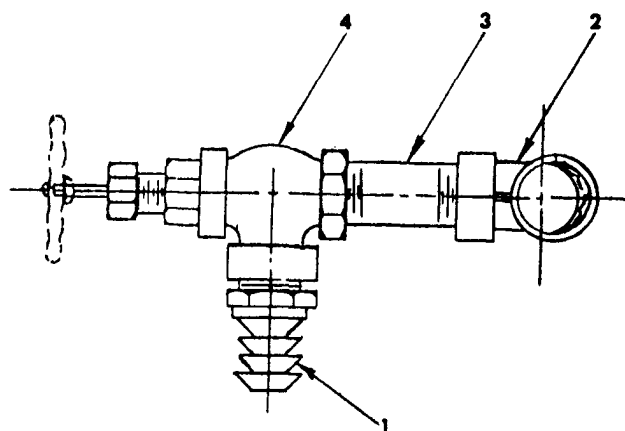


AR700208

*Figure C-22. Light assembly.*

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
C-22	1	XBOZZ		NE51	71744	<b>Group 0502 - LIGHT ASSY</b>  LAMP, NEON	EA	1
C-22	2	XDOZZ		147-1143-2RED- 115V	74970		EA	1

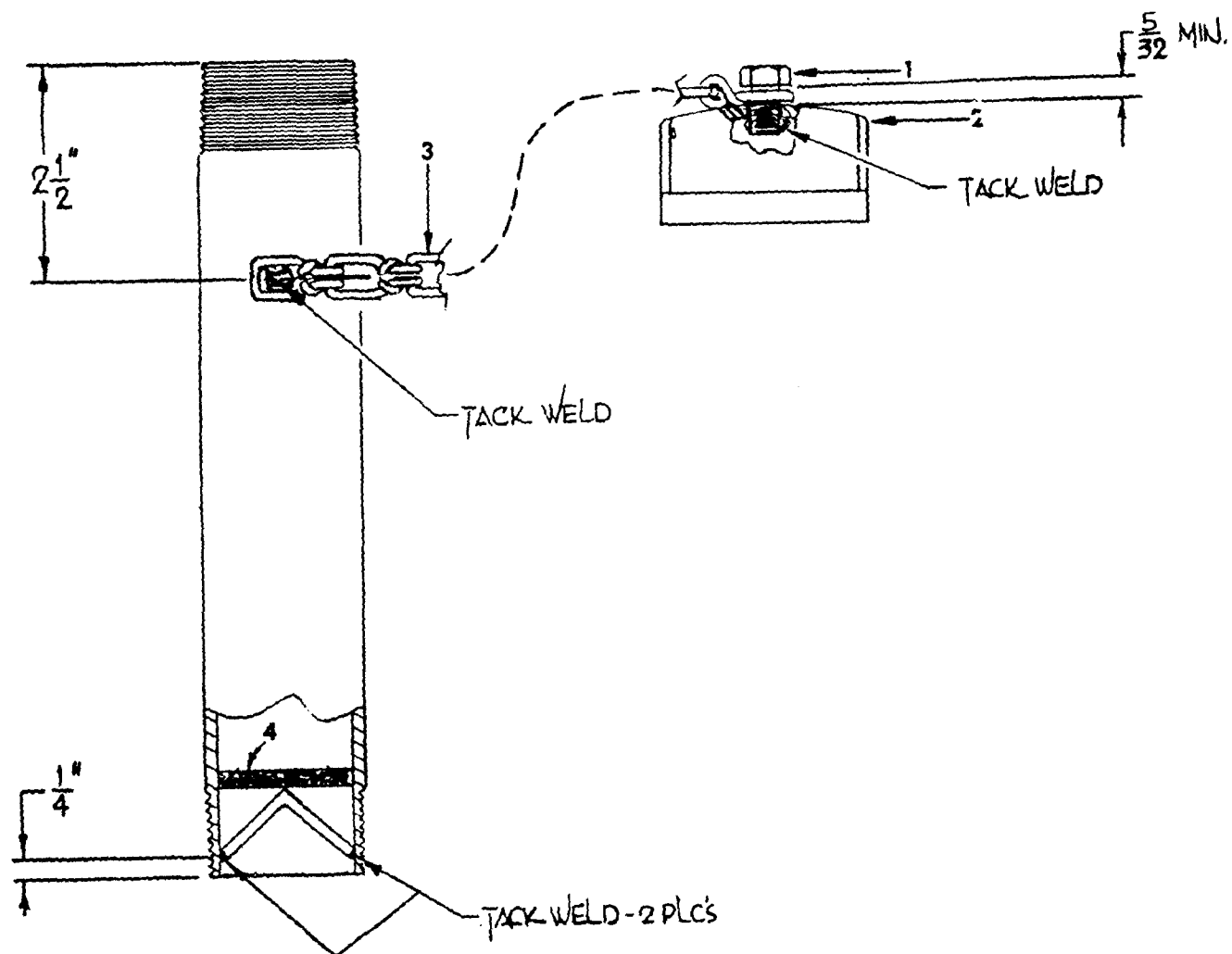


AR700209

*Figure C-23. Outlet assembly, soap tank.*

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
						<b>Group 06 - SOAP AND FUEL TANK GROUP</b>		
						<b>Group 0601 - OUTLET ASSY, SOAP TANK</b>		
C-23	1	XDOZZ		½NPTX3/8HOSE	18702	SPUD	EA	1
C-23	2	XDFZZ		45DEG½NPT	18702	ELBOW	EA	1
C-23	3	XDFZZ		½NPTX3	18702	NIPPLE	EA	1
C-23	4	XDFZZ		300-½	03665	VALVE, ANGLE	EA	1

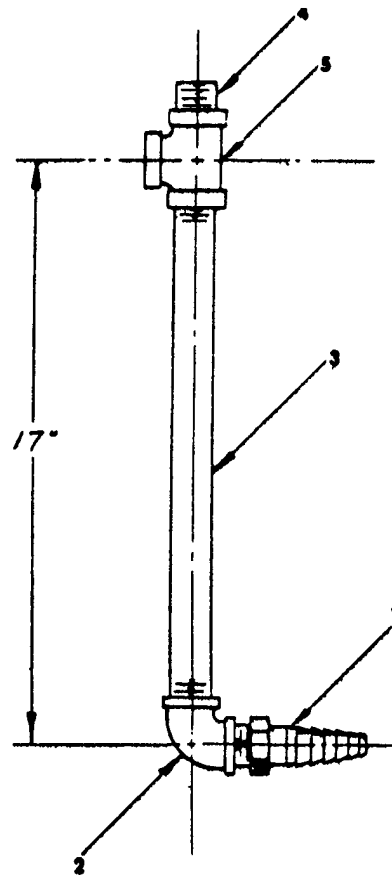


AR700210

Figure C-24. Cap assembly, oil fill

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
						<b>Group 0602 - CAP ASSY, OIL FILL</b>		
C-24	1	XDOZZ		MS90725-31	96906	BOLT, HEX HD	EA	1
C-24	2	XDOZZ		3727-04	94774	CAP, FUEL TANK	EA	1
C-24	3	XDOZZ		NO. 2	80535	CHAIN	IN	6
C-24	4	XDOZZ		40 MESH	18702	SCREEN	EA	1



