

Technical Manual

**OPERATOR'S, ORGANIZATIONL, DIRECT SUPPORT
AND GENERAL SUPPORT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL
TOOLSLIST)**

**OIL-WATER SEPARATOR,
5 GPM, TYPE A, 3 STAGE
NSN 2090-01-076-5849**

**OIL-WATER SEPARATOR,
5 GPM, TYPE B, 3 STAGE
NSN 2090-01-076-5850**

**OIL-WATER SEPARATOR,
5 GPM, TYPE C, 2 STAGE
NSN 2090-01-076-5851**

**OIL-WATER SEPARATOR,
5 GPM, TYPE D, 2 STAGE
NSN 2090-01-076-5852**

This copy is a reprint which includes current pages from Changes 1 and 2.

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HEADQUARTERS, DEPARTMENT OF THE ARMY

10 JANUARY 1983

CHANGE
NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 28 February 1995

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5 GPM, TYPE D, 2 STAGE
NSN 2090-01-076-5852**

Current as of 23 JANUARY 1995

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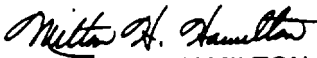
TM 55-2090-201-14&P

C 2

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:


MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
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CHANGE

NO. 1

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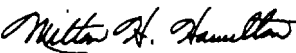
B-3 through B-8

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04000

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FILTER ELEMENTS

Filters Elements are subject to contamination by human hand.
Handle Filter Elements by end caps only.

Place used filter elements in a plastic bag and
mark for petroleum waste disposal.



ELECTRIC POWER

Electrical installation and connection to the main power
source must be performed only by a fully qualified
electrician in accordance with regulations.



Electrical shock or serious injury may
result if the power supply is not disconnected prior
to servicing this equipment.

For Artificial Respiration, refer to FM21-11.

WARNING

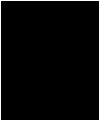
SOLVENT

Drycleaning solvent, P-D-680,
used to clean parts is potentially
dangerous to personnel
and property.

Avoid repeated or prolonged skin contact.
Do not use near open flame or excessive heat.
Flash point of solvent is 100° - 138°F (38° - 59°C).

Technical Manual
 No. 55-2090-201-14&P

HEADQUARTERS
 DEPARTMENT OF THE ARMY
 WASHINGTON, D.C., 10 January 1983



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 Including Repair Parts and Special Tools List

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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2, located in the back of this manual direct to: Commander, US Army Troop Support and Aviation Materiel Readiness Command, ATTN: DRSTS-MPSD, 4300 Goodfellow Blvd., St. Louis, MO 63120. A reply will be furnished directly to you.

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CHAPTER 1

I N T R O D U C T I O N

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1-1. OVERVIEW.

a. Chapter 1 of this TM is intended to give you a general idea of the type of equipment, its use and the main characteristics of the oil-water separators covered by this publication.

b. A hatchmark in parentheses (#) following the paragraph nomenclature indicates that the item of equipment is applicable to all types of separators covered in this publication.

SECTION I.

GENERAL INFORMATION.

1-2. SCOPE.

This manual covers both the two-stage (Type C and D), (figure 1-1) and the three-stage (Type A and B), (figure 1-2) oil water separators.

The Type C and D oil-water separators are two-stage coalescent types. They are designed to separate and remove non-soluble oil, solids and entrained air from an oily water mixture.

The system is designed to operate continuously or intermittently.

No chemicals or other additives are needed.

1-2. SCOPE (Continued).

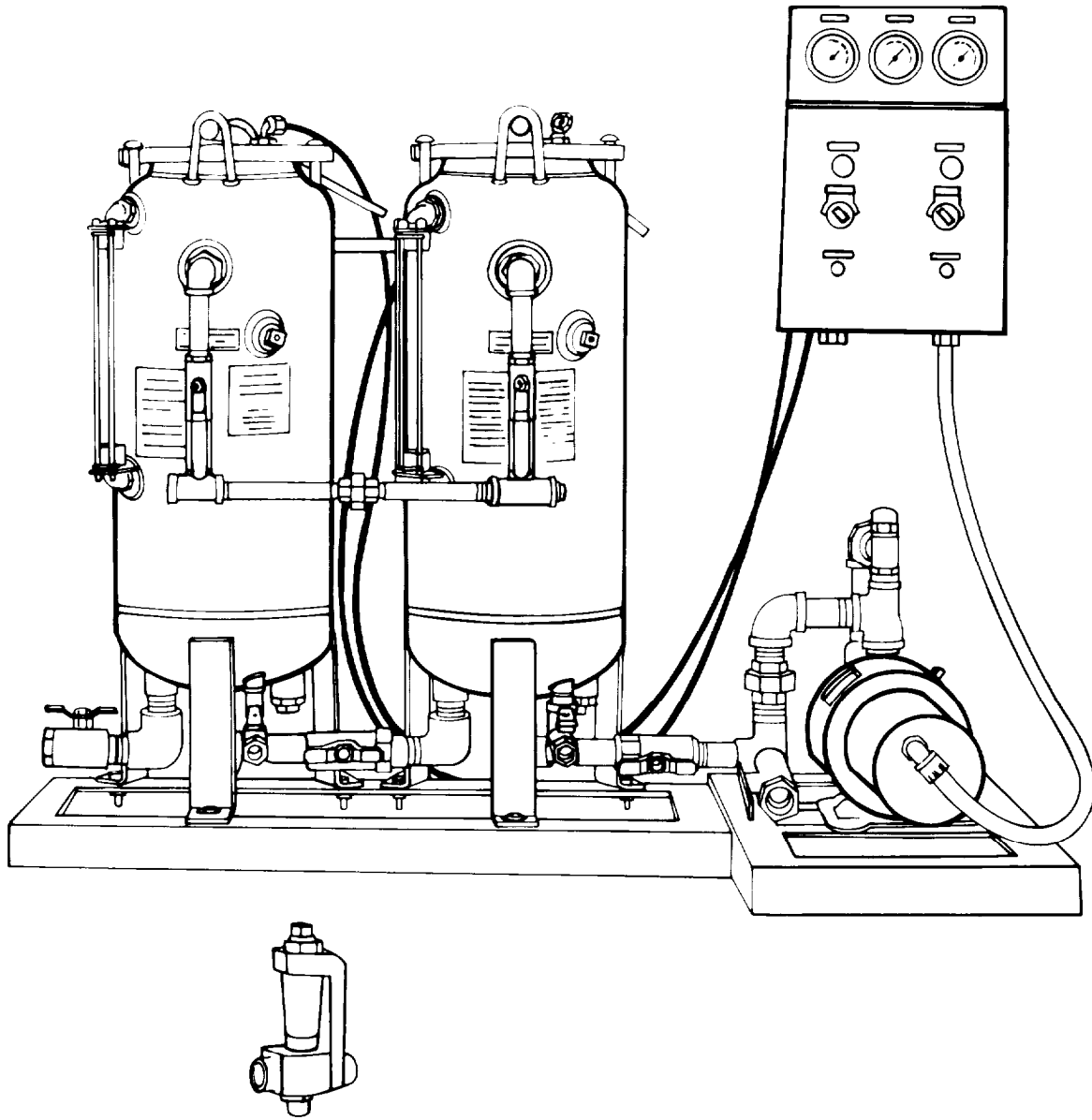


Figure 1-1. Type C and D Separators.

1-2. SCOPE (Continued).

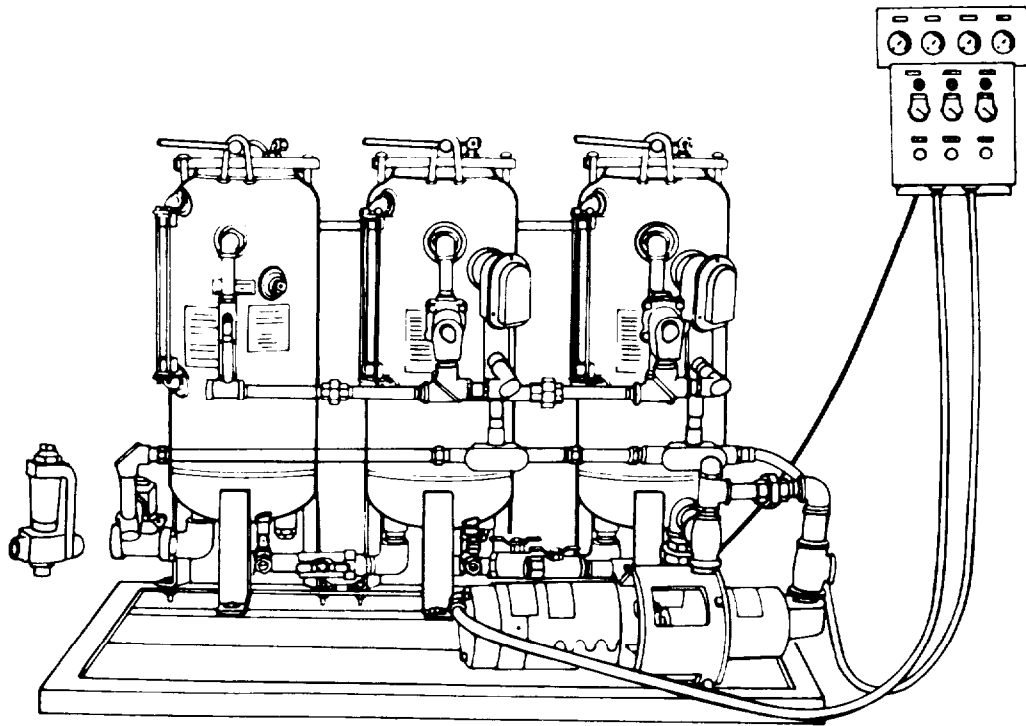


Figure 1-2. Type A and B Separators.

1-2. SCOPE (Continued).

Coalescence occurs as the fluid flows through the filter elements mounted in the two pressure vessels. Separated oil collects at the top of each vessel. It is discharged by opening a hand operated valve. Water processed through the second stage is discharged by opening a hand operated valve.

The Type A and B oil-water separators are three-stage coalescent types. They are designed to separate and remove non-soluble oil, solids and entrained air from an oily water mixture.

The system is designed to operate continuously or intermittently.

No chemicals or other additives are needed.

Coalescence occurs as the fluid flows through the filter elements mounted in three pressure vessels. Two mini-probes, are located in each of the first two separator stages. They provide automatic discharge of accumulated oil.

Oil builds up in the first (prefilter) and second stages, where the bulk of the oil is separated. The mini-probes sense this build up and signal solenoid operated discharge valves. The valves open. Separated oil is dumped into the holding tank.

Oil buildup in the third stage is very small. This is primarily a polishing stage. The water processed through the third stage is discharged through a solenoid operated valve.

1-3. MAINTENANCE FORMS, RECORDS, AND REPORTS.

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System (TAMMS).

1-4. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

Procedures for destroying Army materiel to prevent enemy use are listed in TM 750-244-3.

1-5. PREPARATION FOR STORAGE OR SHIPMENT.

For administrative storage of equipment refer to TM 740-90-1 for instructions.

1-6. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR).

If your separator needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at: Commander, US Army Troop Support and Aviation Materiel Readiness Command, ATTN: DRSTS-MPSD, 4300 Goodfellow Boulevard, St. Louis, MO 63120. We'll send you a reply.

1-7. LIST OF ABBREVIATIONS.

- a..... ampere
- C..... Celsius
- F..... Fahrenheit
- gm sq cm..... grams square centimeter
- GPM..... gallon per minute
- hpr..... Horsepower
- (#)..... Task Covers All Model Separators
- kg..... kilogram
- kg/m..... kilograms per square meter
- l..... liter
- lb..... pound
- LPM..... liters per minute
- OD..... Outside Diameter
- psid..... pounds per square inch pressure drop
- Psig..... pounds per square inch gauge
- psi..... pounds per square inch
- pt..... pint
- rpm..... revolutions per minute
- v..... volts
- vac..... volts alternating current
- vdc..... volts direct current

SECTION II. EQUIPMENT DESCRIPTION.

1-8. PURPOSE.

The oil-water separators are used to separate and remove non-soluble oil, solids, and entrained air from an oily water mixture. The system is designed for continuous and intermittent operation. There is no need for chemical or other additives.

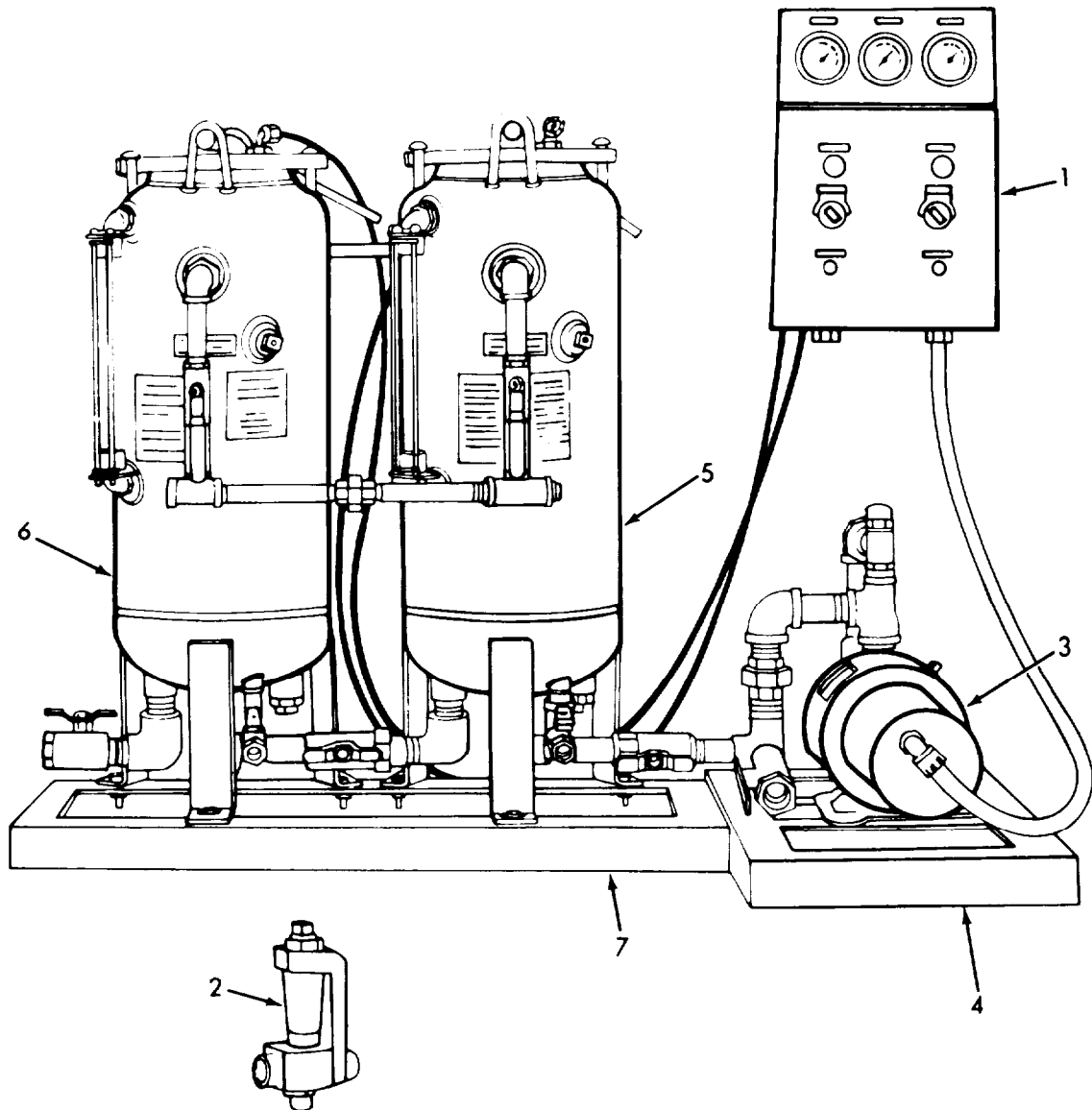
1-9. CAPABILITIES AND FEATURES.

- Frame mounted
- Installed in a vertical position
- Electric motor and pump driven
- Operates continuously or intermittently without the need for chemical or other additives.
- Holding capacity - 13.6 gallons (Type C and D)
- Holding capacity - 20 gallons (Type A and B)
- Automatic air eliminator valve (to vent air)
- Sight glass for viewing water clarity and oil level

1-10. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

Refer to figures 1-3 and 1-4 for the location and description of the major components of the oil-water separators.

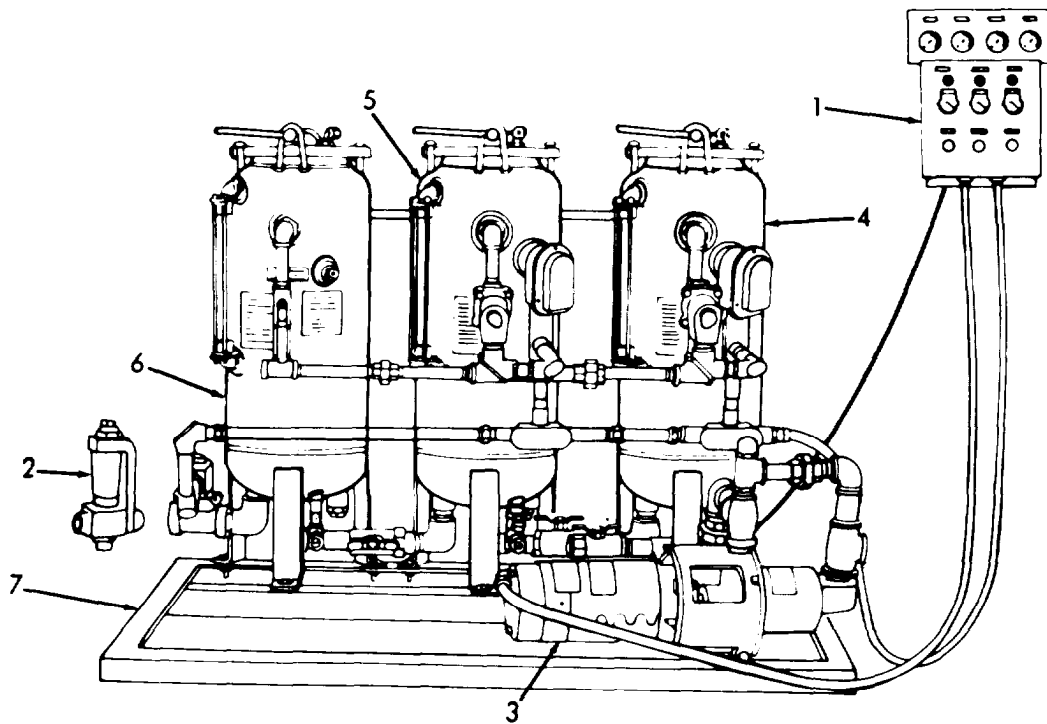
1-10. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Continued).



1. Control Panel. Provides operating controls.
2. Flow Rate Indicator. Indicates the flow rate of liquid.
3. Pump Motor Unit. Provides operating power for separator.
4. Pump Motor Frame. Provides mounting for pump motor.
5. Prefilter Primary Separator. Acts as 1st stage separator and filters matter from influent.
6. Second Stage Separator. Separates oil from the particulate free oil-water emulsion flowing from the prefilter.
7. Frame. Serves as mounting base for separators.

Figure 1-3. Location and Description of Major Components
(Type C and D Separator)

1-10. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Continued).



1. Control Panel. Provides operating controls.
2. Flow Rate Indicator. Indicates the flow rate of liquid.
3. Pump Motor Unit. Provides operating power for separators.
4. Prefilter Primary Separator. Acts as the primary oil separator and filters matter from influent.
5. Second Stage Separator. Separates oil from the particulate free oil-water emulsion flowing from the prefilter.
6. Third Stage Separator. Serves as a back-up and polishing stage to the second stage separator.
7. Frame. Serves as mounting base for separators.

Figure 1-4. Location and Description of Major Components
(5 GPM Oil-Water Separator Type A and B)

1-11. DIFFERENCES BETWEEN MODELS.

	Type A	Type B	Type C	Type D
Control Panel	X	X	X	X
Pump/Motor Unit	X	X	X	X
Holding Capacity (20 gal)	---	---		
Holding Capacity (13.6 gal)			---	---
Filter Elements	---	---	---	---
Mini-Probe (sensor)			---	---
Solenoid Valves			---	---

1-12. EQUIPMENT DATA.

Refer to table 1-1 if you have the two stage type C oil-water separator.

Refer to table 1-2 if you have the two stage type D oil-water separator.

Refer to table 1-3 if you have the three stage type A oil-water separator.

Refer to table 1-4 if you have the three stage type B oil-water separator.

TABLE 1-1. EQUIPMENT DATA, TYPE C

Manufacturer.....	Separation and Recovery Systems, Inc. (53918)	
Type C.....	Two stage coalescer oil-water separator with pump and motor	
Separating capacity.....	5 gpm (18.9 Lpm)	
Holding capacity.....	13.6 gals. (51.4 L)	
Water and oil temperature range.....	40° to 160°F (4.4° - 71°C)	
Ambient temperature range.....	40° to 160°F (4.4° - 71°C)	
Operating pressure.....	0 - 45 psig (0-3163.8 gm sq cm)	
Max. work pressure.....	75 psig (5273.0 gm sq cm)	
Pressure drop (dirty elements).....	30 psid (2109.2 gm sq cm) (replace prefilter elements) 25 psid (1757.7 gm sq cm) (replace coalescer elements)	
Electrical power input.....	24 VDC + 10%	
Pump/Motor Unit.....	Sher-Water Model SI-251-24-VDC 1/2 hp, 1750 rpm	
Pump performance curve.....	Figure 1-5	
Weight of System		
Wet.....	427 lbs (193.9 kg)	
Dry.....	302 lbs (137.1 kg)	
Prefilter Primary Separator Element		
Type.....	MIL-F-52847, Type II, or FSCM (53918) 614-501	

Table 1-1. Equipment Data, Type C (Continued)

Number 1
 Operation Inside-to-outside fluid flow
 Size Cylinder 3 ID x 6 OD x 14 inches
 (7.62 ID x 15.24 OD x 35.56 CM)

Second Stage Coalescer Element

Type ML-F-52847, Type III, or FSCM (53918)
 611-100
 Number 1
 Operation Inside-to-outside fluid flow
 Size Cylinder 3 ID x 6 OD x 11 inches
 (7.62 ID x 15.24 OD x 27.94 CM)

Dimensional Data

Inches

Vessel diameter 10 (25.4 cm)
 Overall length 45 (114.3 cm)
 Overall width 21 (53.34 cm)
 Overall height 33-1/2 (85.09 cm)
 Service clearance:
 (For removal of filter
 elements)
 Height 44 (111.76 cm)

Table 1-1. Equipment Data, Type C (Continued).

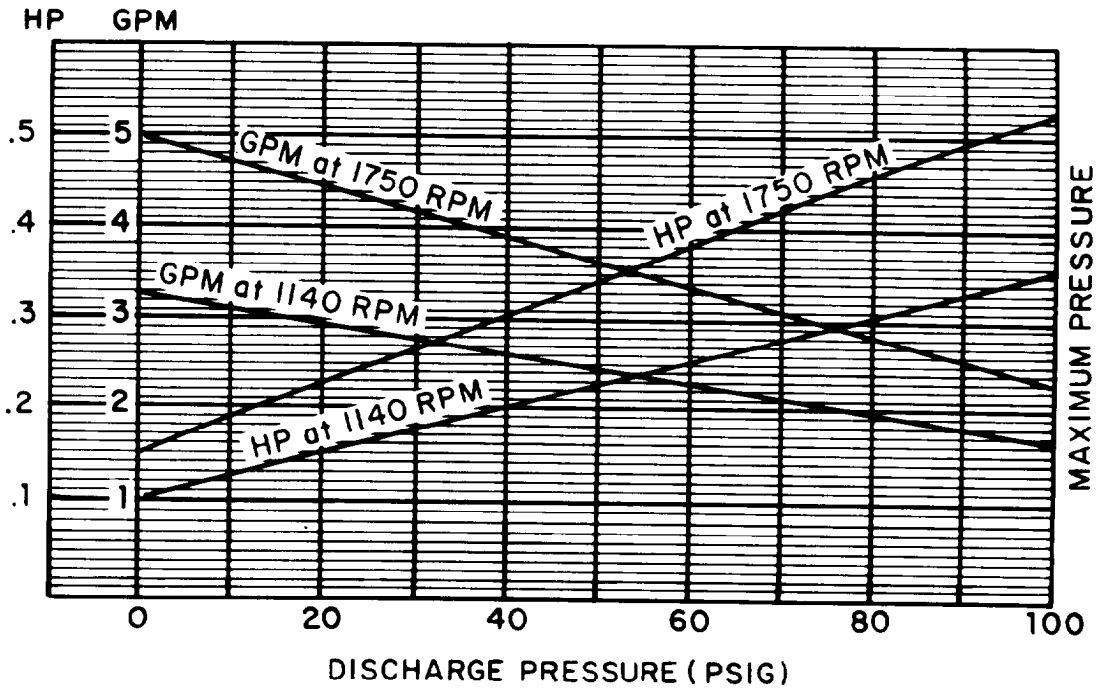


Figure 1-5. Pump Performance Curve for Type C Separator.

TABLE 1-2. EQUIPMENT DATA, TYPE D

Manufacturer.....	Separation and Recovery Systems, Inc.	
Type D.....	Two stage coalescer oil-water separator with pump and motor	
Separating capacity.....	5 gpm (18.9 Lpm)	
Holding capacity.....	13.6 gals. (51.5 L)	
Water and oil temperature range.....	40° to 160°F (4.4° - 71°C)	
Ambient temperature range.....	40° to 160°F (4.4° - 71°C)	
Operating pressure.....	0 - 45 psig (0-3163.8 gm sq cm)	
Max. work pressure.....	75 psig (5273.0 gm sq cm)	
Pressure drop (dirty elements).....	30 psid (2109.2 gm sq cm)	(replace prefilter elements)
	25 psid (1757.7 gm sq cm)	(replace coalescer elements)
Electrical power input.....	120 VDC ± 10%	
Pump/Motor Unit.....	Sher-Water Model SI-251-24-VDC 1/2 hp, 1750 rpm	
Pump performance curve.....	Figure 1-6	
Weight of System		
Wet.....	427 lbs.	(193.9 kg)
Dry.....	302 lbs.	(137.1 kg)
Prefilter Primary Separator Element		
Type.....	MIL-F-52847, Type II, or FSCM (53918) 614-501	
Number.....	1	

TABLE 1-2. EQUIPMENT DATA, TYPE D (Continued)

Operation Inside-to-outside fluid flow
 Size Cylinder 3 ID x 6 OD x 14 inches
 (7.62 ID x 15.24 OD x 35.56 CM)

Second Stage Coalescer Element

Type MIL-F-52847, Type III, or FSCM (53918)
 611-100
 Number 1
 Operation Inside-to-outside fluid flow
 Size Cylinder 3 ID x 6 OD x 11 inches
 (7.62 ID x 15.24 OD x 27.94 CM)

Dimensional Data

Inches

Vessel diameter 10 (25.4 cm)
 Overall length 45 (114.3 cm)
 Overall width 21 (53.34 cm)
 Overall height 33-1/2 (85.09 cm)
 Service clearance:
 (For removal of filter
 elements)
 Height 44 (111.76 cm)

Table 1-2. Equipment Data, Type D (Continued).

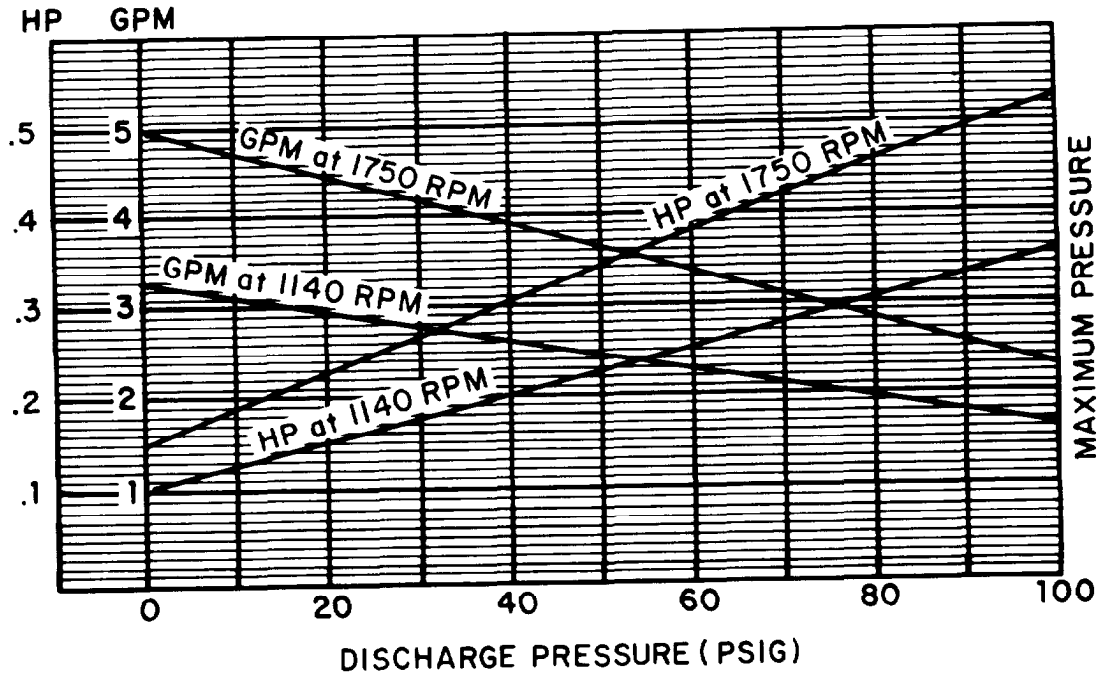


Figure 1-6. Pump Performance Curve for Type D Separator.

TABLE 1-3. EQUIPMENT DATA, TYPE A

Manufacturer	Separation and Recovery Systems, Inc.	
Type A	Three stage coalescer oil-water separator with pump and motor	
Separating capacity	5 gpm (18.9 Lpm)	
Holding capacity	20 gals. (75.7 L)	
Water and oil temperature range	40° to 160°F (4.4° - 71°C)	
Ambient temperature range	40° to 160°F (4.4° - 71°C)	
Operating pressure	0 - 45 psig (0-3163.8 gm sq cm)	
Max. work pressure	75 psig (5273.0 gm sq cm)	
Pressure drop (dirty elements)	30 psid (2109.2 gm sq cm) (change elements)	
	25 psid (17.57.7 gm sq cm) (replace coalescer elements)	
Electrical control power input	230 VAC + 10%, 60 Hz, 3 phase	
Pump/Motor Unit		
Pump	Sher-Water Model SI-253-TEFC	
Capacity	5 gpm (18.9 L)	
Discharge pressure	70 psig (4921.5 gm sq cm)	
Suction lift	25 ft. (7.63 M)	
Motor	1/2 hp	
	1750 rpm	
	230 VAC + 10%, 60 Hz, 3 phase	

TABLE 1-3. EQUIPMENT DATA, TYPE A (Continued)

Pump performance curve.....Figure 1-7

Weight of System

Wet 515 lbs (233.8 K)
 Dry 328 lbs (148.9 K)

Prefilter Primary Separator Element

Type..... MIL-F-52847, Type II, or FSCM (53918)
 614-501
 Number..... 1
 Operation.....Inside-to-outside fluid flow
 Size..... Cylinder 3 ID x 6 OD x 14 inches
 (7.62 ID x 15.24 OD x 35.56 CM)

Second and Third Stage Coalescer Element

Type..... MIL-F-52847, Type III, or FSCM (53918)
 611-100
 Number 2
 Operation.....Inside-to-outside fluid flow
 Size..... Cylinder 3 ID x 6 OD x 11 inches
 (7.62 ID x 15.24 OD x 27.94 CM)

Dimensional Data

Inches

Vessel diameter.....10 (25.4 cm)
 Overall length.....48 (123.19 cm)
 Overall width.....21-1/2 (54.61 cm)
 Overall height..... 33-1/2 (85.09 cm)

TABLE 1-3. EQUIPMENT DATA, TYPE A (Continued)

Service clearance:

(For removal of filter elements)

Height 44 (111.76 cm)

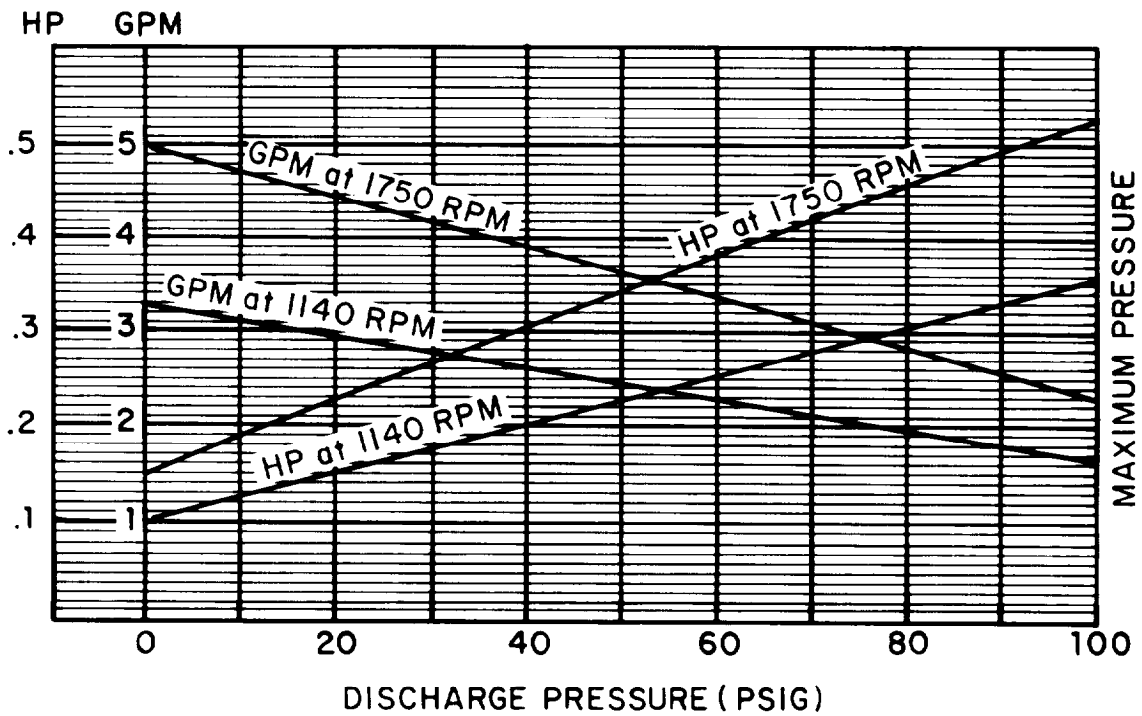


Figure 1-7. Pump Performance Curve, Type A Separator.

TABLE 1-4. EQUIPMENT DATA, TYPE B

Manufacturer.....	Separation and Recovery Systems, Inc.	
Type B.....	Three stage coalescer oil-water separator with pump and motor	
Separating capacity.....	5 gpm (18.9 Lpm)	
Holding capacity.....	20 gals. (75.7 L)	
Water and oil temperature range.....	40° to 160°F (4.4° - 71°C)	
Ambient temperature range.....	40° to 160°F (4.4° - 71°C)	
Operating pressure.....	0 - 45 psig (0-3163.8 gm sq cm)	
Max. work pressure.....	75 psig (5273.0 gm sq cm)	
Pressure drop (dirty elements)	30 psid (2109.2 gm sq cm) (change elements)	
	25 psid (1757.7 gm sq cm) (replace coalescer elements)	
Electrical control power input.....	120 VDC ± 10%	
Pump/Motor Unit		
Pump.....	Sher-Water Model SI-251-DC-110	
Capacity.....	5 gpm (18.9 Lpm)	
Discharge pressure.....	70 psig (4921.5 gm sq cm)	
Suction lift.....	25 ft. (7.63 m)	
Motor.....	1/2 hp	
	1750 rpm	
	115 VDC	

TABLE 1-4. EQUIPMENT DATA, TYPE B (Continued)

Pump performance curve.....Figure 1-8

Weight of System

Wet..... 515 lbs (233.8 K)
Dry..... 328 lbs (148.9 K)

Prefilter Primary Separator Element

Type..... MIL-F-52847, Type II, or FSCM (53918)
614-501
Number..... 1
Operation..... Inside-to-outside fluid flow
Size..... Cylinder 3 ID x 6 OD x 14 inches
(7.62 ID x 15.24 OD x 35.56 CM)

Second and Third Stage Coalescer Element

Type..... MIL-F-52847, Type III, or FSCM (53918)
611-100
Number..... 2
Operation..... Inside-to-outside fluid flow
Size..... Cylinder 3 ID x 6 OD x 11 inches
(7.62 ID x 15.24 OD x 27.94 CM)

Dimensional Data

Inches

Vessel diameter..... 10 (25.4 cm)
Overall length..... 48 (123.19 cm)
Overall width..... 21-1/2 (54.61 cm)
Overall height..... 33-1/2 (85.09 cm)

TABLE 1-4. EQUIPMENT DATA, TYPE B (Continued)

Service clearance:

(For removal of filter
elements)

Height.....44 (111.76 cm)

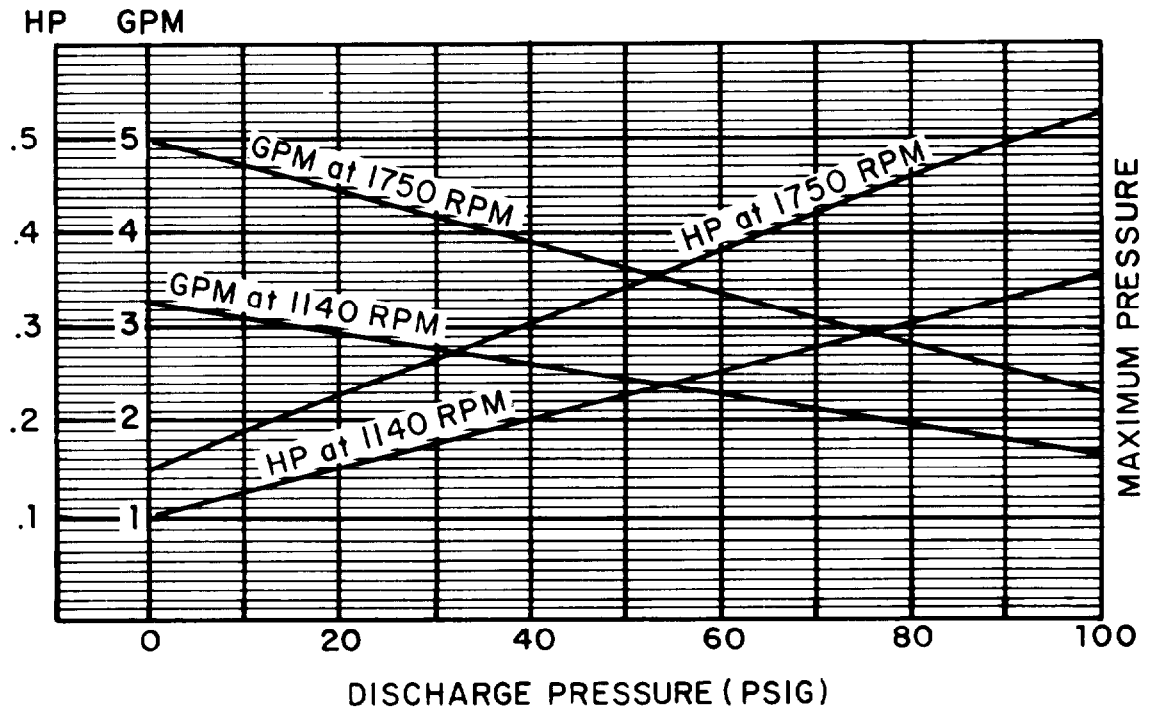


Figure 1-8. Pump Performance Curve, Type B Separator.

SECTION III. TECHNICAL PRINCIPLES OF OPERATION.

1-13. OIL-WATER SEPARATOR OPERATING PRINCIPLES.

a. Type C and D Separators.

(1) The design of the C and D oil-water separator is based on the principle of coalescence. In this process oily water is pumped through special filters. Small droplets of non-soluble oil mixed in the water attach to the filter surface. There they combine (coalesce) with other oil droplets. When the oil drops become large enough, they are forced off of the filter by fluid flow. Due to the difference in weight (specific gravity), oil separates from the water and rises to the top.

(2) The system has two vessels. The first is a prefilter. The second is called a coalescer. They are connected in series. Fluid (influent) containing oil, water and solids is pumped to the system by a supply pump.

(3) Primary separation and removal of oil from water takes place in the first stage in the prefilter primary separator. Inside the vessel is a replacable prefilter element. Fluid flows from inside to outside of the element. It works as follows:

- Fluid is pumped through the hollow core of the filter.
- Solids are collected inside the core of the filter.
- Small drops of oil form on the outside of the filter.
- When drops become large enough, they are forced off the surface by fluid flow.
- Oil rises to the top of the vessel.

1-13. OIL-WATER SEPARATOR OPERATING PRINCIPLES (Continued).

- Air displaced by the rising fluid is discharged through the air eliminator valve mounted on the cover of the vessel.
- When enough oil has gathered in the vessel it becomes visible in a sight glass mounted on the vessel.
- A hand operated water discharge valve located at the second stage outlet is closed during oil discharge. This provides the back pressure needed to force oil from the top of the prefilter primary separator.
- Oil is discharged from the prefilter by opening a hand operated oil discharge valve.
- After the oil has been removed, the oil discharge valve is closed and the water discharge valve is opened.
- Fluid in the bottom of the first stage then enters the second stage separator.
- Fluid flows up through the filter coalescer element. This filters any oil that may not have been removed in the first stage.
- Operation and function of the second stage separator is the same as that of the first stage.

(4) Controls for the type C and D separators are on a remote control panel. The panel contains a supply pump switch and a monitor switch for future use. Indicator lights show whether the switches are on or off. Also mounted on the control panel are three pressure gauges. These gauges read 0-100 pounds per square inch (psi). One gauge shows the pressure at the inlet to the prefilter primary separator. The other two gauges show the pressure at the discharge side of each Stage.

(5) The Pressure vessels are made of carbon steel. Each vessel has a cam bar secured cover. Filter elements may be replaced by removing this cover. An air eliminator valve on each unit vents air out of the separator as fluid enters. Zinc anodes in the bottom of each vessel cut down the effects of electrolysis on the tanks.

1-13. OIL-WATER SEPARATOR OPERATING PRINCIPLES (Continued).

(6) Sight glasses on each unit show the oil level and water clarity. Elbows into which each of the sight glasses is fitted are self-sealing. This prevents leakage if a sight glass breaks.

(7) Each separator has a combination water sample/drain valve. This permits draining each vessel or drawing samples if needed.

(8) Both separators have a manual oil discharge valve.

(9) Three manual shut-off valves are located in the system flow lines. One is at the inlet to the first stage. The second is between the first and second stages. The third is at the outlet of the second stage. This permits isolation of each stage.

(10) A flow rate gauge is installed in the water outlet line.

b. Type A and B Separators.

(1) The design of the A and B oil-water separator is based on the principle of coalescence. In this process oily water is pumped through special filters. Small droplets of non-soluble oil mixed in the water attach to the filter surface. There they combine (coalesce) with other oil droplets. When the oil drops become large enough, they are forced off of the filter by fluid flow. Due to the difference in weight (specific gravity), oil separates from the water and rises to the top.

(2) The unit has three separate vessels or stages. They are connected in series. The fluid (influent) containing oil, water and solids is pumped to the system by a supply pump.

(3) The pump is equipped with a pressure relief valve. This prevents the system back pressure from exceeding 45 psi (3163.8 gm sq cm).

(4) Primary separation and removal of oil from water takes place in the first stage in the prefilter primary separator. Inside the vessel is a replacable prefilter element. Fluid flows from inside to outside of the element. It works as follows:

- Fluid is pumped through the hollow core of the filter.

1-13. OIL-WATER SEPARATOR OPERATING PRINCIPLES (Continued).

- Solids are collected inside the core of the filter.
- Small drops of oil form on the outside of the filter.
- When drops become large enough, they are forced off the surface by fluid flow.
- Oil rises to the top of the vessel.
- Air displaced by the rising fluid level is discharged through the air eliminator valve mounted on the cover of the vessel.
- When enough oil has gathered in the first stage the system operates automatically.
- A mini-probe located in the first stage senses the level of oil. It then signals electrically.
- The first stage solenoid operated oil discharge valve opens.
- At the same time the solenoid operated water discharge valve closes. Closing of this valve supplies the pressure needed to force oil from the top of the prefilter primary separator.
- When enough oil has been discharged to uncover the mini-probe, the oil discharge valve closes. At the same time the water discharge valve opens.
- Fluid in the bottom of the first stage then enters the second stage separator.
- Fluid flows up through the filter coalescer element. This filters any oil that may not have been removed in the first stage.
- Operation and function of the second stage separator is the same as that of the first stage.

1-13. OIL-WATER SEPARATOR OPERATING PRINCIPLES (Continued).

- Following processing through the second stage water enters the third stage.
- Processing is the same as the first two stages except the third stage has a manual oil discharge valve instead of a solenoid operated valve. Very little oil will accumulate in the third stage. Most, if not all of the oil, will have been removed in the first two stages.

(5) Controls for the type A and B separators are on a remote control panel. An off-on switch controls automatic operation of the mini-probes and solenoid valves. An off-on switch operates the supply pump motor. A monitor switch is provided for future use. Indicator lights show whether the switches are on or off.

(6) There are three additional display lights. One is an overboard indicator light. This light shows that the oil discharge valve is open when oil is being pumped out. There are two oil dump lights. Each of these includes a button for manual oil discharge from the first or second stage. They are also used for testing the oil level mini-probe circuit.

(7) Also mounted on the control panel are four pressure gauges. These gauges read 0-100 psi. One gauge shows the pressure at the inlet to the prefilter primary separator. The other three gages show the pressure at the discharge side of each of the three stages.

(8) The pressure vessels are made of carbon steel. They are frame mounted. Each vessel has a cam bar secured cover. Filter elements may be replaced by removing this cover. An air eliminator valve on each unit vents air out of the separator as fluid enters. Zinc anodes in the bottom of each vessel cut down the effects of electrolysis on the tanks.

(9) Sight glasses on each unit show the oil level and water clarity. Elbows into which each of the sight glasses is fitted are self-sealing. This prevents leakage if a sight glass breaks.

(10) Each separator has a combination water sample/drain valve. This permits draining each vessel or draining samples if needed.

(11) Each vessel has a manual or automatic oil discharge valve.

1-13. OIL-WATER SEPARATOR OPERATING PRINCIPLES (Continued).

(12) Three manual shut-off valves are located in the system flow lines. One is at the inlet to the first stage. The second is between the first and second stages. The third is between the second and third stage. This permits isolation of each stage.

(13) A bypass valve is located on the inlet to the first stage. This permits the filter elements to be bypassed during pumping for other than oil-water separation.

(14) A flow rate gauge is installed in the water outlet line.

CHAPTER 2

OPERATING INSTRUCTIONS

	Page
● Overview	2-1
● Operator's Controls and Indicators	2-1
● Preventive Maintenance Checks and Services	2-11
● Operating Under Usual Conditions	2-19
● Operating Instructions on Decals and Instruction Plates	2-32
● Operating Under Unusual Conditions	2-37

2-1. OVERVIEW.

This chapter provides and illustrates the necessary instructions needed by the operator to use the oil-water separator.

SECTION I. CONTROLS AND INDICATORS.