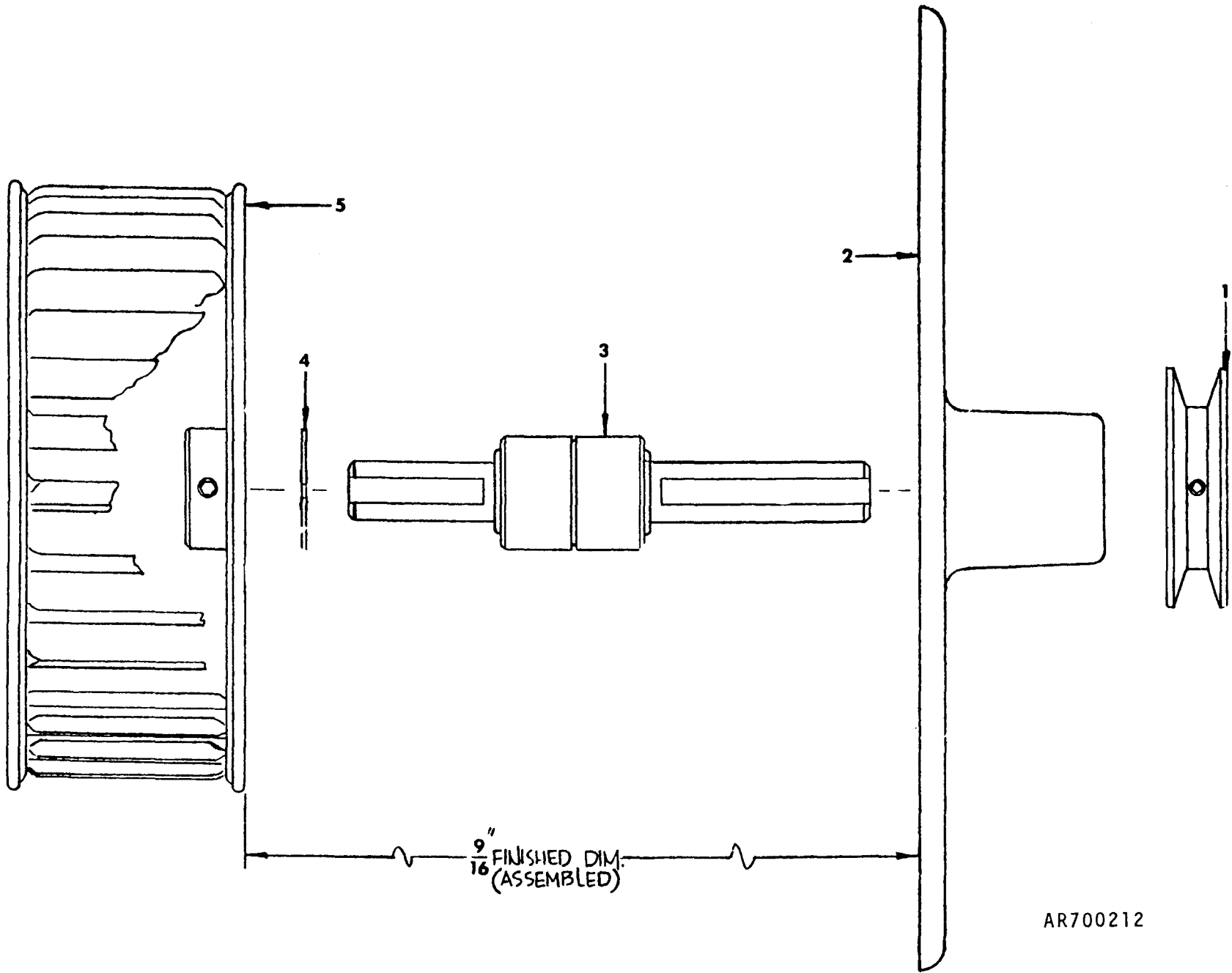
AR700211

Figure C-25. Outlet assembly, air dome.

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
						<b>Group 0603 - OUTLET ASSY. AIR DOME</b>		
C-25	1	XDOZZ		¾NPTX1HOSE	18702	SPUD	EA	1
C-25	2	XDOZZ		90DEG¾NPT	18702	ELBOW	EA	1
C-25	3	XDOZZ		¾NPTX15	18702	NIPPLE	EA	1
C-25	4	XDOZZ		¾NPTX1½	18702	NIPPLE	EA	1
C-25	5	XDOZZ		¾NPT	18702	TEE	EA	1





AR700212

Figure C-26. Wheel assembly blower.

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
						<b>Group 07 - ELECTRICAL POWER GROUP</b>		
						<b>Group 0701 - WHEEL ASSY, BLOWER</b>		
C-26	1	XDOZZ		1501-03	94774	PULLEY	EA	1
C-26	2	XDOZZ		3725-04	94774	COVER PLATE, BLOWER	EA	1
C-26	3	XDOZZ		234	94774	BEARING	EA	1
C-26	4	XDOZZ		5008-118	75364	RING, RETAINING	EA	1
C-26	5	XDOZZ		1532-03	94774	WHEEL, BLOWER	EA	1

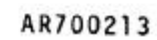
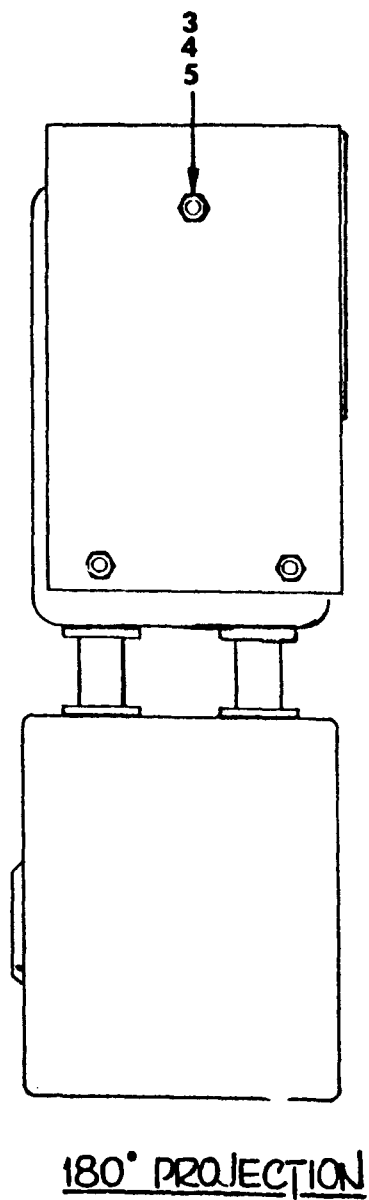
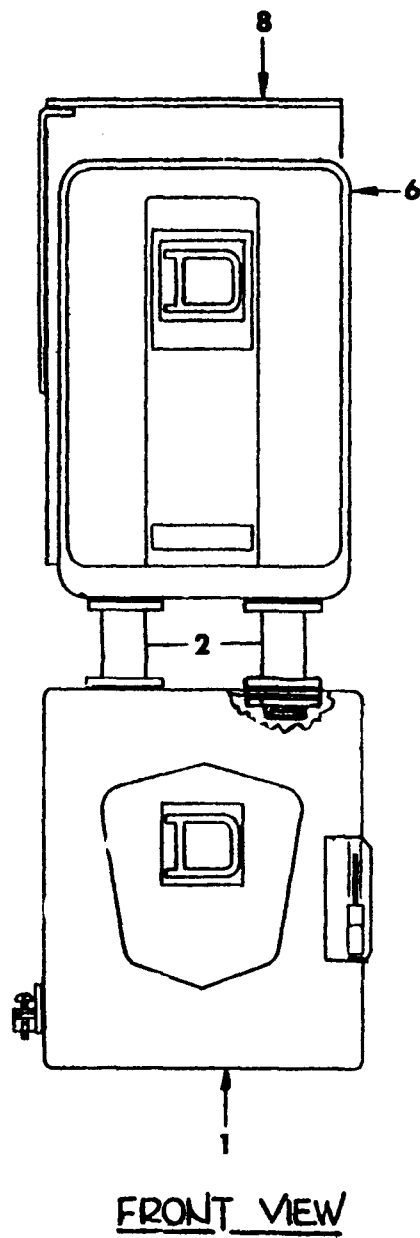
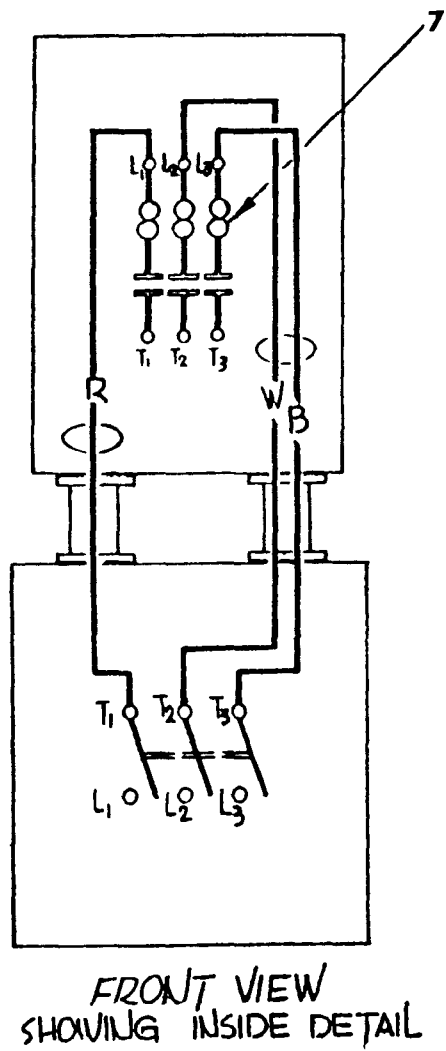


Figure C-27. Power cord.

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
						<b>Group 0702 - POWER CORD</b>		
C-27	1	XBOZZ		2411	25170	PLUG, ELECTRICAL	EA	1
C-27	2	XBOZZ		13310	79061	TERMINAL, LUG	EA	1
C-27	3	XDOZZ		NO NUMBER		CABLE, ELECTRIC, 4-WIRE #14 AWG, 76 FT.	EA	1

Figure C-28. Switch assembly, starter and breaker.



AR700214

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
C-28	1	XDFZZ		DU321SERIESC1, 30AMP, 240 VAC	88434	<b>Group 0703 - SWITCH ASSY, STARTER &amp; BREAKER</b> SWITCH, DISCONNECT	EA	1
C-28	2	XDFZZ		H0252	78229	NIPPLE OFF-SET	EA	2
C-28	3	PAFZZ	5310-00-421-9608	MS51585-4	96906	NUT, HEX	EA	3
C-28	4	PAFZZ	5310-00-809-3305	MS35340-42	96906	WASHER, LOCK	EA	3
C-28	5	PAOZZ	5305-00-834-8231	8-32X½	18702	SCREW	EA	3
C-28	6	XDFZZ		1515-05	94774	STARTER, MAGNETIC	EA	1
C-28	7	XBOZZ		B25	88434	HEATER, OVERLOAD THERMAL	EA	3
C-28	8	XDFZZ		3764-02	94774	PLATE ASSY, SWITCH	EA	1

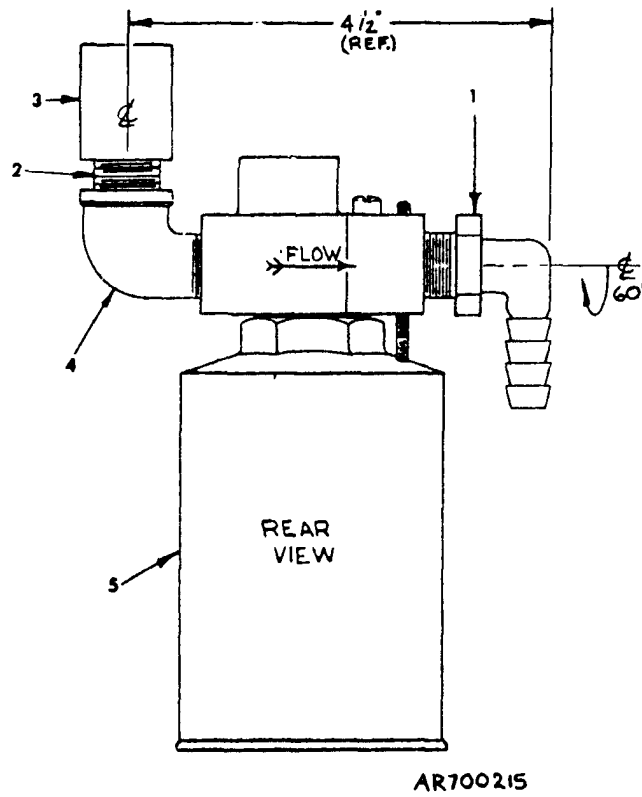
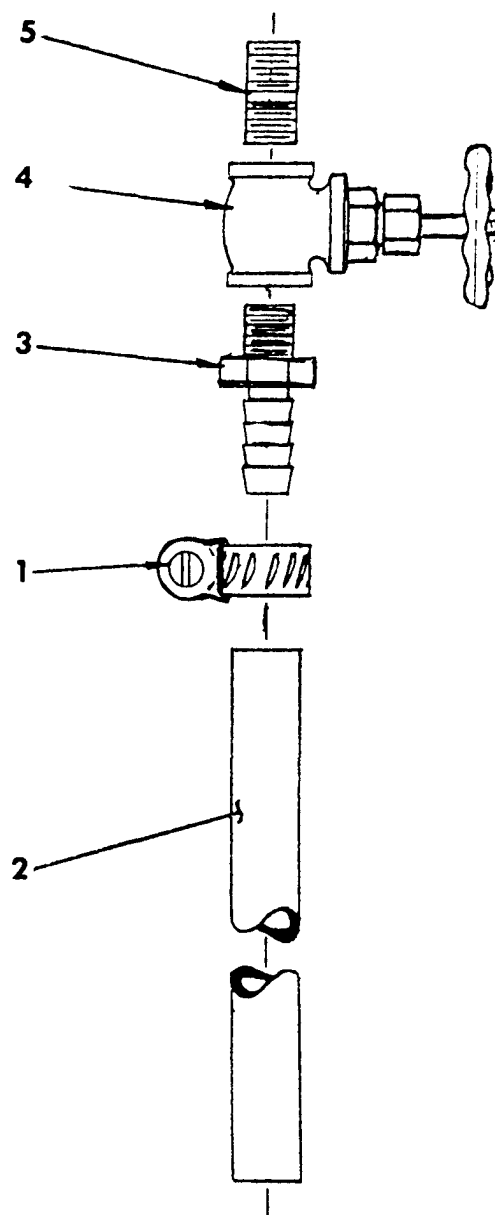


Figure C-29. Fuel filter assembly.

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
						<b>Group 08 - FILTER AND DRAIN GROUP</b>		
						<b>Group 0801 - FUEL FILTER ASSY</b>		
C-29	1	XDOZZ		90DEG3/8NPTX3/8 HOSE	18702	SPUD	EA	1
C-29	2	XDOZZ		3/8NPT	18702	NIPPLE, CLOSE	EA	1
C-29	3	XDOZZ		3/8NPT	18702	COUPLING	EA	1
C-29	4	XDOZZ		90DEG/3/8NPT	18702	ELBOW, STREET	EA	1
C-29	5	PAOZZ	4330-00-476-5471	24104	79396	FILTER, FUEL	EA	1



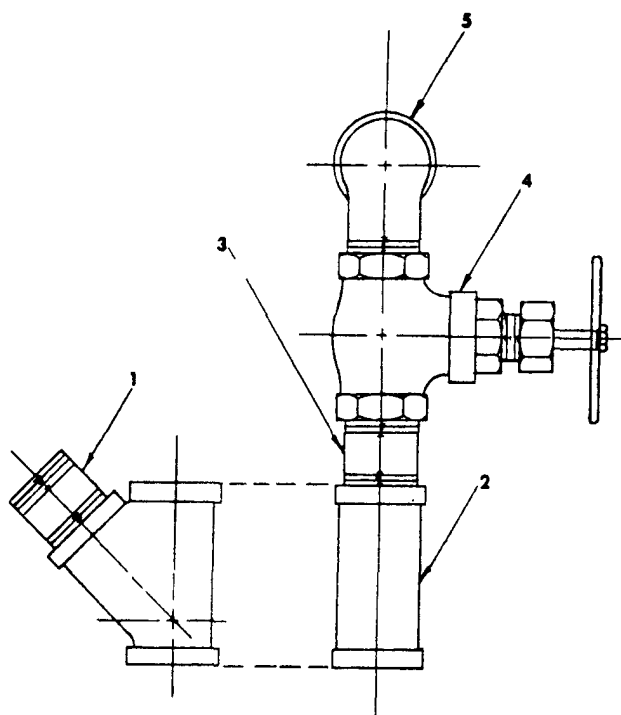


AR700216

Figure C-30. Drain assembly, oil tank.