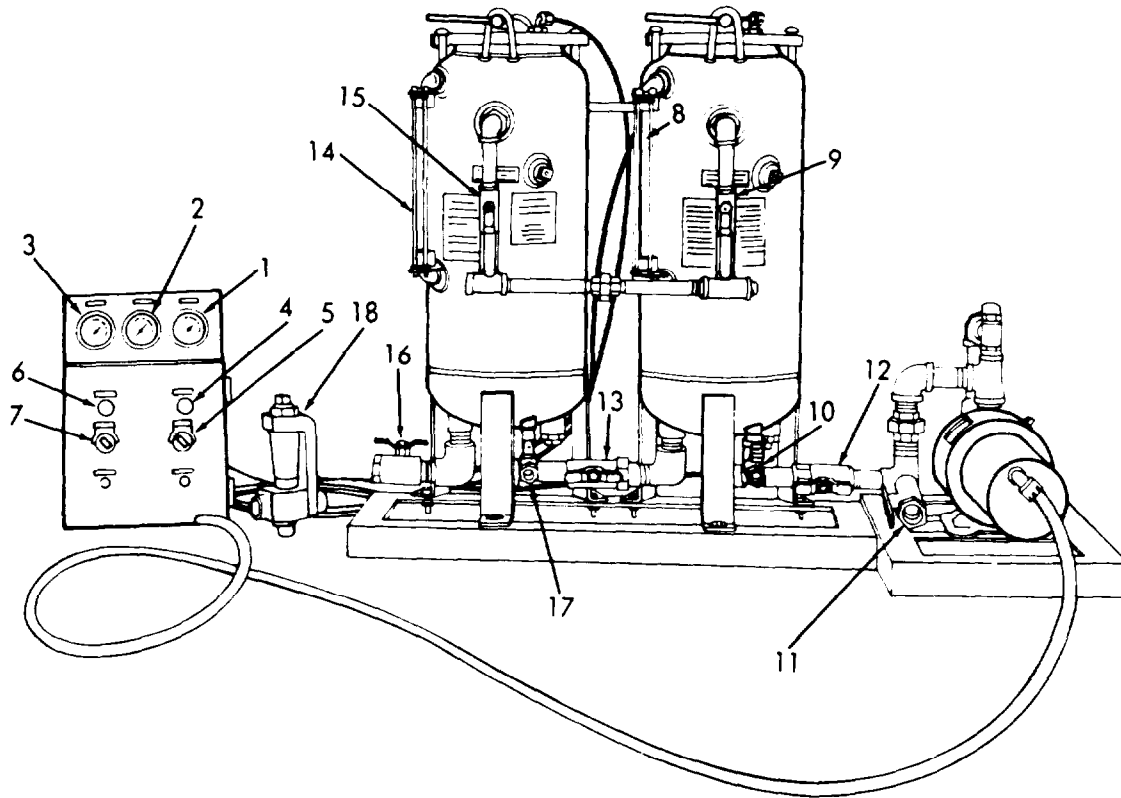
2-2. CONTROLS, DESCRIPTION AND USE.

a. See figure 2-1 and 2-2 for illustration and description of operator controls and indicators for type C and D oil-water separators.

CONTROLS AND INDICATORS

1. Inlet Pressure Gauge. Needle points to actual fluid pressure at inlet to prefilter primary separators.
2. 1st Stage Pressure Gauge. Needle points to actual fluid pressure at outlet from prefilter primary separator.
3. 2nd Stage Pressure Gauge. Needle points to actual fluid pressure at outlet from second stage separator.

2-2. CONTROLS, DESCRIPTION AND USE (Continued).

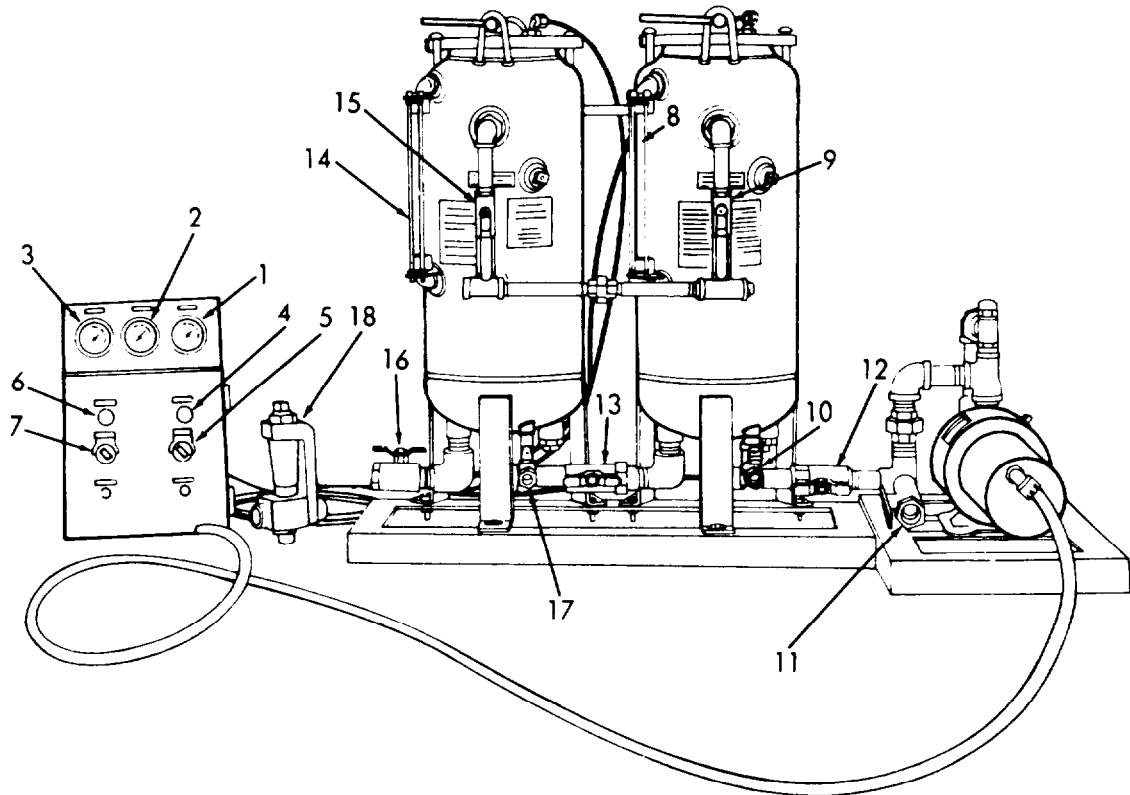


- | | |
|--------------------------------|-------------------------------|
| 1. Inlet Pressure Gauge | 10. Sample/Drain Valve |
| 2. First Stage Pressure Gauge | 11. Bypass Valve |
| 3. Second Stage Pressure Gauge | 12. Inlet Valve |
| 4. Supply Pump Indicator Light | 13. Intervessel Shutoff Valve |
| 5. Supply Pump Selector Switch | 14. Sight Glass |
| 6. Monitor Indicator Light | 15. Oil Discharge Valve |
| 7. Monitor Selector Switch | 16. Discharge Valve |
| 8. Sight Glass | 17. Sample/Drain Valve |
| 9. Oil Discharge Valve | 18. Flow Rate Indicator |

Figure 2-1. Controls and Indicators, Type C Separator.

2-2. CONTROLS, DESCRIPTION AND USE (Continued).

CONTROLS AND INDICATORS (continued).



- | | |
|--------------------------------|-------------------------------|
| 1. Inlet Pressure Gauge | 10. Sample/Drain Valve |
| 2. First Stage Pressure Gauge | 11. Bypass Valve |
| 3. Second Stage Pressure Gauge | 12. Inlet Valve |
| 4. Supply Pump Indicator Light | 13. Intervessel Shutoff Valve |
| 5. Supply Pump Selector Switch | 14. Sight Glass |
| 6. Monitor Indicator Light | 15. Oil Discharge Valve |
| 7. Monitor Selector Switch | 16. Discharge Valve |
| 8. Sight Glass | 17. Sample/Drain Valve |
| 9. Oil Discharge Valve | 18. Flow Rate Indicator |

Figure 2-2. Controls and Indicators, Type D Separator.

2-2. CONTROLS, DESCRIPTION AND USE (Continued).

CONTROLS AND INDICATORS (Continued).

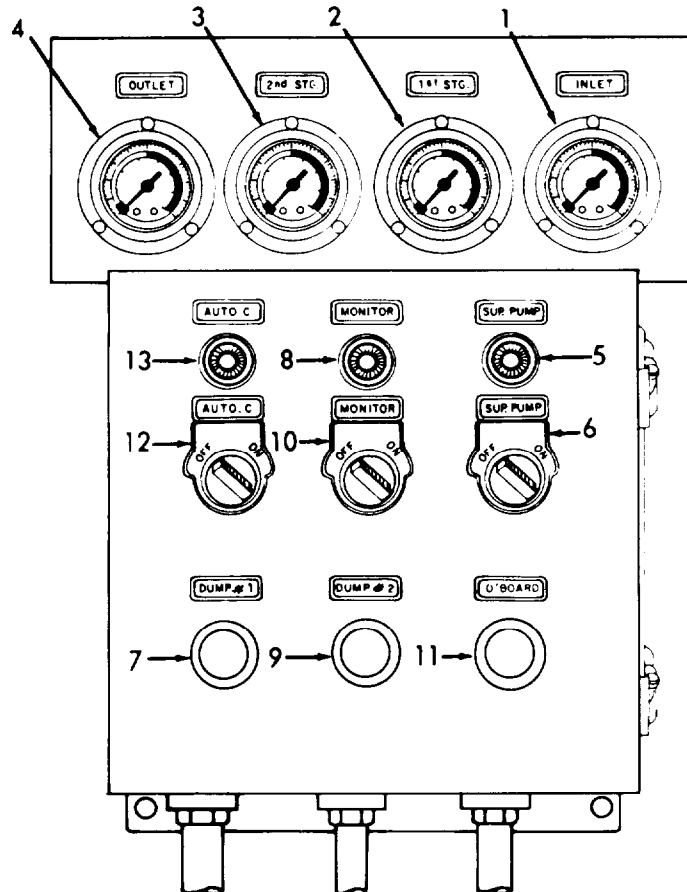
4. **Supply Pump Indicator Light.** Lights up when pump switch is turned ON.
5. **Supply Pump Selector Switch.** Switch for turning electrical power ON-OFF for supply pump.
6. **Monitor Indicator Light.** Lights up when monitor switch is turned ON.
7. **Monitor Selector Switch.** Switch for turning electrical power ON-OFF for monitor.
8. **Sight Glass for Prefilter Primary Separator.** Shows amount of oil in prefilter.
9. **Oil Discharge Valve.** Manually operated valve for releasing oil from primary separator.
10. **Sample/Drain Valve.** Manually operated valve to drain or sample liquid from primary separator.
11. **Bypass Valve.** Manually operated valve used to bypass oil-water separator.
12. **Inlet Valve.** Manually operated valve to shut off fluid entering system.
13. **Intervessel Shutoff Valve.** Manually operated valve to stop flow of fluid between 1st and 2nd stages.
14. **Sight Glass for Second Stage Separator.** Shows amount of oil in separator.
15. **Oil Discharge Valve.** Manually operated valve for releasing oil from 2nd stage separator.
16. **Discharge Valve.** Manually operated valve to release clean water from the 2nd stage separator.
17. **Sample/Drain Valve.** Manually operated valve to drain or sample water from the 2nd stage separator.
18. **Flow Rate Indicator.** Shows the flow rate of water/oil from the separators.

b. See figures 2-3, 2-4 and 2-5 for illustration and description of operator controls and indicators for type A and B oil-water separators.

1. **Inlet Pressure Gauge.** Needle points to actual fluid pressure at inlet to prefilter primary separator.

2-2. CONTROLS, DESCRIPTION AND USE (Continued).

CONTROLS AND INDICATORS (continued).

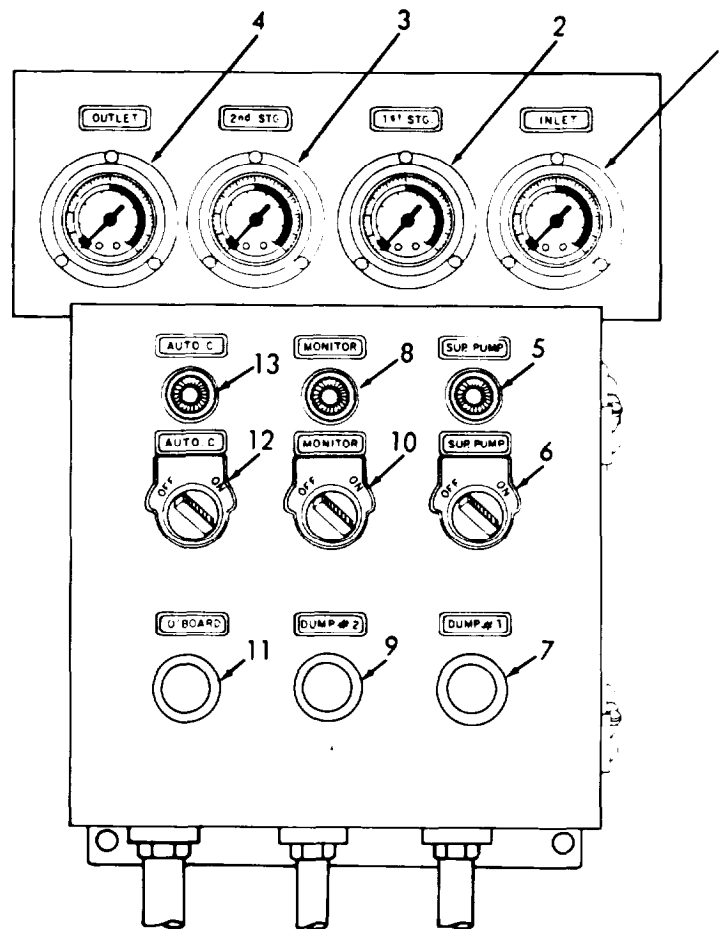


- | | |
|--------------------------------|---------------------------------------|
| 1. Inlet Pressure Gauge | 8. Monitor Indicator Light |
| 2. First Stage Pressure Gauge | 9. Oil Dump Second Stage Light/Button |
| 3. Second Stage Pressure Gauge | 10. Monitor Selector Switch |
| 4. Outlet Pressure Gauge | 11. Overboard Indicator Light |
| 5. Supply Pump Indicator Light | 12. Auto Control Selector Switch |
| 6. Supply Pump Selector Switch | 13. Auto Control Indicator Light |
| 7. Oil Dump First Stage | |

Figure 2-3. Controls and Indicators, Type A Separator.

2-2. CONTROLS, DESCRIPTION AND USE (Continued).

CONTROLS AND INDICATORS (continued).



- | | |
|--------------------------------|---------------------------------------|
| 1. Inlet Pressure Gauge | 8. Monitor Indicator Light |
| 2. First Stage Pressure Gauge | 9. Oil Dump Second Stage Light/Button |
| 3. Second Stage Pressure Gauge | 10. Monitor Selector Switch |
| 4. Outlet Pressure Gauge | 11. Overboard Indicator Light |
| 5. Supply Pump Indicator Light | 12. Auto Control Selector Switch |
| 6. Supply Pump Selector Switch | 13. Auto Control Indicator Light |
| 7. Oil Dump First Stage | |

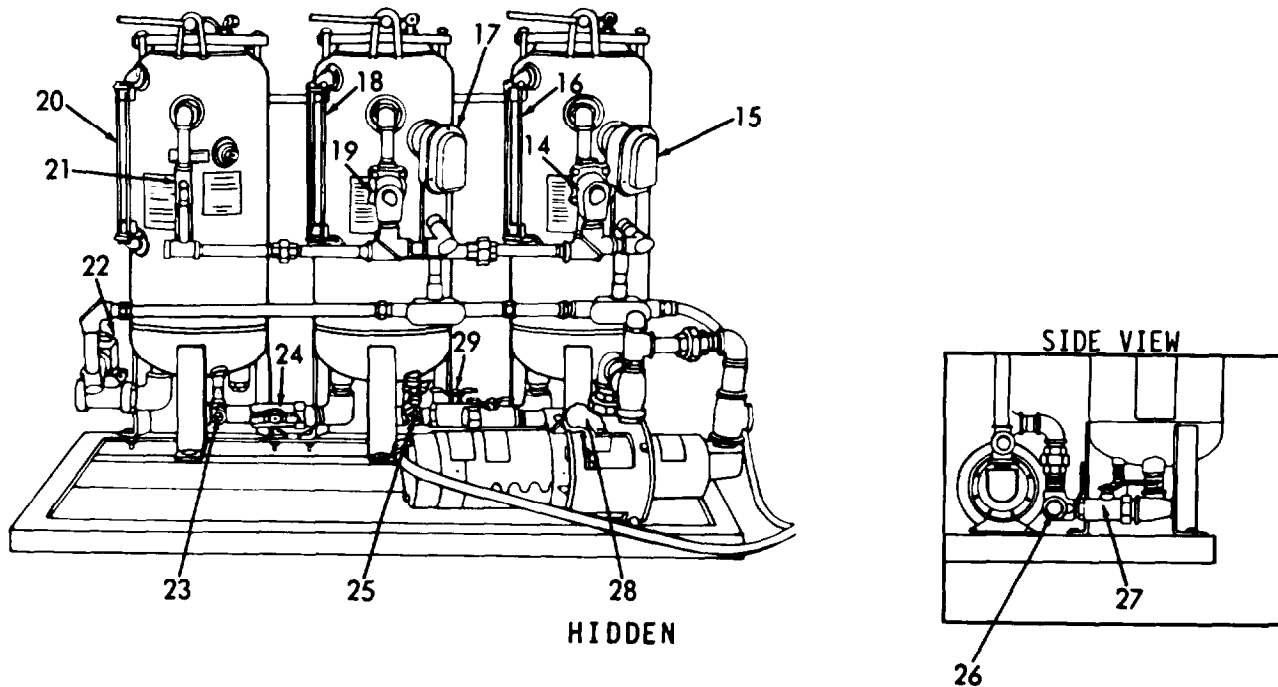
Figure 2-4. Controls and Indicators, Type B Separator.

2-2. CONTROLS, DESCRIPTION AND USE (Continued).**CONTROLS AND INDICATORS (Continued).**

2. 1st Stage Pressure Gauge. Needle points to actual fluid pressure at 1st stage prefilter separator outlet.
3. 2nd State Pressure Gauge. Needle points to actual fluid pressure at 2nd stage separator outlet.
4. 3rd Stage Pressure Gauge. Needle points to actual fluid pressure at 3rd stage separator outlet.
5. Supply Pump Indicator Light. Lights up when pump switch is turned ON.
6. Supply Pump Selector Switch. Switch for turning electrical power ON-OFF for supply pump.
7. Oil Dump First Stage Light/Button. Lights when mini-probe signals solenoid operated discharge valve to open and discharge oil. Provides a push button to depress to test function of mini-probe to open discharge valve.
8. Monitor Indicator Light. Lights up when monitor switch is turned ON.
9. Oil Dump Second Stage Light/Button. Lights when mini-probe signals solenoid operated discharge valve to open and discharge oil. Provides a push button to depress to test function of mini-probe to open discharge valve.
10. Monitor Selector Switch. Switch for turning electric ON-OFF for monitor light.
11. Overboard Indicator Light. Lights up when solenoid operated water discharge valve is opened to discharge water overboard.
12. Auto Control Selector Switch. Switch for turning electric ON-OFF to operate the relays, solenoid valves, and mini-probes.
13. Auto Control Indicator Light. Lights up when control circuit is turned ON.
14. Solenoid Operated Oil Discharge Valve. Valve opens when mini-probe in prefilter separator detects oil and transmits electric signal to valve.

2-2. CONTROLS, DESCRIPTION AND USE (Continued).

CONTROLS AND INDICATORS (continued).



- | | | | |
|-----|--|-----|---|
| 14. | Solenoid Operated Oil Discharge Valve | 21. | Oil Discharge Valve |
| 15. | Mini-probe | 22. | Solenoid Operated Water Discharge Valve |
| 16. | Sight Glass for Prefilter Separator | 23. | Sample/Drain Valve |
| 17. | Mini-Probe Second Stage | 24. | Intervessel Shutoff Valve |
| 18. | Sight Glass for Second Stage Separator | 25. | Sample/Drain Valve |
| 19. | Solenoid Operated Oil Discharge Valve | 26. | Sample/Drain Valve. |
| 20. | Sight Glass for Third Stage Separator | 27. | Shutoff Valve |
| | | 28. | Sample/Drain Valve |
| | | 29. | Intervessel Shutoff Valve |

Figure 2-5. Controls and Indicators, Type A and B Separators.

2-2. CONTROLS, DESCRIPTION AND USE (Continued).

CONTROLS AND INDICATORS (Continued).

15. **Mini-Probe.** Detects presence of oil in prefilter separator. When mini-probe is covered with oil or is in air, an electric signal is transmitted to open prefilter oil discharge valve and close the water discharge valve.
16. **Sight Glass for Prefilter Separator.** Shows amount of oil in separator.
17. **Mini-Probe, Second Stage.** Detects presence of oil in separator. When mini-probe is covered with oil or is in air, an electric signal is transmitted to open second stage oil discharge valve. The second stage mini-probe will override signals from prefilter stage mini-probe. Ensures that only one solenoid operated valve can be open at a given time.
18. **Sight Glass for Second Stage Separator.** Shows amount of oil in separator.
19. **Solenoid Operated Oil Discharge Valve.** Valve opens when mini-probe in second stage separator detects oil and transmits electric signal to valve.
20. **Sight Glass for Third Stage Separator.** Shows amount of oil in separator.
21. **Oil Discharge Valve.** Manually operated valve for releasing oil from 3rd stage separator.
22. **Solenoid Operated Water Discharge Valve.** Normally closed (when solenoid not energized). Opens to allow discharge of clean water when both mini-probe are in water. When either solenoid operated oil discharge valve opens, the water discharge valve closes.
23. **Sample/Drain Valve.** Manually operated valve to drain or sample water in 3rd stage separator.
24. **Intervessel Shutoff Valve.** Manually operated valve to stop flow of fluid between 2nd and 3rd stage separators.
25. **Sample/Drain Valve.** Manually operated valve to drain or sample water in 2nd stage separator.
26. **Sample/Drain Valve.** Manually operated valve to drain or sample water in prefilter separator.

2-2. CONTROLS, DESCRIPTION AND USE (Continued).

CONTROLS AND INDICATORS (Continued).

- 27. **Manual Shutoff Valve.** Manually operated valve to prevent fluid flow to prefilter separator.
- 28. **Sample/Drain Valve.** Manually operated valve to drain or sample water in prefilter separator.
- 29. **Intervessel Shutoff Valve.** Manually operated valve to prevent fluid flow between prefilter separator and second stage separator.

SECTION II.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

2-3 PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

- a. Before you operate. Always keep in mind the WARNINGS and CAUTIONS. This is for your protection. Perform your before (B) PMCS.
- b. While you operate. Always keep in mind the WARNINGS and CAUTIONS. This is for your protection. Perform your during (D) PMCS.
- c. After you operate. Perform your after (A) PMCS.
- d. If your equipment fails to operate, troubleshoot with proper equipment. Record any deficiencies using DA Form 2404. (See figure 2-6.)

NOTE

While the separators are operating, if any defect develops that you think will damage the separators, stop them at once. Shut off power to unit.

- e. Perform Operator's Preventive Maintenance Checks and services in accordance with Table 2-1.

TABLE 2-1. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES
TYPE C AND D SEPARATORS

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

LEGEND

B - Before
D - During

A - After
W - Weekly

M - Monthly

Item No.	Interval					Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	For readiness reporting equipment not ready/available if:
	B	D	A	W	M			
1	●	●				Control panel pressure gauges, tubing	Inspect for damage and proper operation, cracked or severed tubing.	Damaged or defective
2	●	●				Control panel indicator lights	Inspect for cracked or broken glass (plastic), loose connections, proper operation.	Obviously damaged or defective
3	●					Control panel switches	Inspect for loose connections, evidence of overheating, proper operation and obvious damage.	Obviously damaged or defective
4	●					Control panel fuses	Inspect for defective condition corrosion.	Corroded, or defective
5					●	Control panel relay	Inspect for loose connections, overheating, damaged or defective wiring.	Obviously damaged or defective
6					●	Control panel contact sections	Inspect for loose wiring, evidence of overheating, defective or damaged wiring.	Obviously damaged or defective

**TABLE 2-1. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES
TYPE C AND D SEPARATORS - Continued**

Item No.	Interval					Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	For readiness re-reporting equipment not ready/available if:
	B	D	A	W	M			
7					●	Power cable connectors	Inspect for damaged insulation, severed cable, loose or damaged connectors.	Cable or connectors are defective or damaged.
8	●	●				Flow rate indicator	Inspect for cracked or broken metering tube, leaking.	Obviously damaged or leaking
9	●	●				Piping and Fittings	Inspect for leakage.	Leaking
10	●	●				Manually operated valves	Inspect for proper operation and leakage.	Obviously defective or leaking
11	●	●				Supply pump motor	Inspect for loose mounting bolts, loose electrical connections, proper operation.	Obviously damaged or defective
12	●	●				Supply pump	Inspect for loose mounting bolts, proper operation, leakage.	Obviously damaged or leaking
13	●	●				Suction strainer	Inspect for torn mesh, clogged condition or damaged cover gasket.	Obviously torn or clogged
14	●					Vessel cam bar	Inspect for burrs.	-----
15	●					Vessel cover	Inspect for cracks, damage.	Obviously damaged or defective
16	●	●				Vessel sight glass, Fittings	Inspect for cracks, leakage.	Obviously damaged or leaking

TABLE 2-1. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES

TYPE C AND D SEPARATORS - Continued

Item No.	Interval					Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	For readiness reporting equipment not ready/available if:
	B	D	A	W	M			
17					●	Air eliminator valve	Visually inspect tubing for cracks, breaks, loose connections, operable condition. COALESCER ELEMENTS ARE SUBJECT TO CONTAMINATION BY HUMAN HAND	Obvioulsy damaged or defective
18		●			●	Filter elements	Visually inspect for dirt, clogged, or torn condition.	Obviously damaged or defective
19					●	Anodes	Inspect for corrosion and wear.	Obviously corroded or worn
20				●	●	Warning, instruction and identification plates	Inspect for defaced, illegible or loose condition.	-----
21					●	Mounting frames	Inspect for cracks, distortion, breaks.	Condition prevents proper utilization.

TABLE 2-2. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES
TYPE A AND B SEPARATORS

NOTE

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

Legend

B - Before
D - During

A - After
W - Weekly

M - Monthly

Item No.	Interval					Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	For readiness reporting equipment not ready/available if:
	B	D	A	W	M			
1	●	●				Control panel, pressure gauges, tubing	Inspect for damage and proper operation, cracked or severed tubing.	Damaged or defective
2	●	●				Control panel indicator lights	Inspect for cracked or broken glass (plastic), loose connections, proper operation.	Obviously damaged or defective
3	●					Control panel switches	Inspect for loose connections, evidence of overheating, proper operation and obvious damage.	Obviously damaged or defective
4	●					Control panel fuses	Inspect for defective condition, corrosion.	Corroded or defective
5					●	Control panel relay	Inspect for loose connections, overheating, damaged or defective wiring.	Obviously damaged or defective
6					●	Control panel contact sections	Inspect for loose wiring, evidence of overheating, defective or damaged wiring.	Obviously damaged or defective

TABLE 2-2. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES

TYPE A AND B SEPARATORS - Continued

Item No.	Interval					Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	For readiness reporting equipment not ready/available if:
	B	D	A	W	M			
7					●	Power cable connectors	Inspect for damaged insulation, severed cable, loose or damaged connectors.	Cable or connectors are defective or damaged.
8	●	●				Flow rate indicator	Inspect for cracked or broken metering tube, leaking.	Obviously damaged or leaking
9	●	●				Piping, air lines, and fittings	Inspect for leakage.	Leaking
10	●	●				Manually operated valves	Inspect for proper operation and leakage.	Obviously defective or leaking
11	●	●				Supply pump motor	Inspect for loose mounting bolts, loose electrical connections, proper operation.	Obviously damaged or defective
12	●	●				Supply pump	Inspect for loose mounting bolts, proper operation, leakage.	Obviously damaged or leaking
13	●	●				Suction strainer	Inspect for torn mesh, clogged condition, damaged cover gasket.	Obviously torn or clogged
14					●	Vessel cam bar	Inspect for burrs.	-----
15					●	Vessel cover	Inspect for cracks, damage.	Obviously damaged or defective
16	●	●				Vessel sight glass fittings	Inspect for cracks, leakage.	Obviously damaged or defective

TABLE 2-2. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES

TYPE A AND B SEPARATORS - Continued

Item No.	Interval					Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	For readiness reporting equipment not ready/available if:
	B	D	A	W	M			
17					●	Air eliminator valve	Inspect tubing for cracks, breaks, loose connections, operable condition. COALESCER ELEMENTS ARE SUBJECT TO CONTAMINATION BY HUMAN HAND	Obvioulsy damaged or leaking
18	●	●				Filter elements	Inspect for dirt, clogged, or torn condition.	Obviously damaged or defective
19					●	Anodes	Inspect for corrosion and wear.	Obviously corroded or worn
20	●	●				Mini-probe	Inspect for proper operation and leakage.	If defective or leaking
21	●	●				Solenoid operated oil discharge valves	Inspect for proper operation and leakage.	If defective or leaking
22				●	●	Warning, instruction and identification plates	Inspect for defaced, illegible or loose condition.	-----
23					●	Mounting frames	Inspect for cracks, distortion, breaks.	Condition prevents proper utilization.

SECTION III.

OPERATING UNDER USUAL CONDITIONS.

2-4 OPERATING UNDER USUAL CONDITIONS.

- Refer to table 2-3 for scheduled maintenance.
- See figure 2-7 for start up and operating procedures for Type C and D separators.
- See figure 2-8 for start up and operating procedures for Type A and B separators.
- See figure 2-9 for shut down procedures, Type C and D separators.
- See figure 2-10 for shut down procedures, Type A and B separators.

CAUTION

All operators must watch system to make sure supply pump does not run dry - MONITOR OVERBOARD DISCHARGE.

NOTE

Although system operation is automatic, operator is not completely relieved of responsibility of monitoring system while in operation.

TABLE 2-3. SCHEDULED MAINTENANCE INDEX

Frequency	Procedure	Reference
When filter element becomes clogged with particles and the differential pressure reaches 30 psi (2109.2 gm sq cm).	Replacement of filter element	Paragraph 3-38

Table 2-3. Scheduled Maintenance Index - Continued

<u>Frequency</u>	<u>Procedure</u>	<u>Reference</u>
Periodically (once each hour) during system operation. Frequency dependent on level of solid contaminants in fluid.	Differential pressure calculation	Paragraph 3-38
As required.	Adjustment of pressure relief valve	Paragraph 3-32
As required	Removal and cleaning of air eliminator valve	Paragraph 3-37
As required	Cleaning flow rate indicator	Paragraph 3-21

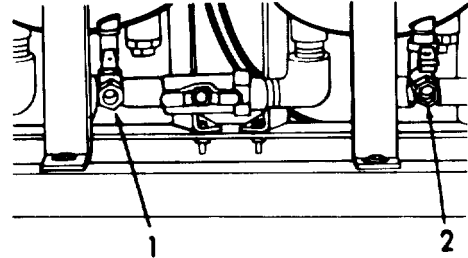
2-4. OPERATING UNDER USUAL CONDITIONS (Continued).

PRESTART CHECKS

NOTE

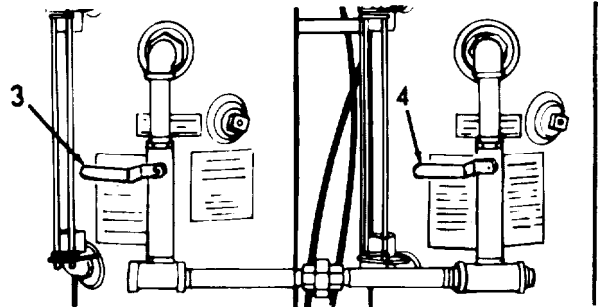
Different type boats may have an additional remote switch that must be turned on.

- A. Close the following valves located at the base of each stage.



- 1. Sample/Drain Valve
 - 2. Sample/Drain Valve
- A

- B. Close the following valves located on the vessels.

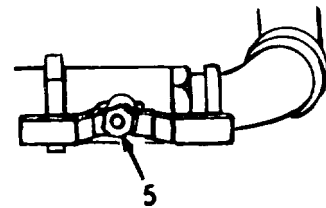


- 3. Oil Discharge Valve
 - 4. Oil Discharge Valve
- B

- C. Close this valve located on the separator system inlet line.

NOTE

Open all valves located between the bilge and pump inlet line.



- 5. Bypass Valve
- C

Figure 2-7. Start-up and Operating Procedures, Type C and D Separators (Sheet 1 of 4).

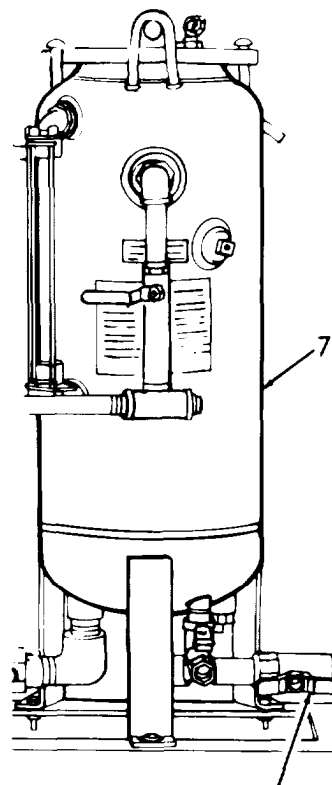
2-4 OPERATING UNDER USUAL CONDITIONS (Continued).

PRESTART CHECKS (Continued).

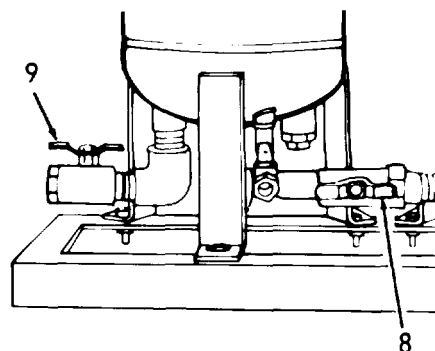
D. Open the inlet valve located on the inlet line to the prefilter separator.

E. Open the intervessel shutoff valve located between the 1st (pre-filter) and 2nd stages

Open the water discharge valve at base of 2nd stage.



- 6. Inlet Valve
- 7. Prefilter Separator



- 8. Intervessel Shutoff Valve
- 9. Water Discharge Valve

Figure 2-7. Start-up and Operating Procedures, Type C and D Separators (Sheet 2 of 4).

2-4. OPERATING UNDER USUAL CONDITIONS (Continued).

TO START

NOTE

DO NOT allow the oil level to drop more than 1-inch (2.54 cm) down the sight glass before draining. The efficiency of the coalescing process is reduced if the filter element becomes immersed in oil.

- A. Turn the supply pump selector switch to ON.

- B. Drain oil from each stage when oil level is first visible in sight glass by:
 - 1. Opening the oil discharge valve on either the 1st (prefilter) or 2nd stage.

NOTE

Allow the oil to discharge for approximately one to two seconds after the oil disappears from the sight glass before closing the oil discharge valve.

- 3. Open the Water Discharge Valve and close the Oil Discharge Valve after the oil has drained from the vessel.

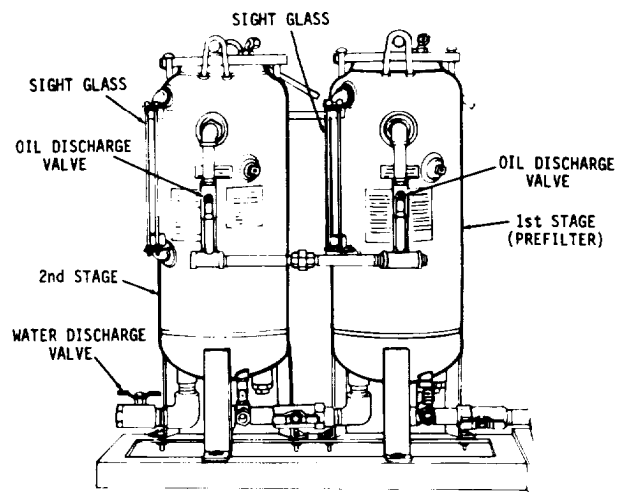
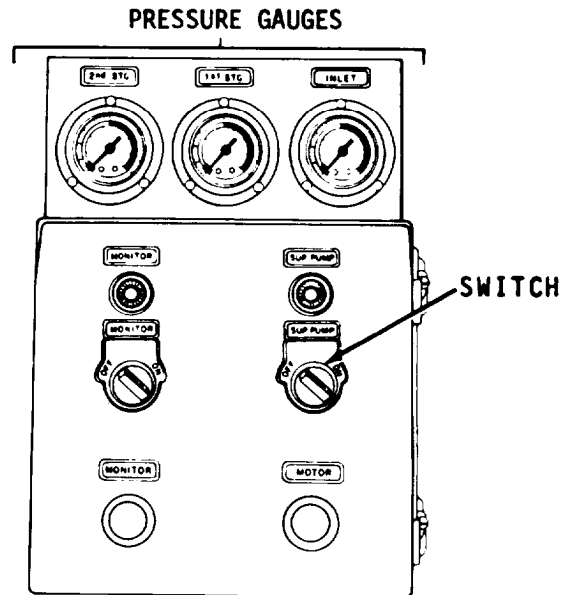
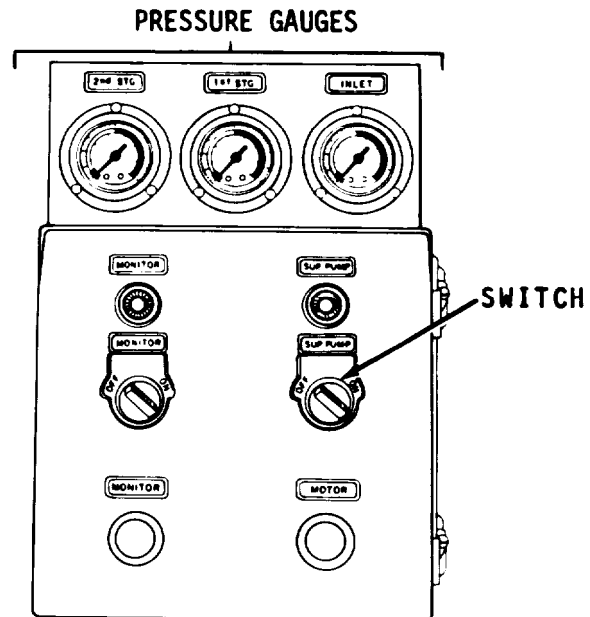


Figure 2-7. Start-up and Operating Procedures, Type C and D Separators (Sheet 3 of 4).

2-4. OPERATING UNDER USUAL CONDITIONS (Continued).

TO START (Continued).

C. Observe the pressure on the pressure gauges at regular intervals for differential pressure build-up. Refer to paragraph 3-38, Differential Pressure Calculation.



D. Change the filter element in the 1st or 2nd stage separators when the differential pressure reaches 30 psid (2109.2 gm sq cm) on the 1st (Prefilter) stage or 25 psid (1757.7 gm sq cm) on the second stage.

NOTE

A rapid rise in the differential pressure for the first stage (pre-filter) indicates that the filter element is being blocked by solid contaminants.

Figure 2-7. Start-up and Operating Procedures, Type C and D Separators (Sheet 4 of 4).

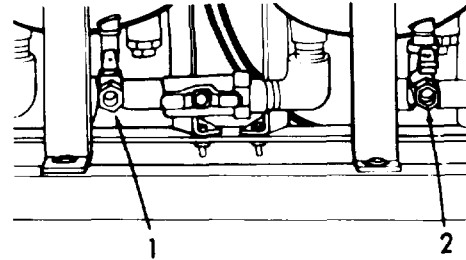
2-4. OPERATING UNDER USUAL CONDITIONS (Continued).

PRESTART CHECKS

NOTE

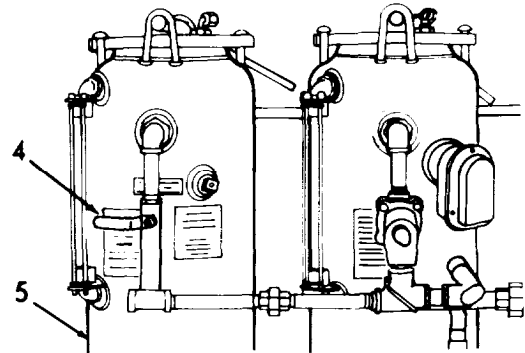
Different type boats may have an additional remote switch that must be turned on.

A. Close the following valves located at the base of each stage.



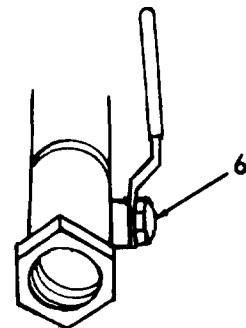
- 1. Sample/drain valve
 - 2. Sample/drain valve
 - 3. Sample/drain valve
- A

B. Close this valve located on 3rd stage vessel.



- 4. Oil discharge valve
 - 5. 3rd Stage Vessel
- B

C. Close this valve located on the bypass outlet at pump.



- 6. Manual shutoff valve
- C

NOTE

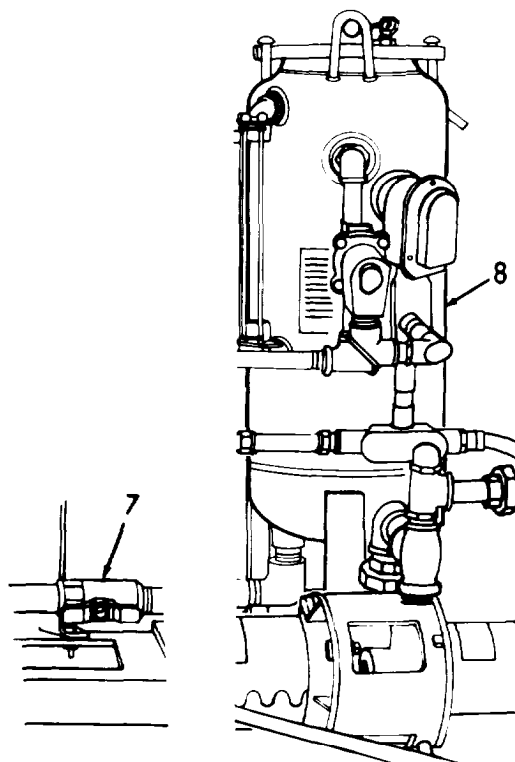
Open all valves located between the bilge and pump inlet line.

Figure 2-8. Start-up and Operating Procedures, Type A and B Separators (Sheet 1 of 5).

2-4. OPERATING UNDER USUAL CONDITIONS (Continued).

PRESTART CHECKS (Continued).

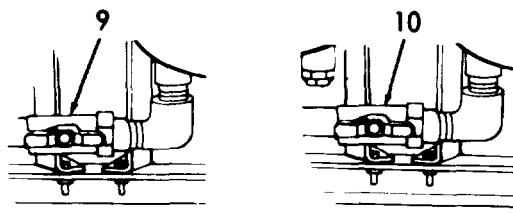
D. Open the shutoff valve on the inlet line to prefilter separator.



- 7. Manual shutoff valve.
- 8. Prefilter separator.

D

E. Open the innervessel shutoff valves located between the 1st and 2nd stages and 2nd and 3rd stages.



- 9. Manual innervessel shutoff valve, 1st (prefilter) and 2nd stage.
- 10. Manual intervessel shutoff valve, 2nd and 3rd stage.

E

Figure 2-8. Start-up and Operating Procedures, Type A and B Separators (Sheet 2 of 5).

2-4. OPERATING UNDER USUAL CONDITIONS (Continued).

TO START

CAUTION

Unusually high reading on pressure gauges may indicate improper startup procedures.

- A. Place auto controls selector switch in ON position.

- B. Place supply pump selector switch in the ON position. The system is now operating in automatic mode. Oil extracted from the water will be automatically discharged from the first (prefilter) and second stage separators when sufficient oil has accumulated in the top of each vessel to cover the mini-probe. If oil is observed in the sight glass of the third stage vessel, it is removed manually by opening the oil discharge valve. The presence of oil in the third stage vessel, as observed in the sight glass could be an indication of a ruptured filter coalescer element in the second stage or leakage around seals at either end of the element.

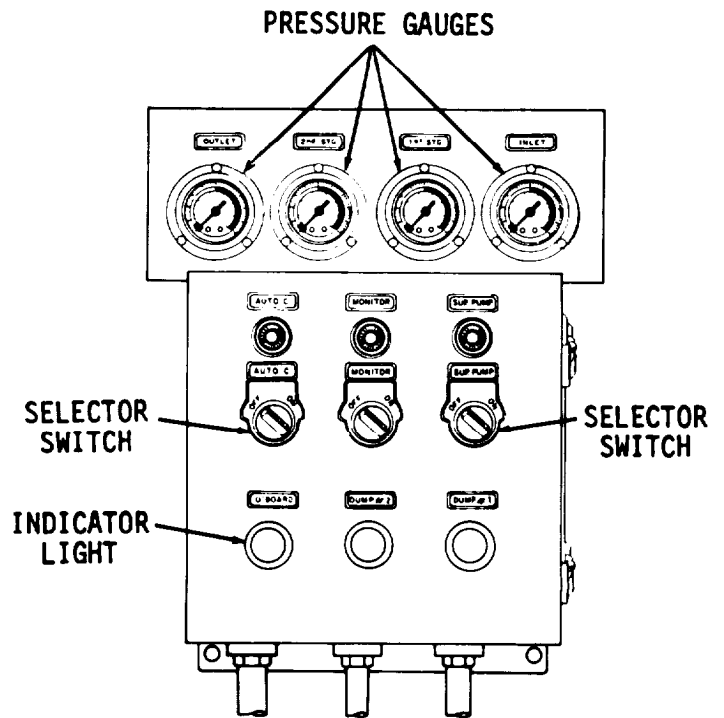


Figure 2-8. Start-up and Operating Procedures, Type A and B Separators (Sheet 3 of 5).

2-4. OPERATING UNDER USUAL CONDITIONS (Continued).

TO START (Continued).

- C. Observe the pressure on the pressure gages at regular intervals for differential pressure buildup. Refer to Paragraph 3-38, Differential Pressure Calculations.

NOTE

A rapid rise in the differential pressure for the first stage (pre-filter) indicates that the filter element is being blocked by solid contaminants.

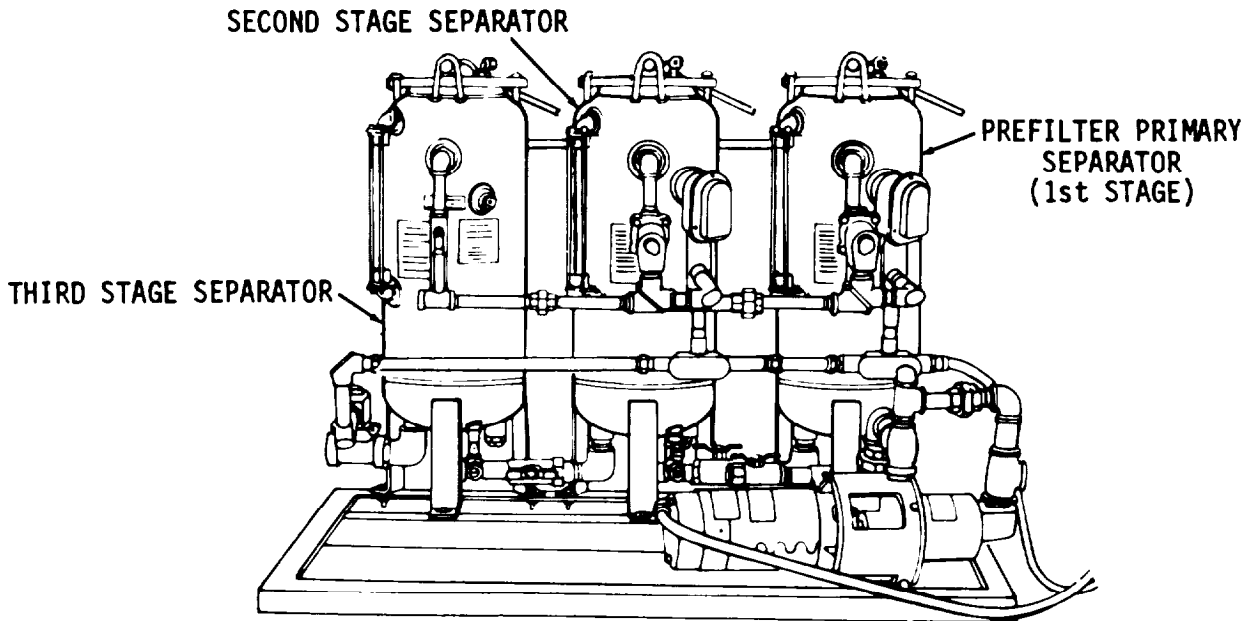
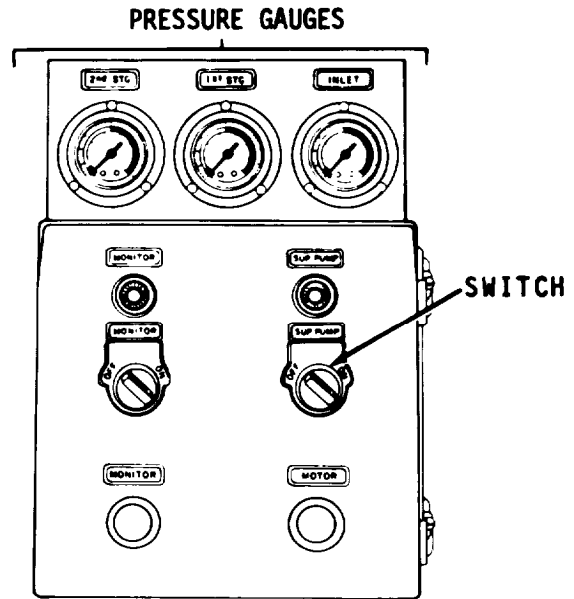


Figure 2-8. Start-up and Operating Procedures, Type A and B Separators (Sheet 4 of 5).