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
						<b>Group 0802 - DRAIN ASSY, OIL TANK</b>		
C-30	1	XDOZZ		6H	66295	CLAMP, WORM	EA	1
C-30	2	XDOZZ		3/8ID	18702	HOSE, 3/8 ID, 20 IN	EA	1
C-30	3	XDOZZ		3/8NPTX3/8HOSE	18702	SPUD	EA	1
C-30	4	XDFZZ		75	12168	VALVE, GLOBE	EA	1
C-30	5	XDOZZ		3/8NPT	18702	NIPPLE, CLOSE	EA	1

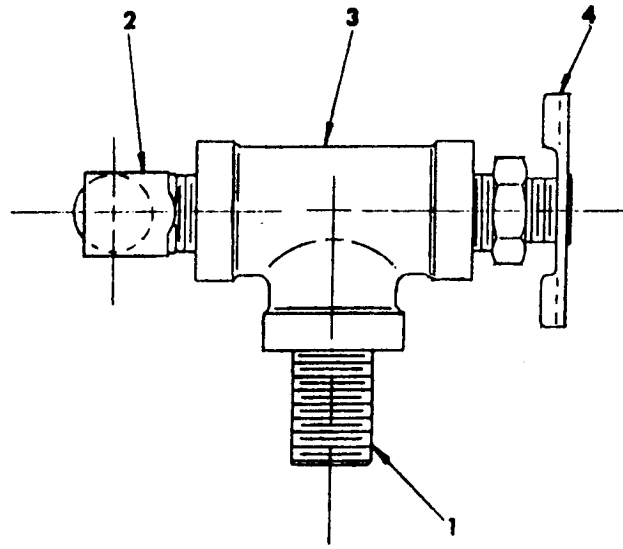


AR700217

Figure C-31. Overflow assembly, soap tank.

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
C-31	1	XDFZZ		¾X1½NPT- TOE	18702	NIPPLE	EA	1
C-31	2	XDFZZ		45DEG¾NPT	18702	Y	EA	1
C-31	3	XDOZZ		¾NPTX2	18702	NIPPLE	EA	1
C-31	4	XDFZZ		75¾NPT	12168	VALVE	EA	1
C-31	5	XDOZZ		90DEG¾NPT	18702	ELBOW, STREET	EA	1



AR700218

*Figure C-32. Air dome vent.*

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
						<b>Group 0804 - VENT, AIR DOME</b>		
C-32	1	XBFZZ		½NPT	18702	NIPPLE, CLOSE	EA	1
C-32	2	XBFZZ		¼NPTX¼TUBE 90DEG	18702	FITTING	EA	1
C-32	3	XBFZZ		¼NPT	18702	TEE	EA	1
C-32	4	XBFZZ		426	94774	VALVE, VENT	EA	1

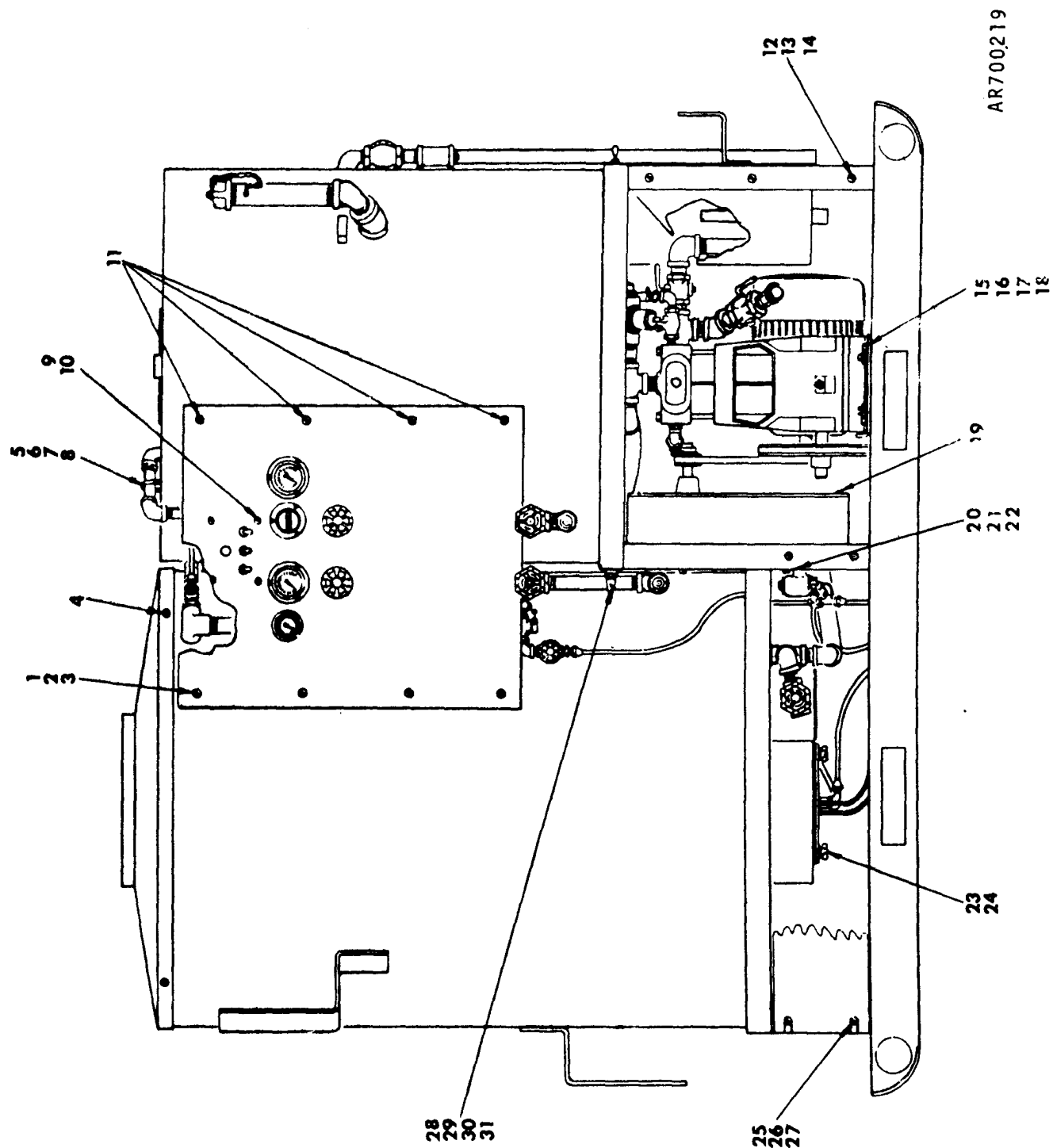


Figure C-33. Hardware installation (sheet 1 of 2).

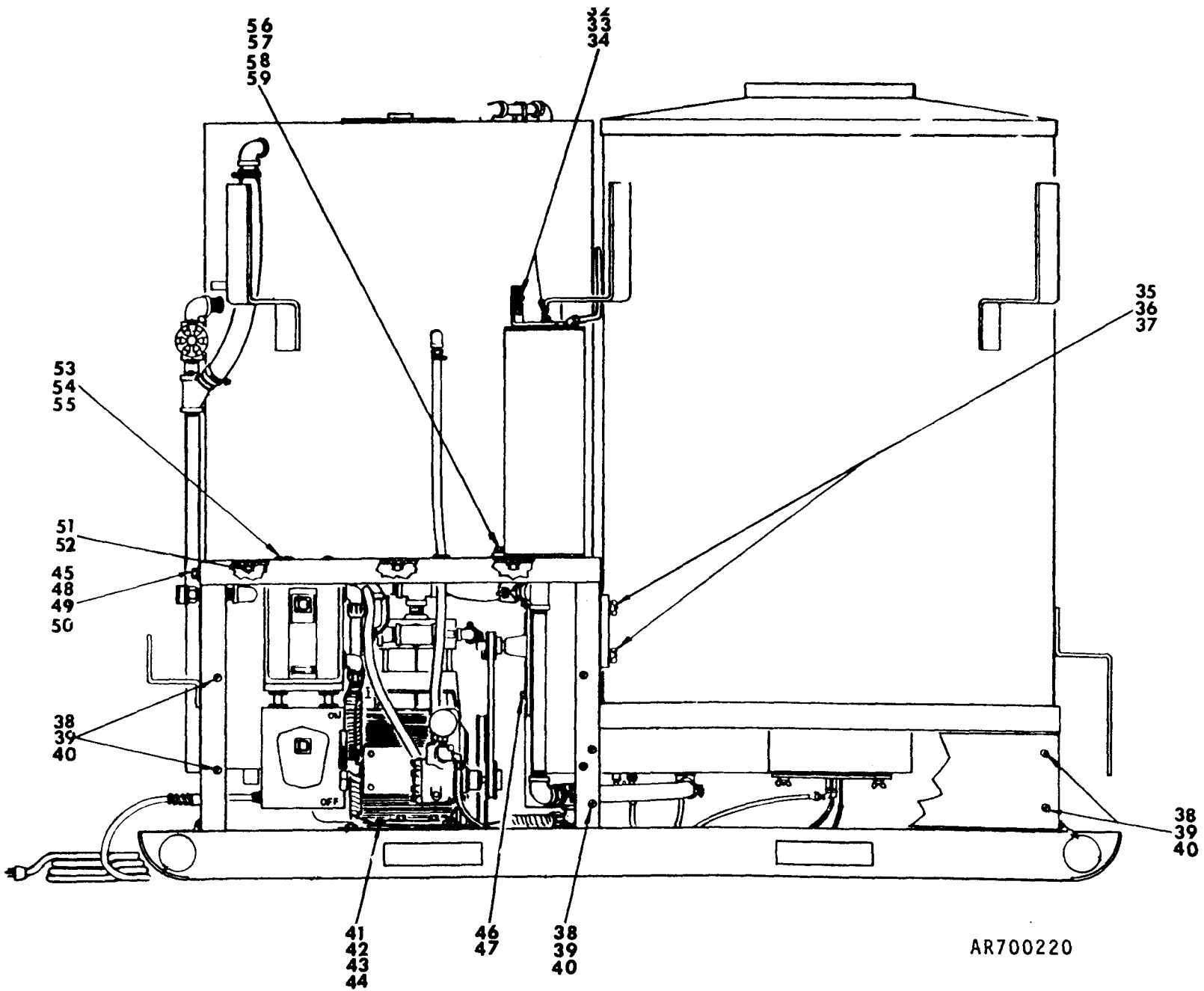


Figure C-33. Hardware installation (sheet 2 of 2).



## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
<b>Group 09 – HARDWARE GROUP</b>								
<b>Group 0901 - HARDWARE INSTALLATION</b>								
C-33	1	PAOZZ	5310-00-761-6882	MS51967-2	96906	NUT, HEX	EA	8
C-33	2	PAOZZ	5310-00-682-5930	MS35340-44	96906	WASHER, LOCK	EA	8
C-33	3	PAOZZ	5305-00-826-9165	¼-20X½	18702	SCREW, RD HD	EA	8
C-33	4	XBOZZ		¼-20X½	18702	SCREW, SELF TAP	EA	3
C-33	5	PAOZZ	5310-00-761-6882	MS51967-2	96906	NUT, HEX	EA	2
C-33	6	PAOZZ	5310-00-809-4058	MS27183-10	96906	WASHER, FLAT	EA	2
C-33	7	PAOZZ	5310-00-682-5930	MS35340-44	96906	WASHER, LOCK	EA	2
C-33	8	XDOZZ		1552-05	94774	CLAMP, U	EA	1
C-33	9	XBOZZ		8-32X½	18702	SCREW, SELF TAP	EA	4
C-33	10	PAOZZ	5310-00-809-3365	MS35340-42	96906	WASHER, LOCK	EA	4
C-33	11	XDOZZ		¼-20	18702	NUT, CLIP	EA	2
C-33	12	PAOZZ	5305-00-826-9165	¼-20X½	18702	SCREW, RD HD	EA	3
C-33	13	PAOZZ	5310-00-809-4058	MS27183-10	96906	WASHER, FLAT	EA	3
C-33	14	PAOZZ	5310-00-809-3365	MS35340-44	96906	WASHER, LOCK	EA	3
C-33	15	PAOZZ	5310-00-732-0558	MS51967-8	96906	NUT, HEX	EA	2
C-33	16	PAOZZ	5310-00-080-6004	MS27183-14	96906	WASHER, FLAT	EA	2
C-33	17	PAOZZ	5310-00-959-4675	MS35338-46	96906	WASHER, LOCK	EA	2
C-33	18	PAOZZ	5305-00-269-3211	MS90725-60	96906	BOLT, HEX HD	EA	2
C-33	19	XBOZZ		10-32X½	18702	SCREW, SELF TAPPING	EA	4
C-33	20	PAOZZ	5310-00-761-6882	MS51967-2	96906	NUT, HEX	EA	4
C-33	21	PAOZZ	5310-00-682-5930	MS35340-44	96906	WASHER, LOCK	EA	4
C-33	22	PAOZZ	5305-00-850-1354	½-20X1	18702	SCREW, RD HD	EA	4
C-33	23	XBOZZ		¼-20	18702	NUT, WING	EA	3
C-33	24	PAOZZ	5310-00-682-5930	MS35340-44	96906	WASHER, LOCK	EA	3
C-33	25	PAOZZ	5305-00-826-9165	¼-20X½	18702	SCREW, RD HD	EA	4
C-33	26	PAOZZ	5305-00-682-5980	MS35340-44	96906	WASHER, LOCK	EA	4
C-33	27	PAOZZ	5310-00-809-4058	MS27183-10	18702	WASHER, FLAT	EA	4
C-33	28	PAOZZ	5310-00-880-7744	MS51967-5	96906	NUT, HEX	EA	1
C-33	29	PAOZZ	5310-00-959-4679	MS35340-45	96906	WASHER, LOCK	EA	1
C-33	30	PAOZZ	5806-00-225-8497	MS90725-32	96906	BOLT, HEX HD	EA	1
C-33	31	XDOZZ		126-1	26403	CLAMP, HALF	EA	1
C-33	32	PAOZZ	5310-00-732-0558	MS51967-8	96906	NUT, HEX	EA	2
C-33	33	PAOZZ	5310-00-080-6004	MS27183-14	96906	WASHER, FLAT	EA	2
C-33	34	PAOZZ	5310-00-959-4675	MS35338-46	96906	WASHER, LOCK	EA	2
C-33	35	XBOZZ		¼-20	18702	NUT, WING	EA	2
C-33	36	PAOZZ	5310-00-809-4058	MS27183-10	96906	WASHER, FLAT	EA	4
C-33	37	PAOZZ	5305-00-761-6882	MS51967-2	96906	NUT, HEX	EA	2
C-33	38	PAOZZ	5310-00-826-9165	¼-20X½	18702	SCREW, RD HD	EA	8
C-33	39	PAOZZ	5310-00-809-4058	MS27183-10	96906	WASHER, FLAT	EA	8

## Section II. REPAIR PARTS LIST (Cont'd)

(1) Illustration		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	NATIONAL STOCK NUMBER	PART NUMBER	FSCM	DESCRIPTION  <i>USABLE ON CODE</i>	U/M	QTY INC IN UNIT
C-33	40	PAOZZ	5310-00-682-5930	MS35340-44	96906	WASHER, LOCK	EA	8
C-33	41	PAOZZ	5310-00-732-0558	MS51967-8	96906	NUT, HEX	EA	2
C-33	42	PAOZZ	5310-00-080-6004	MS27183-14	96906	WASHER, FLAT	EA	2
C-33	43	PAOZZ	5310-00-959-4675	MS35338-46	96906	WASHER, LOCK	EA	2
C-33	44	PAOZZ	5305-00-269-3211	MS90725-60	96906	BOLT, HEX HD	EA	2
C-33	45	PAOZZ	5310-00-761-6882	MS51967-8	96906	NUT, HEX	EA	3
C-33	46	PAOZZ	5310-00-682-5930	MS35340-44	96906	WASHER, LOCK	EA	3
C-33	47	PAOZZ	5310-00-732-0558	MS51967-8	96906	NUT, HEX	EA	3
C-33	48	PAOZZ	5310-00-959-4675	MS35338-46	96906	WASHER, LOCK	EA	3
C-33	49	PAOZZ	5310-00-269-3211	MS90725-60	96906	BOLT, HEX HD	EA	3
C-33	50	XDOZZ		126-1	18702	CLAMP, HALF	EA	1
C-33	51	PAOZZ	5310-00-768-0318	MS51967-14	96906	NUT, HEX	EA	7
C-33	52	PAOZZ	5310-00-834-7606	MS35340-48	96906	WASHER, LOCK	EA	7
C-33	53	PAOZZ	5310-00-761-6882	MS51967-2	96906	NUT, HEX	EA	3
C-33	54	PAOZZ	5310-00-682-5930	MS35340-44	96906	WASHER, LOCK	EA	3
C-33	55	PAOZZ		¼-20X¾	18702	SCREW, FIL HD	EA	3
C-33	56	PAOZZ	5310-00-761-6882	MS51967-2	96906	NUT, HEX	EA	1
C-33	57	PAOZZ	5310-00-682-5930	MS35340-44	96906	WASHER, LOCK	EA	1
C-33	58	PAOZZ	5310-00-809-4058	MS27183-10	96906	WASHER, FLAT	EA	1
C-33	59	PAOZZ	5305-00-826-9165	¼-20X½	18702	SCREW, RD HD	EA	1