2-4. OPERATING UNDER USUAL CONDITIONS (Continued).

TO START (Continued).

- D. Change the filter elements in the first (prefilter), second, or third stage separators when a pressure differential of 30 psid (2109.2 gm sq cm) is observed. Refer to paragraph 3-38, Replacement of filter elements.

NOTE

An adjustable pressure relief valve set at 45 psig (3163.8 gm sq cm) is provided at the outlet from the pump to protect the system from overpressure caused by clogged filters, valve malfunction, or other causes. Refer to paragraph 3-32, Adjustment of Pressure Relief Valve.

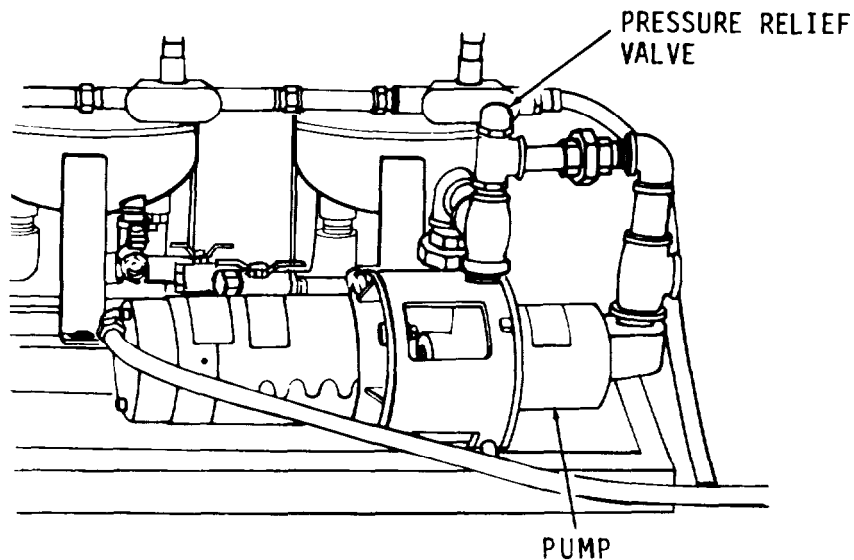
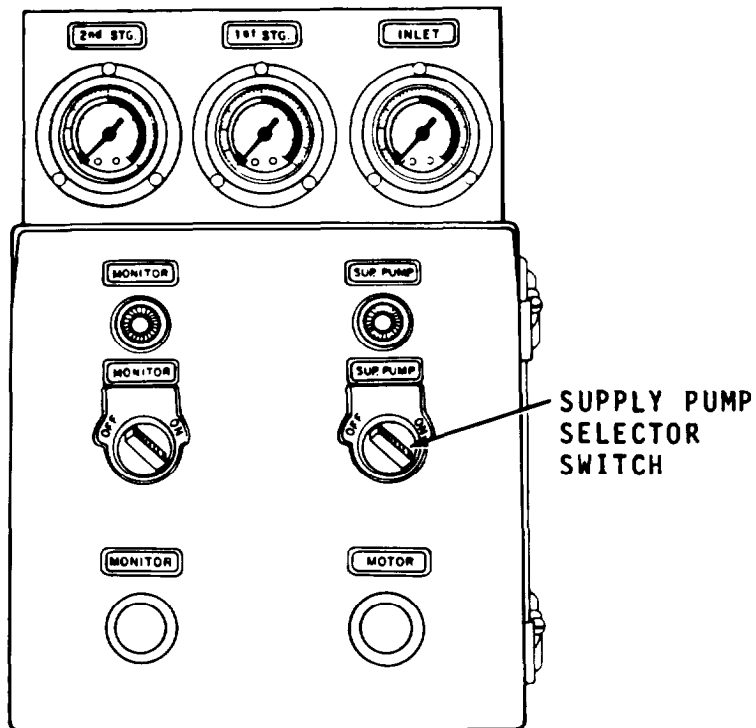


Figure 2-8. Start-up and Operating Procedures, Type A and B Separators (Sheet 5 of 5).

2-4. OPERATING UNDER USUAL CONDITIONS (Continued)

TO SHUT DOWN SYSTEM - TYPE C AND D SEPARATORS.

- A. Place supply pump selector switch in OFF position.



- B. Close water discharge Valve.

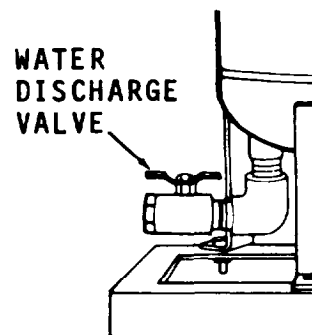


Figure 2-9. How to Shut Down System - Type C and D Separators.

2-4. OPERATING UNDER USUAL CONDITIONS (Continued).

TO SHUT DOWN SYSTEM - TYPE A AND B SEPARATORS.

- A. Place supply pump selector switch on control panel in OFF position.
- B. Place auto controls selector switch on control panel in OFF position.

CAUTION

Be sure auto control selector switch is in OFF position to prevent system drainage and to close electrically operated valves.

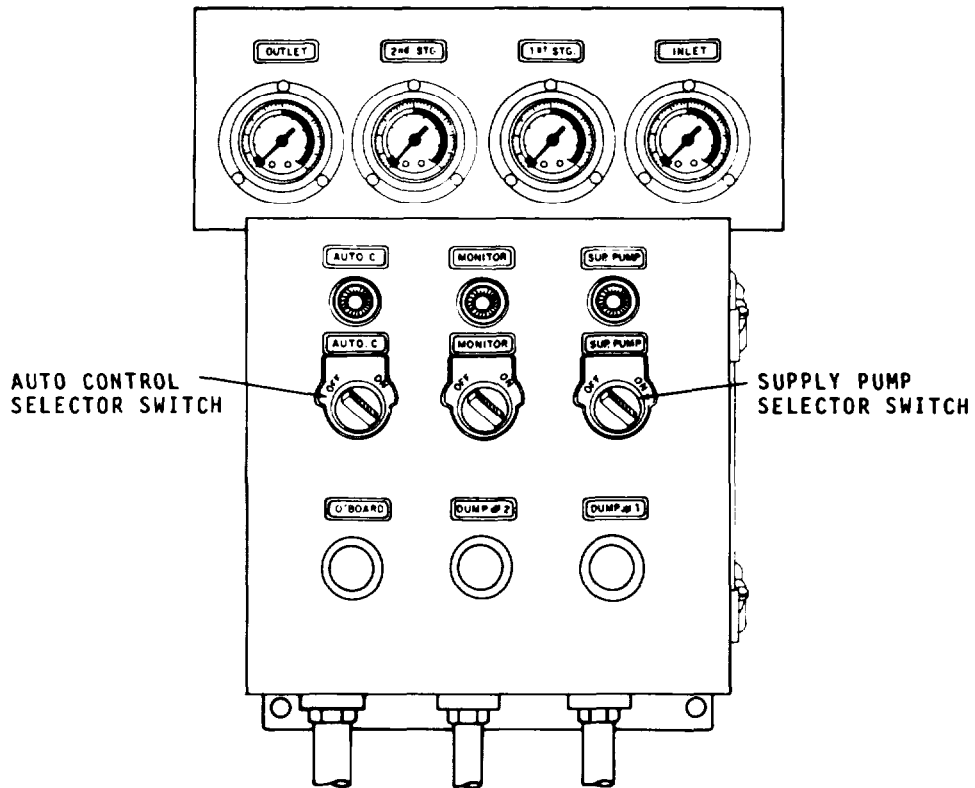
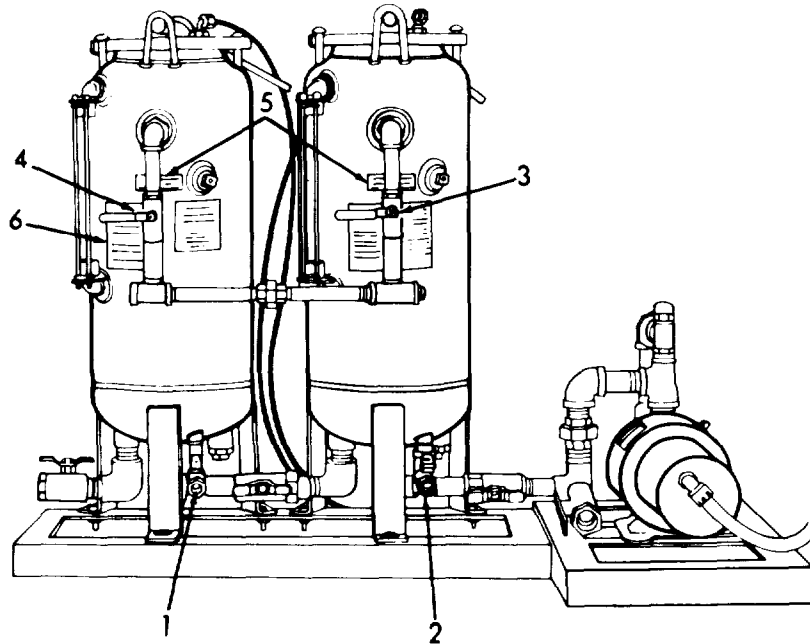


Figure 2-10. How to Shut Down System - Type A and B Separators.

2-5. OPERATING INSTRUCTIONS ON DECALS AND INSTRUCTIONS PLATES.

- See Figure 2-11 and 2-12 for location of decals, instruction, and identification plates, Type C and D Separators.
- See Figure 2-13 and 2-14 for location of decals, instruction, and identification plates, Type A and B Separators.

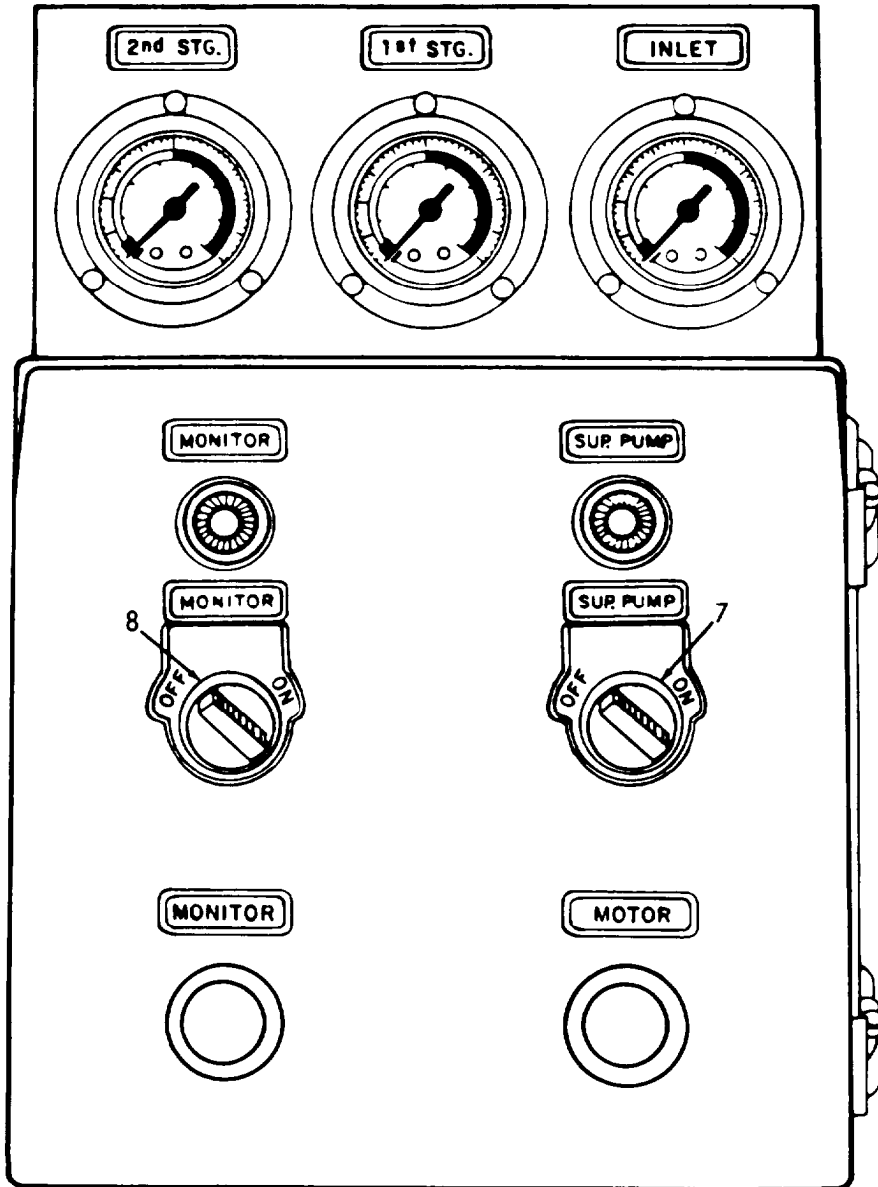
2-5. OPERATING INSTRUCTIONS ON DECALS AND INSTRUCTION PLATES
(Continued).



1. Sample/Drain Valve. Turn handle 90° left to close, 90° right to open.
2. Sample/Drain Valve. Turn handle 90° left to close, 90° right to open.
3. Oil Discharge Valve. Turn handle 90° left to close, 90° right to open.
4. Oil Discharge Valve. Turn handle 90° left to close, 90° right to open.
5. Open valve only to discharge oil.
6. Filter element instructions:
 - a. Replace prefilter element Type II when differential pressure reaches 30 PSID (2109.2 GM SQ CM).
 - b. Replace filter-coaleszer element when differential pressure reaches 25 PSID (1747.7 GM SQ CM).
7. Supply Pump Switch. Turn knob right for ON, left for OFF.
8. Monitor Switch. Turn knob right for ON, left for OFF.

Figure 2-11. Location of Decals, Instruction, and Identification Plates, Type C and D Separators.

2-5. OPERATING INSTRUCTIONS ON DECALS AND INSTRUCTIONS PLATES
(Continued).

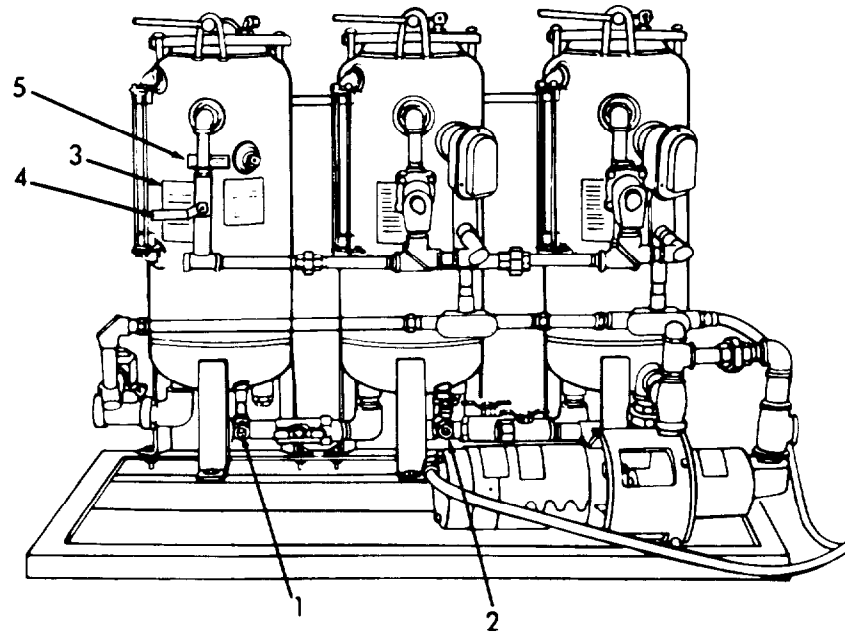


7. Supply Pump Switch

8. Monitor Switch

Figure 2-12. Location of Decals, Instruction, and Identification Plates, Type C and D Separators.

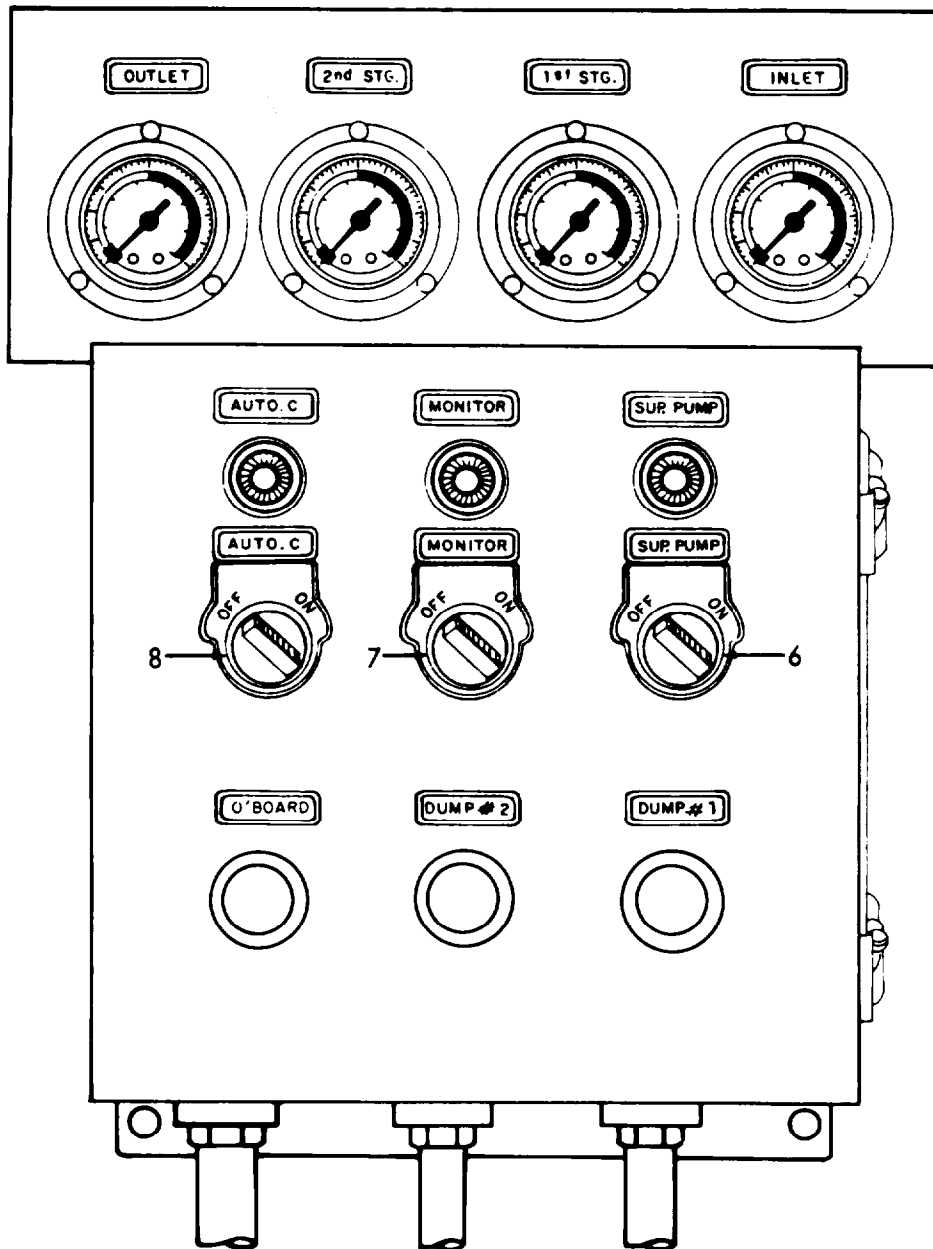
2-5. OPERATING INSTRUCTIONS ON DECALS AND INSTRUCTIONS PLATES
(Continued).



1. Sample/Drain Valve. Turn handle 90° left to close, 90° right to open.
2. Sample/Drain Valve. Turn handle 90° left to close, 90° right to open.
3. Oil Discharge Valve. Turn handle 90° left to close, 90° right to open.
4. Filter element instructions:
 - a. Replace prefilter element Type II when differential pressure reaches 30 PSID (2109.2 GM SQ CM).
 - b. Replace filter-coalescer element when differential pressure reaches 25 PSID (1757.7 GM SQ CM).
5. Open valve only to discharge oil.

Figure 2-13. Location of Decals, Instruction, and Identification Plates, Type A and B Separators

2-5. OPERATING INSTRUCTIONS ON DECALS AND INSTRUCTIONS PLATES
(Continued).



- 6. Supply Pump Switch. Turn knob right for ON, left for OFF.
- 7. Monitor Switch. Turn knob right for ON, left for OFF.
- 8. Auto Controls Switch. Turn knob right for ON, left for OFF.

Figure 2-14. Location of Decals, Instruction, and Identification Plates, Type A and B Separators

SECTION IV.
OPERATING UNDER UNUSUAL CONDITIONS.

2-6. OPERATING UNDER UNUSUAL CONDITIONS.

EXTREME COLD:

a. Precautions

(1) Open all drain valves, drain system, sight glass and pump. (Refer to paragraph 3-40 for procedures).

(2) After operation, remove filter elements to prevent bursting from freezing.

WARNING

Coalescer filter elements are subject to contamination by human hand. Handle by end caps only. For disposal, place in plastic bag and mark for petroleum waste disposal.

(3) Replace vessel covers when not in use.

CHAPTER 3

OPERATORS MAINTENANCE INSTRUCTIONS

	Page
● Overview	3-1
● Lubrication Instructions	3-1
● Troubleshooting	3-1
● Maintenance Procedures	3-43

3-1. OVERVIEW

This chapter contains instructions for troubleshooting and maintenance that are the responsibility of the operator.

SECTION I.

LUBRICATION INSTRUCTIONS.

3-2. LUBRICATION.

There are no lubrication instructions for the operator.

SECTION II.

TROUBLESHOOTING.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES.

CAUTION

After Oil-Water Separator has been installed, use only cleaning solution NSN 7930-01-019-7941 (Appendix C, Item No. 1) or equal in machine and bilge spaces. Use in weakest mix that will do the job. Strong solution with water can shorten the life of the Coalescer element.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

The table lists the common malfunctions which you may find during the operation or maintenance of the oil-water separator. You should perform the test/inspections and corrective actions in the order listed.

This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

See tables 3-1, 3-2, 3-3, 3-4, or 3-5 for your type separator.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-1. Operators Troubleshooting Chart Type C and D Separators

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Air eliminator valve leaks fluid.	Step 1. Check for dirt or debris in air eliminator.	Clean air eliminator valve per paragraph 4-27.
	Step 2. Inspect for defective plunger O-ring seal.	Replace per paragraph 4-27.
	Step 3. Inspect for bent float pins.	Straighten pins.
2. Pressure differential builds rapidly on second coalescer stage.	Step 1. Prefilter elements not sealing properly.	Realign elements on striker plate and retighten.
	Step 2. Check for ruptured prefilter element.	Replace element per paragraph 3-38.
3. Pump motor will not start.	Step 1. Check ON-OFF switch.	Place in ON position to check switch.
	Step 2. Inspect for defective fuse with switch in OFF position.	Replace per paragraph 3-7.
	Step 3. Check for loose wiring or connections.	Tighten with switch in OFF position.
	Step 4. If motor still will not start.	Report condition to Organizational Maintenance.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-1. Operators Troubleshooting Chart Type C and D Separators (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
4. Motor runs and kicks out.	Step 1. Review prestart checks.	Properly align system.
	Step 2. Check for excessive discharge pressure: Is prefilter element clogged? Is discharge line obstructed?	Replace element per paragraph 3-38. Remove obstruction.
	Step 3. Inspect for loose connections.	Tighten.
	Step 4. Check for improper ventilation.	Increase ventilation.
5. Pump fails to pump or prime.	Step 1. Check for closed valve in suction line.	Open closed valve.
	Step 2. Inspect for clogged or leaking strainer on inlet line.	Clean strainer per paragraph 3-29.
	Step 3. Inspect for broken flexible joint.	Report to General Support Maintenance.
	Step 4. Pump still fails to operate.	Report condition to General Support Maintenance.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-1. Operators Troubleshooting Chart Type C and D Separators (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Pump overloads.	Step 1. Check for excessive discharge pressure caused by clogged filter in 1st stage (prefilter).	Replace element per paragraph 3-38.
	Step 2. Check for obstruction in discharge line.	Remove obstruction.
7. Pump noisy.	Step 1. Check for loose mounting bolts.	Tighten.
	Step 2. Check for lack of suction.	Remove obstruction in strainer or suction line.
	Step 3. Check for worn flexible joint.	Report condition to General Support Maintenance.
	Step 4. Pump still noisy.	Report condition to General Support Maintenance.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-2. Operators Troubleshooting Chart for Oil-Water Separator, Type A and B

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

-
1. Unable to discharge water overboard or water discharge valve remains closed.
 - Step 1. Are switches ON?

Place auto control and supply pump switches in ON position.
 - Step 2. Inspect for defective fuse.

Replace fuse per paragraph 3-7.
 - Step 3. Inspect for loose electrical connections.

Tighten with switch OFF.
 - Step 4. Test for defective mini-probe. Refer to table 3-4 or 3-5, test procedures 2 and 3.

Replace defective mini-probe per paragraph 3-46.
 - Step 5. Test for defective solenoid on water discharge valve. Refer to table 3-4 or 3-5, test procedure 4.

Replace defective solenoid per paragraph 3-46.
 - Step 6. Test for defective transistor on circuit board. Refer to table 3-4 or 3-5, test procedure 2 and 3.

Replace defective circuit board per paragraph 3-14. Evacuate defective circuit board to General Support Maintenance.
 2. Oil discharge valve closes before sufficient oil is discharged or remains open and allows oil level to drop too low in sight glass.

NOTE

Too low is below point mini-probe is installed on vessel.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-2. Operators Troubleshooting Chart for Oil-Water Separator, Type A and B (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
Step 1.	Check electrical circuit: Is main power source on? Are there any loose connections?	Turn on main power. Tighten loose connections.
Step 2.	Inspect for blockage in oil discharge line.	Remove blockage.
Step 3.	Test for defective mini-probe. Refer to table 3-4 or 3-5, test procedure 2 and 3.	Replace defective mini-probe per paragraph 3-24.
Step 4.	Test for defective solenoid operated oil discharge valve. Refer to table 3-4 or 3-5, test procedure 4.	Replace defective valve per paragraph 3-24.
Step 5.	Check for defective capacitor (C1) in timing circuit.	Replace printed circuit board. Refer to paragraph 3-14. Evacuate defective circuit board to General Support Maintenance.
Step 6.	Check for defective capacitor (C2) in timing circuit.	Replace printed circuit board. Refer to paragraph 3-14. Evacuate defective circuit board to General Support Maintenance.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-2. Operators Troubleshooting Chart for Oil-Water Separator, Type A and B (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
3. Water discharge valve does not close when either of the solenoid operated oil discharge valves open	Step 1. Inspect for dirt or obstruction in solenoid valve.	Disassemble and clean valve per paragraph 3-46.
	Step 2. Check for defective diodes (CR2 or CR3) on printed circuit board.	Replace printed circuit board. Refer to paragraph 3-14. Evacuate circuit board to General Support Maintenance.
4. Solenoid operated oil discharge valves remain open or open at same time.	Step 1. Test for defective mini-probe. Refer to table 3-4 or 3-5, test procedures 2 and 3.	Replace defective mini-probe per paragraph 3-24.
	Step 2. Inspect for dirt or obstruction in valve.	Disassemble and clean valve per paragraph 3-24.
	Step 3. Check for defective diode (CR1) on printed circuit board.	Replace printed circuit board. Refer to paragraph 3-14. Evacuate circuit board to General Support Maintenance.
5. Electrically operated valves remain closed.	Step 1. Check for loss of electric power.	Place auto control and supply pump switches in ON position.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-2. Operators Troubleshooting Chart for Oil-Water Separator, Type A and B (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	Step 2. Inspect for defective fuse.	Replace fuse per paragraph 3-7.
	Step 3. Inspect for loose connections.	Tighten with power OFF.
	Step 4. Test for defective mini-probe. Refer to table 3-4 or 3-5, test procedures 2 and 3.	Replace defective mini-probe per paragraph 3-24 or 3-48.
	Step 5. Test for defective solenoid on water and oil discharge valves. Refer to table 3-4 or 3-5, test procedure 4.	Replace defective solenoid per paragraph 3-46.
	Step 6. Test for defective transistor on circuit board. Refer to table 3-4 or 3-5, test procedure 2 and 3.	Replace defective circuit board per paragraph 3-14 or 3-17. Evacuate circuit board to General Support Maintenance.
6. Air eliminator valve leaks fluid.	Step 1. Inspect for dirt or debris in valve.	Clean valve per paragraph 3-37.
	Step 2. Inspect for defective O-ring seal.	Replace defective seal per paragraph 3-37.
	Step 3. Inspect for bent float pins.	Straighten.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-2. Operators Troubleshooting Chart for Oil-Water Separator, Type A and B (Continued).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
7. Pressure differential builds rapidly on second coalescer stage.	Step 1. Inspect prefilter element for proper seating.	Realign element on striker plate and tighten.
	Step 2. Inspect for ruptured or clogged prefilter element.	Replace element per paragraph 3-38.
8. Pressure differential builds rapidly on third coalescer stage.	Step 1. Inspect prefilter element for proper seating	Realign element on striker plate and tighten.
	Step 2. Inspect for ruptured or clogged prefilter element.	Replace element per paragraph 3-38.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-3. Operators Troubleshooting Chart for Pump and Motor, Type A and B Separators

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

1. Motor will not start.

Step 1. Check power supply: Are cable connections tight? Is wiring tight?

Turn on main power. Place pump selector switch in ON position. Tighten loose connections with power OFF.

Step 2. Test for defective part on printed circuit board. Refer to table 3-4 or 3-5, test procedures 2, 3, and 4.

Replace defective printed circuit board per paragraph 3-14 or 3-17. Evacuate circuit board to General Support Maintenance.

2. Motor runs but kicks out.

Step 1. Review prestart checks.

Properly align system

Step 2. Inspect prefilter element for clogged condition.

Replace element per paragraph 3-38.

Step 3. Inspect discharge line for obstruction.

Remove obstruction.

Step 4. Check for obstructions around motor that blocks air flow.

Remove obstructions.

3. Pump will not pump or prime

Step 1. Is valve closed in suction line?

Open valve.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-3. Operators Troubleshooting Chart for Pump and Motor, Type A and B Separators (Continued).

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

	Step 2.	Inspect for clogged strainer on suction side and air leaks.	Clean strainer per paragraph 3-29. stop leaks.
	Step 3.	Inspect for broken flexible joint.	Report condition to General Support Maintenance.
	Step 4.	Inspect for torn stator.	Report condition to General Support Maintenance.
4.	Pump overloads.		
	Step 1.	Inspect prefilter element for clogged condition.	Replace filter element.
	Step 2.	Inspect discharge line for obstruction.	Remove obstruction.
5.	Noisy pump.		
	Step 1.	Check for obstruction in bilge suction line.	Remove obstruction.
	Step 2.	Inspect for loose mounting bolts.	Tighten.
	Step 3.	Is flexible joint loose or worn?	Tighten if loose. If worn report condition to General Support Maintenance.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-3. Operators Troubleshooting Chart for Pump and Motor, Type A and B Separators (Continued).

MALFUNCTION

TEST OR INSPECTION

CORRECTIVE ACTION

6. Leaking seal.

Step 1. Inspect seal for cracks.

Report condition to General Support Maintenance.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-4. Test Procedures for Electrical and Electronic Components, Type A Separators



Electrical checks and troubleshooting should be performed only by a fully qualified electrician. Check that all electrical components are dry and free of moisture before making electrical checks.

NOTE

Use a multi-meter.

Refer to Figure 3-1 for electronic components and test point locations for type A Separator.

Numbers in parentheses in text refer to callouts on figure 3-2.

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
1. To verify 24 VDC output of power supply: A. Open control panel (1) and, B. Connect a test meter across terminal contacts 8 and 9 on terminal board TB1	24	1. Auto controls switch (2) and internal power are on, supply pump switch (3) is off.	1. If there is no output power, check that internal power is on. Electrical input lines should be connected properly. There should be no loose or broken wires. Check that the 1-amp fast blow fuse is not defective. 230 VAC internal input power can be read across terminal contacts 14 and 17. Replace the

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-4. Test Procedures for Electrical and Electronic Components, Type A Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
1. (Continued)			lamp in the auto controls indicator light (4) if a reading of 24 VDC was obtained, but the indicator did not light. Refer to paragraph 3-10 for lamp replacement.
2. Verify the operation of the first stage (pre-filter) mini-probe (5) and the printed circuit board:		2. Internal power and auto controls switch (2) are on: pump switch (3) off; both mini-probe (5, 6) immersed in water	2. The normal operation of the mini-probe is to transmit a 24 VDC signal. The signal opens the solenoid operated oil discharge valve. It closes the solenoid operated water discharge valve when it senses oil or air. The mini-probe should be replaced if a signal is generated while it is in water. The mini-probe should be replaced if a signal is not transmitted when the first (prefilter) stage oil dump light/button (7) does not light when it is depressed.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-4. Test Procedures for Electrical and Electronic Components, Type A Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
2. (Continued)			A malfunction in the printed circuit board is indicated when the mini-probe generated signal is not relayed to the solenoid valve.
A. Connect the test meter leads to terminal contacts 1 and 8 on Terminal Board TB1	0		Refer to paragraph 3-49 for mini-probe replacement.
B. Connect the test meter leads to terminal contacts 1 and 3. Depress the No. 1 (prefilter) oil dump light/button (7). This grounds the mini-probe test terminal.	24		A. Replace the mini-probe (5) if a zero reading is not obtained on the test meter. Refer to paragraph 3-49 for replacement of mini-probe.
			B. Depressing the No. 1 oil dump light/button (7) will cause the mini-probe to generate a signal.
			This lights the first stage (prefilter) oil dump light (7). The first stage (prefilter) solenoid operated oil discharge valve (8) opens. The solenoid operated

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-4. Test Procedures for Electrical and Electronic Components, Type A Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
2. (Continued)			water discharge valve (9) closes. The overboard discharge light (10) goes out. Replace the mini-probe (5) if a 24 +5 VDC reading is not obtained. Refer to paragraph 3-49 for replacement of mini-probe.
2. C. Connect the test meter leads to contacts 5 and 9. Depress the No. 1 (prefilter) oil dump light/button (7). Next connect the test meter leads to contacts 7 and 9. Depress the No. 1 (prefilter) oil dump light/button (7).	24 0		C. A 24 VDC read-out between contacts 5 and 9 indicates the first (prefilter) stage oil discharge valve (8) and the No. 1 (prefilter) oil dump light/button (7) are receiving a signal from mini-probe (5). The printed circuit board is also functioning properly.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-4. Test Procedures for Electrical and Electronic Components, Type A Separators (Continued).

Test	Procedure	Meter Reading (VDC)	Test Conditions	Remarks
2.	(Continued)			<p>A zero read out between contacts 7 and 9 indicates the water discharge valve (9) and circuit board are functioning properly.</p> <p>Replace circuit board if output between contacts 5 and 9 is less than 24 + 5 VDC, or greater than 0 volts between contacts 7 and 9.</p> <p>Refer to paragraph 3-17 for circuit board replacement. If output between contacts 5 and 9 is 24 VDC but the first stage (prefilter) oil discharge valve (8) does not open, then check the valve and solenoid coil per paragraph 3-24, disassembly of solenoid valve and test procedure 4 below.</p>

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-4. Test Procedures for Electrical and Electronic Components, Type A Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
2. (Continued)			<p>If output between contacts 7 and 9 is 0 volts and the water discharge valve (9) does not close, check the valve per para 3-24, disassembly of solenoid valve.</p> <p>A built-in time delay of approximately 2-3 seconds will hold the first stage (prefilter) oil discharge valve (8) open after the mini-probe signal terminates.</p>
3. To verify the operation of the No. 2 stage mini-probe (6) and the printed circuit board:		<p>3. Internal power and auto controls switch (2) are on. Pump switch (3) is off. No. 2 stage mini-probe (6) in water. First (prefilter) stage mini-probe (5) in water, oil or air.</p>	<p>3. Refer to remarks for test procedure 2. The No. 2 oil dump light/button (11) when depressed activates the No. 2 mini-probe (6).</p>

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-4. Test Procedures for Electrical and Electronic Components, Type A Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
3. (Continued)			
A. Connect the test meter leads to terminal contacts 3 and 8 on Terminal Board TB1.	0		A. Replace mini-probe (6) if a zero voltage reading is not obtained on the test meter. Refer to para 3-49 for replacement of mini-probe.
B. Connect the test meter leads to terminal contacts 3 and 8. Depress the No. 2 oil dump light/button (11) thereby grounding the mini-probe test terminal.	24		B. Depressing the oil dump No. 2 light/button (11) will cause the mini-probe to generate a signal. The No. 2 oil dump light/button (11) will illuminate. The second stage solenoid operated oil discharge valve (12) will open. The solenoid operated water discharge valve (9) will close. The overboard discharge light (10) will go out. Replace the mini-probe (6) if a 24 + VDC reading is not obtained.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-4. Test Procedures for Electrical and Electronic Components, Type A Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
3. (Continued)			Refer to paragraph 3-49 for replacement of mini-probe.
C. Connect the test meter leads first to contacts 6 and 9. Depress the oil dump No. 2 light/button (11)	24		C. A 24 VDC read out between contacts 6 and 9 indicates that the second stage oil discharge valve (12) and the oil dump No. 2 light/button (11) are receiving a signal from the mini-probe (6). Also the printed circuit board is functioning properly.
Connect the test meter leads to contacts 7 and 9 and again depress the oil dump No. 2 light button (11).	0		A zero readout between contacts 7 and 9 indicates the water discharge valve (9) and circuit board are functioning properly.
			Replace the circuit board if output between contacts 6 and 9 is less than 24 + VDC or greater than 0 volts between contacts 7 and 9.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-4. Test Procedures for Electrical and Electronic Components, Type A Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
3. (Continued)			<p>Refer to paragraph 3-17 for circuit board replacement. If the output between contacts 6 and 9 is 24 VDC but the second stage oil discharge valve (12) does not open, then check the valve and solenoid coil per paragraph 3-24, discharge assembly of solenoid valve, and test procedure 4 below.</p> <p>If output between contacts 7 and 9 is 0 volts and the water discharge valve (9) does not close, check the valve per paragraph 3-24, disassembly of solenoid valve.</p> <p>A built-in time delay of approximately 2 seconds will hold the second stage oil discharge valve</p>

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-4. Test Procedures for Electrical and Electronic Components, Type A Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
3. (Continued)			(12) open after the mini-probe signal terminates. A signal from the second stage mini-probe (6) will override a signal from the first stage (prefilter) mini-probe (5).
4. To check the solenoid coils of the electrically operated valves for an open circuit:		4. Auto control switch (2) and pump switch (3) off, vessel being serviced drained of water.	
A. Remove the cover from the electrical conduit tee to gain access to the leads on the solenoid coil in the water discharge valve.			
4. B. Remove the cover from the first stage (prefilter) mini-probe chassis (5) to gain access to the leads in the			

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).
--

Table 3-4. Test Procedures for Electrical and Electronic Components, Type A Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
4. (Continued)			
		<p>solenoid coil on the first stage (prefilter) oil discharge valve (8).</p> <p>C. Remove the cover from the electrical conduit tee located below the second stage No. 2 mini-probe chassis (6) to gain access to the leads in the solenoid coil on the second stage No. 2 oil discharge valve (12).</p> <p>D. Remove the wire connectors from the coil leads. Tag and disconnect wires. Check the coil for circuit continuity with an electrical test meter (Simpson 260 or equivalent).</p>	<p>D. Reading on test meter should be approximately 50 ohms. Reading to ground should be infinity.</p>

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).
--

Table 3-4. Test Procedures for Electrical and Electronic Components, Type A Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
4. (Continued)			
E. Reconnect wires. Attach the wire connectors to the coil leads. Replace the cover on the respective conduit tee or probe chassis.			
F. To replace a solenoid coil refer to paragraphs 3-24 and 3-46 solenoid valve disassembly and reassembly.			

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

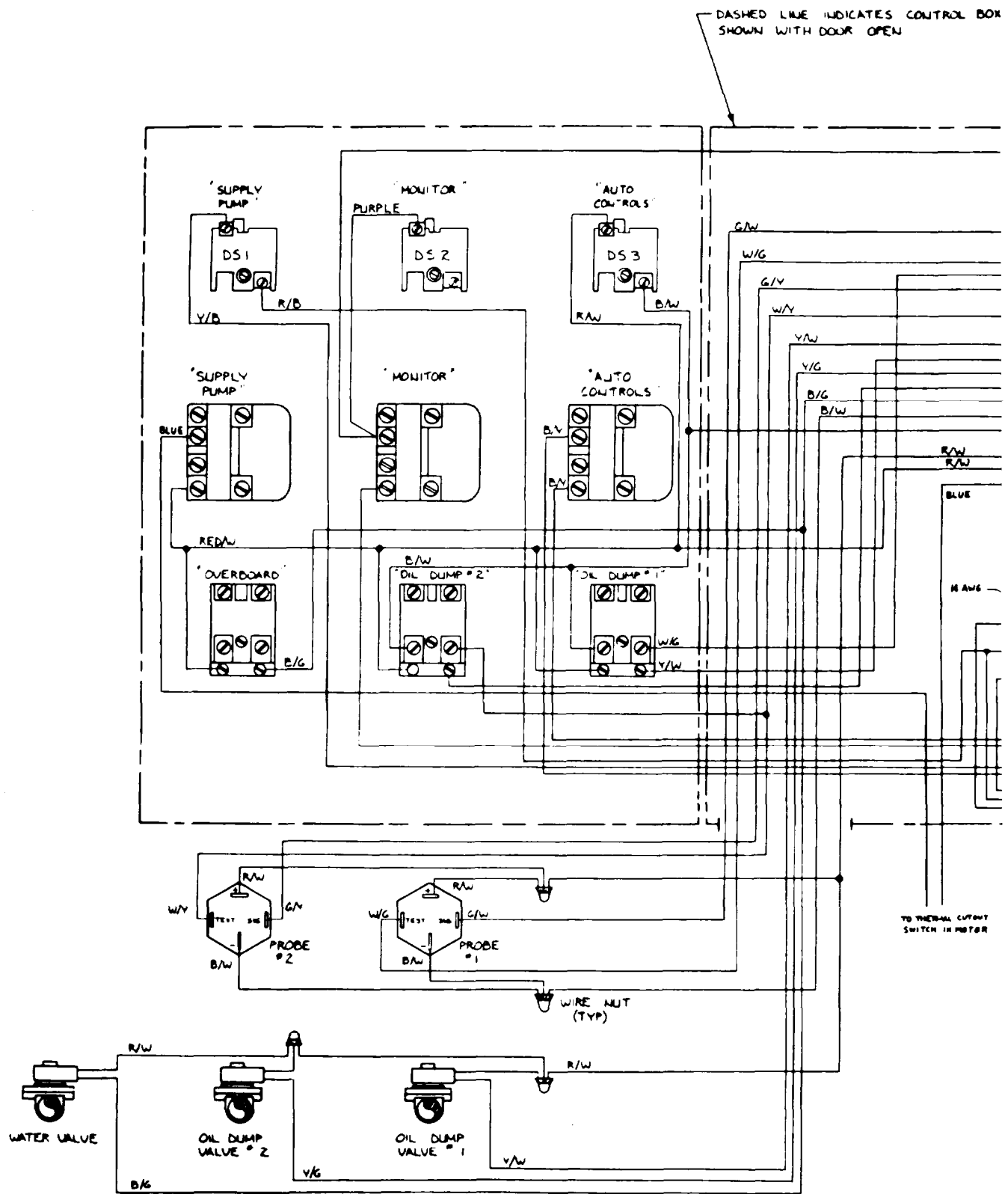


Figure 3-1. Electronic Components and Test Point Locations for Type A Separators (Sheet 1 of 2).

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

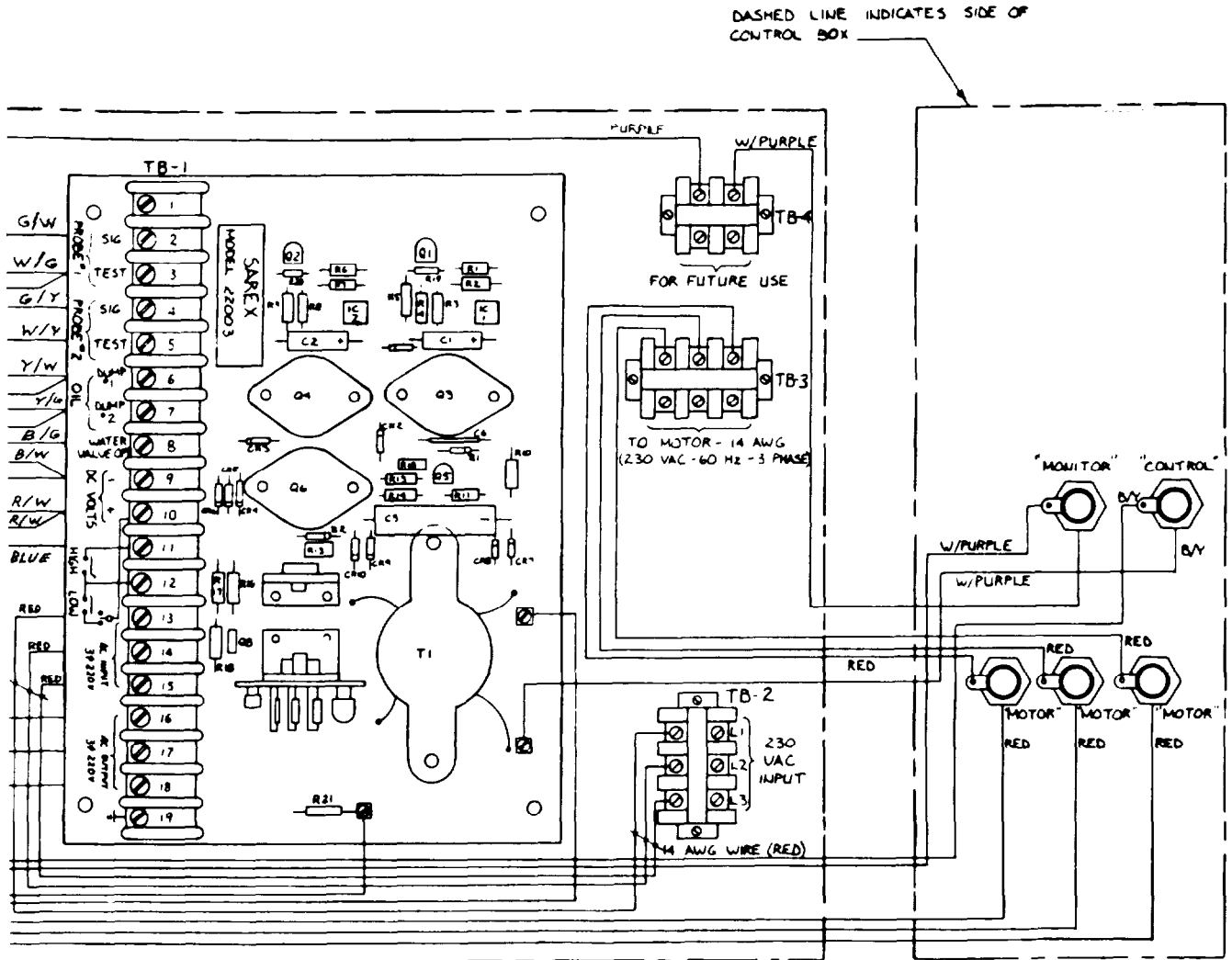
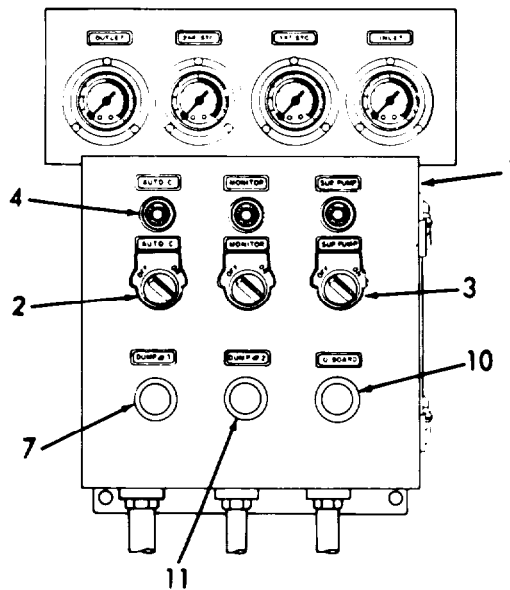
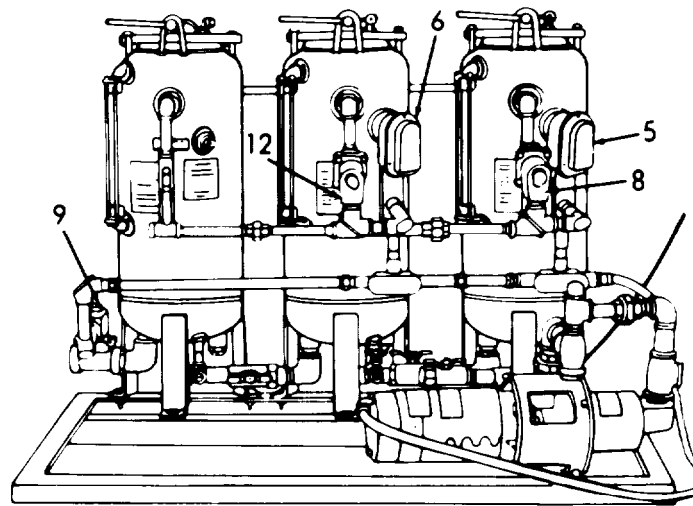


Figure 3-1. Electronic Components and Test Point Locations for Type A Separators (Sheet 2 of 2).