### Section III. NATIONAL STOCK NUMBER AND REFERENCE NUMBER INDEX

National Stock Number	Figure number	Index Number	National Stock Number	Figure number	Index number
3030-00-080-8817	C-4	5	5310-00-682-5930 cont.	C-33	2
3110-00-044-1488	C-9	27		C-33	7
3895-00-374-6103	C-12	15		C-33	14
4030-00-911-5123	C-13	33		C-33	21
4320-00-028-3862	C-12	18		C-33	24
4320-00-472-6227	C-12	10		C-33	26
4330-00-461-3964	C-12	21		C-33	40
4330-00-476-5471	C-29	5		C-33	46
4520-00-976-2259	C-12	5		C-33	54
4730-00-860-5272	C-12	16		C-33	57
4730-00-472-6209	C-12	12	5310-00-721-7809	C-13	2
4940-00-473-6218	C-1	0		C-13	27
5305-00-159-5450	C-13	8		C-13	46
	C-13	18	5310-00-732-0558	C-7	2
5305-00-269-3211	C-7	5		C-7	7
	C-33	18		C-18	3
	C-33	44		C-33	15
	C-33	49		C-33	32
5305-00-472-6234	C-12	7		C-33	41
5305-00-546-5630	C-19	23		C-33	45
5305-00-637-0730	C-12	13		C-33	47
5305-00-727-7397	C-33	55	5310-00-761-6882	C-5	1
5305-00-775-5193	C-13	3		C-6	6
	C-13	24		C-13	6
	C-13	28		C-13	16
	C-13	41		C-33	1
	C-13	43		C-33	6
	C-13	47		C-33	20
5305-00-826-9165	C-33	3		C-33	37
	C-33	12		C-33	45
	C-33	25		C-33	53
	C-33	38		C-33	56
	C-33	59	5310-00-768-0318	C-18	1
5305-00-834-8231	C-13	14		C-33	51
	C-28	5	5310-00-809-3078	C-7	14
5305-00-850-1354	C-33	22	5310-00-809-3365	C-13	13
5306-00-225-8496	C-7	15		C-28	4
	C-24	1		C-33	10
	C-33	30	5310-00-809-4058	C-5	3
5306-00-225-8497	C-33	30		C-33	6
5306-00-225-8500	C-7	15		C-33	13
5310-00-037-4935	C-12	17		C-33	27
5310-00-080-6004	C-7	4		C-33	36
	C-7	9		C-33	39
	C-33	16		C-33	58
	C-33	33	5310-00-834-7606	C-18	2
	C-33	42		C-33	52
5310-00-218-2180	C-19	21	5310-00-839-3770	C-19	22
5310-00-421-9608	C-13	12	5310-00-880-7744	C-7	12
	C-28	3		C-33	28
5310-00-472-6204	C-12	22	5310-00-959-4675	C-7	3
5310-00-682-5930	C-5	2		C-7	8
	C-13	7		C-18	4
	C-13	17		C-33	17

### Section III. NATIONAL STOCK NUMBER AND REFERENCE NUMBER INDEX - Continued

National Stock Number	Figure number	Index number	National Stock Number	Figure number	Index number
5310-00-959-4675 cont.	C-33	34	5340-00-472-6194	C-12	6
	C-33	43	5360-00-197-5883	C-12	19
	C-33	48	5360-00-472-6224	C-12	3
5310-00-959-4679	C-7	13	5530-00-527-7560	C-12	8
	C-33	29	5930-00-642-9658	C-19	29
5330-00-374-6104	C-12	4	5940-00-577-3761	C-1	26
5330-00-375-1690	C-12	24	5940-00-881-1424	C-10	4
5330-00-472-6189	C-12	14	5975-00-578-3643	C-10	3

Reference Designator	Figure number	Index number	Reference Designation	Figure number	Index number
AGC-6AMP	C-13	10	MS27183-14 cont.	C-7	9
A19ADB11	C-13	48		C-33	16
A43	C-4	5		C-33	33
	C-7	1		C-33	42
BC32-1-1/8	C-10	2	MS35338-46	C-7	3
BC32X5/8	C-11	2		C-7	8
BODY, PUMP	C-12	25		C-18	4
BU9	C-1	2		C-33	17
B10	C-8	23		C-33	34
	C-8	25		C-33	43
	C-5	32		C-33	48
B25	C-28	7	MS35340-41	C-19	22
CABLE	C-27	3	MS35340-42	C-13	13
CR151D1019	C-13	15		C-28	4
DU321SERIESC-1				C-33	10
30AMP240VAC	C-28	1	MS35340-43	C-33	2
FIG 120	C-17	36		C-13	27
FIG 23D	C-20	4		C-13	46
	C-21	4	MS35340-44	C-5	2
FIG 6-1-1	C-8	43		C-13	7
HKP <sup>3</sup> / <sub>4</sub> X1 <sup>1</sup> / <sub>2</sub>	C-13	11		C-13	17
HO252	C-28	2		C-33	2
H5PA200CW	C-11	14		C-33	7
K271FA312	C-13	40		C-33	14
K281FA312	C-13	39		C-33	21
MS17187	C-13	1		C-33	24
	C-13	26		C-33	26
	C-13	45		C-33	40
MS207183-14	C-7	4		C-33	46
	C-7	9		C-33	54
	C-33	16		C-33	57
	C-33	33	MS35340-45	C-7	13
	C-33	42		C-33	29
MS27183-10	C-5	4	MS35340-46	C-7	3
	C-33	6		C-7	8
	C-33	13		C-18	4
	C-33	27		C-33	17
	C-33	36		C-33	34
	C-33	39		C-33	43
	C-33	58		C-33	48
MS27183-11	C-7	14	MS35340-48	C-18	2
MS27183-14	C-7	4		C-33	52

### Section III. NATIONAL STOCK NUMBER AND REFERENCE NUMBER INDEX - Continued

Reference Designator	Figure number	Index number	Reference Designator	Figure number	Index number
MS39167-3			1/2(NUT, JAM)	C-13	33
MS51858-3	C-19	21	1/2-13X1-1/2	C-9	4
MS51858-4	C-13	12	1/2IN	C-13	21
	C-28	3	1/2 IN	C-13	22
MS51967-14	C-18	1	1/2NPT (COUPLING)	C-17	48
	C-33	50	1/2NPT (NIPPLE, CLOSE)	C-13	34
MS51967-2	C-5	1		C-16	9
	C-6	6		C-17	39
	C-13	6		C-17	49
	C-13	16	1/2NPT	C-8	42
	C-33	1	1/2NPTX1/2HOSE	C-17	35
	C-33	5	1/2NPTX1/2NPTX1/4NPT	C-17	38
	C-33	20	1/2NPTX11-1/2	C-17	28
	C-33	37	1/2NPTX3	C-23	3
	C-33	45	1/2NPTX3-1/2	C-17	30
	C-33	53	1/2NPTX5	C-17	26
	C-33	56	1/2NPTX9	C-17	33
MS51967-5	C-7	12	1/2X1/4NPT	C-17	44
	C-33	28	1/2X3/8NPT	C-8	22
MS51967-8	C-7	2		C-8	28
	C-7	7	1/4(NUT, FLARE)	C-34	1
	C-18	3	1/4-20(NUT, CLIP)	C-33	11
	C-33	15	1/4-20(NUT, WING)	C-33	23
	C-33	32		C-33	35
	C-33	41	1/4-20X1/2(SCREW, FIL HD)	C-13	8
	C-33	45		C-13	18
	C-33	47	1/4-20X1(SCREW, RD HD)	C-33	22
MS90725-31	C-24	1	1/4-20X1/2(BOLT)	C-5	4
	C-33	30	1/4-20X1/2(SCREW, RD HD)	C-33	3
MS90725-32	C-7	15		C-33	12
MS90725-35	C-33	30		C-33	25
MS90725-60	C-7	15		C-33	38
	C-7	5		C-33	59
	C-33	18	1/4-20X1/2(SCREW, SET)	C-11	16
	C-33	44	1/4-20X1/2(SCREW, SELF-TAP)	C-33	4
	C-33	49	1/4-20X3/4(SCREW)	C-33	55
MS90725-62	C-7	10	1/4IN	C-34	2
NE51	C-22	1	1/4NPT(ELBOW)	C-11	4
NO2	C-24	3	1/4NPT	C-17	19
NO6	C-19	2		C-17	22
N1030	C-19	28		C-32	2
P70AA15	C-13	44	1/4NPT	C-17	17
P70AA47	C-13	42	1/4NPT(TEE)	C-17	18
P70CA15	C-13	25		C-21	2
R400	C-6	8	1/4NPT(TEE)	C-32	3
R440-5-5	C-6	5	1/4NPT(VALVE)	C-17	21
SB500-6	C-13	51	1/4NPTX1/4	C-13	32
SB562-7	C-13	53		C-13	41
SB875-11	C-13	52	1/4NPTX1/4TUBE	C-14	7
	C-4	45		C-17	20
STST42DSS	C-19	1		C-17	37
	C-4	58		C-20	1
S126BRRT1/2	C-8	27			
TYPE312-25AB01V	C-13	10			
UVM2A	C-13	4			
UV1A36	C-13	49			

### Section III. NATIONAL STOCK NUMBER AND REFERENCE NUMBER INDEX - Continued

Reference Designator	Figure number	Index number	Reference Designator	Figure number	Index number
1/4NPTX1/4Tube cont.	C-21	1	10-32X3/8 cont.	C-13	28
1/4NPTX1/4TUBE	C-11	13		C-13	41
	C-17	16		C-13	43
	C-32	2		C-13	47
1/4NPTX3/8HOSE	C-11	9	100031	C-12	18
	C-23	1	100241	C-12	22
1/4NPTX3/8HOSE	C-11	12	100291	C-12	15
1/8NPT	C-11	6	100301	C-12	3
1/8X1/4NPT	C-11	5	100319	C-12	4
1/8NPTX1/4	C-13	30	100371	C-12	14
	C-13	37	100901	C-12	8
1/8NPTX1/4TUBE	C-16	7	100931	C-12	10
1/8NPTX1/4TUBE90DEG	C-16	8	101001	C-12	13
1/8NPTX1/4X1/4	C-13	36	101641	C-12	19
1/8X9X116-1/2	C-4	19	101861	C-12	6
IID	C-8	10	103379	C-12	7
	C-8	24	103902	C-11	15
	C-4	33	109777	C-12	16
	C-4	48	110SPM-OFF	C-13	31
1NPT	C-8	47	110441	C-12	24
	C-17	54	111-16-73	C-19	29
1NPT(NIPPLE, CLOSE,	C-8	13	111401	C-12	1
	C-8	16	116907	C-12	5
	C-8	36	12HSS	C-8	19
	C-8	41	121732	C-12	2
	C-8	48	122822	C-12	21
	C-17	53	126-1	C-33	31
	C-32	1		C-33	50
1NPT(TEE)	C-8	45	128393	C-12	9
1NPT(UNION)	C-1	9	128433	C-12	20
	C-8	31	128443	C-12	1A
	C-4	16	131129	C-12	23
1NPTX1/2NPTX1NPT	C-17	52	13310	C-10	4
1NPTX1NPT1/2NPT	C-17	45		C-27	2
	C-17	50	14-1	C-15	2
1NPTX10-1/2	C-17	51	1407-05	C-17	47
1NPTX2	C-8	34	14206	C-1	26
	C-8	44	1462-03	C-11	1
	C-8	46	147-1143-2RED115V	C-22	2
	C-8	50	1501-03	C-26	11
	C-17	46	1515-05	C-28	6
1NPTX3	C-8	32	1532-03	C-26	5
1NPTX7	C-17	42	1535-05	C-1	5
1NPTX8-1/2	C-4	17	1541-05	C-16	4
1NPTX8TOE	C-8	52	1542-05	C-16	5
1X1-1/4NPT	C-1	6	1543-05	C-16	3
1X1/2NPT	C-17	34	1543-1-05	C-16	2
	C-17	40	1552-05	C-33	8
1X2-1/2NPT	C-1	8	1555-05	C-1	3
1X3/4NPT	C-17	8	1556-05	C-1	22
	C-17	15	1557-05	C-1	11
1X3/8NPT	C-8	40	1565-05	C-8	33
10-24X1/2	C-9	30		C-8	49
10-32X1/2	C-33	19	16HS	C-4	47
10-32X3/8	C-13	3	16HSS	C-1	19
	C-13	24		C-1	21

### Section III. NATIONAL STOCK NUMBER AND REFERENCE NUMBER INDEX - Continued

Reference Designator	Figure number	Index number	Reference Designator	Figure number	Index number
16HSS cont.	C-8	9	3/4NPT(TEE) cont.	C-25	5
1615-05	C-19	3	3/4NPT to 3/4FNPT	C-1	18
1616-05	C-4	58	3/4NPT to 3/4FNPT-HOSE	C-1	20
1617-05	C-19	4	3/4NPTX1HOSE	C-14	1
1618-05	C-19	5		C-25	1
1619-05	C-4	59	3/4NPTX1-1/2	C-25	4
1620-05	C-19	6	3/4NPTX15	C-25	3
1621-05	C-19	7	3/4NPTX2	C-8	14
1622-05	C-19	8		C-31	3
1623-05	C-19	9		C-17	46
1624-05	C-19	10	3/4NPTX2-1/2	C-17	4
1625-05	C-19	11	3/4NPTX3	C-17	7
1626-05	C-19	12	3/4NPTX3-1/2	C-17	10
1627-05	C-4	60	3/4NPTX3/4HOSE	C-17	1
1628-05	C-4	61		C-17	8
1629-05	C-19	13	3/4NPTX3/4TUBE	C-4	14
1630-05	C-4	62	3/4NPTX30-1/2	C-4	46
1631-05	C-4	63	3/4NPTX4	C-6	2
1632-05	C-4	64	3/4NPTX8	C-17	12
1633-05	C-4	65	3/4NPTX8TOE	C-6	4
1634-05	C-19	14	3/4NPT3/4HOSE	C-1	1
1635-05	C-4	66		C-6	1
1636-05	C-4	67	3/4 to 1/4NPT	C-14	8
1640-05	C-19	15	3/4X1-1/2NPT	C-31	1
1641-05	C-19	16	3/4X1/2NPT	C-2	4
1642-05	C-19	17	3/4X20	C-4	15
1643-05	C-19	18	3/8	C-9	2
1645-05	C-19	19	3/8-16-3/4	C-9	1
1646-05	C-19	20	3/8-16X4-3/4	C-9	16
	C-4	58	3/8(COUPILING)	C-29	2
17527B1	C-8	6	3/8ID	C-4	3
1910-0	C-3	29	3/8ID	C-11	8
200-10N	C-19	25	3/8ID	C-11	11
21-3/4 to 1/2	C-10	5	3/8ID	C-30	2
2125-01	C-17	24	3/8IN-NPT	C-2	1
214	C-8	3	3/8NPT(COUPILING)	C-3	1
234	C-26	3	3/8NPT(NIPPLE, CLOSE)	C-8	4
2404-47-1/4	C-20	3		C-8	21
	C-21	3		C-8	30
24104	C-29	5		C-29	3
2411	C-27	1		C-30	5
24800	C-12	12	3/8NPTX1-1/2	C-8	37
24816	C-12	11		C-8	39
25815	C-12	17	3/8NPTX3/8HOSE	C-8	1
28737-1	C-16	6		C-30	3
3/4NPT(COUPILING)	C-17	9		C-4	53
3/4NPT(CROSS)	C-14	9	3/8 to 1/4NPT	C-1	15
3/4NPT(ELBOW ST)	C-14	6	3SL625A38-10.3SL	C-8	54
3/4NPT(NIPPLE, CLOSE)	C-8	8	300-1/2	C-23	4
	C-8	11	3205	C-9	27
	C-14	3	33	C-4	23
	C-14	5	3496TEFC184T	C-10	7
	C-17	4	3516	C-8	18
	C-4	50		C-8	26
3/4NPT(PLUG, PIPE)	C-8	5	36HSS	C-1	7
	C-9	35		C-1	10
3/4NPT(TEE)	C-8	15	3700-01	C-1	0