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).



- | | |
|---------------------------------------|--|
| 1. Control Panel | 8. First Stage Solenoid Operated Oil Discharge Valve |
| 2. Auto Control Switch | 9. Solenoid Operated Water Discharge Valve |
| 3. Supply Pump Switch | 10. Overboard Discharge Light |
| 4. Auto Controls Indicator Light | 11. No. 2 Oil Dump Light/Button |
| 5. First Stage (Prefilter) Mini-probe | 12. Second Stage Solenoid Operated Oil Discharge Valve |
| 6. Second Stage Mini-probe | |
| 7. First Stage Oil Dump Light Button | |

Figure 3-2. Component Location for Test Procedure, Type A Separator.

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-5. Test Procedures for Electrical and Electronic Components, Type B Separators

WARNING

Electrical checks and troubleshooting should be performed only by a fully qualified electrician. Check that all electrical components are dry and free of moisture before making electrical checks.

NOTE

Use a multi-meter.

Refer to Figure 3-3 for electronic components and test point locations for type B Separators.

Numbers in parentheses in the text refer to callouts on figure 3-4.

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
1. To verify 24 VDC output of power supply: A. Open control panel (1). B. Connect a test meter across terminal contacts 8 and 9 on terminal Board TBI.	24	1. Auto controls switch (2) and internal power are on, supply pump switch (3) is on.	1. If there is no output power, check that internal power is on. Electrical input must be connected properly. There should not be any loose or broken wires. Check that the 1-amp fast blow fuse is not defective. 120 VDC facility input power can be read across terminal contacts

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-5. Test Procedures for Electrical and Electronic Components, Type B Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
1. (Continued)			14 and 17. Replace the lamp in the auto controls indicator light (4) if a reading of 24 VDC was obtained, but the indicator did not light. Refer to paragraph 3-10 for lamp replacement.
2. Verify the operation of the first stage (prefilter) mini-probe (5) and the printed circuit board:		2. Internal power and auto controls switch (2) are on. Pump switch (3) on. Both mini-probes (5, 6) immersed in water.	2. The normal operation of the mini-probe is to transmit a 24 VDC signal to open the solenoid operated oil discharge valve and close the solenoid operated water discharge valve only when the mini-probe senses oil or air. The mini-probe should be replaced if either a signal is generated while the mini-probe is in water or a signal is not transmitted when the No. 1 (prefilter) oil dump light/button (7) does not light when it is depressed. A malfunction in the printed

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-5. Test Procedures for Electrical and Electronic Components, Type B Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
2. (Continued)			circuit board is indicated when the mini-probe generated signal is not relayed to the solenoid valve. Refer to paragraph 3-49 for mini-probe replacement.
A. Connect the test meter leads to terminal contacts 1 and 8 on terminal board TB1	0		A. Replace the mini-probe (5) if a zero reading is not obtained on the test meter. Refer to paragraph 3-49 for replacement of mini-probe.
B. Connect the test meter leads connected to terminal contacts 1 and 8, depress the oil dump No. 1 (prefilter) light/button (7). This grounds the mini-probe test terminal.	24		B. Depressing the oil dump No. 1 light button will cause the mini-probe to generate a signal. The oil dump No. 1 (prefilter) light/button (7) will illuminate. The first stage solenoid operated oil discharge valve (8) will open. The solenoid operated water discharge valve (9) will close. The overboard discharge light (10) will go out. Replace the mini-probe (5) if a 24 ± 5

OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-5. Test Procedures for Electrical and Electronic Components, Type B Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
2. (Continued)			
<p>C. Connect the test meter leads first to contacts 5 and 9. Depress the No. 2 (pre-filter oil dump light/button (7).</p>	24		<p>VDC reading is not obtained. Refer to paragraph 3-49 for replacement of mini-probe.</p>
<p>Connect the test meter leads to contacts 7 and 9. Depress the oil dump No. 1 Prefilter) light/button (7).</p>	0		<p>C. A 24 VDC readout between contacts 5 and 9 indicates the first stage (prefilter) oil discharge valve (8) and the No. 1 oil dump light/button (7) are receiving a signal from mini-probe (5). The printed circuit board is functioning properly. A zero readout between contacts 7 and 9 indicates the water discharge valve (9) and circuit board are functioning properly. Replace circuit board if output between contacts 5 and 9 is less than 24 ± 5 VDC, or greater than 0 volts between contacts 7 and 9.</p> <p>Refer to para 3-14 for circuit board replacement. If output between</p>

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-5. Test Procedures for Electrical and Electronic Components, Type B Separators (Continued).

Test	Procedure	Meter Reading (VDC)	Test Conditions	Remarks
2.	(Continued)			<p>contacts 5 and 9 is 24 VDC but the first stage (pre-filter) oil discharge valve (8) does not open, then check the valve and solenoid coil per paragraph 3-24, disassembly of solenoid valve and test procedure 4 below. If output between contacts 7 and 9 is 0 volts and the water discharge valve (9) does not close, check the valve per para 3-24, disassembly of solenoid valve. A built-in time delay of approximately 2-3 seconds will hold the first stage (prefilter) oil discharge valve (8) open after the mini-probe signal terminates.</p>
3.	<p>To verify the operation of the second stage mini-probe (6) and the printed circuit board:</p>		<p>3. Internal power and auto controls switch (2) are on. Pump switch (3) is on. Second stage mini-probe (6)</p>	<p>3. Refer to remarks for test procedure 2. The second stage No. 2 oil dump light/button (11) when depressed activates the second stage mini-probe (6).</p>

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-5. Test Procedures for Electrical and Electronic Components, Type B Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
3. (Continued)		in water; first stage (prefilter) mini-probe (5) in water, oil or air.	
3. A. Connect the test meter leads to terminal contacts 3 and 8 on terminal board TB1.	0		A. Replace mini-probe (6) if a zero voltage reading is not obtained on the test meter. Refer to para 3-49 for replacement of mini-probe.
B. Connect the test meter leads to terminal contacts 3 and 8. Depress the second stage No. 2 oil dump light/button (11). This grounds the mini-probe test terminal.	24		B. Depressing the No. 2 oil dump light/button (11) will cause the mini-probe to generate a signal. The second stage No. 2 oil dump light/button (11) will illuminate. The second stage solenoid operated oil discharge valve (12) will open. The solenoid operated water discharge valve (9) will close. The overboard discharge light (10) will go out. Replace the mini-probe if a 24 ± 5 VDC reading is

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-5. Test Procedures for Electrical and Electronic Components, Type B Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
3. (Continued)			not obtained. Refer to paragraph 3-49 for replacement of mini-probe.
C. Connect the test meter leads first to contacts 6 and 9. Depress the second stage No. 2 oil dump light/button (11).	24		C. A 24 VDC read out between contacts 6 and 9 indicates second stage oil discharge valve (12) and second stage No. 2 oil dump light/button (11) is receiving a signal from the mini-probe (6). The printed circuit board is functioning properly* A zero read out between contacts 7 and 9 indicates water discharge valve (9) and circuit board are functioning properly.
Connect the test meter leads to contacts 7 and 9. Depress the second stage No. 2 oil dump light/button (11).	0		Replace the circuit board if output between contacts 6 and 9 is less than 24 ± 5 VDC, or greater than 0 volts between contacts 7 and 9. Refer to

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-5. Test Procedures for Electrical and Electronic Components, Type B Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
3. (Continued)			<p>paragraph 3-14 for circuit board replacement. If the output between contacts 6 and 9 is 24 VDC but the second stage oil discharge valve (12) does not open, then check the valve and solenoid coil per paragraph 3-24, disassembly of solenoid valve, and test procedure 4 below.</p> <p>If output between contacts 7 and 9 is 0 volts and the water discharge valve (9) does not close, check the valve per para 3-24, disassembly of solenoid valve. A built-in time delay of approximately 2 seconds will hold the second stage oil discharge valve (12) open after the mini-probe signal terminates. A signal from the</p>

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-5. Test Procedures for Electrical and Electronic Components, Type B Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
3. (Continued)			second stage mini-probe (6) will override a signal from the first stage (prefilter) mini-probe (5).
4. To check the solenoid coils of the electrically operated valves for an open circuit:		4. Auto control switch (2) and pump switch (3) off. Vessel being serviced drained of water.	
A. Remove the cover from the electrical conduit tee to gain access to the leads in the solenoid coil for the water discharge valve (9).			
B. Remove the cover from the first stage (prefilter) mini-probe chassis (5) to gain access to the leads for the solenoid coil on the first stage (prefilter) oil discharge valve (8).			

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-5. Test Procedures for Electrical and Electronic Components, Type B Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
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4. (Continued)

C. Remove the cover from the electrical conduit tee located below the second stage mini-probe chassis (6) to gain access to the leads for the solenoid coil on the second stage oil discharge valve (12).

D. Remove the wire connectors from the coil leads. Tag and disconnect wires and check the coil for circuit continuity with an electrical test meter (Simpson 260 or equivalent).

E. Reconnect wires. Attach the wire connectors to the coil leads. Replace the cover on the respective conduit tee or probe chassis.

D. Reading on test meter should be approximately 50 ohms. Reading to ground should be infinity

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

Table 3-5. Test Procedures for Electrical and Electronic Components, Type B Separators (Continued).

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
4. (Continued)			
F. To replace a solenoid coil refer to para 3-24.			
5. To Verify 120 VAC output to inverter to control circuit:			5. Check power leads for proper polarity and reverse leads if improperly connected.
Connect the test meter leads to terminal contacts 14 and 17.			

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

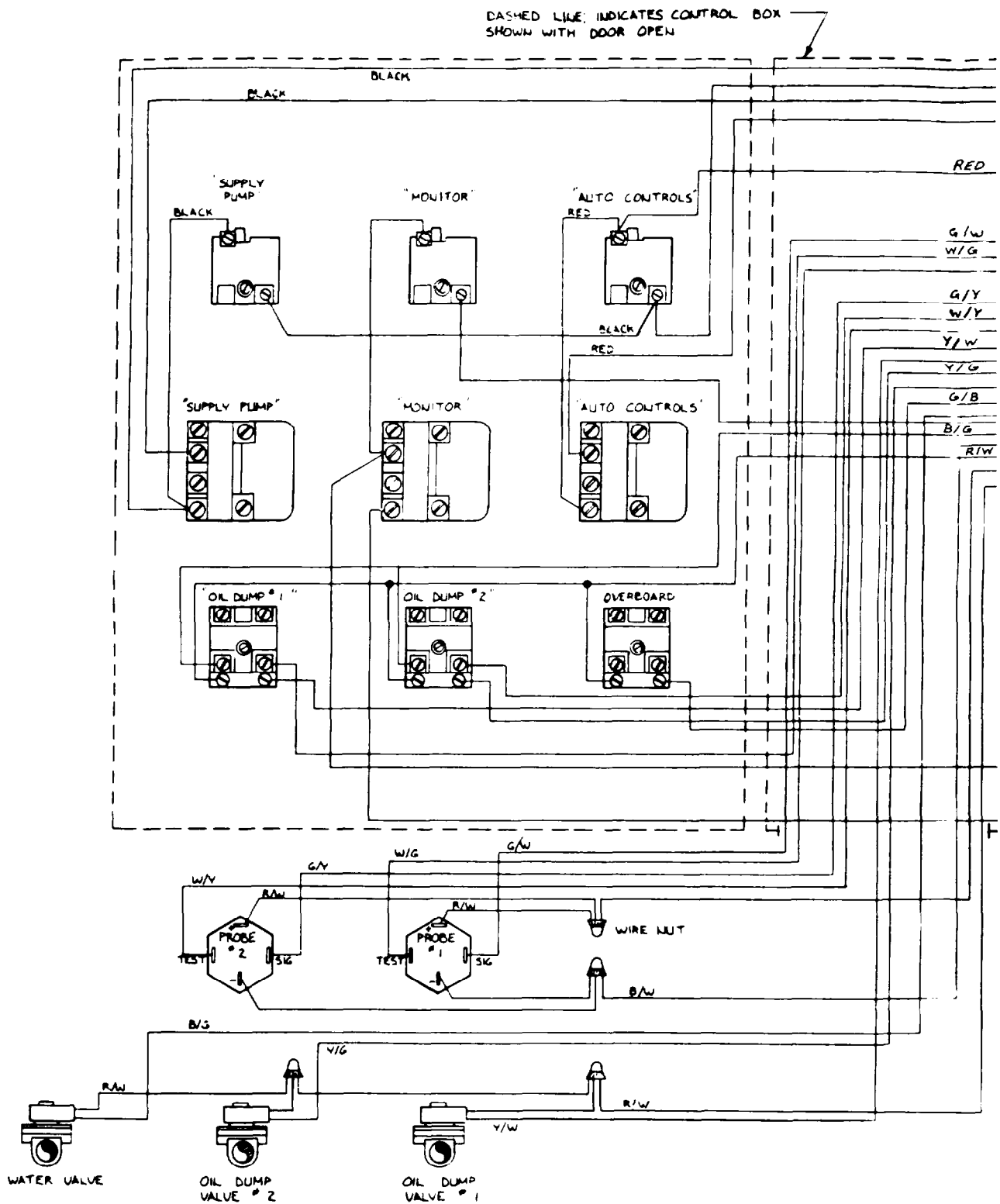


Figure 3-3. Electronic Components and Test Point Locations for Type B Separators (Sheet 1 of 2).

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).

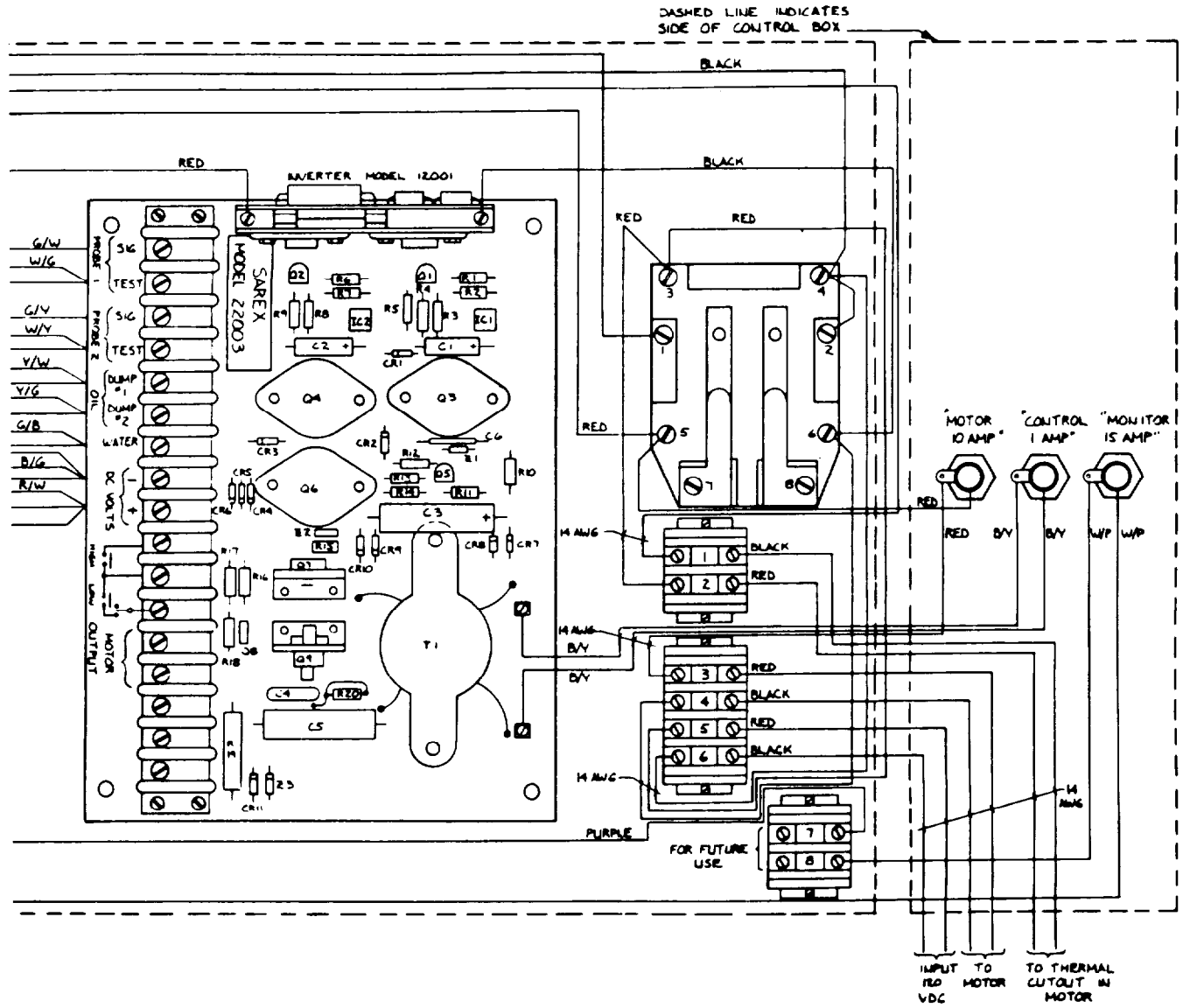
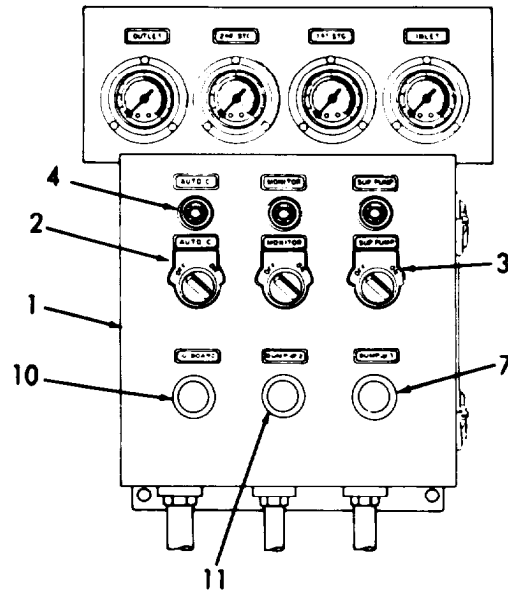
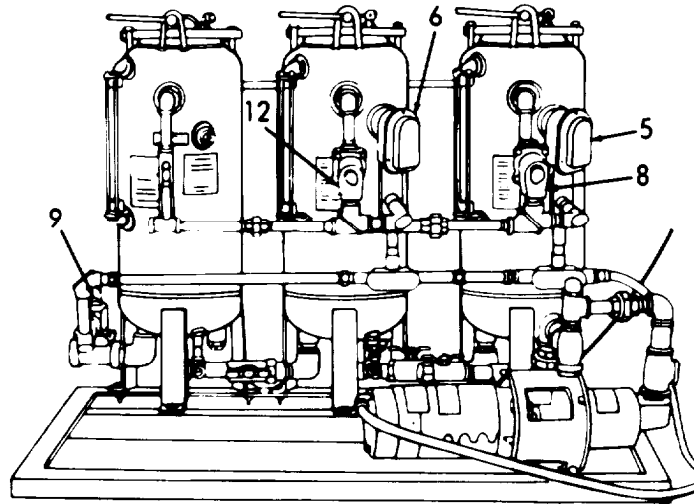


Figure 3-3. Electronic Components and Test Point Locations for Type B Separators (Sheet 2 of 2).

3-3. OPERATORS TROUBLESHOOTING PROCEDURES (Continued).



- | | |
|---|---|
| <ul style="list-style-type: none"> 1. Control Panel 2. Auto Control Switch 3. Supply Pump Switch 4. Auto Control Indicator Light 5. First Stage (Prefilter) Mini - probe 6. Second Stage Mini - probe 7. No. 1 (Prefilter) Oil Dump Light Button | <ul style="list-style-type: none"> 8. First Stage Solenoid Operated Oil Discharge Valve 9. Solenoid Operated Water Discharge Valve 10. Overboard Discharge Light 11. Second Stage No. 2 Oil Dump Light/Button 12. Second Stage Solenoid Operated Oil Discharge Valve |
|---|---|

Figure 3-4. Component Location.

SECTION III

OPERATOR MAINTENANCE PROCEDURES

3-4. SUMMARY AND DETAILED PROCEDURES

SUMMARY PROCEDURES

Paragraph	Procedure
3-27	Air Discharge Lines (Covers)
3-37	Air Eliminator Valve, Type A and B Separators
3-41	Anode (#)
3-34	Cam Bar, Type A and B Separators
3-22	Conduit, Connectors and Wiring, Type A and B Separators
3-17	Control Box Circuit Board, Type A Separator
3-14	Control Box Circuit Board, Type B Separator
3-13	Control Box Inverter, Type B Separator
3-9	Control Box Lamps
3-12	Control Box Legend and Identification Plates(#)
3-10	Control Box Lights, Type A and B Separators
3-15	Control Box Relay, Type B Separator
3-11	Control Box Switches, Type A and B Separators
3-18	Control Box Terminals, Type A Separator
3-16	Control Box Terminals, Type B Separator
3-20	Control Box, Type A and B Separators
3-19	Control Box Wiring, Type A and B Separator
3-36	Cover Seal ("O" Ring) (#)
3-46	Discharge Valve, Solenoid Operated, Type A and B Separators

3-4. SUMMARY AND DETAILED PROCEDURES (Continued).

Paragraph	Procedure
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3-38	Filter Element (#)
3-39	Filter Support, Type A and B Separators
3-21	Flow Rate Indicator, Type A and B Separators
3-7	Fuse (#)
3-8	Fuse Holder (#)
3-47	Inlet Valve, Fluid, Manually Operated, Type A and B Separators
3-48	Intervessel Shutoff Valves, Manual, Type A and B Separators
3-49	Mini-Probe, Type A and B Separators
3-25	Oil Discharge Valve (Manually Operated) Type A and B Separators
3-24	Oil Discharge Valve, Solenoid Operated (1st (prefilter) and 2nd Stage only), Type A and B Separators
3-23	Piping, Air Lines and Fittings, Type A and B Separators
3-42	Prefilter Separator, Type A and B
3-26	Pressure Gauge and Vessel Tubing, Type A and B Separators
3-6	Pressure Gauges, Mounting Bracket and Legend and Identification Plates, Type A and B Separators
3-32	Relief Valve, Type A and B Separators
3-43	2nd Stage Separator, Type A and B
3-40	Sight Glass and Fittings, Type A and B Separators
3-29	Suction Strainer (#)
3-28	Supply Pump Assembly, Type A and B Separators

SUMMARY AND DETAILED PROCEDURES (Continued).

Paragraph	Procedure
3-31	Supply Pump Motor, Type A and B Separators
3-30	Supply Pump, Type A and B Separators
3-44	3rd Stage Separator, Type A and B
3-35	Vessel Cover, Type A and B Separators
3-33	Vessel Sub-Assembly, Type A and B Separators
3-50	Warning, Instruction and Identification Plates, Type A and B Separators
3-45	Water Sample/Drain Valves, Manual, Type A and B Separators

3-5. OPERATOR MAINTENANCE PROCEDURES.

3-6. PRESSURE GAUGES, MOUNTING BRACKET, LEGEND AND IDENTIFICATION PLATES, TYPE A and B SEPARATORS.

This task covers:

- a. Removal
- b. Cleaning
- c. Repair/Replace
- d. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Gauge(s)
Legend and Identification Plates
Cleaning solvent P-D-680
Appendix C. Item No. 2

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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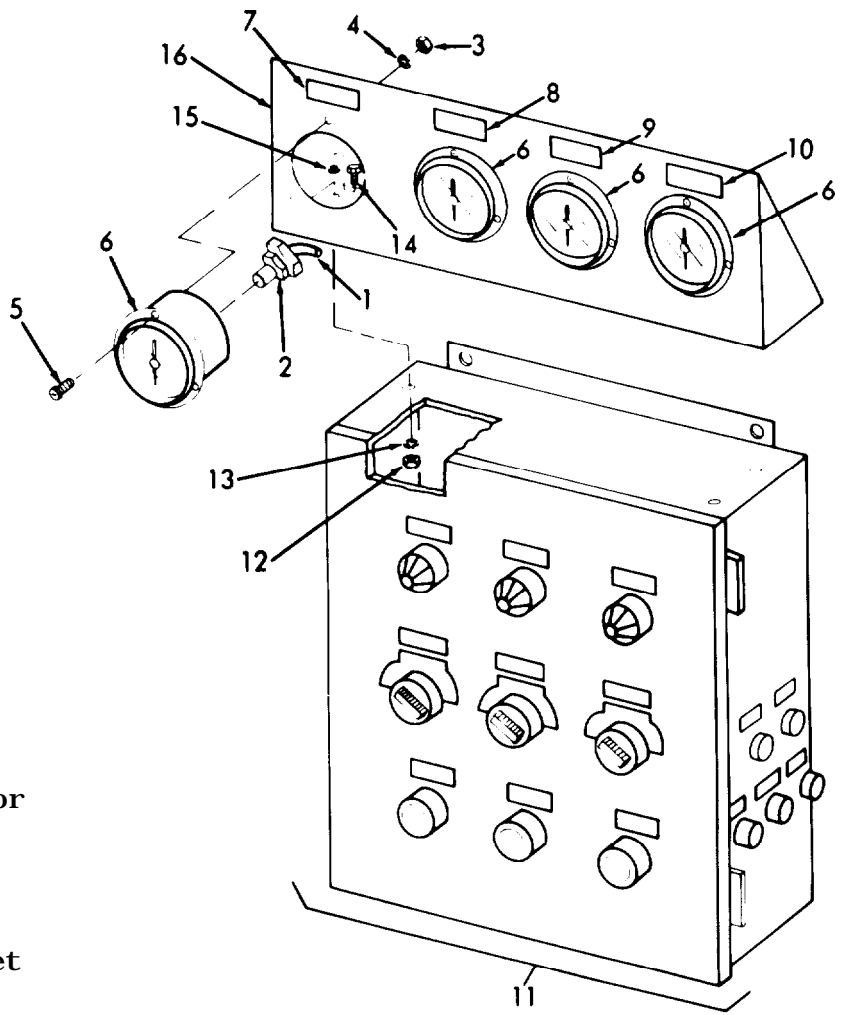
Removal

- | | | | |
|----|----------------------------------|--|--|
| 1. | Air line | a. Disconnect air line (1).
b. Unscrew connector (2). | |
| 2. | Pressure gauge | a. Remove nuts (3), lockwashers (4) and screws (5).
b. Remove pressure gauge (6). Remove all gauges in the same manner. | Discard if defective. |
| 3. | Legend and identification plates | Peel plates (7, 8, 9 and 10) from bracket (16). | Remove and discard only if defaced or illegible. |

3-6. PRESSURE GAUGES, MOUNTING BRACKET, LEGEND AND IDENTIFICATION PLATES, TYPE A and B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|----|------------------|---|--|
| 4. | Mounting bracket | <p>a. Open control box door (11).</p> <p>b. Remove nuts (12), lockwashers (13).</p> <p>c. Remove bolts (14), flat washers (15).</p> <p>d. Remove mounting bracket (16).</p> | |
|----|------------------|---|--|



- 1. Air Line Connector
- 2. Nut
- 3. Nut
- 4. Lockwasher
- 5. Screw
- 6. Pressure gauge
- 7. Plate
- 8. Plate
- 9. Plate
- 10. Plate
- 11. Control Box Door
- 12. Nut
- 13. Lockwasher
- 14. Bolt
- 15. Flatwasher
- 16. Mounting Bracket

3-6. PRESSURE GAUGES, MOUNTING BRACKET, LEGEND AND IDENTIFICATION PLATES, TYPE A and B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Cleaning

WARNING

Cleaning solvent Fed. Spec. P-D-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° - 138°F (38° - 59°C).

- a. Using a mild detergent, water and a clean cloth, wipe gauges clean.
- b. Clean bracket with a clean cloth dampened in cleaning solvent P-D-680 and dry thoroughly.

Repair

Replace defective part with serviceable-like item.

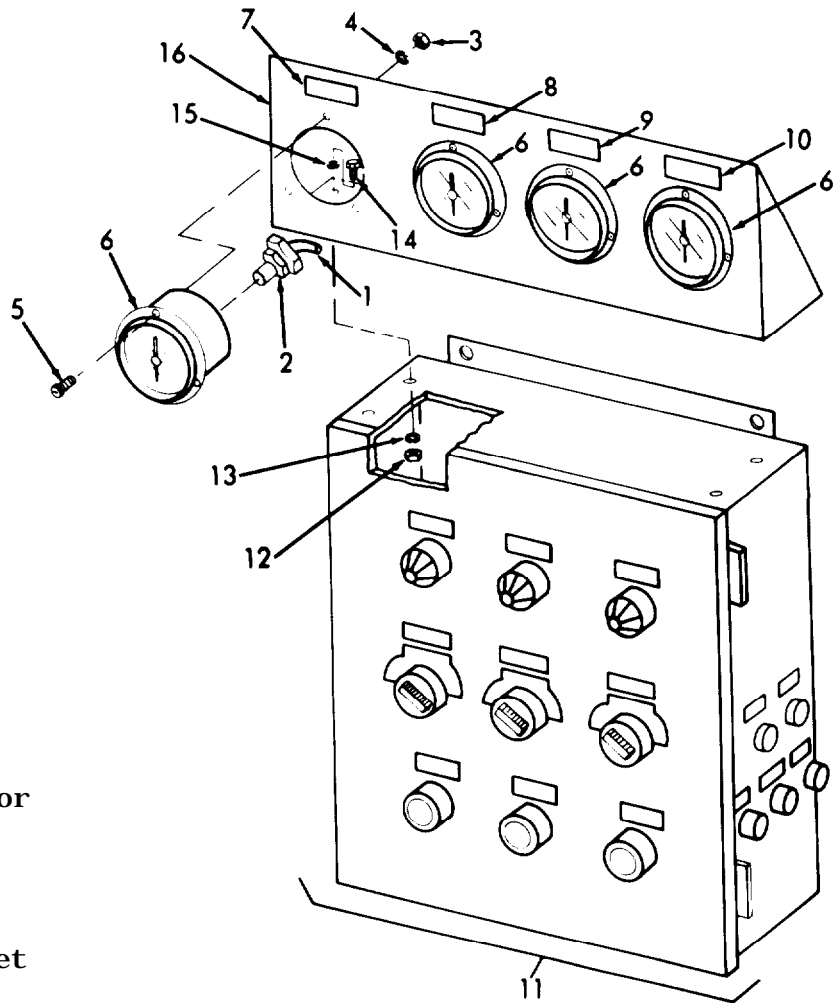
Installation

5.	Mounting bracket	<ul style="list-style-type: none"> a. Position mounting bracket (16) on control panel (11). b. Use flat washer (15), bolt (14), lockwasher (13) and nut (12) to fasten bracket (16) to control panel (11). 	
6.	Legend and identification plates (7, 8, 9 and 10)	Press in place if replaced.	Self-adhesive.
7.	Pressure gauge	<ul style="list-style-type: none"> a. Insert pressure gauge (6) thru opening in mounting bracket (16). 	

3-6. PRESSURE GAUGES, MOUNTING BRACKET, LEGEND AND IDENTIFICATION PLATES, TYPE A and B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- b. Secure with screws (5), lockwashers (4) and nuts (3). Install all gauges in the same manner.
- a. Air line
- a. Install connector (2).
- b. Secure air line (1) to connector.



- 1. Air Line
- 2. Connector
- 3. Nut
- 4. Lockwasher
- 5. Screw
- 6. Pressure gauge
- 7. Plate
- 8. Plate
- 9. Plate
- 10. Plate
- 11. Control Box Door
- 12. Nut
- 13. Lockwasher
- 14. Bolt
- 15. Flatwasher
- 16. Mounting Bracket

3-7. FUSES (#).

This task covers:

- a. Removal
- b. Repair/Replace
- c. Installation

INITIAL SETUP

Test Equipment
None

Tools

Material/Parts
Fuse(s)

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



Electrical shock or serious injury may result if internal power is not shut off prior to servicing this assembly.

NOTE

Instructions in this paragraph are for all types of separators covered in this publication. Refer to figures 3-4 and 3-5 and note that fuses are located on right side or front of control panel.

3-7. FUSES (#) (Continued).

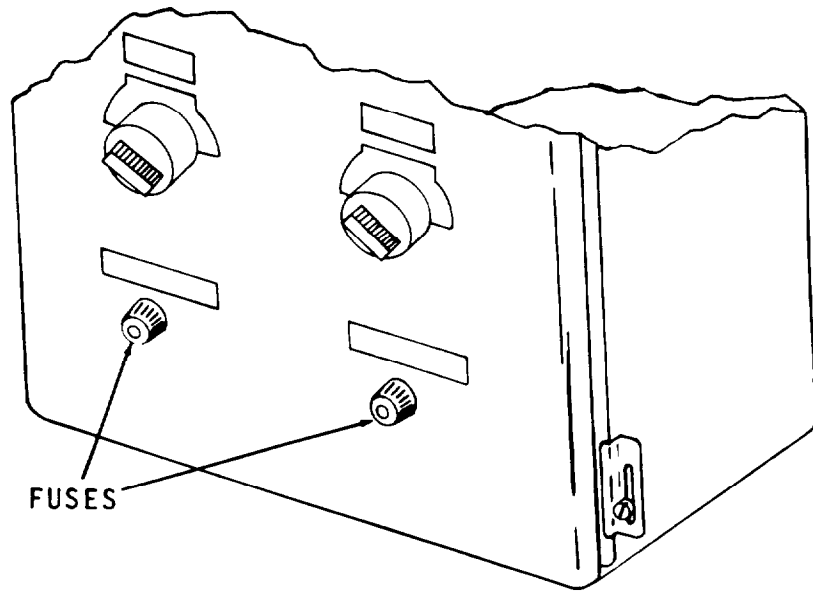
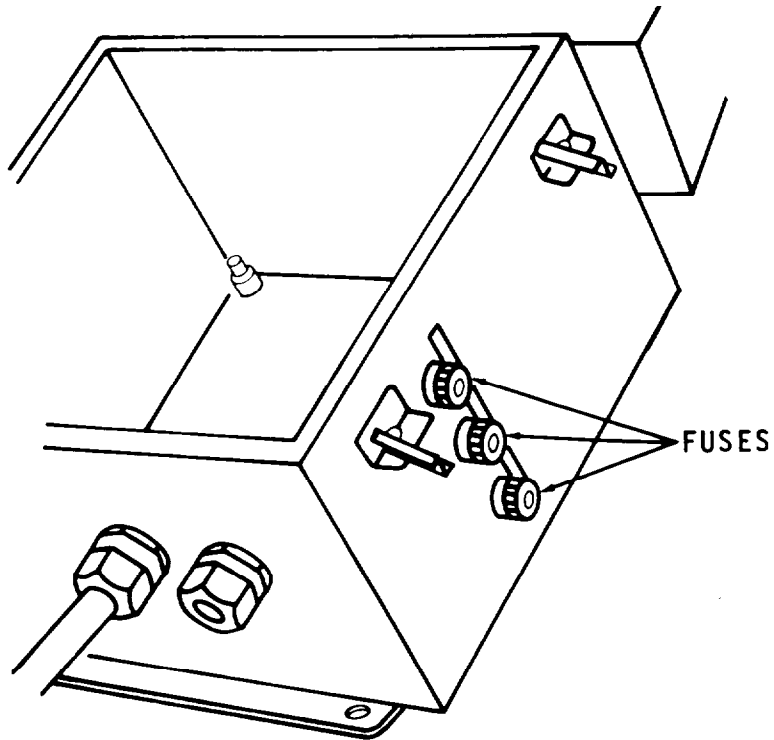
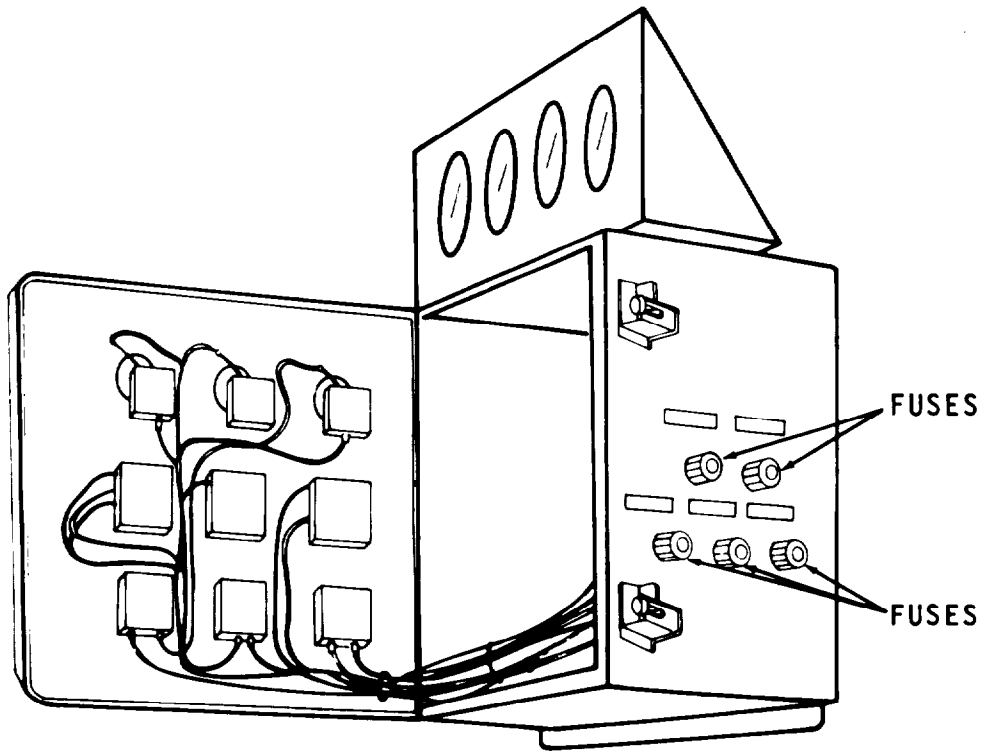


Figure 3-4. Fuse Location - Type C and D Separators.

3-7. FUSES (#) (Continued).



View A - Type B Separator



View B - Type A Separator

Figure 3-5. Fuse Locations

3-7. FUSES (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
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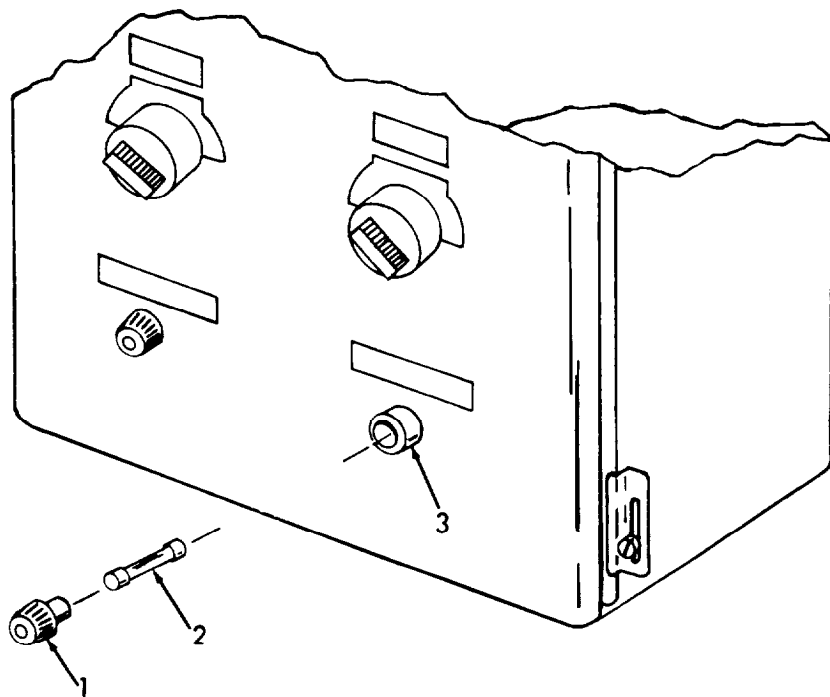
Removal

ELECTRIC POWER TURN OFF

- | | | | |
|----|-------------------------|---|-----------------------|
| 2. | Cap (1)

Fuse (2) | Depress slightly. Turn 45° left and remove cap (1).

Lift fuse (2) from fuseholder (3). | Discard if defective. |
|----|-------------------------|---|-----------------------|



- 1. Cap
- 2. Fuse
- 3. Fuseholder

Repair

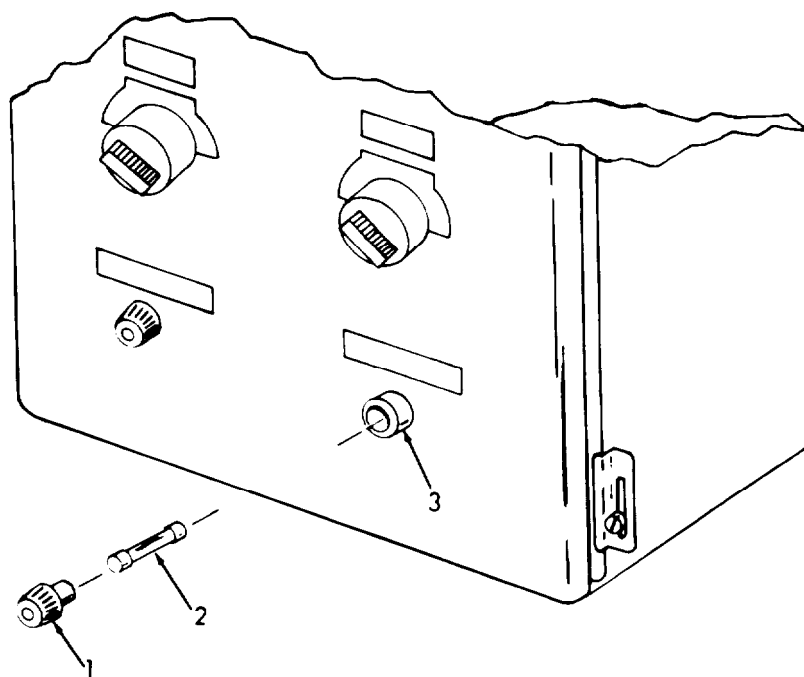
Replace defective fuse with one of the same amperage.

3-7. FUSES (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Installation

- | | | | |
|----|----------|--|--|
| 3. | Fuse (2) | Place new fuse (2) in fuseholder. | <p>NOTE
Replace fuse with one of same amperage.</p> |
| 4. | Cap (1) | Place cap (1) on fuseholder (3) depress slightly turn 45" right. | |



- 1. Cap
- 2. Fuse
- 3. Fuseholder

- | | | |
|----|----------------|----------|
| 5. | Electric power | Turn ON. |
|----|----------------|----------|

3-8. FUSEHOLDER (#).

This task covers:

- a. Removal
- b. Repair/Replace
- c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics
Soldering Iron

Material/Parts
Solder
Appendix C. Item No. 3
Fuseholder

Equipment Condition

Personnel Required
1

LOCATION	ITEM	ACTION	REMARKS
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Electrical shock or serious injury may result if internal power is not shut off prior to servicing this assembly.

NOTE

Instructions in this paragraph are for all types of separators covered in this publication. Refer to figures 3-6 and 3-7 and note that fuseholders are located on right side or front of control panel.

3-8. FUSEHOLDER (#) (Continued).

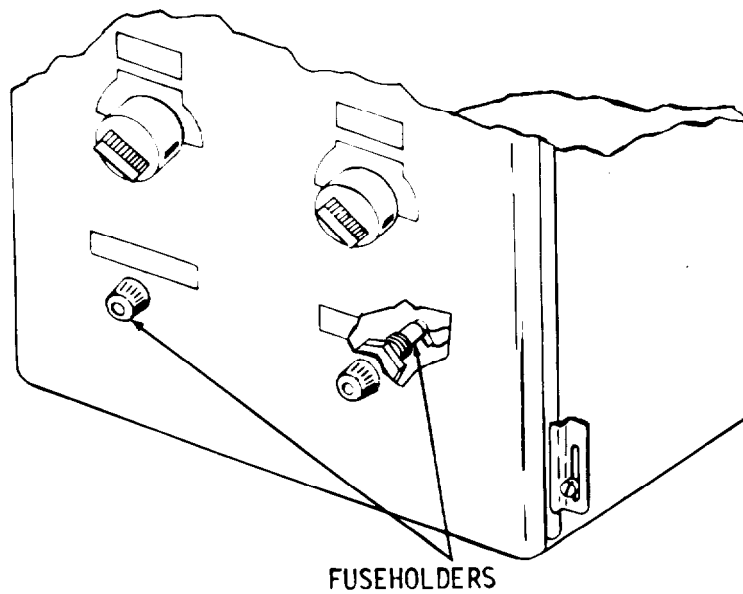
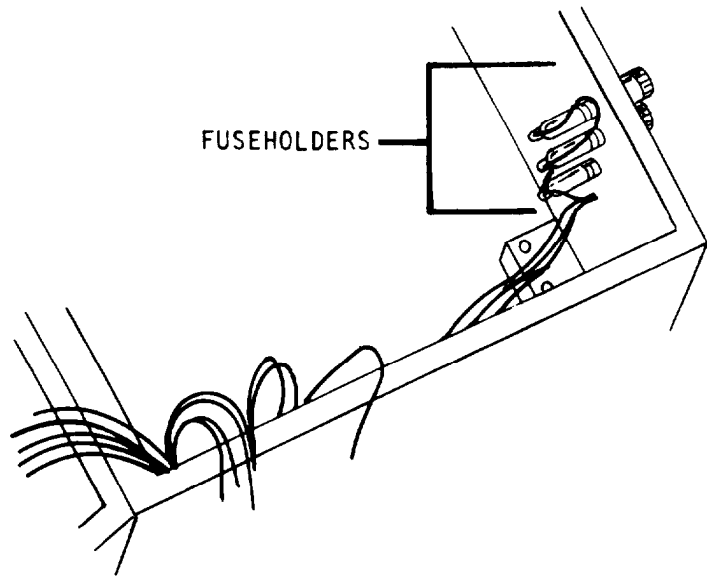
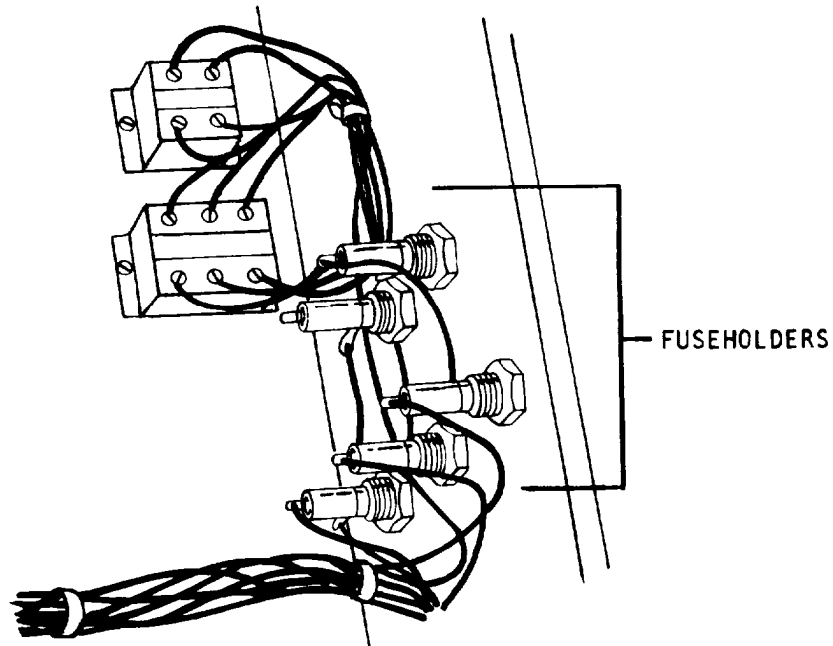


Figure 3-6. Fuseholder Locations - Type C and D Separators.