### Section III. NATIONAL STOCK NUMBER AND REFERENCE NUMBER INDEX - Continued

Reference Designator	Figure number	Index Number	Reference Designator	Figure number	Index number
3702-01	C-1	23	405-6	C-3	2
3703-01	C-1	24	405A	C-2	3
3704-01	C-1	25	405D	C-3	5
3705-1-01	C-4	37	405E	C-3	4
3706-01	C-4	7A	405F	C-3	3
3707-01	C-4	41	405G	C-3	6
3708-01	C-4	40	406-17-02	C-2	2
3709-01	C-4	13	407-1-01	C-1	4
3710-01	C-4	21	409-2-04	C-1	16
3711-01	C-4	1	409-3-04	C-1	17
3712-01	C-4	6	422	C-11	3
3713-01	C-4	25	426	C-32	4
3713-1-01	C-19	27	44	C-10	6
3713-2-01	C-19	24	45DEG1-1/2NPT	C-4	29
3713-3-01	C-19	26	45DEG1/2NPT	C-23	2
3714-01	C-4	2	45DEG1NPT	C-8	35
3715-01	C-4	36	45DEG3/4NPT(ELBOW)	C-8	7
3716-01	C-4	11	45DEG3/4NPT(Y)	C-31	2
3716-1-01	C-4	10	5/16-18X1-1/2	C-9	21
3717-01	C-7	6	5/16-18X3/8	C-10	1
3718-01	C-7	16	5/8ID	C-8	20
3719-01	C-4	27	5SDX1/2	C-4	24
3719-1-01	C-4	44	5008-118	C-26	4
3720-01	C-7	11	5252	C-10	2
3721-01	C-4	35		C-13	20
3722-01	C-4	49		C-13	23
3723-01	C-4	18	5303	C-15	1
3724-01	C-4	9	568-05	C-6	7
3725-04	C-26	2	573-05	C-17	43
3726-04	C-9	17	6(CLAMP)	C-4	4
3727-04	C-24	2		C-11	7
3729-01	C-4	54A		C-11	10
3730-02	C-4	20		C-16	1
3732-02	C-4	30		C-4	26
3737-02	C-6	9		C-4	42
3747-02	C-6	6		C-30	1
3748-02	C-4	43		C-4	52
3749-02	C-4	8	6-32X1/2	C-19	23
3749-1-02	C-4	31	61-3060	C-13	5
3750-02	C-1	27	625-A91684	C-9	18
3757-02	C-7	17		C-9	20
3764-02	C-28	8	625-K1		
3772-02	C-19	30	625-K2		
3775-02	C-4	56	625-1105666	C-9	36
3779-02	C-4	55	625-1177394	C-9	7
3784-02	C-4	28		C-9	11
3785-02	C-13	54		C-9	14
3786-02	C-4	7	625-1185360	C-9	39
3788-02	C-4	34	625-1187413	C-9	47
3789-02	C-18	5	625-1216823	C-9	34
3789-1-02	C-4	12	625-1218743	C-9	24
3791-1-02	C-16	10	625-1219606	C-9	37
3793-02	C-4	22	625-1219610	C-9	9
3796-02	C-4	38		C-9	14
40 MESH	C-24	4	625-1219614	C-9	6
405-11	C-2	5	625-1219615	C-9	10
405-13	C-2	6		C-9	16



### Section III. NATIONAL STOCK NUMBER AND REFERENCE NUMBER INDEX - Continued

Reference Designator	Figure number	Index number	Reference Designator	Figure number	Index number
625-1219650	C-9	33	701-3/4NPT	C-17	3
625-1219669	C-9	26	75	C-30	4
625-1222355	C-9	8	75-3/4NPT	C-31	4
	C-9	12	7805-5043	C-8	53
625-1241362	C-9	19	8-32X1/2	C-13	14
625-1244781	C-9	41		C-28	5
625-1244881	C-9	42		C-3	9
625-1244980	C-9	28	90DEG1/2NPT	C-17	25
625-1247237	C-9	48		C-17	27
625-1247238	C-9	40		C-17	29
625-1255223	C-9	43		C-17	31
625-1255224	C-9	44	90DEG1/4NPT	C-17	23
625-1255297	C-9	3		C-20	2
625-1255887	C-9	5	90 DEG 1/8NPT	C-13	35
625-1263906	C-9	23	90DEG1NPT	C-8	51
625-1267611	C-9	49		C-17	41
625-1269388	C-9	23	90DEG3/4NPT	C-8	17
625-1272419	C-9	38		C-14	2
625-1276367	C-9	46		C-17	2
625-1279148	C-9	22		C-17	5
625-1280807	C-9	29		C-17	11
625-1280908	C-9	31		C-25	2
625-1284515	C-9	45		C-32	5
625-5000-206	C-9	25		C-4	51
636-2491	C-13	9	90DEG3/4X1	C-8	12
649-35S	C-1	14	90DEG3/4X3/4	C-6	3
6623	C-13	50	90DEGX3/8NPT	C-8	2
	C-4	39		C-8	29
679-02	C-1	13		C-8	38
679-1-02	C-1	12		C-29	4
680-03	C-5	5		C-4	54
701-1/2NPT	C-17	32	90DEG3/8NPTX3/8HOSE	C-29	1
701-3/4	C-14	4	990117		
	C-17	13			



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USAR: None

For explanation of abbreviations used, see AR 310-50.



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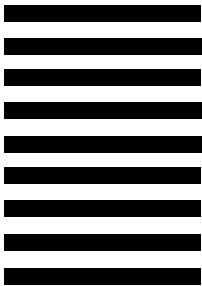
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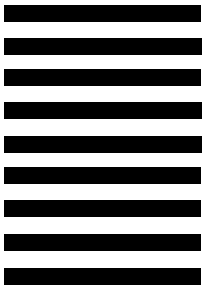
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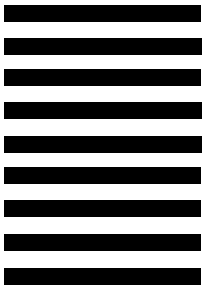
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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches  
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches  
1 Kilometer = 1000 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

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces  
1 Kilogram = 1000 Grams = 2.2 Lb  
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

CUBIC MEASURE

1 Cu Centimeter = 1000 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 = 1000 Milliliters = 33.82 Fluid Ounces

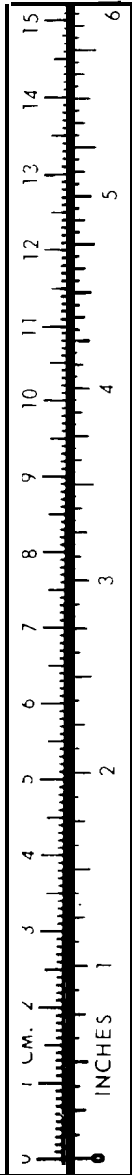
TEMPERATURE

$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$   
212° Fahrenheit is equivalent to 100° Celsius  
90° Fahrenheit is equivalent to 32.2° Celsius  
32° Fahrenheit is equivalent to 0° Celsius  
 $9/5^{\circ}\text{C} + 32 = ^{\circ}\text{F}$

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
Meter s . . . . .	Feet . . . . .	3.289
Meter s . . . . .	Yards . . . . .	1.094
Kilometers . . . . .	Miles . . . . .	0.621
Square Centimeters.	Square Inches.	0.155
Square Meters . . . . .	Square Feet. . . . .	10.764
Square Meters . . . . .	Square Yards	1.195
Square Kilometers . . . . .	Square Miles	0.385
Square Hectometers.	Acres. . . . .	2.471
Cubic Meters. . . . .	Cubic Feet	35.315
Cubic Meters, . . . . .	Cubic Yards.	1303
Milliliters . . . . .	Fluid Ounces . . . . .	0.034
Liters . . . . .	..Pints . . . . .	2.113
Liter s . . . . .	Quarts . . . . .	1.057
Liter s . . . . .	Gallons . . . . .	..0.264
Grams . . . . .	..Ounces . . . . .	..0.035
Kilograms . . . . .	Pounds . . . . .	2.205
Metric Tons . . . . .	Short Tons	1.102
Newton-Meters . . . . .	Pound-Feet . . . . .	0.733
Kilopascals . . . . .	Pounds per Square Inch . . . . .	0.145
Kilometers per Liter. . . . .	Miles per Gallon . . . . .	2.354
Kilometers per Hour . . . . .	Miles per Hour . . . . .	0.621



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