3-8. FUSEHOLDER (#) (Continued).



View A - Type B Separator



View B - Type A Separator

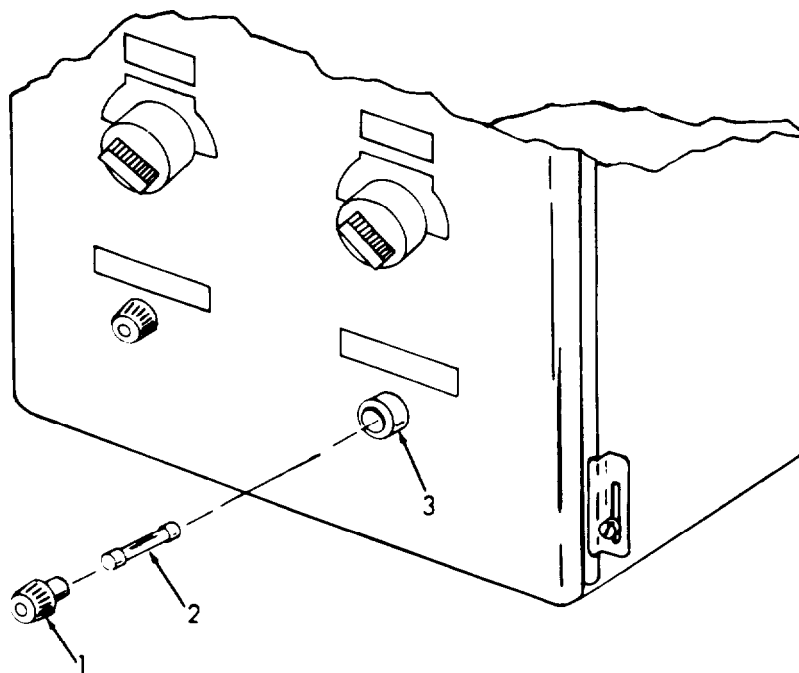
Figure 3-7. Fuseholder Locations.

3-8. FUSEHOLDER (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Removal

- | | | |
|----|----------|---|
| 1. | Cap (1) | Depress slightly. Turn 45° left and remove cap (1). |
| 2. | Fuse (2) | Lift fuse (2) from fuseholder (3). |



- 1. Cap
- 2. Fuse
- 3. Fuseholder

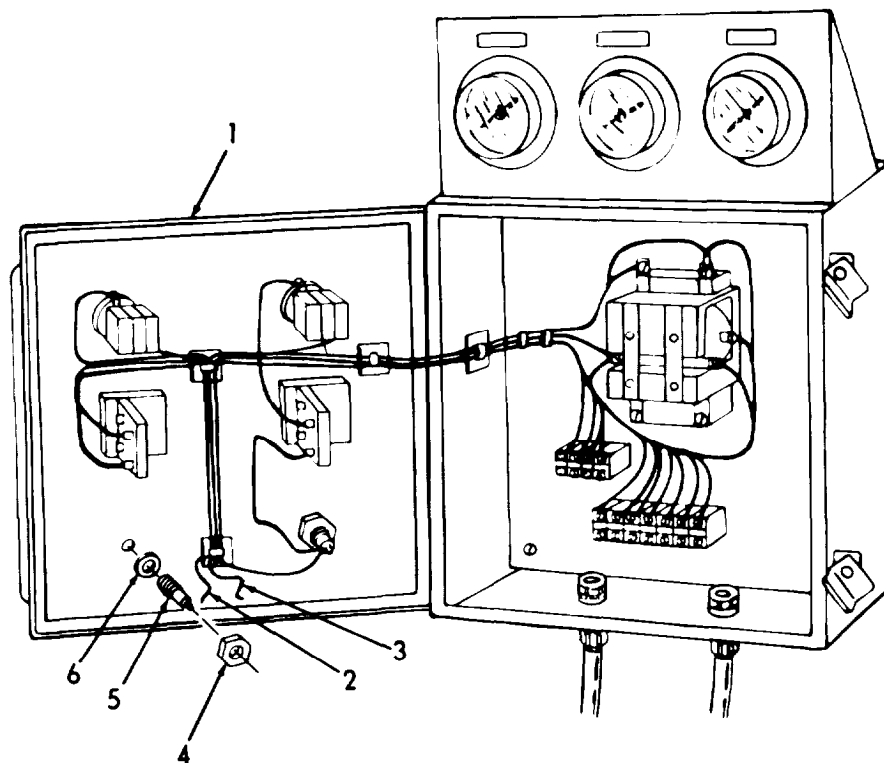
- | | | |
|----|---------------|------------------------------|
| 3. | Control panel | Open control panel door (1). |
|----|---------------|------------------------------|

CAUTION

Soldering iron rating should not exceed 40W.

3-8. FUSEHOLDER (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
4.	Fuseholder	a. Tag and unsolder leads (2 and 3).	Soldering iron required
		b. Unscrew nut (4) from fuseholder (5).	
		c. Remove fuseholder (5) and washer (6).	Discard if defective.



- 1. Control Panel Door
- 2. Lead
- 3. Lead
- 4. Nut
- 5. Fuseholder
- 6. Washer

[Repair]

Replace defective fuseholder, cap or nut with a serviceable-like item.

3-8. FUSEHOLDER (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Installation

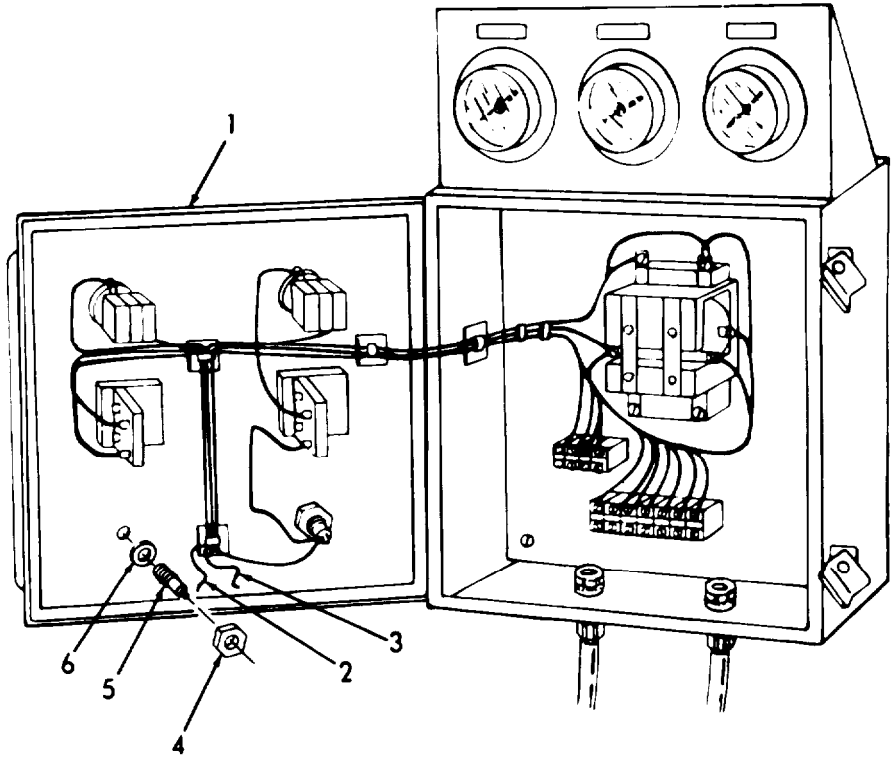
5. Fuseholder
- Place washer (6) over fuseholder (5).
 - Insert fuseholder (5) into opening on control panel.
 - Secure with nut (4).

CAUTION

Soldering iron rating should not exceed 40W.

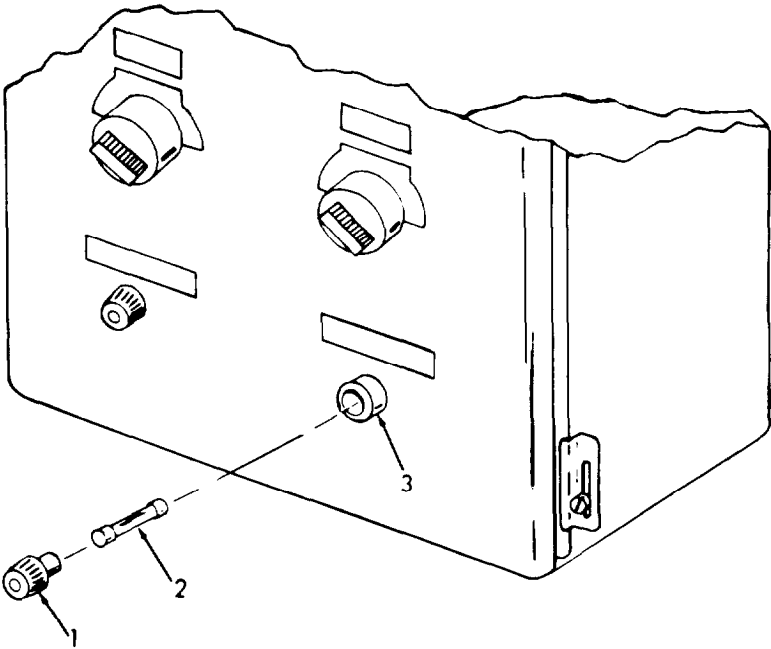
- Resolder leads (2 and 3) to fuseholder. Solder in accordance with MIL-STD-454, Requirement 5.
- Close control panel door

1. Control Panel Door
2. Lead
3. Lead
4. Nut
5. Fuseholder
6. Washer



3-8. FUSEHOLDER (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
6.	Fuse	<ul style="list-style-type: none">a. Insert fuse (2) into fuseholder (3).b. Place cap (1) on fuseholder (3).c. Depress cap slightly.d. Turn 45° right.	



- 1. Cap
- 2. Fuse
- 3. Fuseholder

Electric power Turn ON.

3-9. CONTROL BOX LAMPS.

This task covers:

- a. Removal b. Repair/Replace c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Lamp(s)

Equipment Condition

Personnel Required

1

LOCATION	II EM	ACTION	REMARKS
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Electrical shock or serious injury may result if internal power is not shut off prior to servicing this assembly.

NOTE

Instructions in this paragraph are for all type separators.

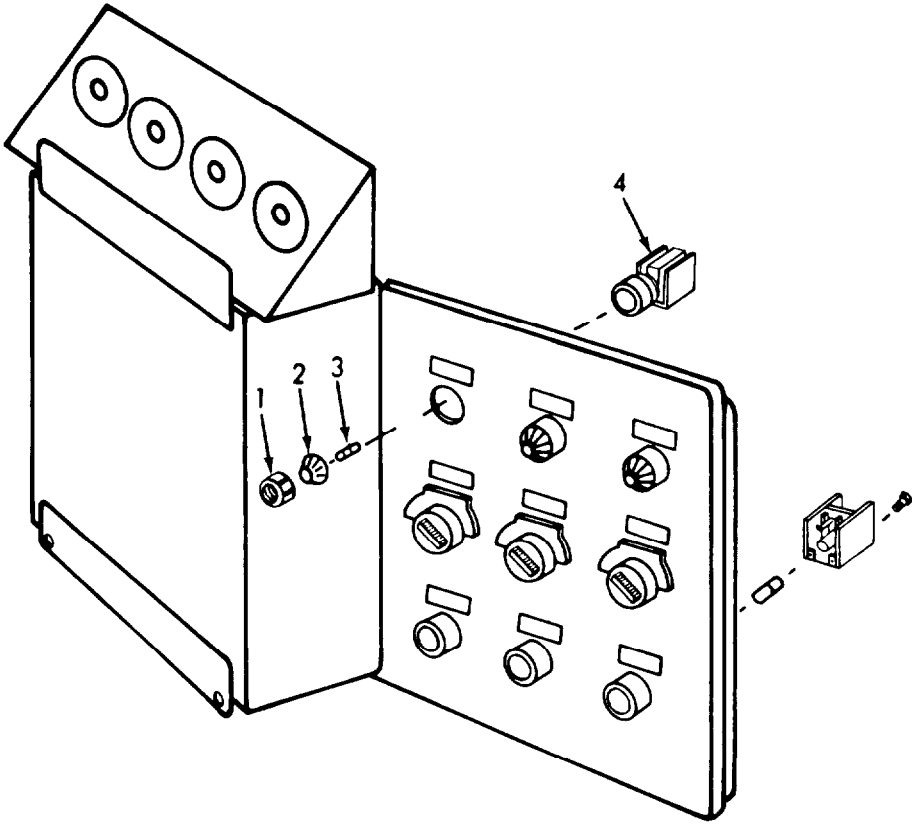
Removal

ELECTRIC POWER TURN OFF

- | | | | |
|--|-----------------|--|---|
| <p>1. Auto control, monitor or supply pump indicator light</p> | <p>Lamp (3)</p> | <p>a. Unscrew lens cap (1) from light body (4).</p> <p>b. Depress lamp (3). Turn approximately 45° left to remove from body (4).</p> | <p>Lens (2) may fall out of cap.</p> <p>Discard defective lamp.</p> |
|--|-----------------|--|---|

3-9. CONTROL BOX LAMPS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



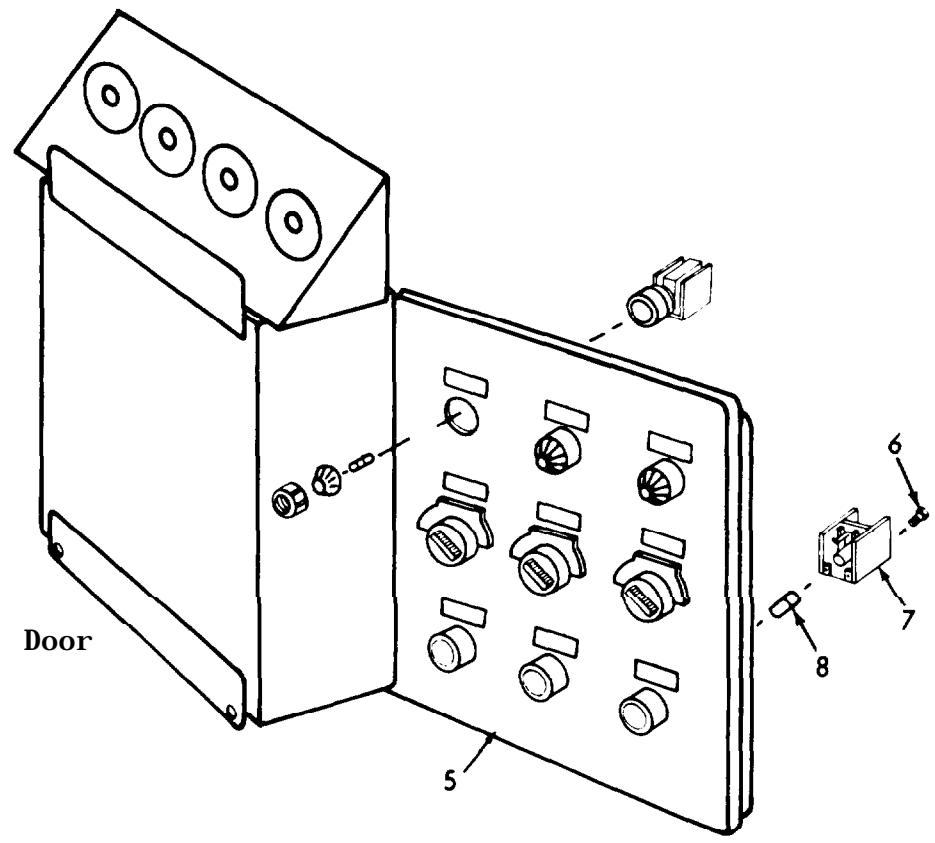
- 1. Lens Cap
- 2. Lens
- 3. Lamp
- 4. Light Body

NOTE

It is not necessary to disconnect leads from lights to replace defective lamps.

3-9. CONTROL BOX LAMPS (Continued).

LOCATION	ITEM	ACTION	REMARKS
2. Oil dump or over-board indicator light	Lamp (8)	<p>a. Open control panel door (5).</p> <p>b. Loosen screw (6) in lamp body (7).</p> <p>c. Move lamp body (7) slightly to right toward front of control panel door (5).</p> <p>d. Disengage lamp body (7) from housing.</p> <p>e. To remove lamp (8), depress and turn to left.</p>	<p>Lamp body is recessed in notch in lamp housing.</p> <p>Discard defective lamp.</p>



- 5. Control Panel Door
- 6. Screw
- 7. Lamp Body
- 8. Lamp

Repair

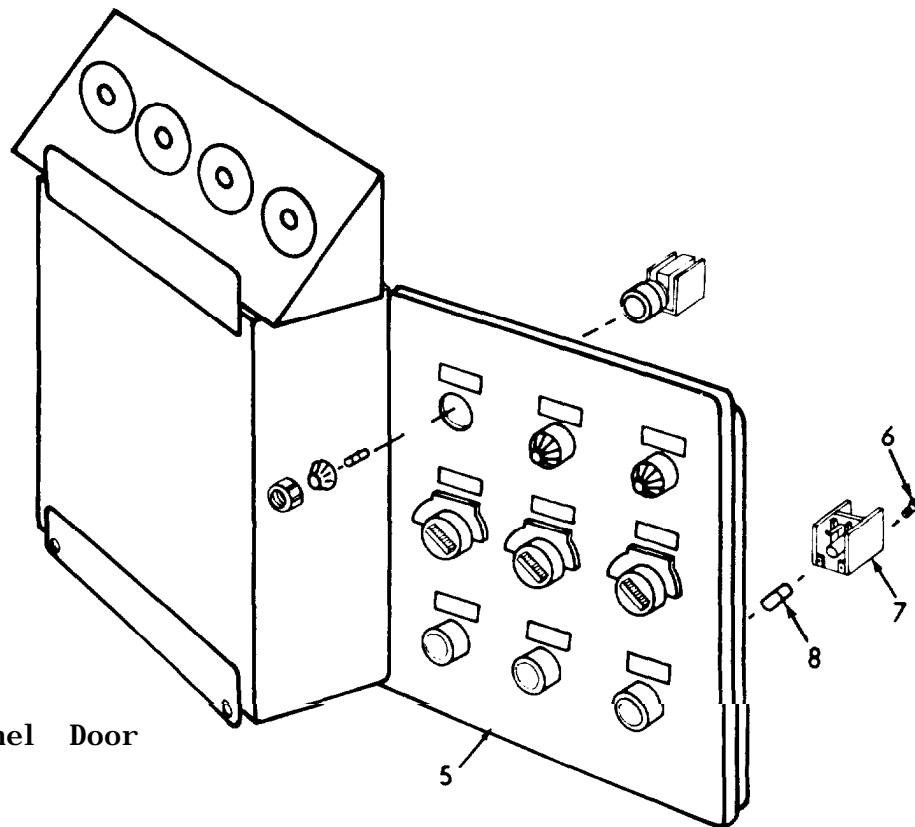
Replace defective lamp with a serviceable-like item. Replace lamp with one of same wattage.

3-9. CONTROL BOX LAMPS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Installation

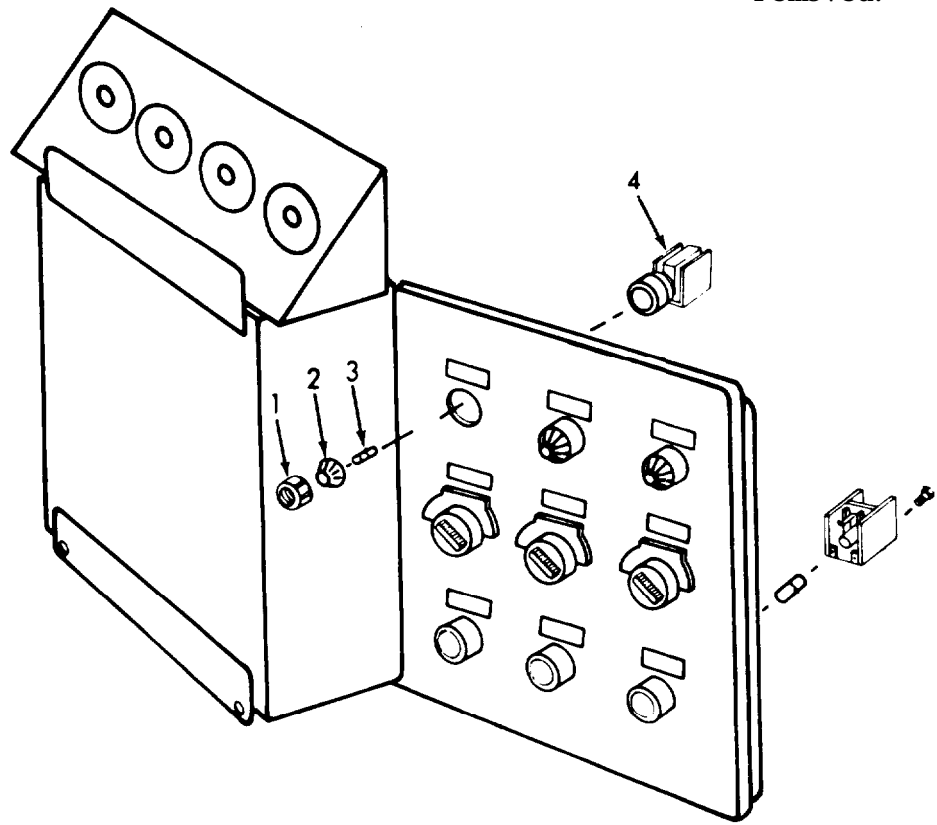
3. Oil dump or over-board indicator light	a.	Place lamp (8) in socket.	
	b.	Depress slightly and turn to right to lock in place.	
	c.	Insert lamp body (7) into housing.	
	d.	Turn lamp body slightly to right to engage in notch in housing.	Lamp body has to be engaged in notch in housing to secure.
	e.	Tighten screw (6).	
	f.	Close control panel door (5).	



- 5. Control Panel Door
- 6. Screw
- 7. Lamp Body
- 8. Lamp

3-9. CONTROL BOX LAMPS (Continued).

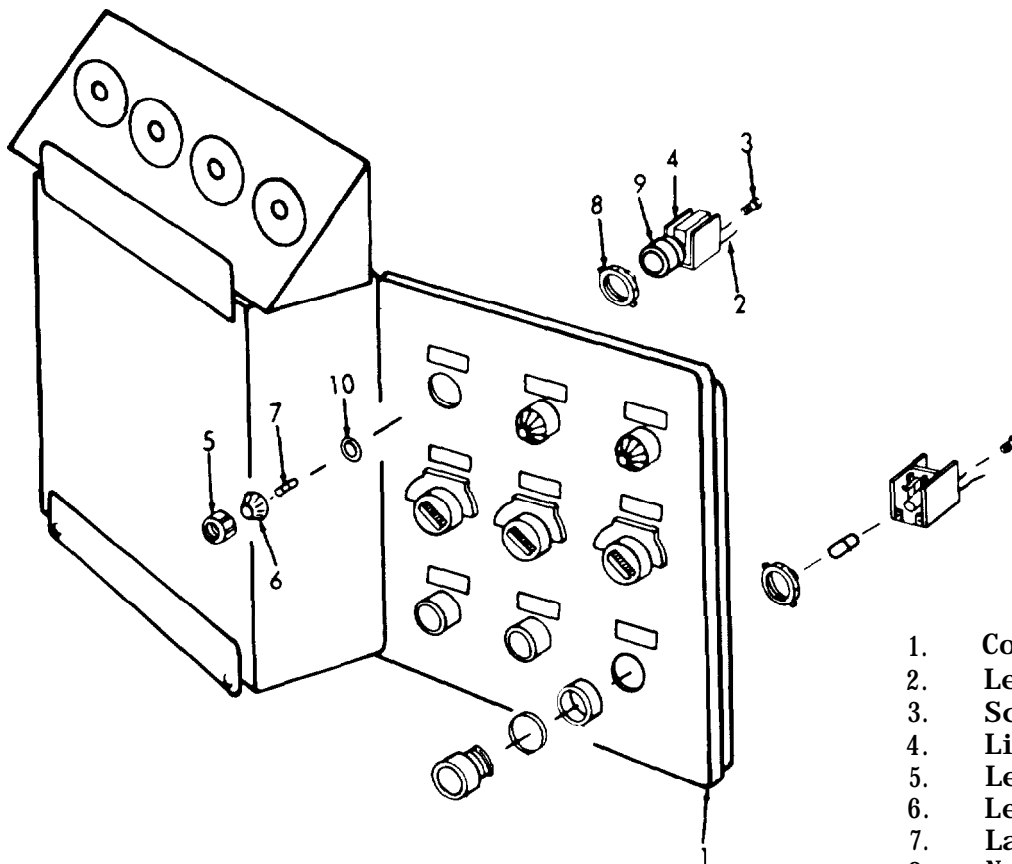
LOCATION	ITEM	ACTION	REMARKS
4. Auto control, monitor or supply pump indicator light		<p>a. Insert lamp (3) into lamp body (4).</p> <p>b. Depress lamp (3) and turn to right to lock in place.</p> <p>c. Install lens cap (1).</p>	Place lens (2) in lens cap if removed.



- 1. Lens Cap
- 2. Lens
- 3. Lamp
- 4. Light Body

**3-10. CONTROL BOX INDICATOR LIGHTS, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
		e. Disengage light body (4) from lamp housing (9).	
		f. Unscrew lens cap (5) from lamp housing (9).	
		Remove lens (6) from cap (5).	
		g. (5).	
		h. Remove lamp (7).	Discard defective lamp.
		i. Remove nut (8), lamp housing (9) and gasket (10).	

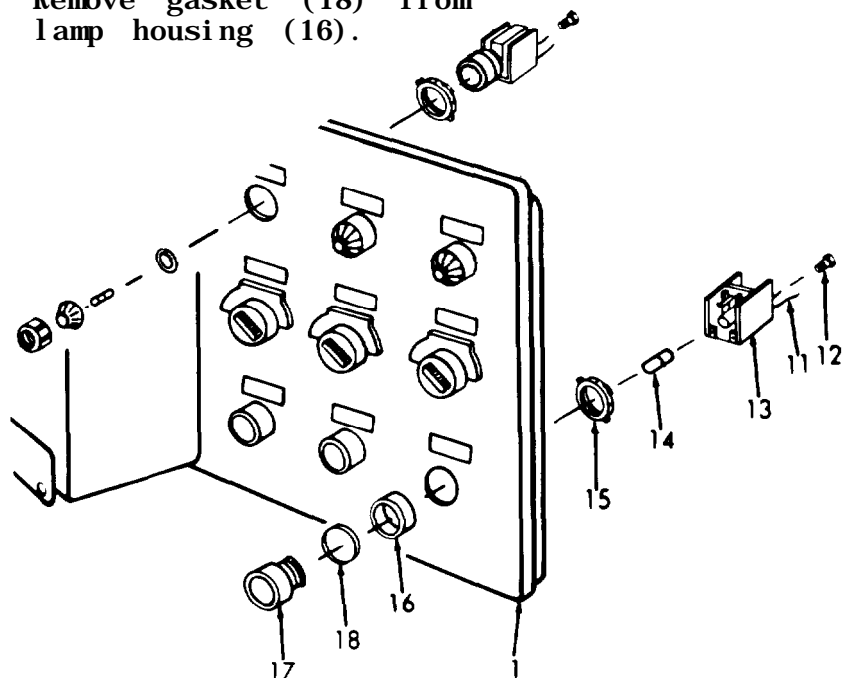


1. Control Panel Door
2. Leads
3. Screw
4. Light Body
5. Lens Cap
6. Lens
7. Lamp
8. Nut
9. Lamp Housing
10. Gasket

3-10. CONTROL BOX INDICATOR LIGHTS, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
2.	Oil dump or over-board indicator light	a. Open control panel door (1). b. Tag and disconnect leads (11) from light. c. Remove screw (12) from back of lamp body (13). d. Move lamp body (13) slightly to right toward front of control panel door (1). e. Disengage lamp body (13) from lamp housing (16). Remove lamp (14). f. Unscrew nut (15) from lamp housing. g. Withdraw thru front of panel, lens cap (17) and lamp housing (16). h. Remove gasket (18) from lamp housing (16).	Lamp body is recessed in notch in lamp housing. Discard defective lamp.

- 1. Control Panel Door
- 11. Leads
- 12. Screw
- 13. Lamp Body
- 14. Lamp
- 15. Nut
- 16. Lamp Housing
- 17. Lens Cap
- 18. Gasket



**3-10. CONTROL BOX INDICATOR LIGHTS, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Repair

Replace defective gasket or indicator light with a serviceable-like item.

Installation

3. Oil dump or over-board indicator light

- a. Install gasket (18) on housing (16).
- b. Install lens cap (17) on housing.
- c. Insert assembled parts thru front of panel and secure with nut (15).
- d. Install lamp (14) in body (13).
- e. Insert lamp body (13) into housing (16).

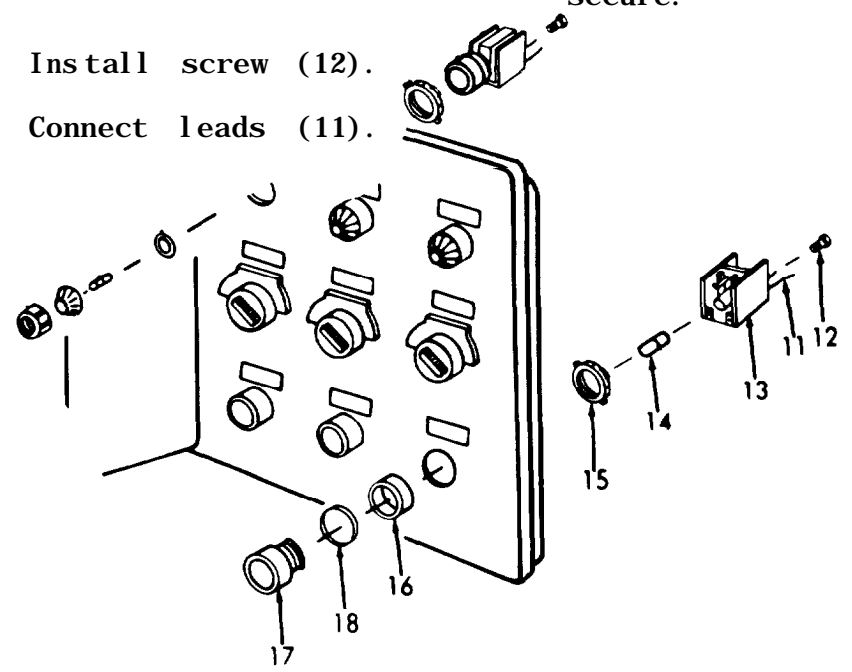
f. Turn lamp body slightly to right to engage in notch in housing.

Lamp body has to be engaged in notch in housing to secure.

Install screw (12).

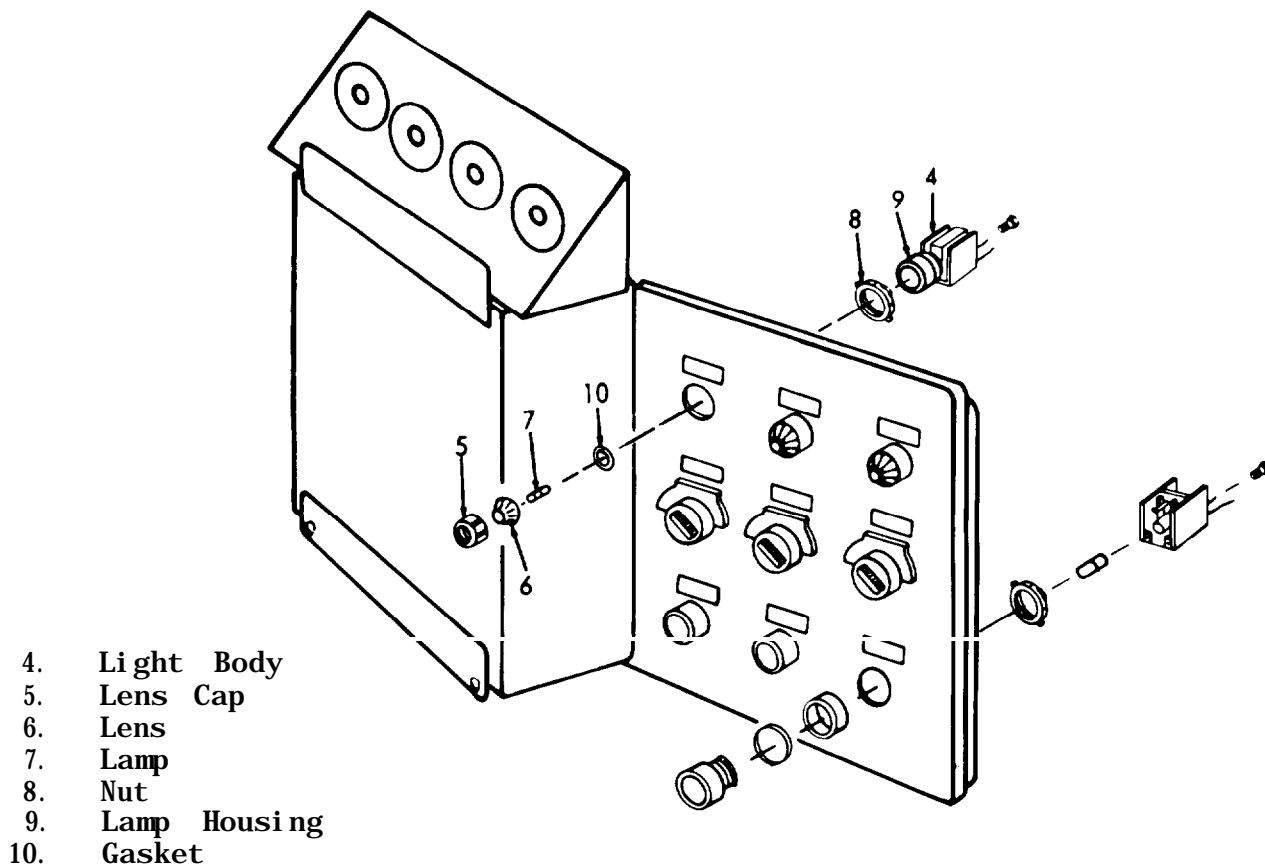
h. Connect leads (11).

- 11. Leads
- 12. Screw
- 13. Lamp Body
- 14. Lamp
- 15. Nut
- 16. Lamp Housing
- 17. Lens Cap
- 18. Gasket



**3-10. CONTROL BOX INDICATOR LIGHTS, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
4. Auto control, monitor or supply pump indicator lamp		<p>a. Install gasket (10) on lamp housing (9).</p> <p>b. Insert lamp housing (9) in control panel and secure with nut (8).</p> <p>c. Install lamp (7).</p> <p>d. Install lens (6) in cap (5). Screw cap (5) onto lamp housing (9).</p> <p>e. Place light body (4) on housing (9) turn slightly to right toward front of panel to engage in notch in housing.</p>	Lamp body has to be engaged in notch in housing to secure.

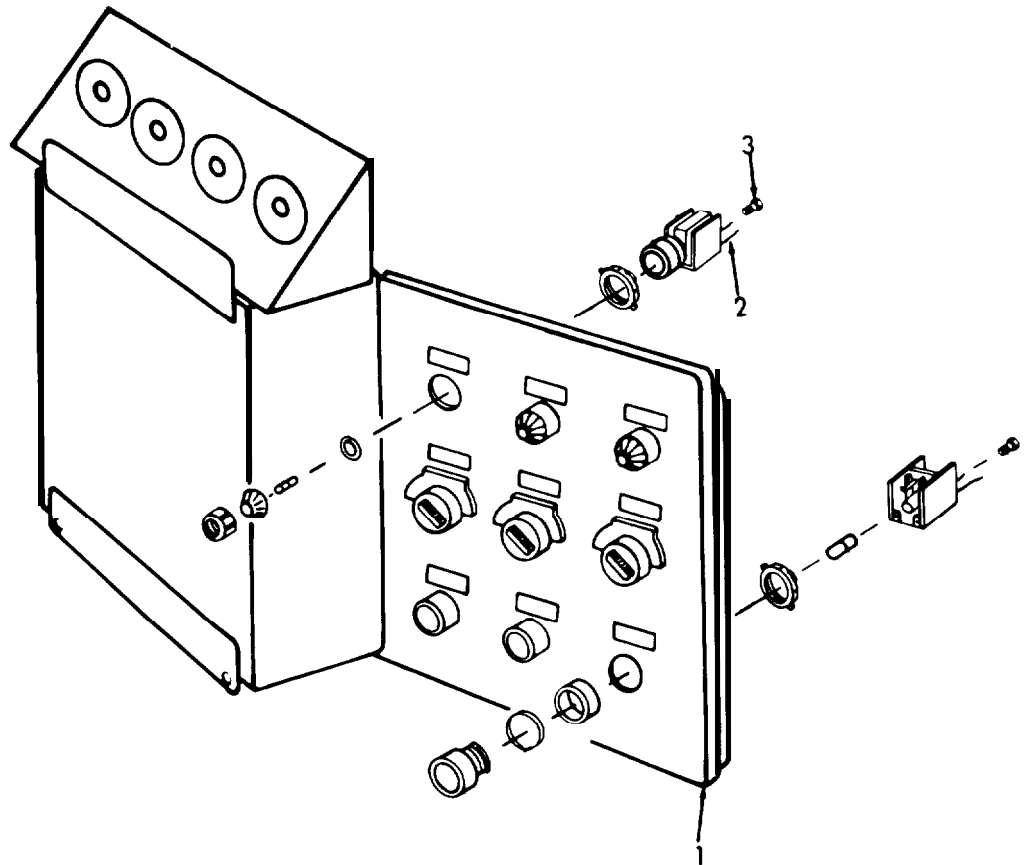


**3-10. CONTROL BOX INDICATOR LIGHTS, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

f. Install screw (3) to secure.

g. Reconnect leads (2) and close door (1).



- 1. Control Panel Door
- 2. Leads
- 3. Screw

5. Electric power

Turn ON.

3-11. CONTROL BOX SWITCHES, TYPE A AND B SEPARATOR.

This task covers:

- a. Removal
- b. Repair/Replace
- c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Switch(s)

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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WARNING

Electrical shock or serious injury may result if internal power is not shut off prior to servicing this assembly.

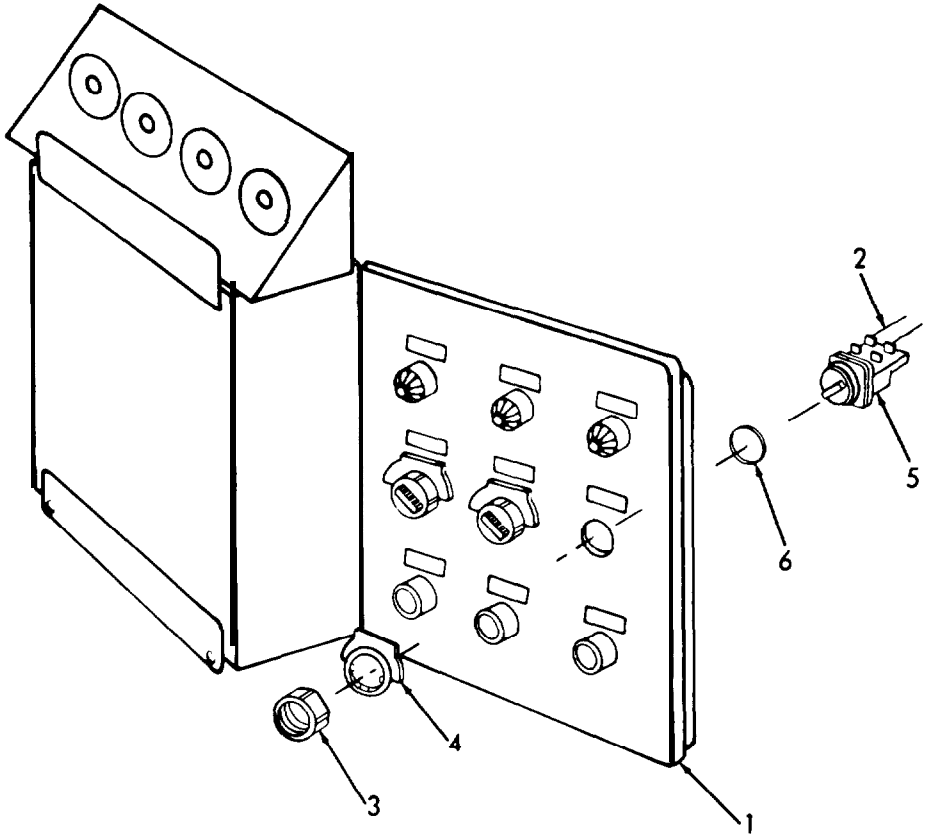
Removal

ELECTRIC POWER TURN OFF.

- | | | |
|---|---|----------------------------------|
| <p>1. Auto control, monitor or supply pump switch</p> | <ul style="list-style-type: none"> a. Open control panel door (1). b. Disconnect leads (2) from switch. c. Unscrew nut (3) and remove legend and identification plate (4). d. Remove switch body (5) and gasket (6) from rear of panel. | <p>Discard defective switch.</p> |
|---|---|----------------------------------|

3-11. CONTROL BOX SWITCHES, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 1. Control Panel Door
- 2. Leads
- 3. Nut
- 4. Legend and Identification Plate
- 5. Switch Body
- 6. Gasket

Repair

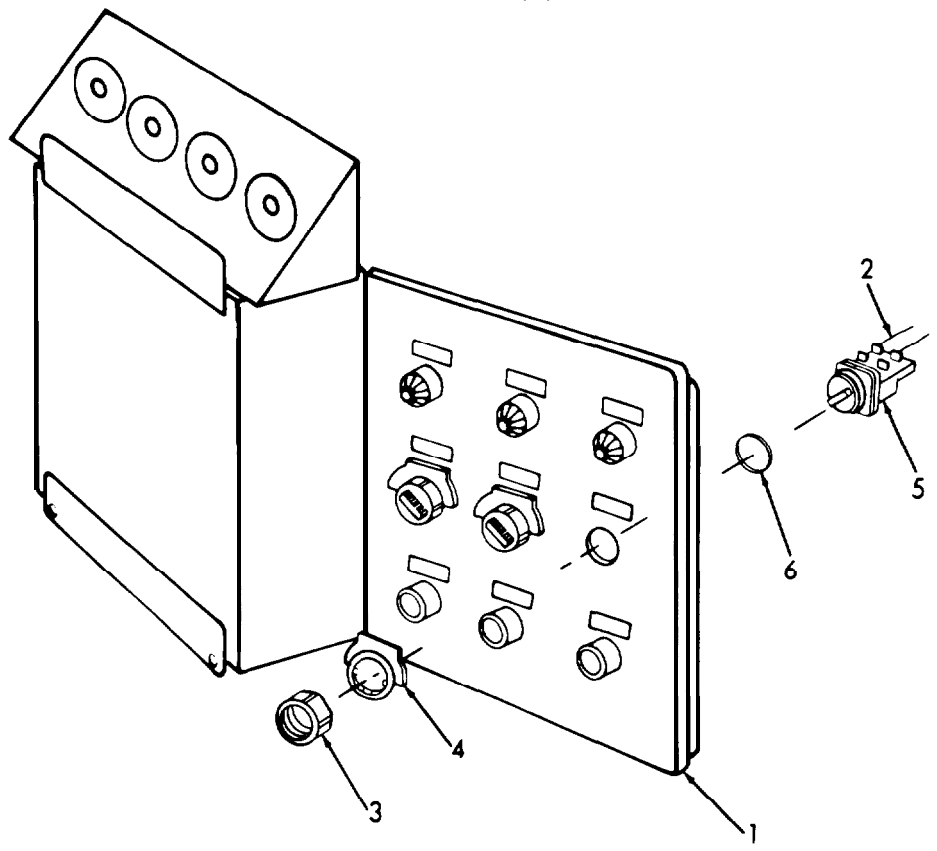
Replace defective switch with a serviceable-like item.

3-11. CONTROL BOX SWITCHES, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Installation

2.
 - a. Place gasket (6) in position on control panel.
 - b. Insert switch body (5) into panel from rear.
 - c. Position legend and identification plate (4) in place and install nut (3) to secure. Tighten nut.
 - d. Reconnect leads (2) and close door (1).



1. Control Panel Door
2. Leads
3. Nut
4. Legend and Identification Plate
5. Switch Body
6. Gasket

3-12. CONTROL BOX LEGEND and IDENTIFICATION PLATES (#).

This task covers:

- a. Removal
- b. Cleaning
- c. Replace
- d. Installation

INITIAL SETUP

Test Equipment
None

Tools

Material/Parts
Legend and identification plates
Cleaning solvent P-D-680
Appendix C. Item No. 2

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

NOTE

Instructions in this paragraph are for all types of separators covered in this publication. Refer to figure 3-8 for location of legend and identification plates for Type A Separators, Figure 3-9 for Type B Separators and Figure 3-10 for Type C and D Separators.

3-12. CONTROL BOX LEGEND and IDENTIFICATION PLATES (#) (Continued).

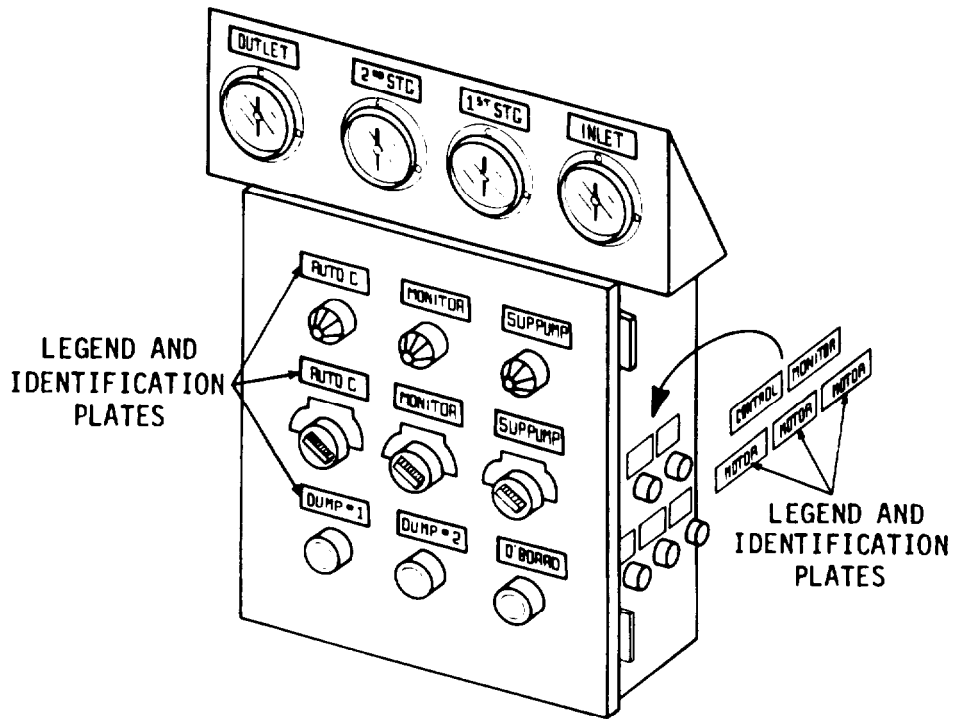


Figure 3-8. Legend and Identification Plates - Type A Separator.

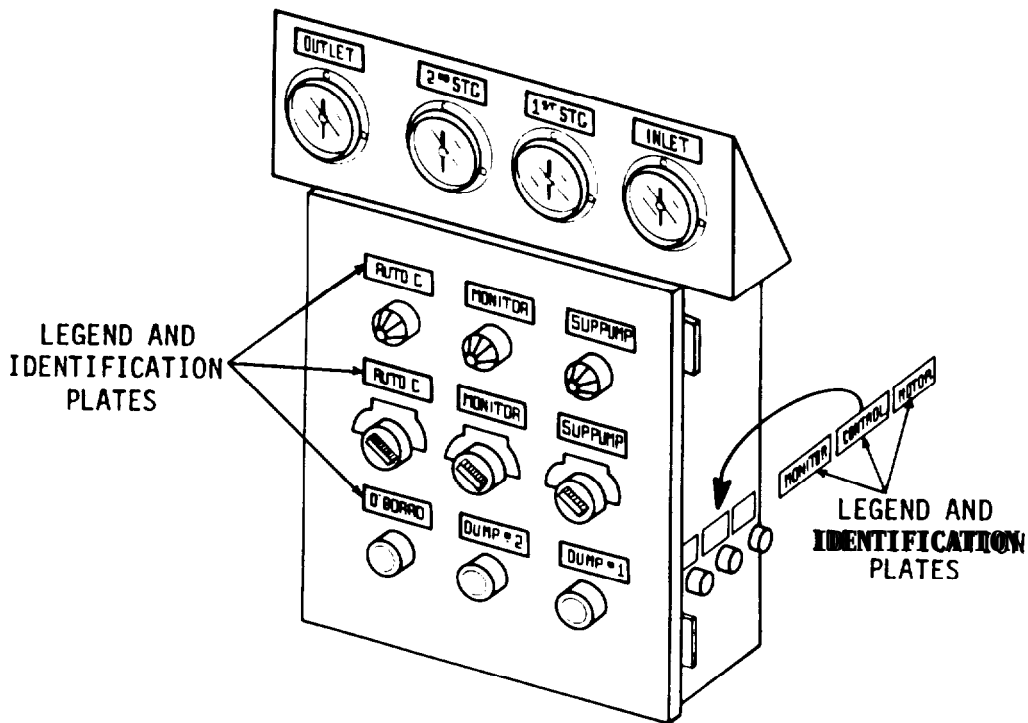
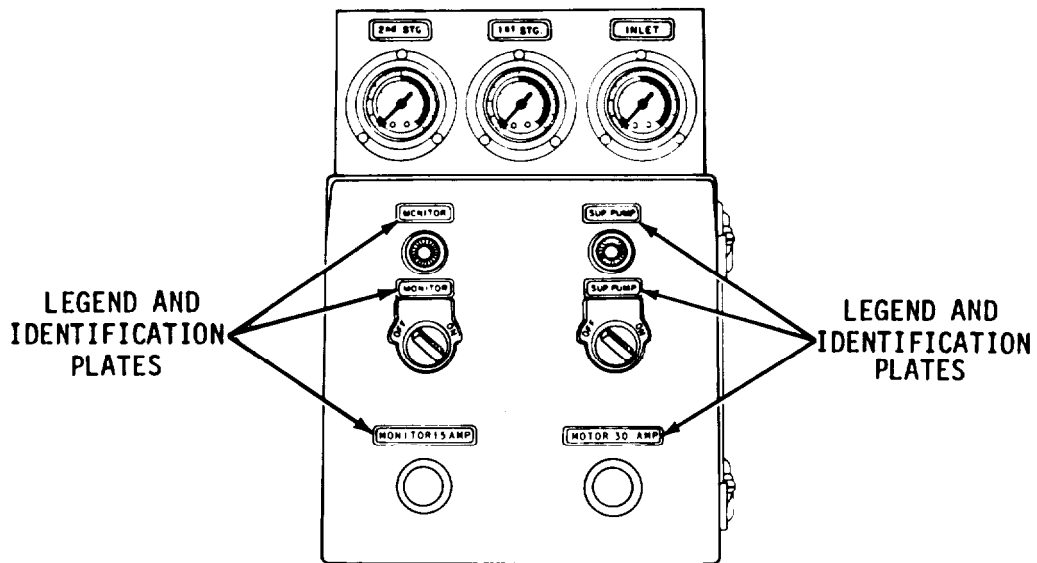
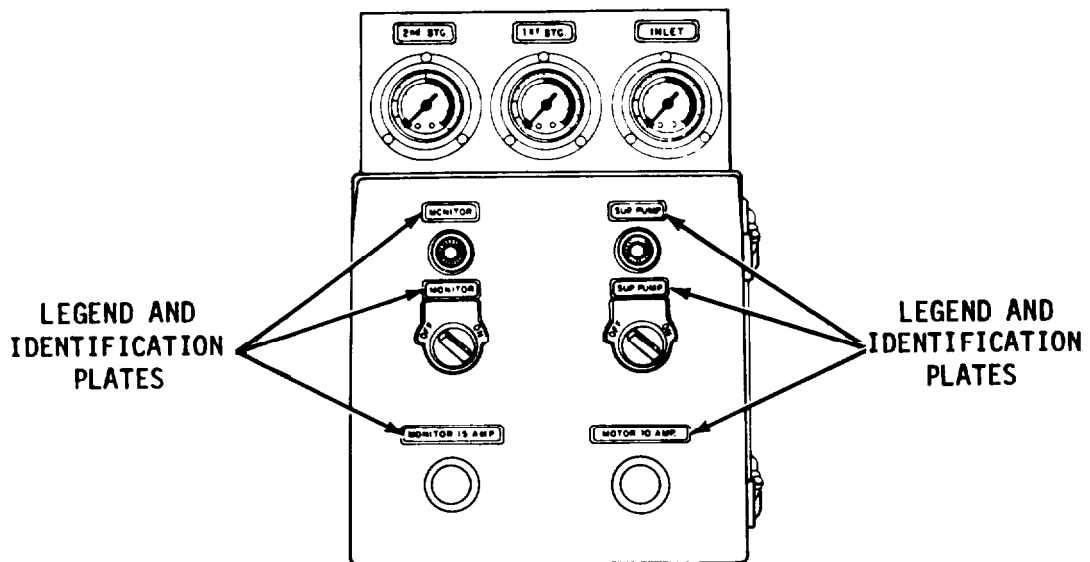


Figure 3-9. Legend and Identification Plates - Type B Separator.

3-12. CONTROL BOX LEGEND and IDENTIFICATION PLATES (#) (Continued).



View A - Type C Separator



View B - Type D Separator

Figure 3-10. Legend and Identification Plates.

3-12. CONTROL BOX LEGEND and IDENTIFICATION PLATES (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Removal

1.	Legend and identification plate	Lift up to remove.	Remove and discard only if illegible.
----	--	---------------------------	--

Cleaning

WARNING

Dry cleaning solvent, Fed. Spec. P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame, or excessive heat. Flash point of solvent is 100⁰ - 138⁰ F (38 - 59⁰ C).

Clean legend and identification plate mounting surface with clean cloth dampened in cleaning solvent P-D-680 to remove any remaining adhesive or other matter.

Repair

Replace missing or illegible legend and identification plates with serviceable-like item

Installation

2.	Legend and identification plates	Press on using finger pressure.	
----	---	--	--

3-13. CONTROL BOX INVERTER, TYPE B SEPARATOR (Continued).

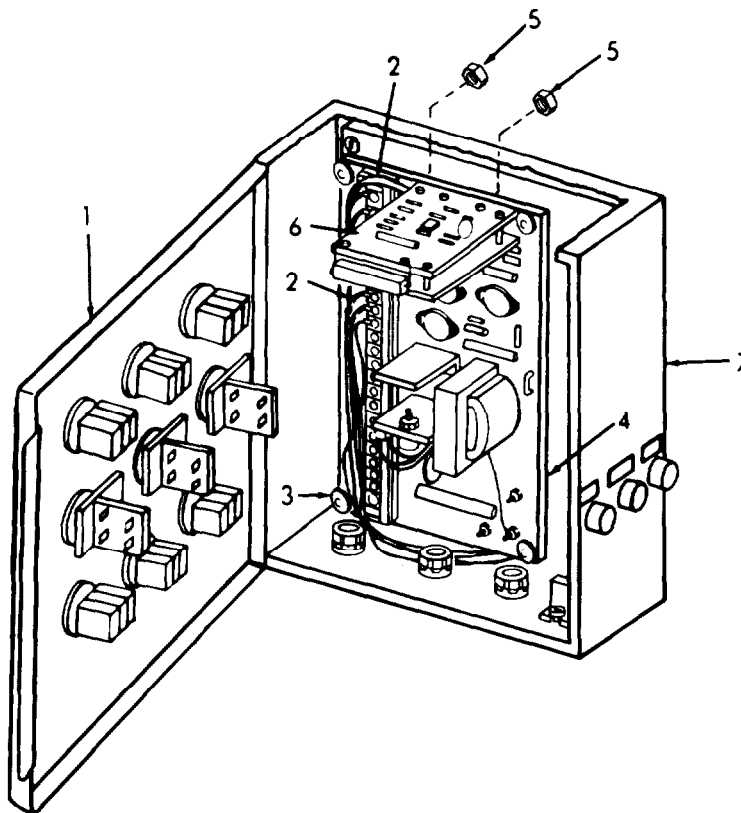
LOCATION	ITEM	ACTION	REMARKS
5.	Inverter (6)	Remove two nuts (5). Remove inverter (6) from circuit board (4).	Evacuate to Direct Support Maintenance.

Repair

Replace inverter with a serviceable like item.

Installation

- | | | |
|----|---------------------------|--|
| 6. | Inverter | a. Position inverter (6) in place on circuit board (4).
b. Secure with nuts (5). |
| 7. | Printed circuit board (4) | a. Secure to control box (7) with knurled nuts (3).
b. Reconnect leads (2) and close door (1) and lock.
c. Turn ON electrical power. |



1. Control Box Door
2. Wiring
3. Knurled Nuts
4. Circuit Board
5. Nuts
6. Inverter
7. Control Box

3-14. CONTROL BOX CIRCUIT BOARD, TYPE B SEPARATOR.

This task covers:

- a. Removal
- b. Repair/Replace
- c. Installation

INITIAL SETUP

Test Equipment
None

Tool Kit, Tools General Mechanics

Material/Parts Equipment Condition
Circuit board

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

WARNING

Electrical shock or serious injury may result if internal power is not shut off prior to servicing this assembly.

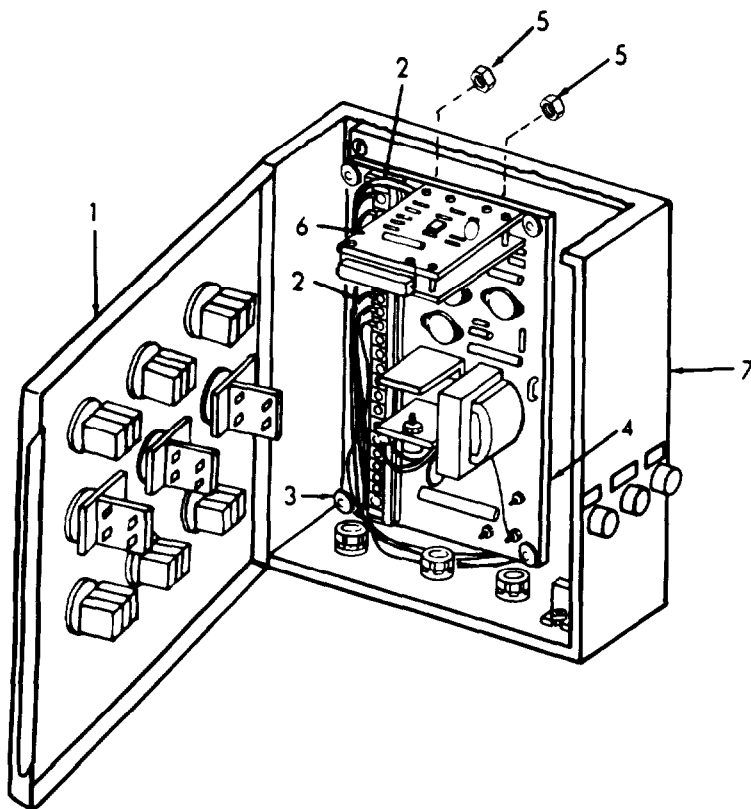
Removal

- | | | | |
|----|----------------------|---|--|
| 1. | Electric power | Turn OFF. | |
| 2. | Control box door (1) | Open. | |
| 3. | Wiring (2) | Tag and disconnect as necessary. | |
| 4. | Circuit board (4) | a. Remove four knurled nuts (3) from circuit board (4). | |

3-14. CONTROL BOX CIRCUIT BOARD, TYPE B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|----|----------|---|--|
| | | b. Remove circuit board (4) from control box (7). | |
| 5. | Inverter | Remove nuts (5) and remove inverter (6) from circuit board (4). | |



1. Control Box Door
2. Wiring
3. Knurled Nuts
4. Circuit Board
5. Nuts
6. Inverter
7. Control Box

Repair

Replace damaged or defective circuit board with a serviceable-like item.

NOTE

Evacuate circuit board to General Support Maintenance for disposition.

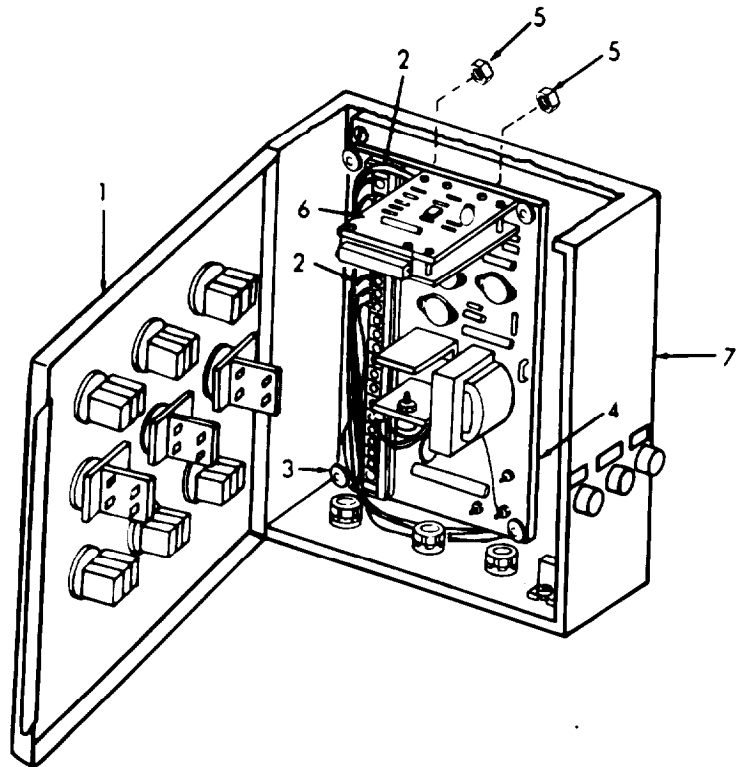
3- 14. CONTROL BOX CIRCUIT BOARD, TYPE B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Installation

- | | | | |
|----|----------------------|---|--|
| 6. | Inverter
(6) | Secure to circuit board (4)
with nuts (5). | |
| 7. | Circuit
board (4) | Position in control box (7)
and secure with knurled nuts
(3). | |
| 8. | Wiring (2) | Reconnect, close door (1)
and lock. | |

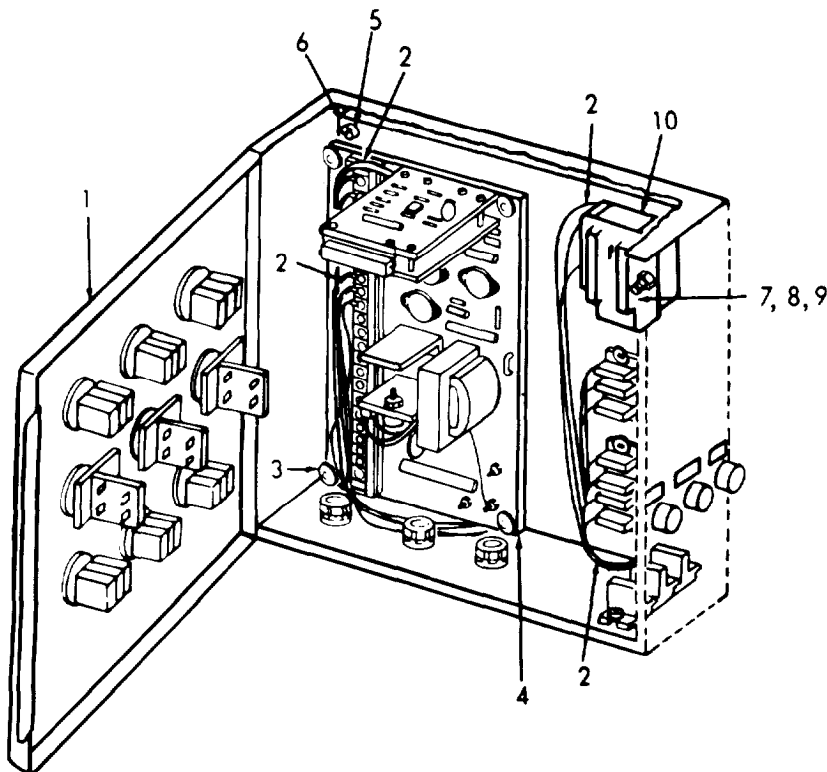
- 1. Control Box Door
- 2. Wiring
- 3. Knurled Nuts
- 4. Circuit Board
- 5. Nuts
- 6. Inverter
- 7. Control Box



- | | | | |
|----|-------------------|----------|--|
| 9. | Electric
power | Turn ON. | |
|----|-------------------|----------|--|

3-15. CONTROL BOX RELAY, TYPE B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
5.	Mounting plate (6)	a. Remove four screws (5). b. Remove plate (6).	Discard if defective.
6.	Relay (10)	Remove nuts (7), lockwashers (8) and screws (9).	Discard if defective.



- 1. Door
- 2. Wiring
- 3. Knurled Nut
- 4. Circuit Board
- 5. Screw
- 6. Mounting Plate
- 7. Nut
- 8. Lockwasher
- 9. Screw
- 10. Relay

Repair

Replace relay or mounting plate with a serviceable-like item.

3-15. CONTROL BOX RELAY, TYPE B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

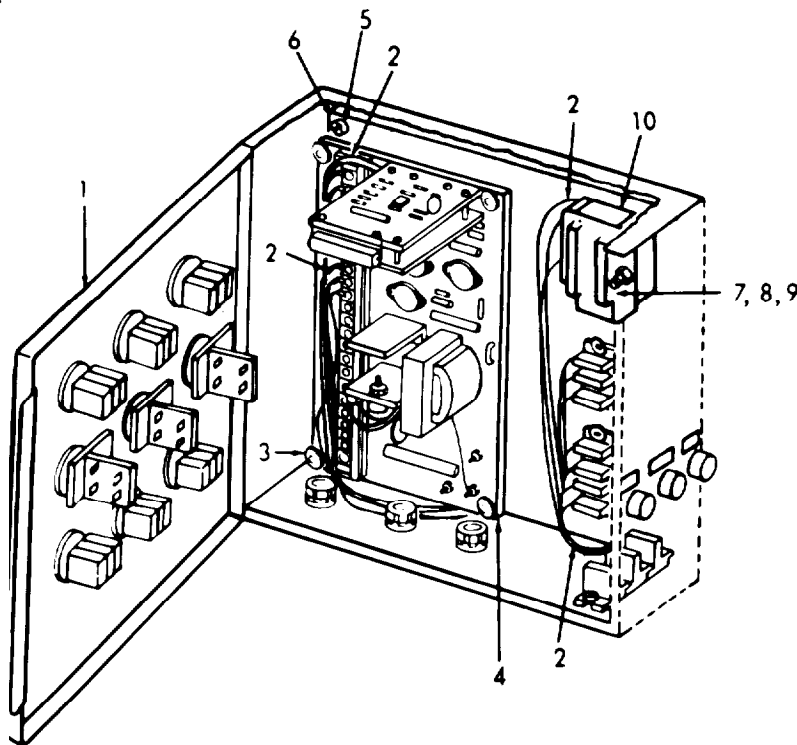
Installation

- | | | | |
|-----|-------------------------|--|--|
| 7. | Relay
(10) | a. Position in place on mounting plate (6).

b. Secure with screws (9) lockwashers (8) and nuts (7). | |
| 8. | Mounting plate
(6) | Secure to mounting studs with four screws (5). | |
| 9. | Circuit board (4) | a. Place in position on mounting plate (6).

b. Secure with knurled nuts (3). | |
| 10. | Wiring
(2) | Reconnect. | |
| 11. | Control box door
(1) | Close and lock. | |

- 1. Door
- 2. Wiring
- 3. Knurled Nut
- 4. Circuit Board
- 5. Screw
- 6. Mounting Plate
- 7. Nut
- 8. Lockwasher
- 9. Screw
- 10. Relay



- | | | | |
|-----|----------------|----------|--|
| 12. | Electric power | Turn ON. | |
|-----|----------------|----------|--|

3-16. CONTROL BOX TERMINALS, TYPE B SEPARATOR.

This task covers:

- a. Removal b. Repair/Replace c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Terminals

Equipment Condition

Personnel Required

LOCATION	ITEM	ACTION	REMARKS
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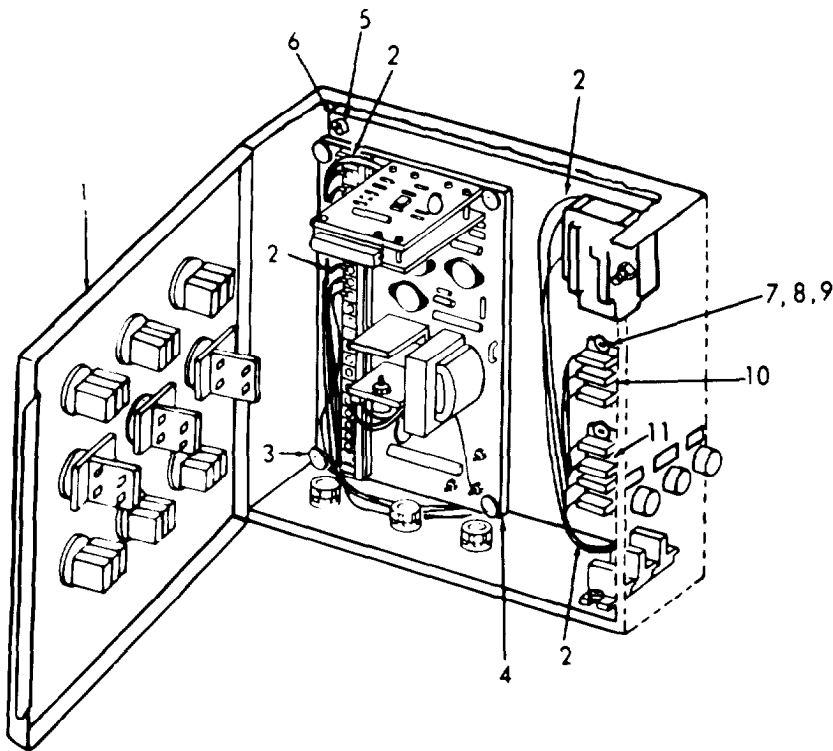
Electrical shock or serious injury may result if internal power is not shut off prior to servicing this assembly.

Removal

- | | | |
|----|----------------------|--|
| 1. | Electric power | Turn OFF. |
| 2. | Control box door (1) | Open. |
| 3. | Wiring (2) | Tag and disconnect as necessary. |
| 4. | Circuit board (4) | a. Remove four knurled nuts (3) from circuit board.
b. Remove circuit board (4) from control box. |

3-16. CONTROL BOX TERMINALS, TYPE B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
5.	Mounting plate (6)	a. Remove four screws (5). b. Remove plate (6).	
6.	Terminal (10)	a. Remove nuts (7) lockwashers (8) and screws (9). b. Remove terminals (10). c. Remove other terminal (11) in the same manner.	Terminals are in interlocking sections. Separate sections. Discard defective sections.



- 1. Door
- 2. Wiring
- 3. Knurled Nut
- 4. Circuit Board
- 5. Screw
- 6. Mounting Plate
- 7. Nut
- 8. Lockwasher
- 9. Screw
- 10. Terminal
- 11. Terminal

Repair

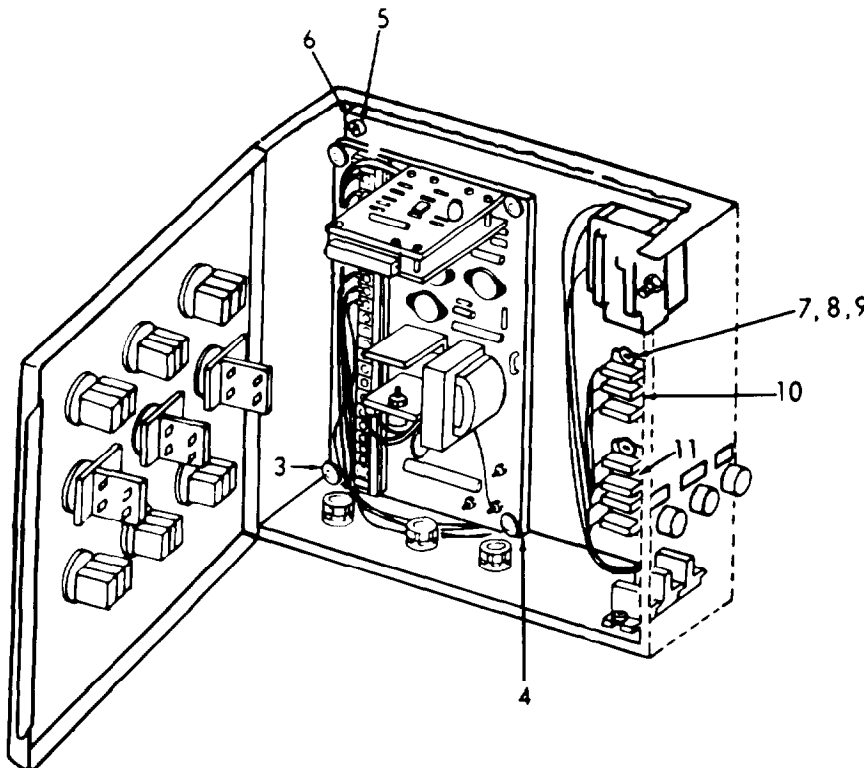
Replace defective terminal section(s) with a serviceable-like item.

3-16. CONTROL BOX TERMINALS, TYPE B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Installation

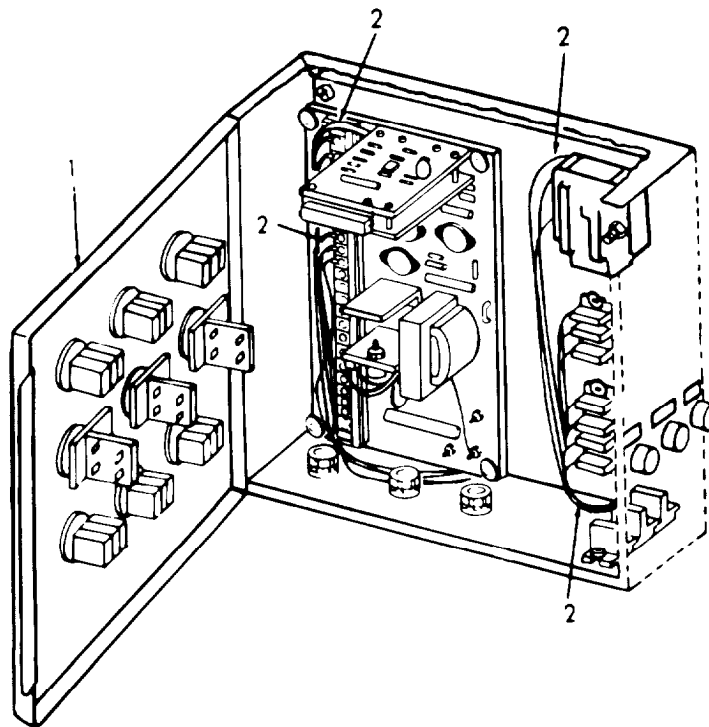
7.	Terminal (10)	a. Position terminal (10) on mounting plate (6). b. Secure with screws (9), lockwashers (8) and nuts (7).	Reassemble interlocking sections. Install other terminal (11) in same manner, if removed.
8.	Mounting plate (6)	Secure to mounting studs with four screws (5).	
9.	Circuit board (4)	a. Place in position on mounting plate (6). b. Secure with knurled nuts (3).	



- 3. Knurled Nut
- 4. Circuit Board
- 5. Screw
- 6. Mounting Plate
- 7. Nut
- 8. Lockwasher
- 9. Screw
- 10. Terminal
- 11. Terminal

3-16. CONTROL BOX TERMINALS, TYPE B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
10.	Wiring (2)	Reconnect.	
11.	Control box door (1)	Close and lock.	



- 1. Control Box Door
- 2. Wiring

12. Electric power Turn ON.

3-17. CONTROL BOX CIRCUIT BOARD, TYPE A SEPARATOR.

This task covers:

- a. Removal b. Repair/Replace c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Circuit board

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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Electrical shock or serious injury may result if internal power is not shut off prior to servicing this assembly.

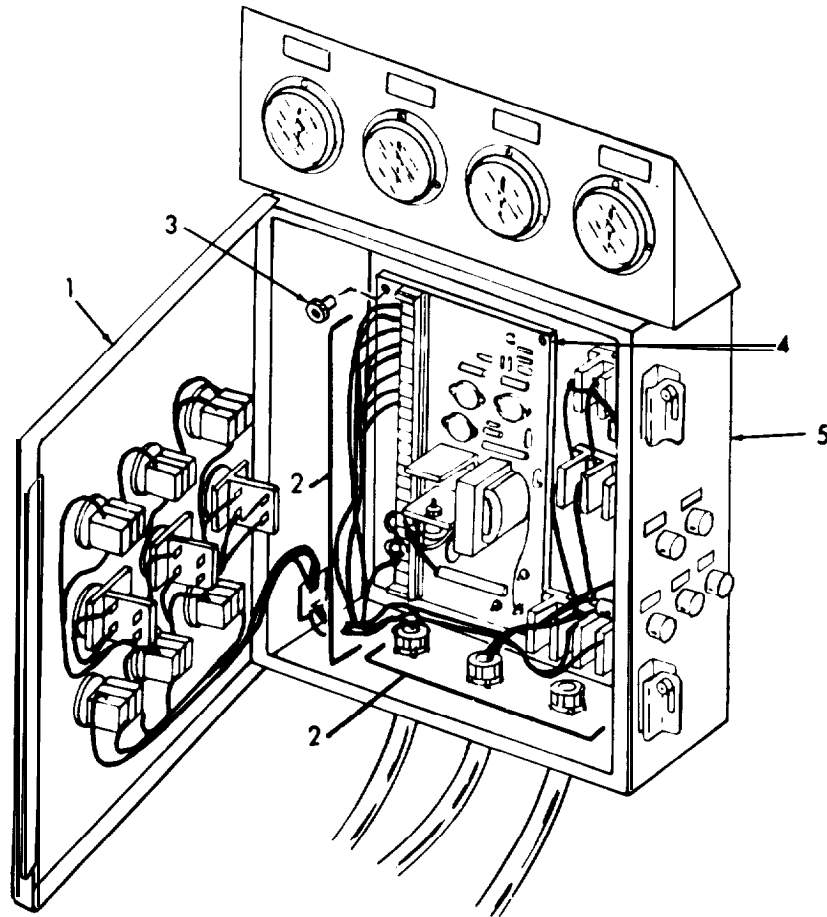
Removal

- | | | |
|----|----------------------|--|
| 1. | Electric power | Turn OFF. |
| 2. | Control box door (1) | Open. |
| 3. | Wiring (2) | Tag and disconnect as necessary. |
| 4. | Circuit board (4) | a. Remove four knurled nuts (3) from board.

b. Remove circuit board (4) from control box (5). |

3-17. CONTROL BOX CIRCUIT BOARD, TYPE A SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 1. Control Box Door
- 2. Wiring
- 3. Knurled Nuts
- 4. Circuit Board
- 5. Control Box

Repair

Replace defective circuit board with a serviceable-like item

NOTE

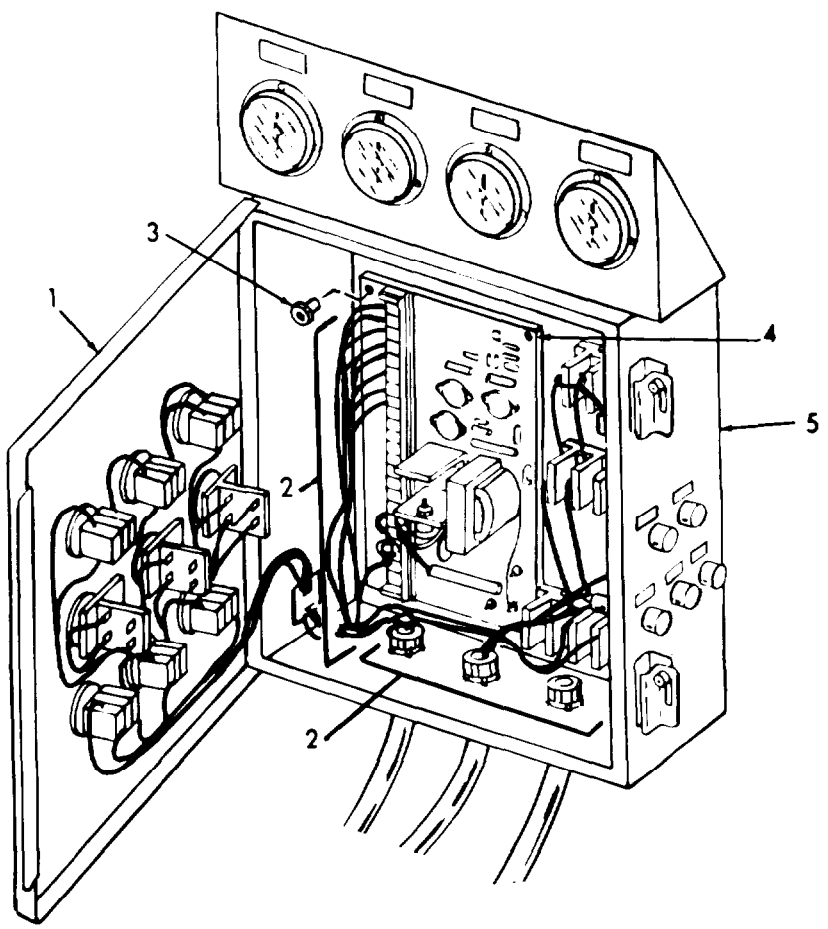
Evacuate circuit board to General Support Maintenance for disposition.

3-17. CONTROL BOX CIRCUIT BOARD, TYPE A SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Installation

- | | | | |
|----|----------------------|--|--|
| 5. | Circuit board (4) | Position in control box (5), secure with knurled nuts (3). | |
| 6. | Wiring (2) | Reconnect. | |
| 7. | Control box door (1) | Close and lock. | |



- 1. Control Box Door
- 2. Wiring
- 3. Knurled Nuts
- 4. Circuit Board
- 5. Control Box

- | | | | |
|----|----------------|----------|--|
| 8. | Electric power | Turn ON. | |
|----|----------------|----------|--|

3- 18. CONTROL BOX TERMINALS, TYPE A SEPARATOR.

This task covers:

- a. Removal b. Repair/Replace c. Installation

INITIAL SETUP

Test Equipment
None

Tool Kit, Tools General Mechanics

Material/Parts Terminal Sections Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



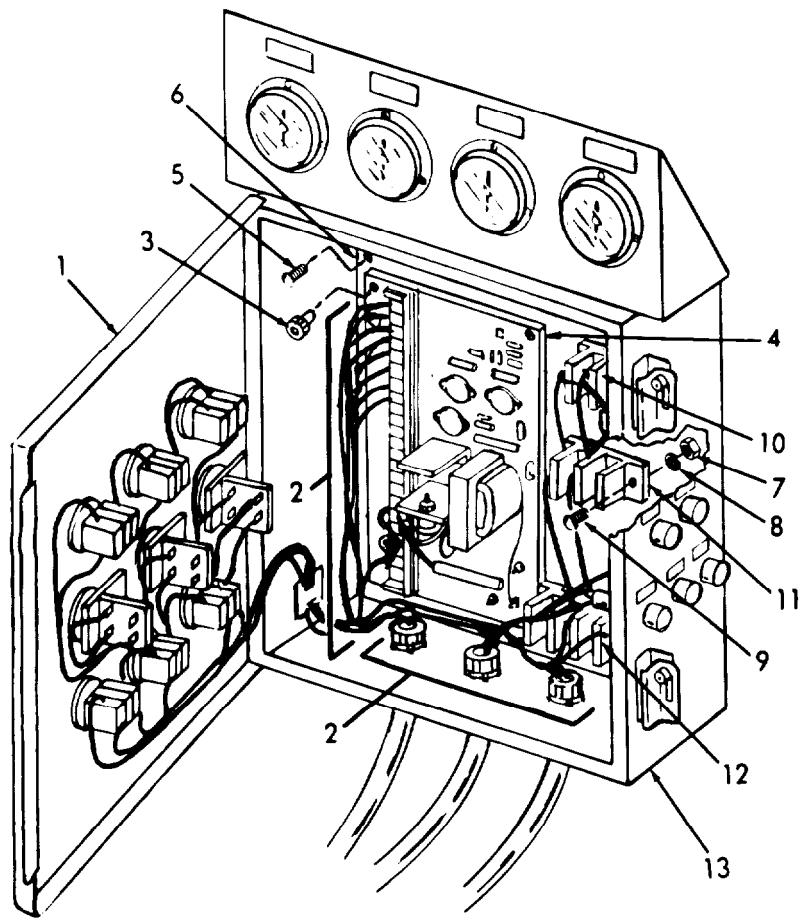
Electrical shock or serious injury may result if internal power is not shut off prior to servicing this assembly.

Removal

- | | | |
|----|----------------------|---|
| 1. | Electric power | Turn OFF. |
| 2. | Control box door (1) | Open. |
| 3. | Wiring (2) | Tag and disconnect as necessary. |
| 4. | Circuit board (4) | a. Remove four knurled nuts (3) from board.
b. Remove circuit board (4) from control box (13). |

3-18. CONTROL BOX TERMINALS, TYPE A SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
5.	Mounting plate (6)	a. Remove four screws (5). b. Remove plate (6) from control box.	
6.	Terminals (10, 11 and 12)	a. Remove nuts (7), lockwashers (8) and screws (9). b. Remove terminals (10, 11 and 12). c. Separate sections.	Terminal sections are interlocking. Separate sections. Discard defective sections.



- 1. Control Box Door
- 2. Wiring
- 3. Knurled Nuts
- 4. Circuit Board
- 5. Screws
- 6. Mounting Plate
- 7. Nuts
- 8. Lockwashers
- 9. Screws
- 10. Terminal
- 11. Terminal
- 12. Terminal
- 13. Control Box

3-18. CONTROL BOX TERMINALS, TYPE A SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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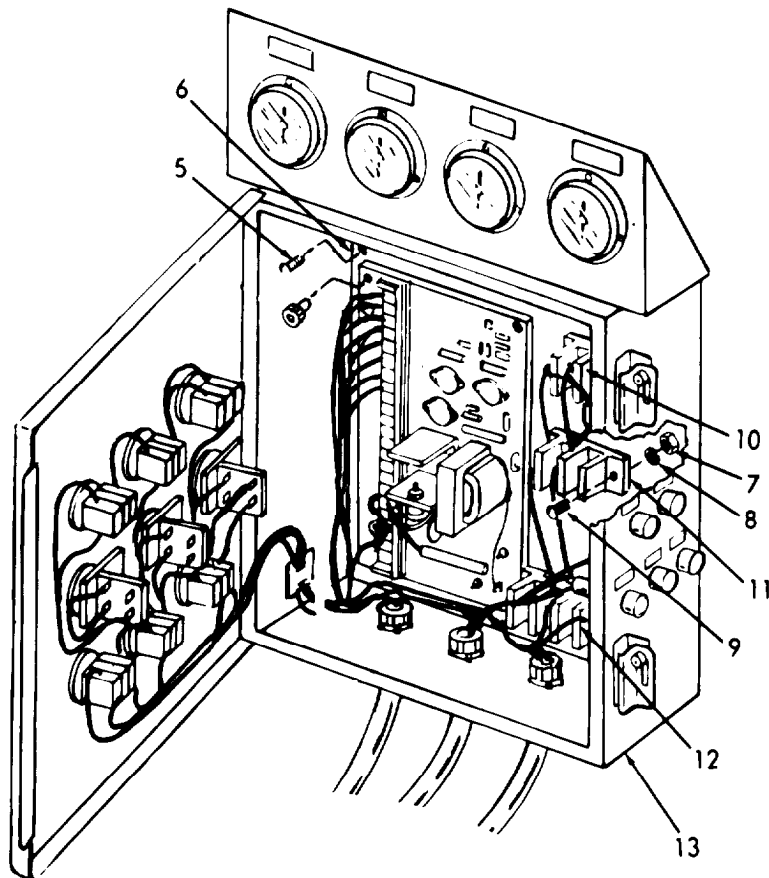
Repair

Replace defective terminal section(s) with a serviceable-like item.

Installation

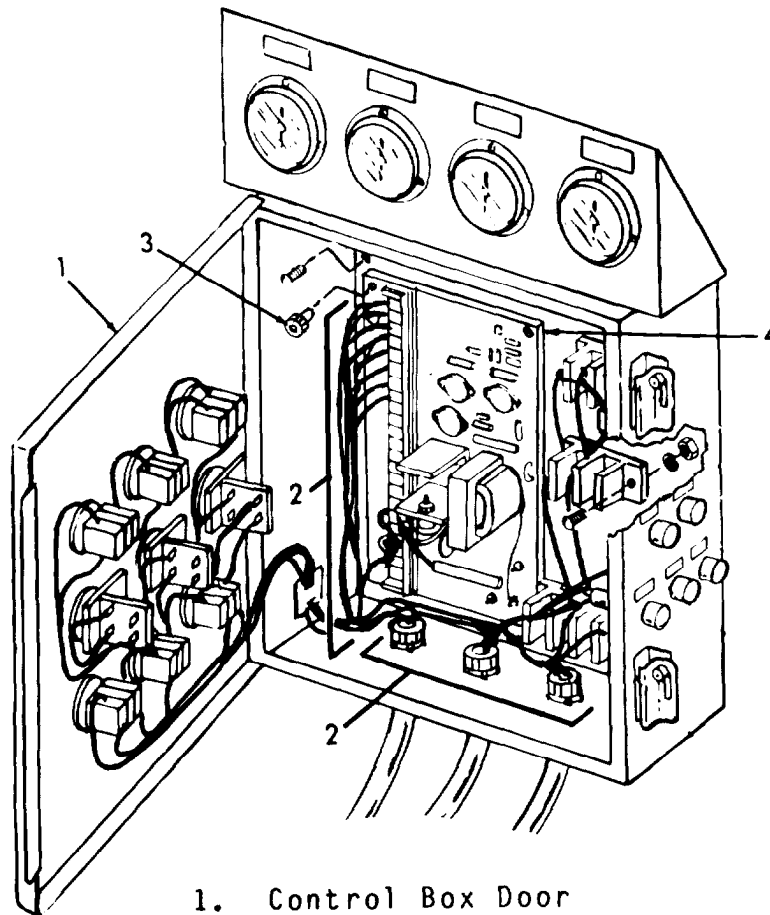
- | | | |
|----|-----------------------------------|--|
| 7. | Terminal sections (10, 11 and 12) | a. Assemble if separated.
b. Install on mounting plate (6) with screws (9), lockwashers (8) and nuts (7). |
| 8. | Mounting plate (6) | a. Position in control box (13).
b. Secure with four screws (5). |

- 5. Screws
- 6. Mounting Plate
- 7. Nuts
- 8. Lockwashers
- 9. Screws
- 10. Terminal
- 11. Terminal
- 12. Terminal
- 13. Control Box



3-18. CONTROL BOX TERMINALS, TYPE A SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
9.	Circuit board (4)	a. Position in control box. b. Secure with knurled nuts (3).	
10.	Wiring (2)	Reconnect.	
11.	Control box door (1)	Close and lock.	



- 1. Control Box Door
- 2. Wiring
- 3. Knurled Nuts
- 4. Circuit Board

12.	Electric power	Turn ON.	
-----	----------------	----------	--

3-19. CONTROL BOX WIRING, TYPE A AND B SEPARATORS.

This task covers:

Removal and Repair

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics
Soldering Iron
Crimping Tool

Material/Parts
Solder
Appendix C, Item No. 3
Wire
Appendix C, Item No. 8
Tywraps

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



Electrical shock or serious injury may result if internal power is not shut off prior to servicing this assembly.

- | | | | |
|----|----------------------|--|----------|
| 1. | Electric power | Turn OFF. | |
| 2. | Control box door (1) | Open. | |
| 3. | Faulty wires | a. Remove tywrap(s) (2), as necessary. | Discard. |

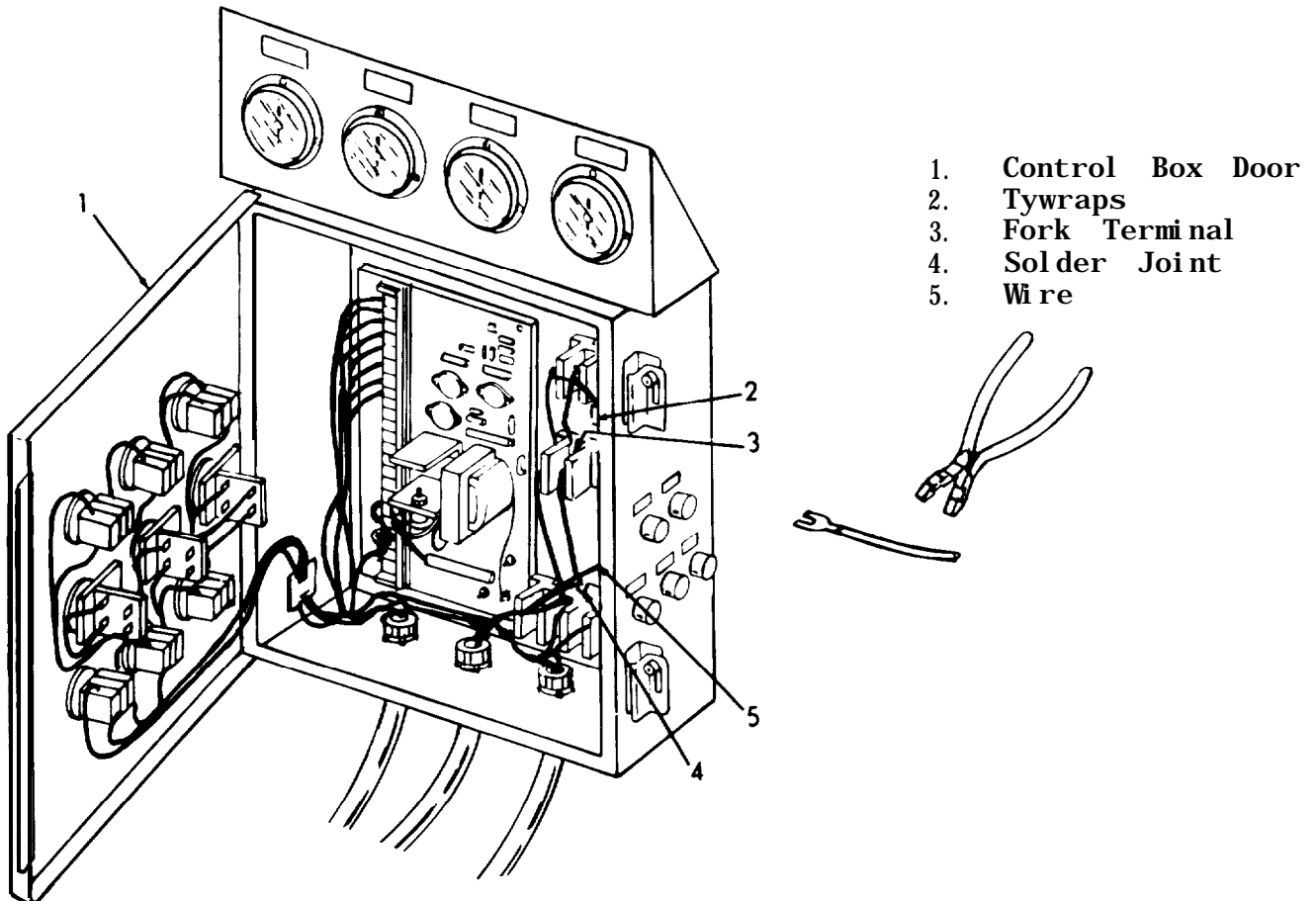
3-19. CONTROL BOX WIRING, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

CAUTION

Soldering iron rating should not exceed 40 W.

- | | |
|---|--|
| <ul style="list-style-type: none"> b. Disconnect fork terminal (3) or unsolder solder joint (4) from component. c. Select new wire (5) of same size, length and color as faulty wire. d. Place new wire in harness. e. Remove old wire. | <ul style="list-style-type: none"> Un solder in accordance with MIL-STD-454, Requirement 5 Wipe off excess solder. Discard. |
|---|--|



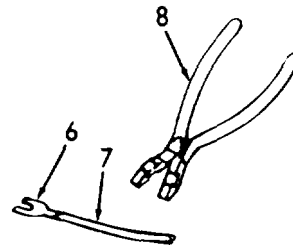
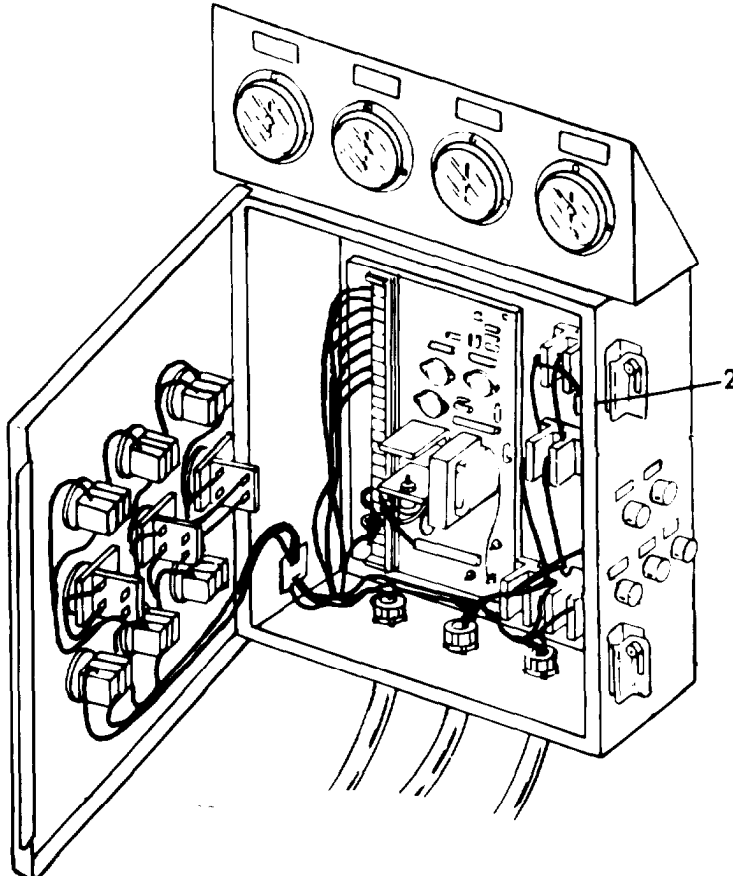
3-19. CONTROL BOX WIRING, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

CAUTION

Soldering iron rating should not exceed 40 W.

- | | | | |
|----|-----------------------|--|---|
| 4. | Faulty fork terminals | <ul style="list-style-type: none"> f. Install new crimp terminal(s) (6) and connect to terminal with screw or solder wire to proper component g. Install new tywraps a. Remove tywraps (2) as necessary. b. Cut wire (7) next to terminal (6). | <p>Crimping tool and/or soldering iron is required. Use solder Sn60 and solder in accordance with MIL-STD-454, Requirement 5.</p> <p>Use diagonal cutting pliers (8).</p> |
|----|-----------------------|--|---|



- 2. Tywraps
- 6. Terminal
- 7. Wire
- 8. Cutting Pliers

3-19. CONTROL BOX WIRING, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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c. Strip about 1/4 inch (6.35 mm) insulation from end of wire (7).

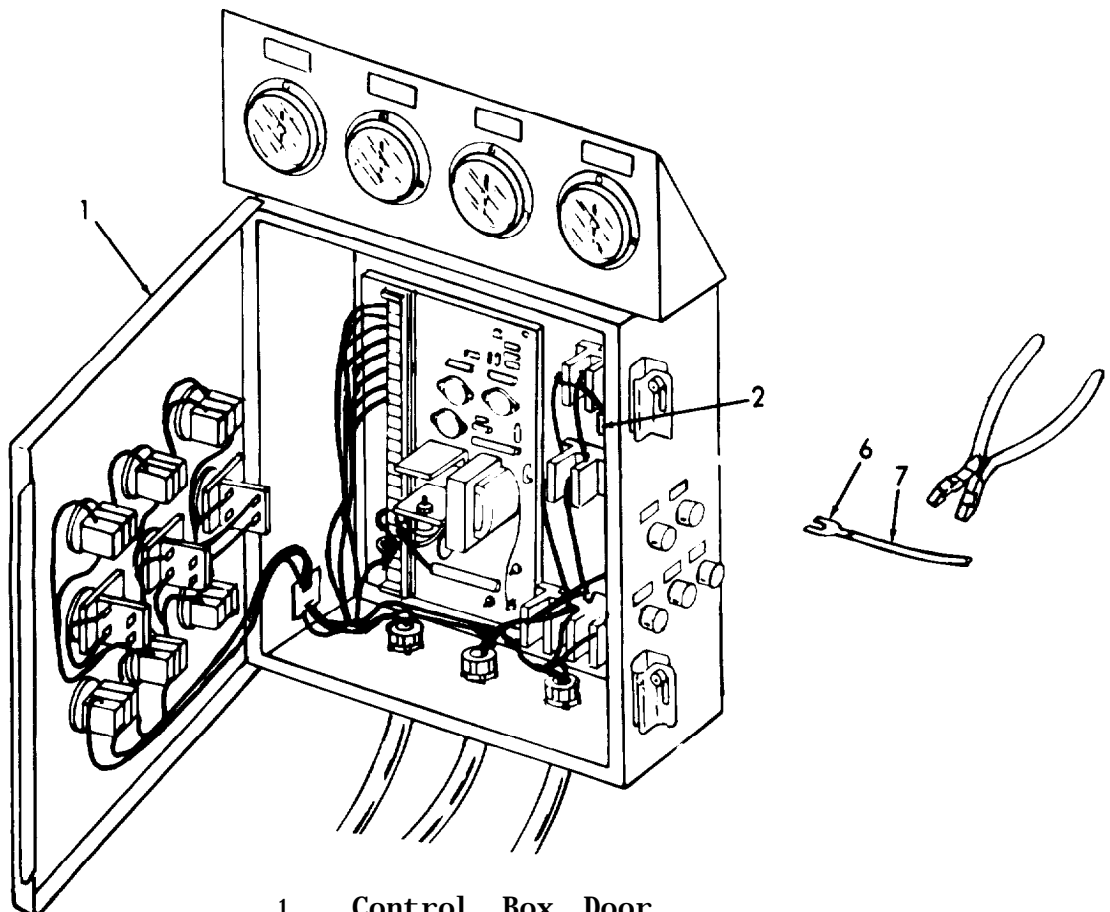
d. Insert bare wire (7) into terminal (6).

e. Crimp new terminal(s) to wire. Use crimping tool.

f. Install new tywraps (2).

g. Close door (1) and lock.

h. Turn on electric power.



- 1. Control Box Door
- 2. Tywraps
- 6. Terminal
- 7. Wire

3-20. CONTROL BOX, TYPE A AND B SEPARATORS.

This task covers:

- a. Removal b. Repair/Replace c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Door seal
Control box
Paint MIL-P-23236 Type II Class 1
Appendix C, Item No. 4

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



Electrical shock or serious injury may result if outside power is not shut off prior to servicing this assembly.

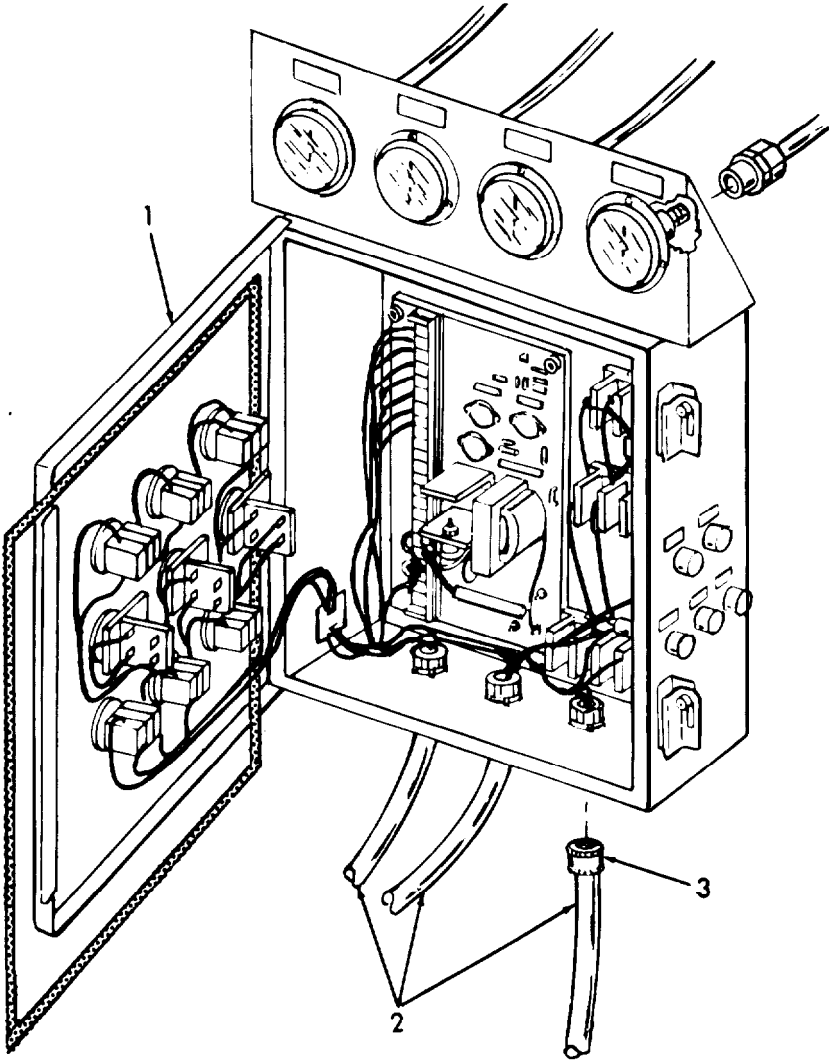
Removal

- | | | |
|----|-------------------------|-------------------------------------|
| 1. | Electric power | Turn OFF. |
| 2. | Control box door
(1) | Open. |
| 3. | Wiring
(2) | Tag and disconnect internal wiring. |

3-20. CONTROL BOX, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|----|------------------|---|--|
| 4. | Connector
(3) | a. Unscrew.
b. Withdraw wiring from control box. | |
|----|------------------|---|--|



- 1. Control Box Door
- 2. Wiring
- 3. Connector

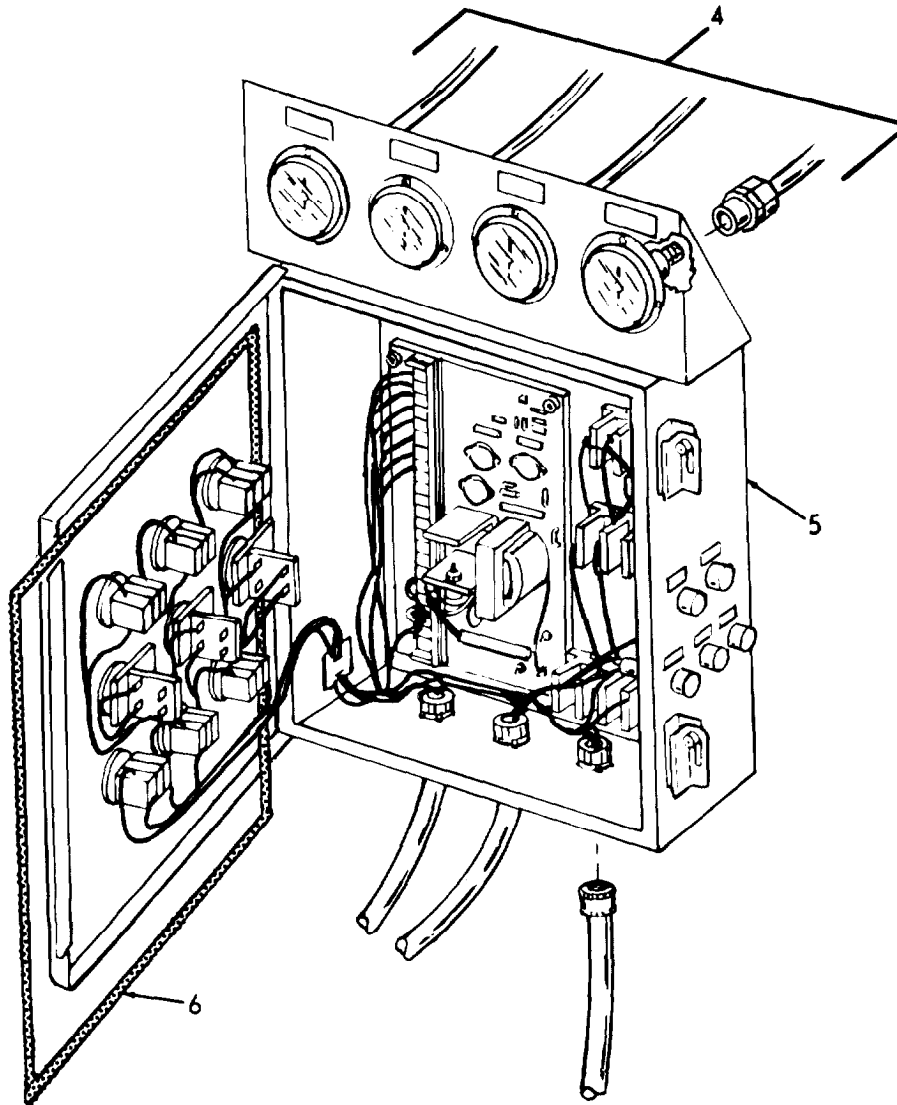
- | | | | |
|----|--------------|------------------------------------|--|
| 5. | Fuse holders | Refer to paragraph 3-8 and remove. | |
|----|--------------|------------------------------------|--|

3-20. CONTROL BOX, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
6.	Indicator lights	Refer to paragraph 3-10 and remove.	
7.	Switches	Refer to paragraph 3-11 and remove.	
8.	Circuit board (Type A separator)	Refer to paragraph 3-17 and remove.	
	Circuit board (Type B separator)	Refer to paragraph 3-14 and remove.	
9.	Relay (Type B separator only)	Refer to paragraph 3-15 and remove.	
10.	Terminals (Type A separator)	Refer to paragraph 3-18 and remove.	
	Terminals (Type B separator)	Refer to paragraph 3-16 and remove.	
11.	Air lines (4)	Disconnect from pressure gauges.	
12.	Control box (5)	Remove from mounting and lay on suitable workbench.	
13.	Door seal (6)	Remove from door.	

3-20. CONTROL BOX, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 4. Air Lines
- 5. Control Box
- 6. Door Seal

Repair

Weld small cracks. Straighten small dents by hammering "out". Spot paint.

Installation

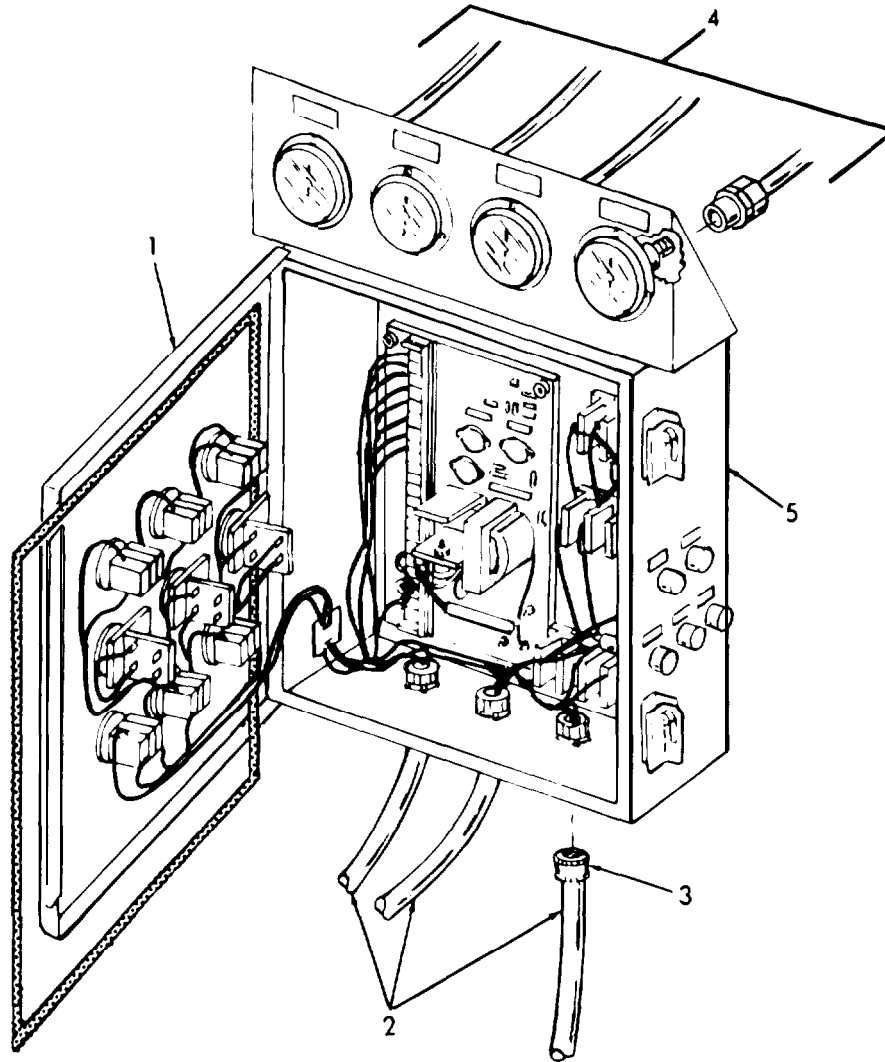
- | | | |
|-----|---------------|-------------------------|
| 14. | Door seal (6) | Install using adhesive. |
|-----|---------------|-------------------------|

3-20. CONTROL BOX, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
15.	Terminals (Type A separator)	Refer to paragraph 3-18 and install.	
	Terminals (Type B separator)	Refer to paragraph 3-16 and install.	
16.	Relay Type B separator only	Refer to paragraph 3-15 and install.	
17.	Circuit board Type A separator	Refer to paragraph 3-17 and install.	
	Circuit board Type B separator	Refer to paragraph 3-14 and install.	
18.	Switches	Refer to paragraph 3-11 and install.	
19.	Indicator lights	Refer to paragraph 3-10 and install.	
20.	Fuse holders	Refer to paragraph 3-8 and install.	
21.	Control box (5)	Mount in place.	
22.	Wiring (2)	a. Insert into control box. Tighten connector (3). b. Reconnect internal wiring.	
23.	Control box door (1)	Close and lock.	
24.	Air lines (4)	Reconnect to pressure gauges.	

3- 20. CONTROL BOX, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 1. Control Box Door
- 2. Wiring
- 3. Connector
- 4. Air Lines
- 5. Control Box

25.	Electric power	Turn ON.	
-----	----------------	----------	--

3- 21. FLOW RATE INDICATOR, TYPE A AND B SEPARATORS.

This task covers:

- a. Inspect
- b. Service
- c. Removal
- d. Repair/Replace
- e. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
0" rings
Flow rate indicator

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Inspection

- | | | | |
|----|---|--|--|
| 1. | Indicator glass
Indicator and piping | a. Inspect for poor visibility.
b. Evidence of leaking. | |
|----|---|--|--|

Service

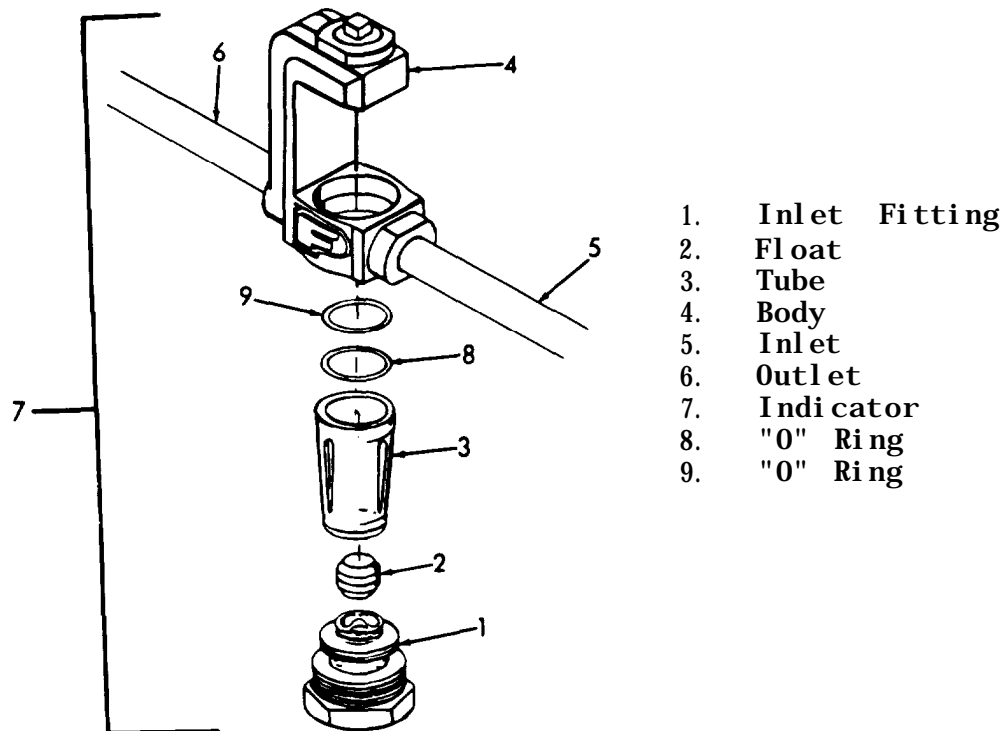
CAUTION

Exercise care when removing the inlet fitting as the float and tube are free to fall out of the meter body.

- | | | | |
|----|----------------------|--|----------|
| 2. | Inlet fitting
(1) | a. Remove.
b. Remove "0" rings (8 and 9). | Discard. |
|----|----------------------|--|----------|

3-21. FLOW RATE INDICATOR, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
3.	Tube (3) and float (2)	a. Remove. b. Clean float and tube using a clean cloth, detergent and water. c. Insert tube (3) into body (4). d. Insert float (2) into tube (3). e. Install "O" rings (8 and 9 in inlet fitting). f. Install inlet fitting (1).	
4.	Piping and indicator	Remove inlet (5) and outlet (6) piping as necessary freeing indicator (7).	

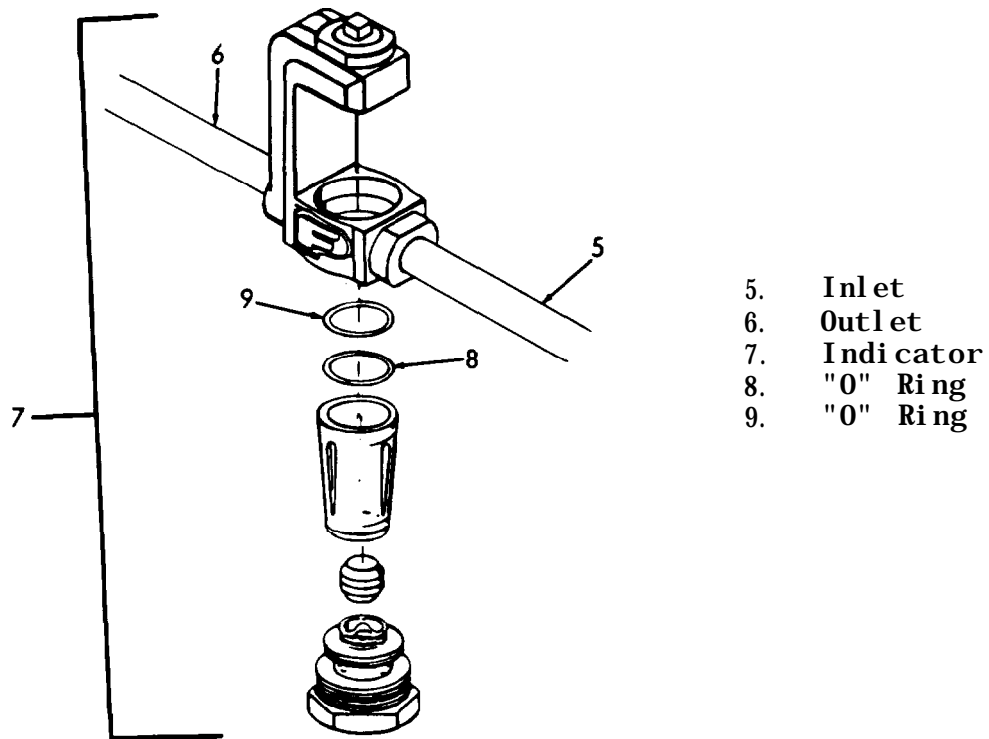


3-21. FLOW RATE INDICATOR, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
	Repair	Replace defective "O" rings or flow rate indicator with a serviceable-like item.	
	Installation		
5.	Piping	a. Position flow rate indicator (7) in place. b. Install "O" rings (8 and 9). c. Install outlet (6) and inlet (5) piping to indicator.	

NOTE

The flow rate indicator should be as free as possible from piping strains.



**3-22. CONDUIT, CONNECTORS AND WIRING, TYPE A AND B SEPARATORS
(Continued).**

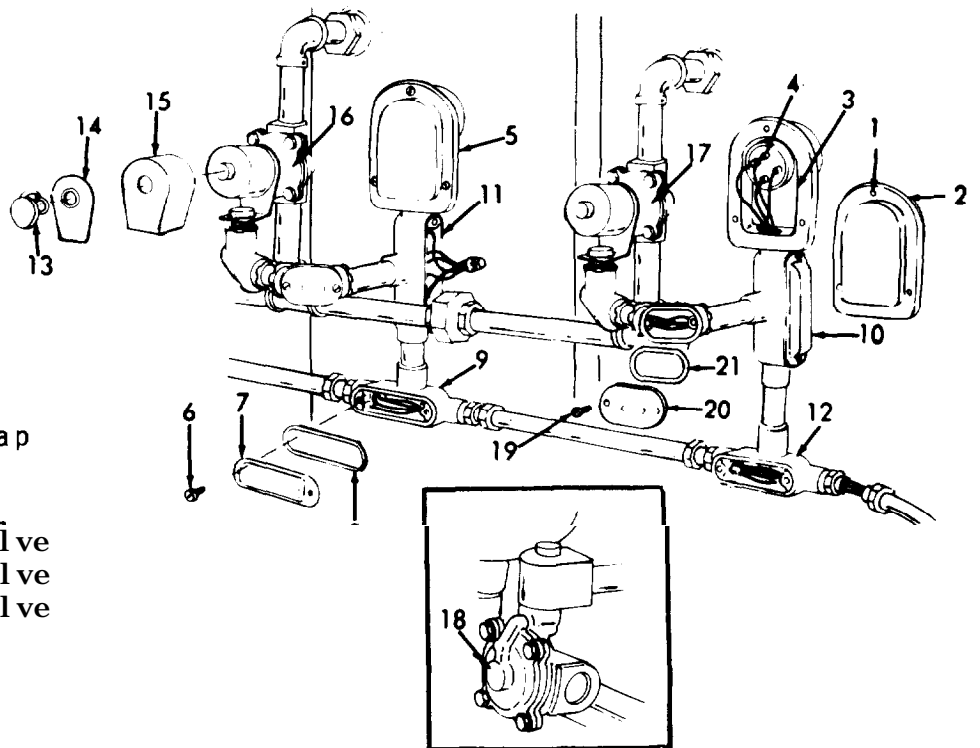
LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

NOTE

Remove second stage mini-probe cover (5) in same manner and disconnect terminals.

- | | | |
|----|--------------------------------------|---|
| 2. | Tee
(9, 10,
11 and,
12) | Remove screws (6), tee cover
(7), and gasket (8) from
tee's (9, 10, 11 and 12). |
| 3. | Solenoid
valve
housing
(15) | Remove retaining cap (13),
nameplate (14) and housing
(15) from solenoid valves
(16, 17 and 18). |
| 4. | Pulling
elbow
cover
(20) | Remove screws (19), cover
(20) and gasket (21). |

- 1. Screws
- 2. Cover
- 3. Gasket
- 4. Terminals
- 5. Cover
- 6. Screws
- 7. Tee Cover
- 8. Gasket
- 9. Tee
- 10. Tee
- 11. Tee
- 12. Tee
- 13. Retaining Cap
- 14. Nameplate
- 15. Housing
- 16. Solenoid Valve
- 17. Solenoid Valve
- 18. Solenoid Valve
- 19. Screws
- 20. Cover
- 21. Gasket



3-22. CONDUIT, CONNECTORS AND WIRING, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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NOTE

Remove covers from other five (5) pulling elbows in same manner.

- | | | |
|----|---------------------|--|
| 5. | Solenoid valve coil | <ul style="list-style-type: none"> a. Tag and disconnect leads (22) by removing connectors (23) from solenoid valves (16, 17 and 18). b. Unscrew locknut (24) from pulling elbow (25). c. Pull straight out on coil (26) to remove. |
|----|---------------------|--|

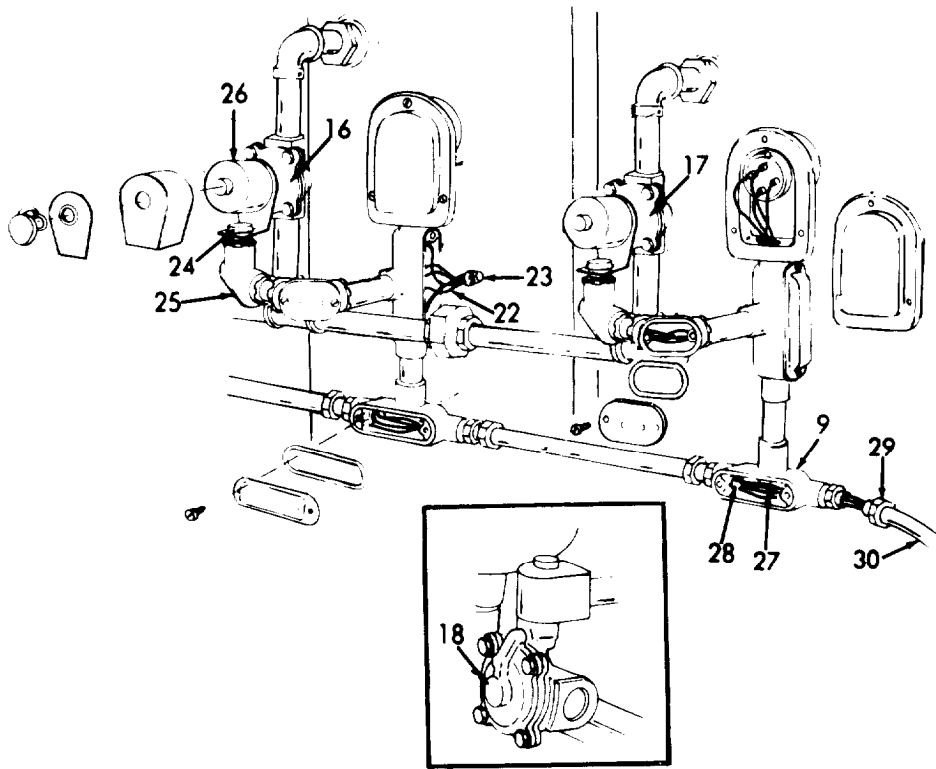
NOTE

Remove other two (2) solenoid valve coils in the same manner.

- | | | |
|----|------------------------------|---|
| 6. | SUPPLY pump motor leads (27) | <ul style="list-style-type: none"> a. Tag and disconnect. b. Remove connectors (28). c. Unscrew collar (29) and remove wiring and cable (30) from tee (9). |
|----|------------------------------|---|

**3-22. CONDUIT, CONNECTORS AND WIRING, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 9. Tee
- 16. Solenoid Valve
- 17. Solenoid Valve
- 18. Solenoid Valve
- 22. Leads
- 23. Connectors
- 24. Locknut
- 25. Elbow
- 26. Coil
- 27. Supply Pump Motor Leads
- 28. Connectors
- 29. Collar
- 30. Wiring and Cable

**3-22. CONDUIT, CONNECTORS AND WIRING, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
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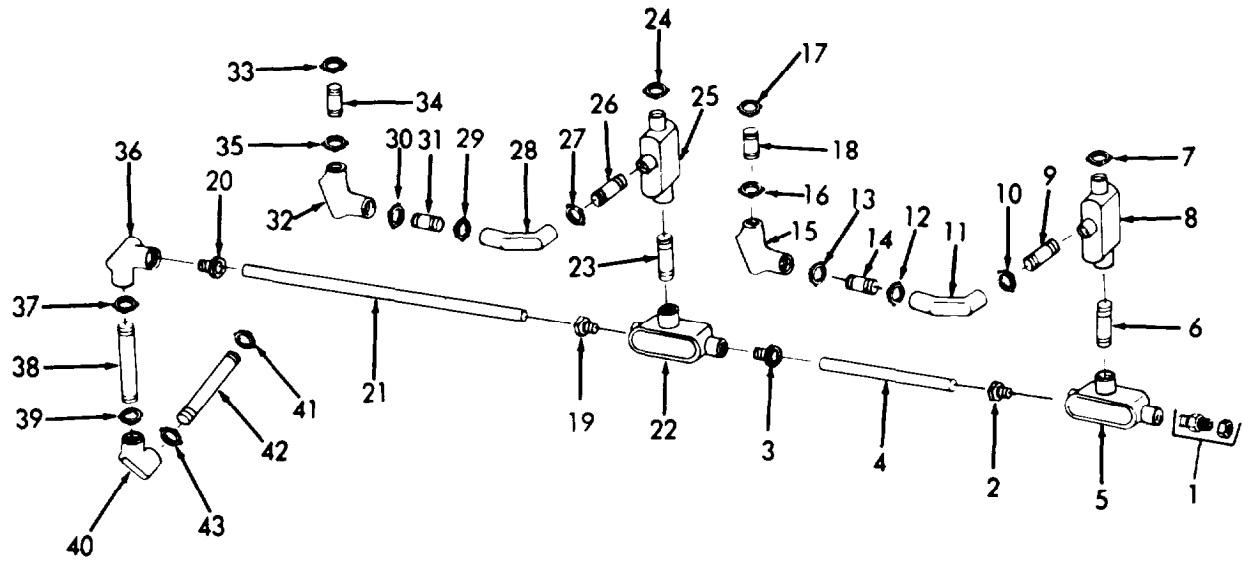
NOTE

Tag and disconnect individual wires and carefully remove each wire from the various electrical components.

- | | | | |
|----|------------------------|--|--|
| 7. | Conduit and connectors | <ul style="list-style-type: none"> a. Remove straight connectors (1, 2, and 3), conduit (4), tee(5), nipple (6), locknut (7), tee (8) nipple (9), and locknut (10). b. Remove pulling elbow (11) locknuts (12 and 13), nipple (14), pulling elbow (15), locknuts (16 and 17) and nipple (18). c. Remove straight connectors (19 and 20), conduit (21), tee (22), nipple (23), locknut (24) and tee (25). d. Remove nipple (26), locknut (27), pulling elbow (28), locknuts (29 and 30)s nipple (31), pulling elbow (32), locknut (33), nipple (34) and locknut (35). e. Remove pulling elbow (36), locknut (37), nipple (38), locknut (39), pulling elbow (40), locknut (41), nipple (42) and locknut (43). | |
|----|------------------------|--|--|

**3-22. CONDUIT, CONNECTORS AND WIRING, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- | | | | |
|-----|--------------------|-----|-----------------|
| 1. | Connectors | 23. | Ni pple |
| 2. | Connectors | 24. | Locknut |
| 3. | Connectors | 25. | Tee |
| 4. | Conduit | 26. | Ni pple |
| 5. | Tee | 27. | Locknut |
| 6. | Ni pple | 28. | Pull ing El bow |
| 7. | Locknut | 29. | Locknut |
| 8. | Tee | 30. | Locknut |
| 9. | Ni pple | 31. | Ni pple |
| 10. | Locknut | 32. | Pull ing El bow |
| 11. | Pull ing El bow | 33. | Locknut |
| 12. | Locknut | 34. | Ni pple |
| 13. | Locknut | 35. | Locknut |
| 14. | Ni pple | 36. | Pull ing El bow |
| 15. | Pull ing El bow | 37. | Locknut |
| 16. | Locknut | 38. | Ni pple |
| 17. | Locknut | 39. | Locknut |
| 18. | Ni pple | 40. | Pull ing El bow |
| 19. | Straight Connector | 41. | Locknut |
| 20. | Straight Connector | 42. | Ni pple |
| 21. | Conduit | 43. | Locknut |
| 22. | Tee | | |

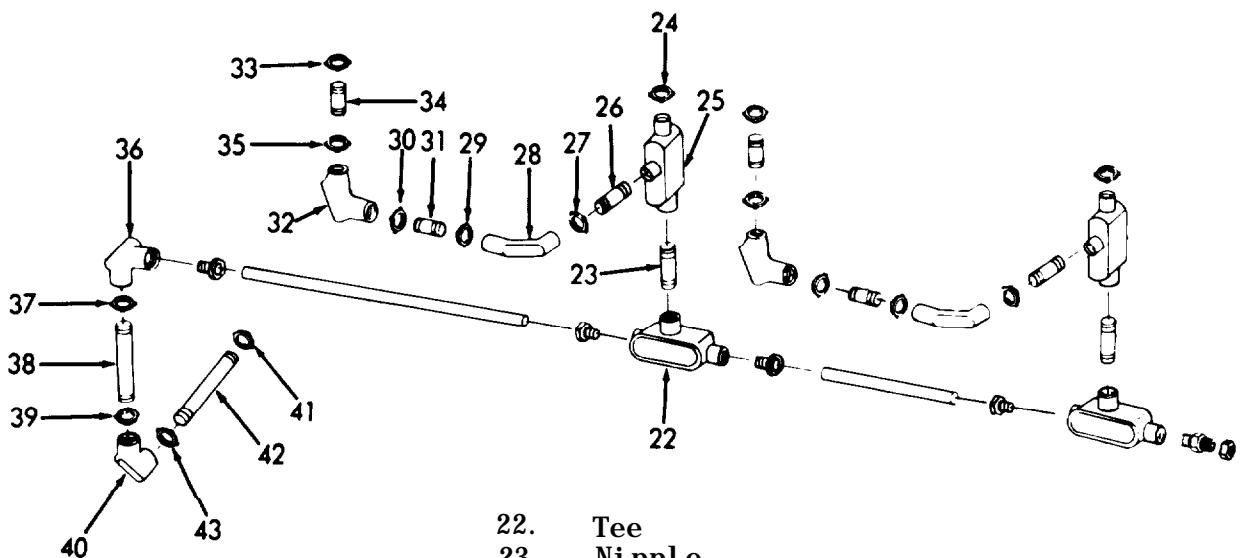
3-22. CONDUIT, CONNECTORS AND WIRING, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
Inspection		Inspect wiring for damaged insulation, conduit and connectors for serviceable condition.	
Repair		Tape damaged insulation using electricians tape and replace all damaged or defective conduit or connectors with a serviceable-like item.	
Installation			
8.	Conduit and connectors	<ul style="list-style-type: none"> a. Insert nipple (42) into 3rd stage water discharge valve baseplate and secure with locknut (41). b. Install pulling elbow (40) onto nipple (42). and secure with locknut (43). c. Insert nipple (38) into elbow (40) secure with locknut (39). Install pulling elbow (36) onto nipple (38) and secure with locknut (37). d. Insert nipple (34) into 2nd stage oil discharge valve baseplate and secure with locknut (33). Install pulling elbow (32) onto nipple (34) with locknut (35). e. Install nipple (31) into elbow (32) with locknut (30). f. Install pulling elbow (28) onto nipple (31) with locknut (29). Insert nipple (26) into pulling elbow (28) and secure with locknut (27). 	

**3-22. CONDUIT, CONNECTORS AND WIRING, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
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g. Insert end of tee (25) into opening in 2nd stage sensor and secure with locknut (24). Install nipple (23) in tee (25) and tee (22) onto nipple (23).



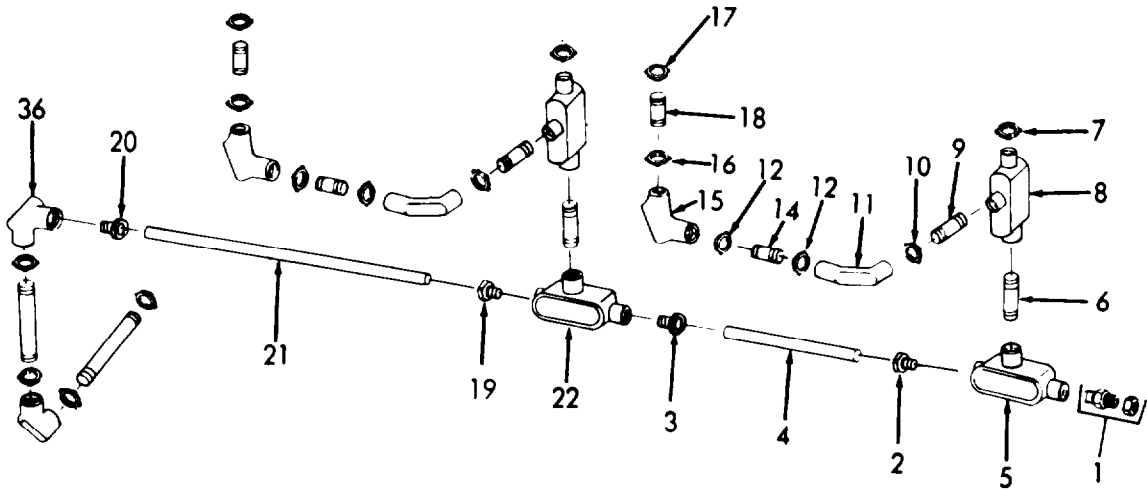
- 22. Tee
- 23. Ni p p l e
- 24. Locknut
- 25. Tee
- 26. Ni p p l e
- 27. Locknut
- 28. Pul l i n g El bow
- 29. Locknut
- 30. Locknut
- 31. Ni p p l e
- 32. Pul l i n g El bow
- 33. Locknut
- 34. Ni p p l e
- 35. Locknut
- 36. Pul l i n g El bow
- 37. Locknut
- 38. Ni p p l e
- 39. Locknut
- 40. Pul l i n g El bow
- 41. Locknut
- 42. Ni p p l e
- 43. Locknut

3-22. CONDUIT, CONNECTORS AND WIRING, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
		h. Install conduit (21) onto pulling elbow (36) using connector (20). Install other end of conduit into tee (22) using connector (19).	
		i. Insert nipple (18) into opening of 1st stage oil discharge valve baseplate and secure with locknuts (17). Install pulling elbow (15) onto nipple (18) using locknut (16).	
		j. Install nipple (14) into elbow (15) using locknut (13). Install pulling elbow (11) onto nipple (14) using locknut (12).	
		k. Install nipple (9) in elbow (11) using locknut (10). Insert end of tee (8) into opening in 1st stage sensor and secure with locknut (7).	
		l. Install nipple (6) in tee (8) and tee (5) onto nipple (6).	
		m. Install conduit (4) into tee's (22) and (5) using connectors (3) and (2). Install connector (1) into tee (5).	

**3-22. CONDUIT, CONNECTORS AND WIRING, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
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- | | |
|--------------------|-----------------------|
| 1. Connectors | 13. Locknut |
| 2. Connectors | 14. Ni pple |
| 3. Connectors | 15. Pulling El bow |
| 4. Conduit | 16. Locknut |
| 5. Tee | 17. Locknut |
| 6. Ni pple | 18. Ni pple |
| 7. Locknut | 19. Straigh Connector |
| 8. Tee | 20. Straigh Connector |
| 9. Ni pple | 21. Conduit |
| 10. Locknut | 22. Tee |
| 11. Pulling El bow | 36. Pulling El bow |
| 12. Locknut | |

NOTE

Carefully thread wiring back thru the various electrical components. Ensure that each wire matches the tagged number, i.e. 4 to 4, 5 to 5 etc.

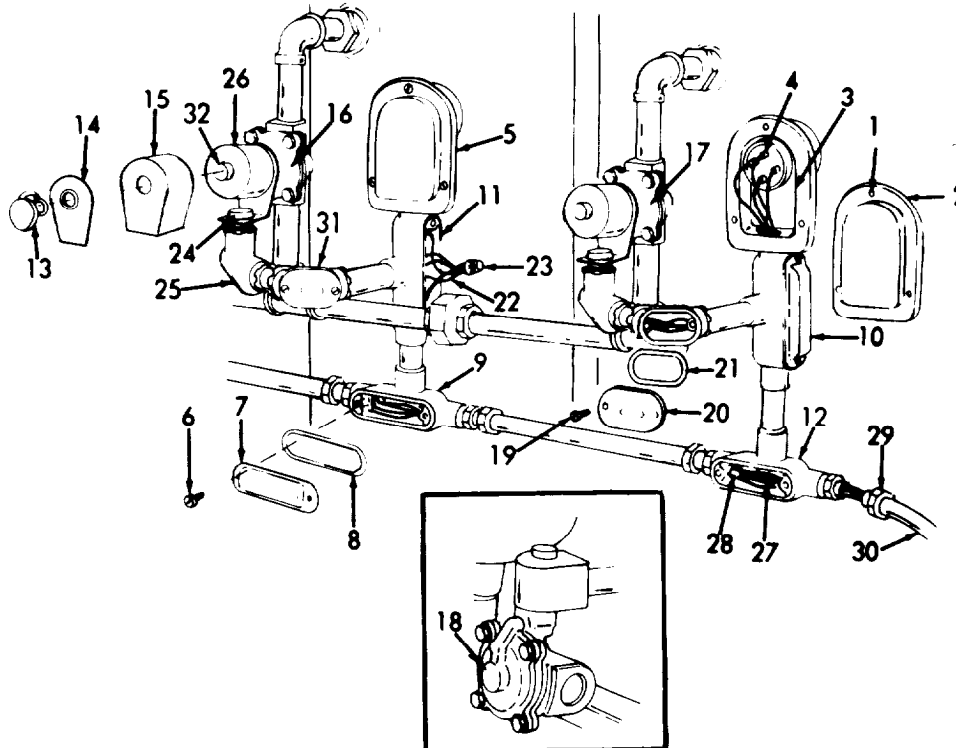
**3-22. CONDUIT, CONNECTORS AND WIRING, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
9.	Supply pump motor leads (27)	a. Insert wiring and cable (30) into tee (12) and secure by tightening collar (29). b. Install connectors (28) to secure leads (27).	
10.	Solenoid valve coil	Thread coil leads (22) thru pulling elbow (25 and 31) and tee (11). Place coil (26) over end of sub-base assembly (32). Install locknut (24) on elbow (25). Install connectors (23) on leads (22).	
NOTE			
Install other two (2) solenoid valve coils in the same manner.			
11.	Pulling elbow cover (20)	Position gasket (21) in place and install cover (20) using screws (19).	
NOTE			
Install covers on other five (5) elbows in same manner.			
12.	Solenoid valve housing (15)	Position housing (15) and nameplate (14) in place on solenoid valves (16, 17 and 18) and secure with retaining cap (13).	
13.	Tee Covers (9, 10, 11, and 12)	Position gasket (8) in place on tee cover and install cover (7) using screw (6).	
14.	Mini-probe covers (2 and 5)	a. Reconnect terminals (4) to 2nd stage and prefilter mini probes.	

3-22. CONDUIT, CONNECTORS AND WIRING, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
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b. Position gasket (3) in place on mini-probe and install cover (2) using screws (1).



- | | | | |
|-----|----------------|-----|-------------------------|
| 1. | Screws | 17. | Solenoid Valve |
| 2. | Cover | 18. | Solenoid Valve |
| 3. | Gasket | 19. | Screws |
| 4. | Terminals | 20. | Cover |
| 5. | Cover | 21. | Gasket |
| 6. | Screws | 22. | Leads |
| 7. | Tee Cover | 23. | Connectors |
| 8. | Gasket | 24. | Locknut |
| 9. | Tee | 25. | Elbow |
| 10. | Tee | 26. | Coil |
| 11. | Tee | 27. | Supply Pump Motor Leads |
| 12. | Tee | 28. | Connectors |
| 13. | Retaining Cap | 29. | Collar |
| 14. | Nameplate | 30. | Wiring and Cable |
| 15. | Housing | 31. | Pulling elbow |
| 16. | Solenoid Valve | 32. | Sub-base Assembly |

15. Electric power Turn ON.

3-23. PIPING, AIR LINES AND FITTINGS, TYPE A AND B SEPARATORS.

This task covers:

- a. Removal b. Repair/Replace c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Pipe fittings and pipe
Sealing compound
Appendix C. Item No. 6

Equipment Condition

Personnel Required

1

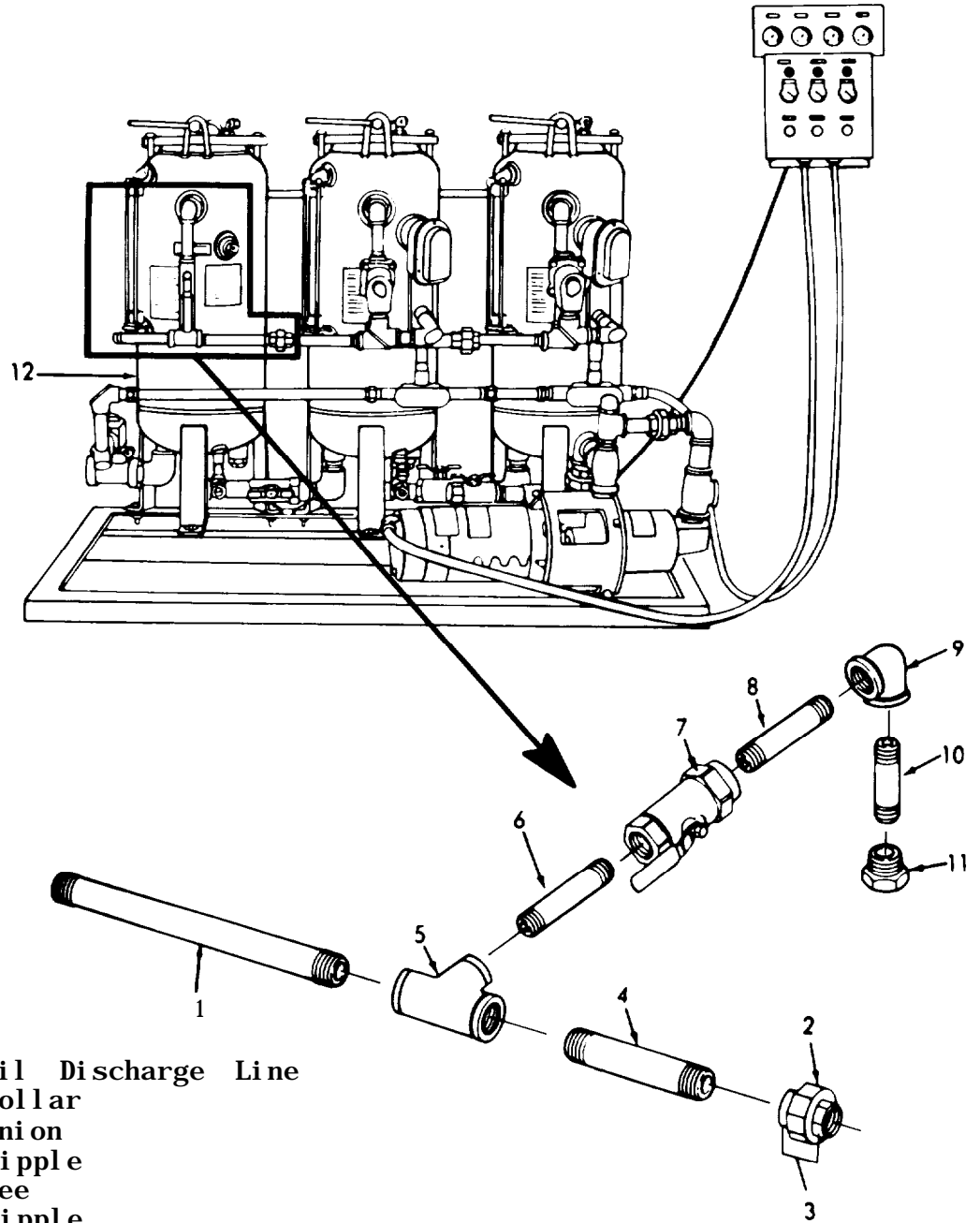
LOCATION	ITEM	ACTION	REMARKS
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Removal

- | | | | |
|----|------------------------------------|---|--|
| 1. | Oil discharge line (1) | Remove. | |
| 2. | 3rd stage (12) piping and fittings | Unscrew collar (2) from union (3). Remove nipple (4), tee (5), nipple (6), valve (7) nipple (8), elbow (9), nipple (10) and reducer (11). | |

**3-23. PIPING, AIR LINES AND FITTINGS, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
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- 1. Oil Discharge Line
- 2. Collar
- 3. Union
- 4. Nipple
- 5. Tee
- 6. Nipple
- 7. Valve
- 8. Nipple
- 9. Elbow
- 10. Nipple
- 11. Reducer
- 12. 3rd Stage

3-23. PIPING, AIR LINES AND FITTINGS, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

WARNING

Electrical shock or serious injury may result if electric power is not shut off prior to performing maintenance on the separators.

- | | | | |
|----|--|--|--|
| 3. | 1st (pre-filter)
2nd (No. 2) stage solenoid coil and valve bonnet | a. Sensor tee (4) | Remove screws (1) tee cover (2) and gasket (3) from 2nd stage sensor tee (4). |
| | | b. Solenoid operated discharge valve coil (13) | Remove connectors (5) and separate coil leads (6). |
| | | c. Coil housing (9) | Remove retaining cap (7), nameplate (8) and coil housing (9). |
| | | d. Coil (13) | (1) Unscrew locknut (10) securing nipple (11) to baseplate (14).

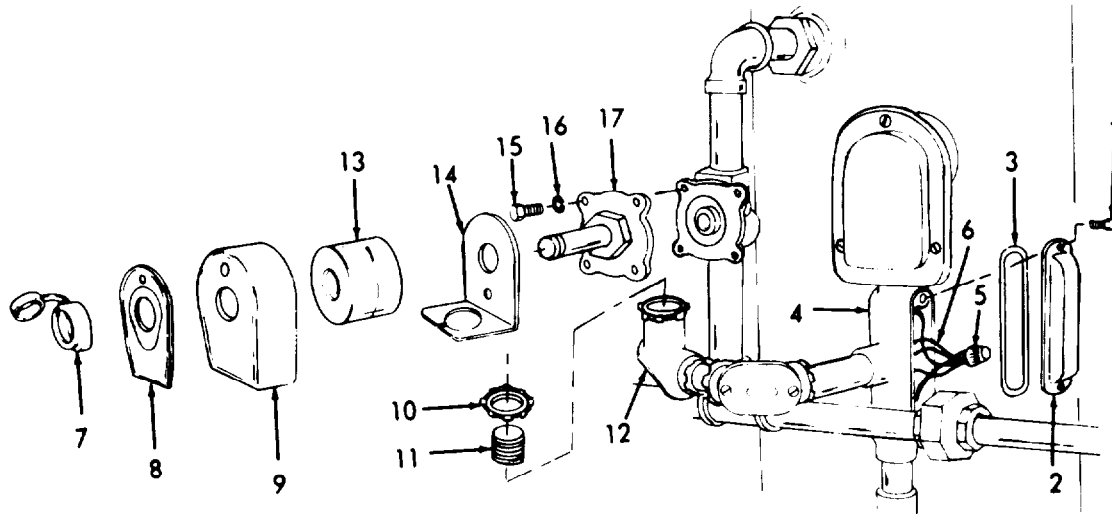
(2) Remove nipple (11) from pulling elbow (12).

(3) Pull straight out on coil (13) and remove coil (13) and baseplate (14). |
| | | e. Valve bonnet (17) | (1) Remove bonnet screws (15) and lockwashers (16).

(2) Remove valve bonnet (17) from valve body with diaphragm and related parts attached. |

**3-23. PIPING, AIR LINES AND FITTINGS, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
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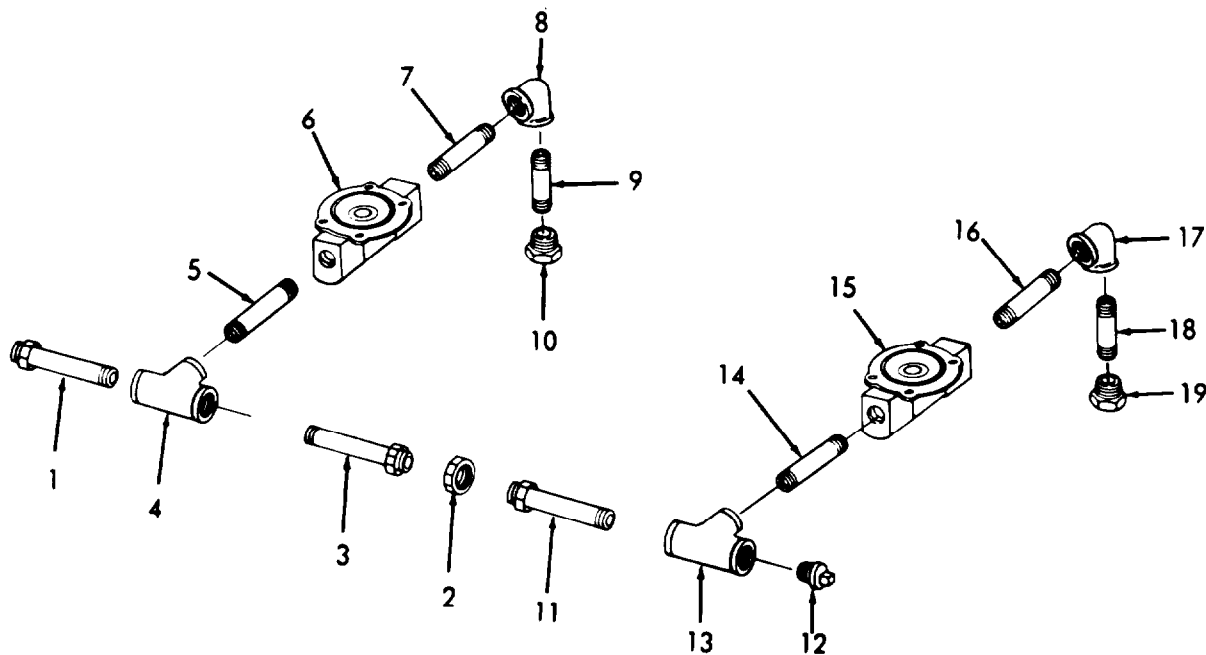
- | | | | |
|----|---------------|-----|---------------|
| 1. | Screws | 10. | Locknut |
| 2. | Tee Cover | 11. | Nipple |
| 3. | Gasket | 12. | Pulling Elbow |
| 4. | Sensor Tee | 13. | Coil |
| 5. | Connectors | 14. | Baseplate |
| 6. | Coil Leads | 15. | Screws |
| 7. | Retaining Cap | 16. | Lockwashers |
| 8. | Nameplate | 17. | Valve Bonnet |
| 9. | Coil Housing | | |

NOTE

Repeat steps 3 a thru e above to remove sensor coil and valve bonnet from 1st stage (prefilter) separator.

**3-23. PIPING, AIR LINES AND FITTINGS, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
4.	2nd stage No. 2 piping and fit- tings	a. Remove nipple (1) from tee (4). b. Unscrew collar (2) and re- move nipple (3), tee (4), nipple (5), solenoid valve body (6), nipple (7), elbow (8), nipple (9) and reducer (10).	
5.	Primary filter piping and fit- tings	Remove nipple (11), pipe plug (12), tee (13), nipple (14), solenoid valve body (15), nipple (16), elbow (17), nipple (18) and reducer (19).	



- | | | | |
|-----|---------------------|-----|---------------------|
| 1. | Nipple | 11. | Nipple |
| 2. | Collar | 12. | Pipe Plug |
| 3. | Nipple | 13. | Tee |
| 4. | Tee | 14. | Nipple |
| 5. | Nipple | 15. | Solenoid Valve Body |
| 6. | Solenoid Valve Body | 16. | Nipple |
| 7. | Nipple | 17. | Elbow |
| 8. | Elbow | 18. | Nipple |
| 9. | Nipple | 19. | Reducer |
| 10. | Reducer | | |

3-23. PIPING, AIR LINES AND FITTINGS, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
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Inspection

Inspect piping and fittings for damaged threads or corrosion.

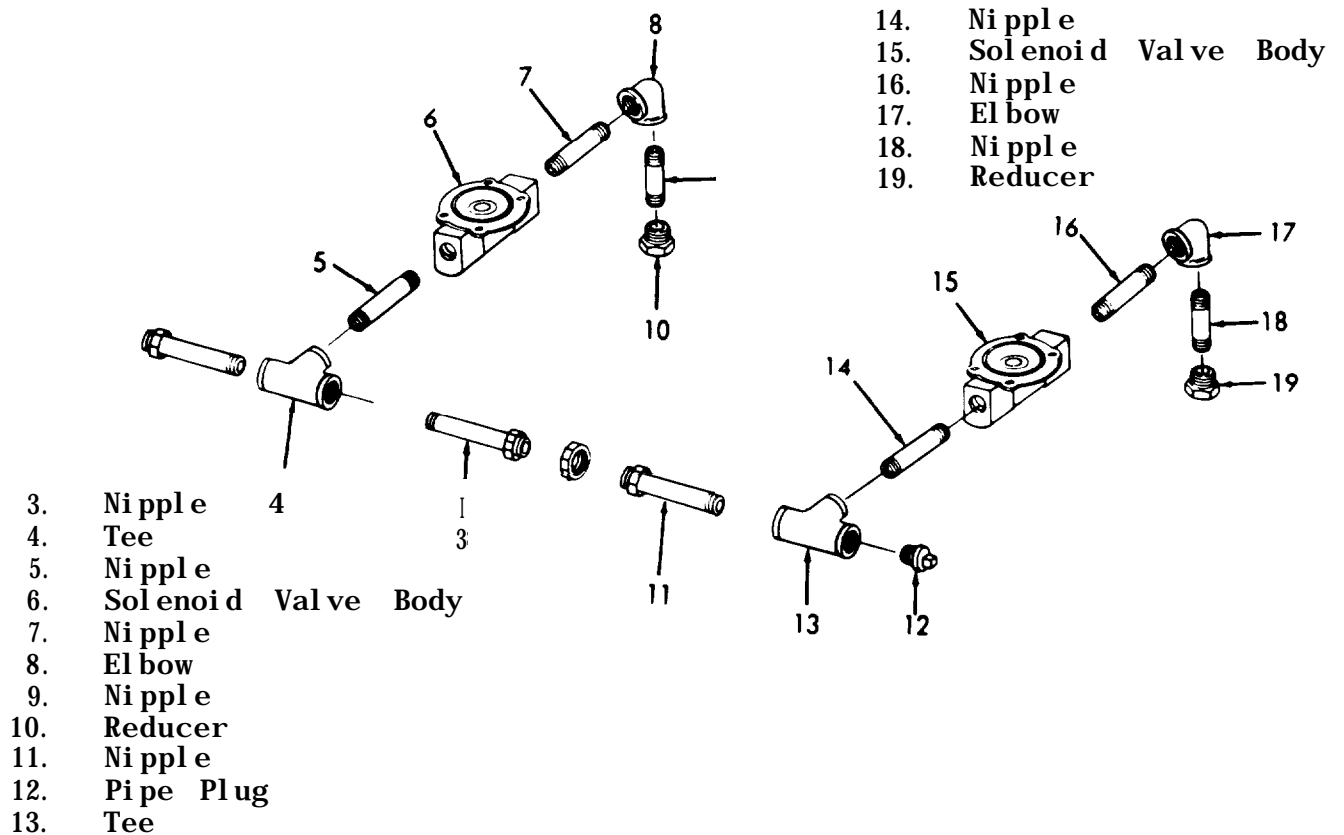
Repair

Replace defective parts with a serviceable-like item.

Installation

6.	Primary filter piping and fittings	Install reducer (19), nipple (18), elbow (17), nipple (16), valve body (15), nipple (14), tee (13), pipe plug (12) and nipple (11).
----	------------------------------------	---

7.	2nd stage No. 2 piping and fittings	a. Install reducer (10), nipple (9), elbow (8), nipple (7), valve body (6), nipple (5), tee (4), nipple (3).
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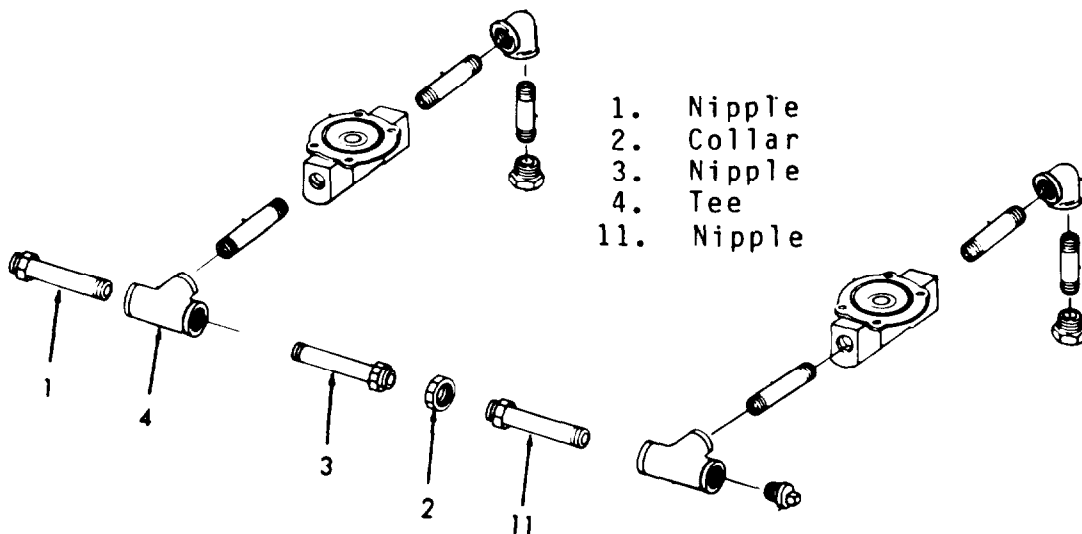


3-23. PIPING, AIR LINES AND FITTINGS, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
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b. Secure nipple (3) to nipple (11) by tightening collar (2).

c. Install nipple (1) into tee (4).



8. Solenoid coil (13) and valve bonnet (17)

a. Valve bonnet (17)

Install valve bonnet (17), with diaphragm and related parts attached, to valve body with lockwashers (16) and screws (15).

b. Coil (13)

- (1) Install nipple (11) in pulling elbow (12).
- (2) Position baseplate (14) over end of solenoid base and secure to nipple (11) with locknut (10).
- (3) Thread coil leads thru pulling elbows and into tee (4).

**3-23. PIPING, AIR LINES AND FITTINGS, TYPE A AND B SEPARATORS
(Continued).**

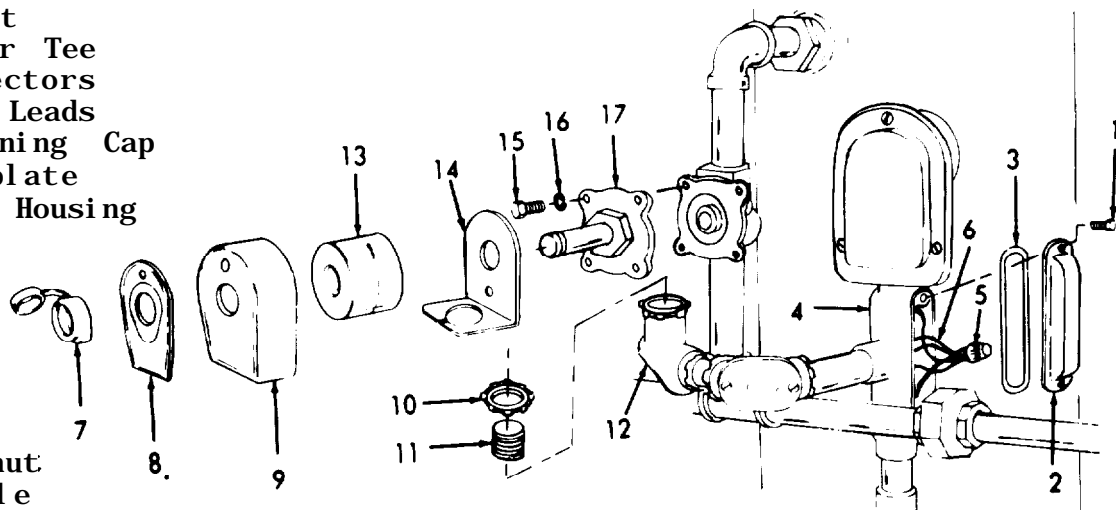
LOCATION	ITEM	ACTION	REMARKS
		(4) Insert coil (13) over end of solenoid base.	
	c. Coil housing (9)	Position coil housing (9) and nameplate (8) over coil (13) and secure with retaining cap (7).	
	d. Leads (6) and tee cover (2)	(1) Reconnect coil leads (6) using connectors (5). (2) Position gasket (3) in place on tee (4). (3) Install cover (2) on tee (4) using screws (1).	

NOTE

Repeat steps 8 a thru d to install sensor coil and valve bonnet on prefilter separator.

- 1. Screws
- 2. Tee Cover
- 3. Gasket
- 4. Sensor Tee
- 5. Connectors
- 6. Coil Leads
- 7. Retaining Cap
- 8. Nameplate
- 9. Coil Housing

- 10. Locknut
- 11. Nipple
- 12. Pulling Elbow
- 13. Coil
- 14. Baseplate
- 15. Screws
- 16. Lockwashers
- 17. Valve Bonnet

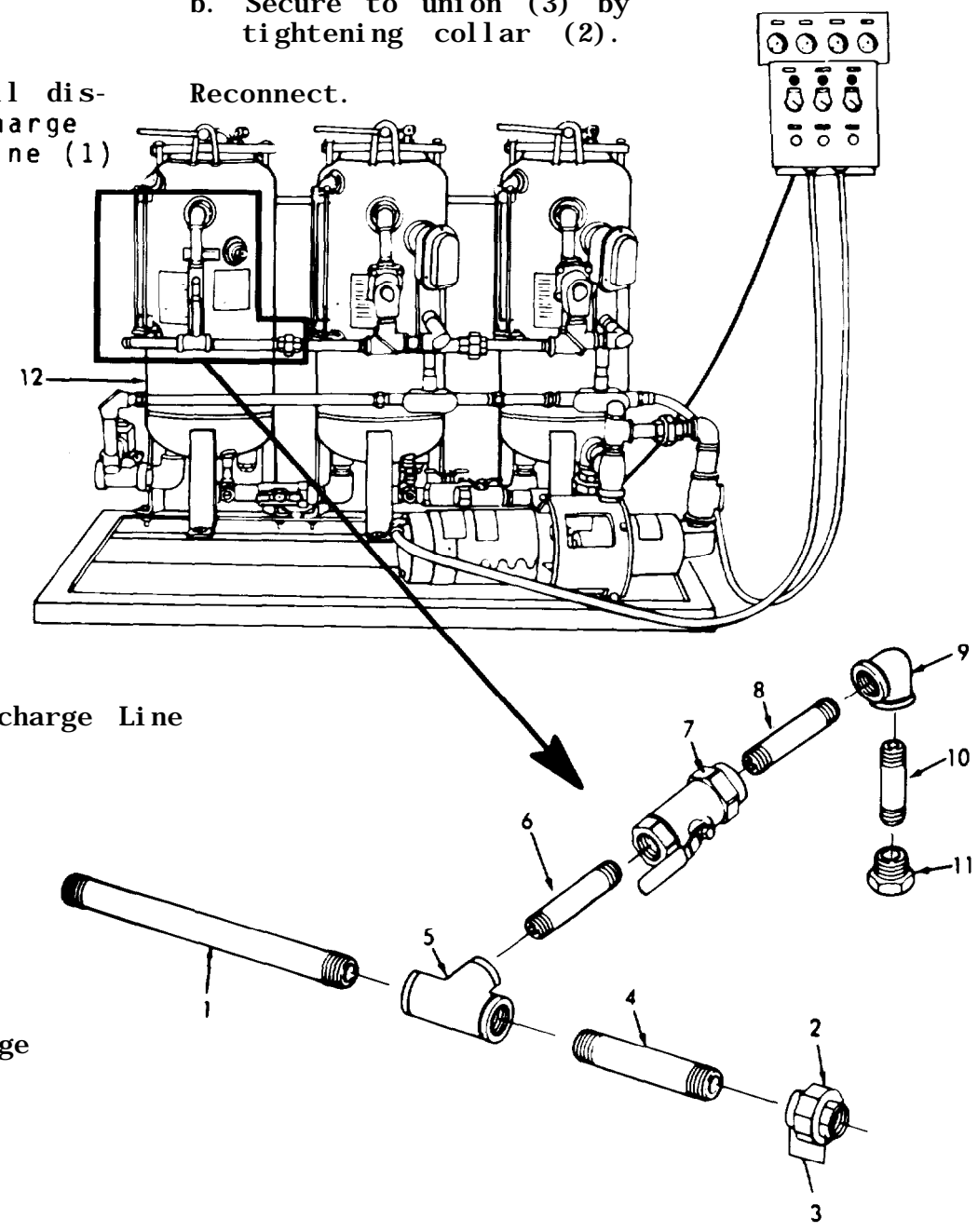


**3-23. PIPING, AIR LINES AND FITTINGS, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
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9.	Third stage piping and fittings (12)	<p>a. Install reducer (11), nipple (10), elbow (9), nipple (8), valve (7), nipple (6), tee (5) and nipple (4).</p> <p>b. Secure to union (3) by tightening collar (2).</p>	
----	--------------------------------------	--	--

10.	Oil discharge line (1)	Reconnect.	
-----	------------------------	------------	--



- 1. Oil Discharge Line
- 2. Collar
- 3. Union
- 4. Nipple
- 5. Tee
- 6. Nipple
- 7. Valve
- 8. Nipple
- 9. Elbow
- 10. Nipple
- 11. Reducer
- 12. 3rd Stage

3-24. OIL DISCHARGE VALVE, SOLENOID OPERATED [1st (Prefilter) and 2nd STAGE ONLY], TYPE A AND B SEPARATORS

This task covers:

- a. Removal b. Repair/Replace c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

<u>Material/Parts</u>	<u>Equipment Condition</u>
Parts Kit FV-158-934 (04854)	
Oil discharge valve	
Sealing compound	
Appendix C, Item No. 6	

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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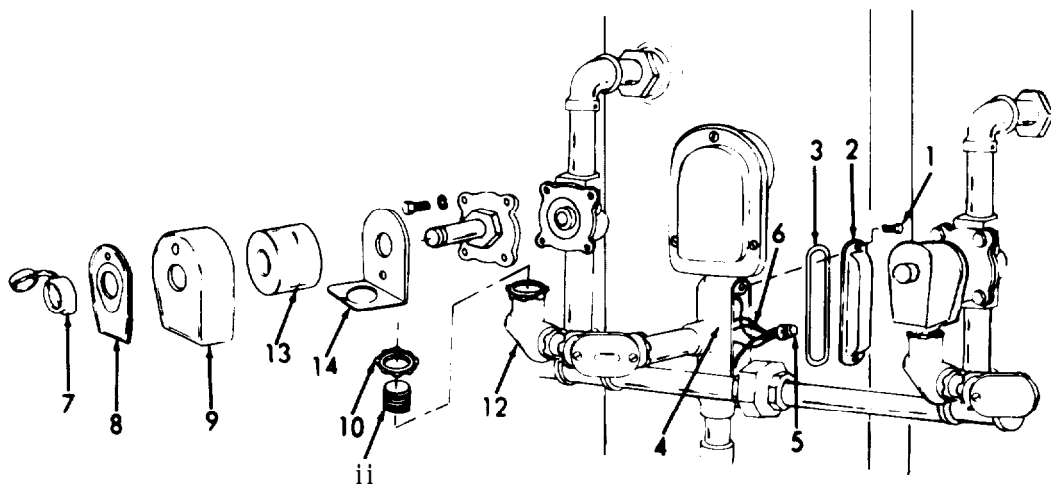
Electrical shock or serious injury may result if electric power is not shut off prior to performing maintenance on the separators.

Removal

- | | | |
|--|--|---|
| 1. 1st (pre-filter) and 2nd stage solenoid coil and valve bonnet | a. Sensor tee (4) | Remove screws (1), tee cover (2), and gasket (3) from 2nd stage sensor tee (4). |
| | b. Solenoid operated discharge valve coil (13) | Remove connectors (5) and separate coil leads (6). |

3-24. OIL DISCHARGE VALVE, SOLENOID OPERATED [1st (prefilter) and 2nd STAGE ONLY], TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
	c. Coil housing (9)	Remove retaining cap (7), nameplate (8) and coil housing (9).	
	d. Coil (13)	(1) Unscrew locknut (10) securing nipple (11) to baseplate (14). (2) Remove nipple (11) from pulling elbow (12). (3) Pull straight out on coil (13) and remove coil (13) and baseplate (14).	



- 1. Screws
- 2. Tee cover
- 3. Gasket
- 4. Sensor Tee
- 5. Connectors
- 6. Coil Leads
- 7. Retaining Cap
- 8. Nameplate
- 9. Coil Housing
- 10. Locknut
- 11. Nipple
- 12. Pulling Elbow
- 13. Coil
- 14. Baseplate

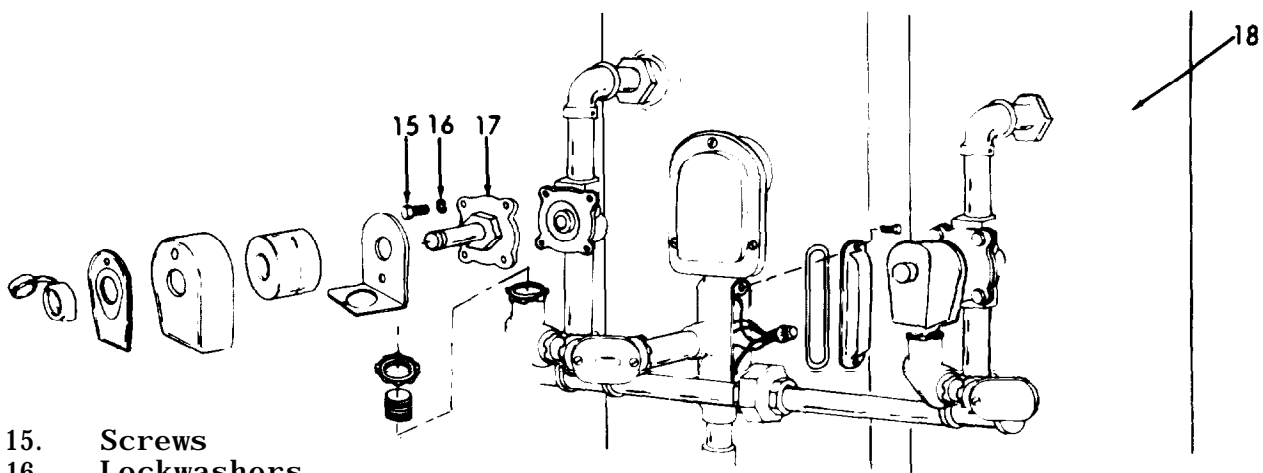
3-24. OIL DISCHARGE VALVE, SOLENOID OPERATED [1st (Prefilter) and 2nd STAGE ONLY], TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- | | | | |
|--|----------------------|--|--|
| | e. Valve bonnet (17) | (1) Remove bonnet screws (15) and lockwashers (16).
(2) Remove valve bonnet (17) from valve body with diaphragm and related parts attached. | |
|--|----------------------|--|--|

NOTE

Repeat steps 1 a thru e above to remove sensor coil and valve bonnet from 1st stage separator (18).



- 15. Screws
- 16. Lockwashers
- 17. Valve Bonnet
- 18. 1st Stage Separator

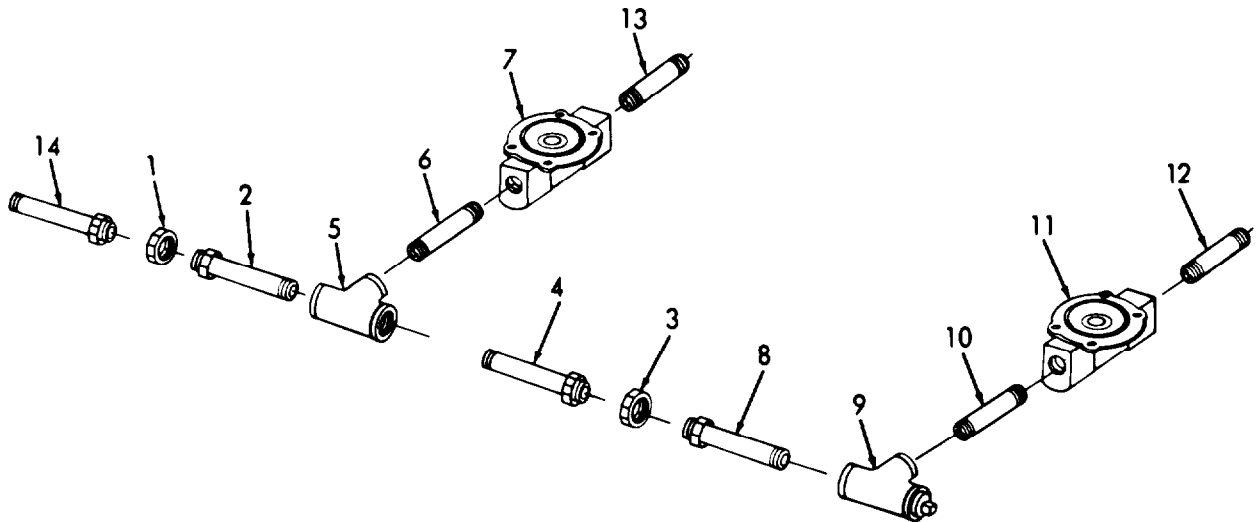
- | | | | |
|----|--|---|--|
| 2. | 1st (pre-filter and 2nd stage piping and fittings) | a. Unscrew collar (1) from union between 2nd and 3rd stage separator.
b. Remove nipple (2).
c. Unscrew collar (3) from union between primary and 2nd stage separator. | |
|----|--|---|--|

3-24. OIL DISCHARGE VALVE, SOLENOID OPERATED [1st (Prefilter) and 2nd STAGE ONLY], TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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d. Remove nipple (4), tee (5), nipple (6) and solenoid valve body (7).

e. Remove nipple (8), tee (9), nipple (10) and solenoid valve body (11).



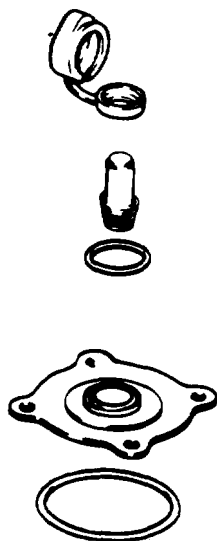
- 1. Collar
- 2. Nipple
- 3. Collar
- 4. Nipple
- 5. Tee
- 6. Nipple
- 7. Solenoid Valve Body
- 8. Nipple
- 9. Tee
- 10. Nipple
- 11. Solenoid Valve Body
- 12. Nipple
- 13. Nipple
- 14. Nipple

3-24. OIL DISCHARGE VALVE, SOLENOID OPERATED [1st (Prefilter) and 2nd STAGE ONLY], TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Repair

Repair of oil discharge valve is limited to replacement of parts contained in parts kit FV-158934 (04854). If repair cannot be accomplished in above manner replace complete valve assembly with a serviceable-like item.



Parts Kit FV-158934

Installation

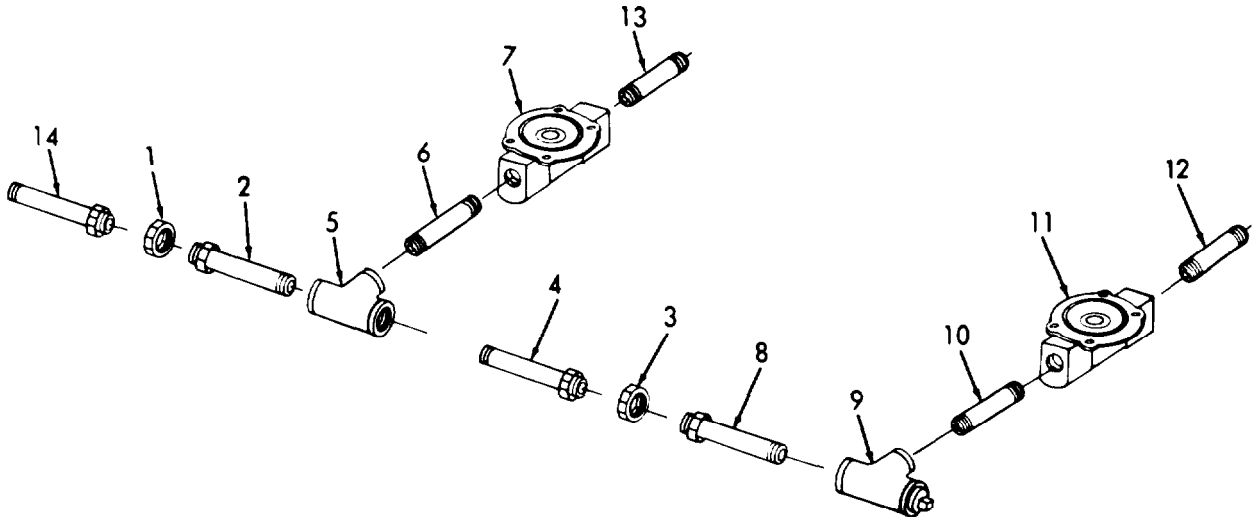
- | | | |
|----|--|--|
| 3. | 1st (pre-filter) and 2nd stage piping and fittings | <ul style="list-style-type: none"> a. On prefilter separator install valve body (11) on nipple (12). b. Install nipple (10), tee (9) and nipple (8). c. On 2nd stage separator install valve body (7) on nipple (13). |
|----|--|--|

3-24. OIL DISCHARGE VALVE, SOLENOID OPERATED [1st (Prefilter) and 2nd STAGE ONLY], TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

d. Install nipple (6), tee (5), and nipple (4).
Secure nipples (4 and 8) together by tightening collar (3).

e. Install nipple (2) in tee (5) and secure nipples (2 and 14) by tightening collar (1).



- 1. Collar
- 2. Nipple
- 3. Collar
- 4. Nipple
- 5. Tee
- 6. Nipple
- 7. Solenoid Valve Body
- 8. Nipple
- 9. Tee
- 10. Nipple
- 11. Solenoid Valve Body
- 12. Nipple
- 13. Nipple
- 14. Nipple

3-24. OIL DISCHARGE VALVE, SOLENOID OPERATED [1st (Prefilter) and 2nd STAGE ONLY], TYPE A AND B SEPARATORS (Continued).

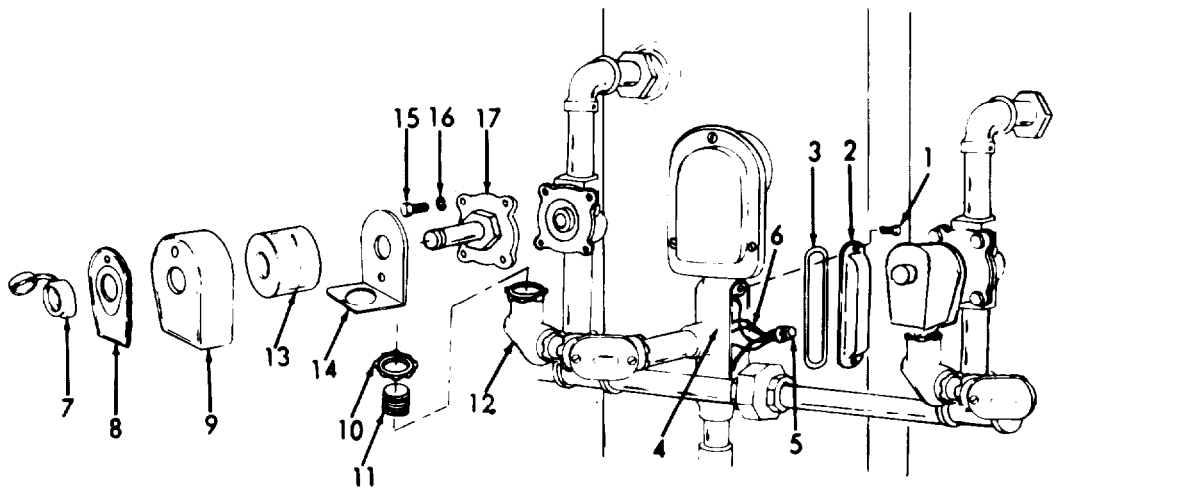
LOCATION	ITEM	ACTION	REMARKS
4.	1st (pre-filter) and 2nd stage solenoid coil and valve bonnet	<p>a. Valve bonnet (17)</p> <p>b. Coil (13)</p>	<p>Install valve bonnet (17), with diaphragm and related parts attached, to valve body with lockwashers (16) and screws (15).</p>
		<p>(1) Install nipple (11) in pulling elbow (12).</p> <p>(2) Position baseplate (14) over end of solenoid base and secure to nipple with locknut (10).</p> <p>(3) Thread coil leads thru pulling elbows and into tee (4).</p> <p>(4) Insert coil (13) over end of solenoid base.</p>	
	c. Coil housing (9)	<p>Position coil housing (9) and nameplate (8) over coil (13) and secure with retaining cap (7).</p>	
	d. Leads (6) and tee cover (2)	<p>(1) Reconnect coil leads (6) using connectors (5).</p> <p>(2) Position gasket (3) in place on tee (4).</p> <p>(3) Install cover (2) on tee (4) using screws (1).</p>	

NOTE

Repeat steps 4 a thru d to install sensor coil and valve bonnet on prefilter separator.

3-24. OIL DISCHARGE VALVE, SOLENOID OPERATED [1st (prefilter) and 2nd STAGE ONLY], TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 1. Screw
- 2. Tee cover
- 3. Gasket
- 4. Sensor Tee
- 5. Connectors
- 6. Coil Leads
- 7. Retaining Cap
- 8. Name Plate
- 9. Coil Housing
- 10. Locknut
- 11. Nipple
- 12. Pulling Elbow
- 13. Coil
- 14. Baseplate
- 15. Screws
- 16. Lockwashers
- 17. Valve Bonnet

3-25. OIL DISCHARGE VALVE (MANUALLY OPERATED), TYPE A AND B SEPARATORS.

This task covers:

- a. Removal b. Repair/Replace c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Sealing compound
Appendix C, Item No. 6
Oil discharge valve

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Removal

- | | | | |
|----|------------------------|---|--------------------------|
| 1. | Oil discharge line (8) | Remove. | |
| 2. | Union (2) | Unscrew collar (1) from union (2). | |
| 3. | Piping | Remove nipple (3), tee (4) and nipple (5). | |
| 4. | Valve (6) | Remove oil discharge valve from nipple (7). | Discard defective valve. |

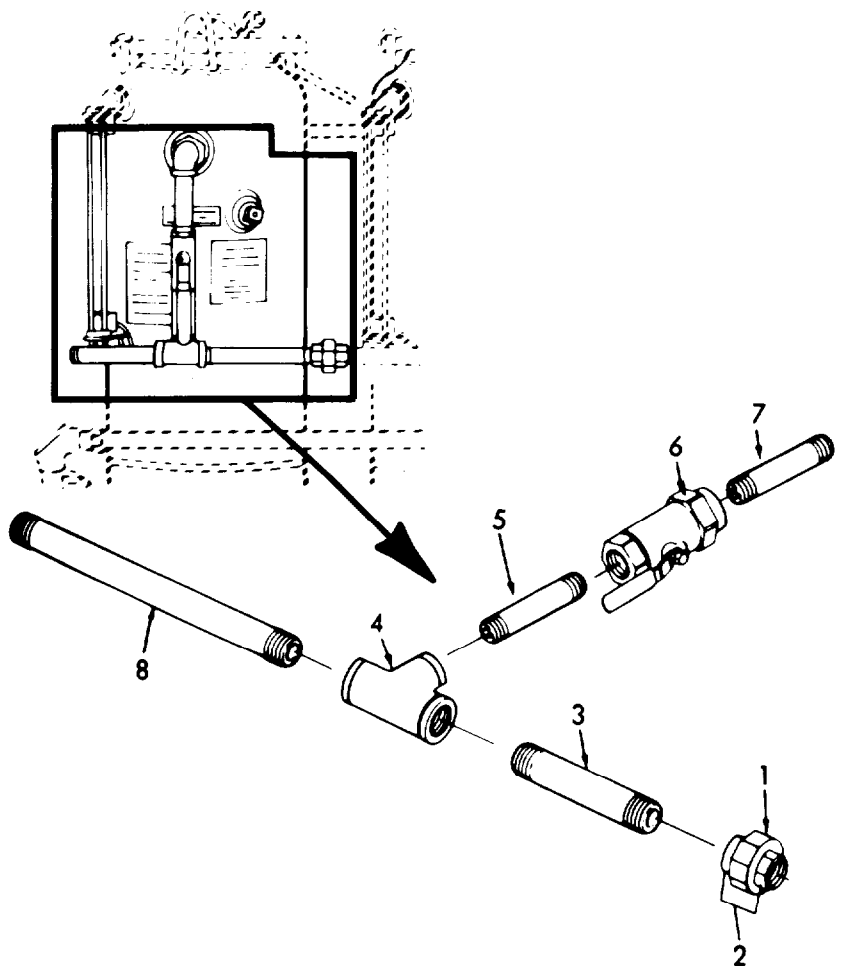
Replacement Replace defective valve with a serviceable-like item.

3-25. OIL DISCHARGE VALVE (MANUALLY OPERATED), TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Installation

5.
 - a. Install valve (6) onto nipple (7).
 - b. Install nipple (5), tee (4) and nipple (3).
 - c. Secure to union (2) by tightening collar (1).
 - d. Install oil discharge line (8).



1. Collar
2. Union
3. Nipple
4. Tee
5. Nipple
6. Valve
7. Nipple
8. Oil Discharge Line

3-26. PRESSURE GAUGE AND VESSEL TUBING, TYPE A AND B SEPARATORS.

This task covers:

- a. Removal b. Repair/Replace c. Installation

INITIAL SETUP

Test Equipment
None

Tools

Tool Kit, General Mechanics

Material/Parts

Tubing
Male connector assembly

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Removal

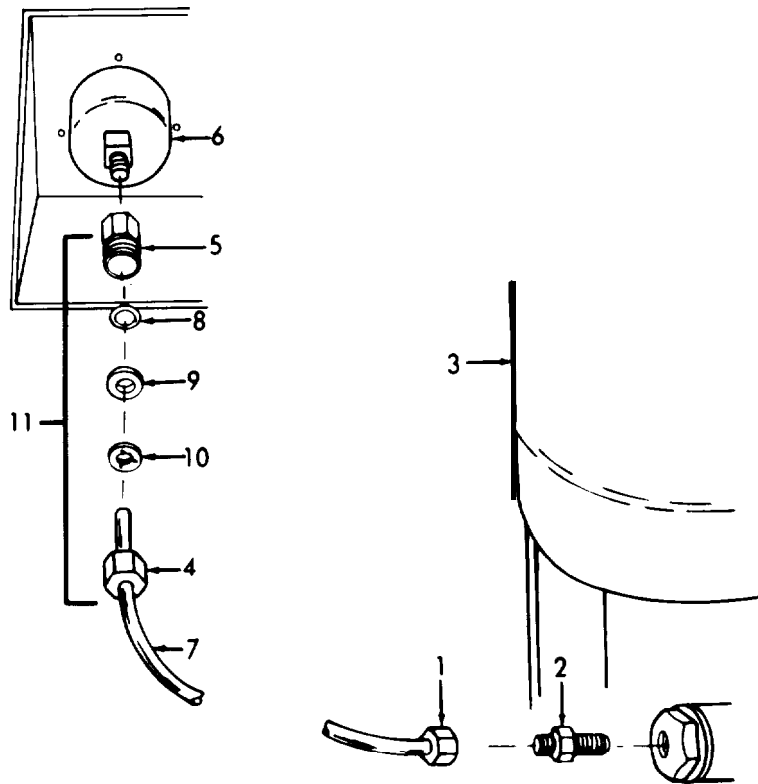
1.	Vessel tubing	a. Unscrew female connector (1). b. Remove male connector (2) from vessel (3).	If "O" ring (8), seal (9) or locknut (10) is defective replace male connector assembly (11).
2.	Pressure gauge tubing	a. Unscrew female connector (4). b. Remove male connector (5) from back of pressure gauge (6). c. Remove tubing (7).	Discard defective tubing.

NOTE

Remove other tubing and connectors in the same manner.

**3-26. PRESSURE GAUGE AND VESSEL TUBING, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- | | |
|---------------------|-----------------------------|
| 1. Female Connector | 7. Tubing |
| 2. Male Connector | 8. "O" Ring |
| 3. Vessel | 9. Seal |
| 4. Female Connector | 10. Locknut |
| 5. Male Connector | 11. Male Connector Assembly |
| 6. Pressure Gauge | |

Replacement

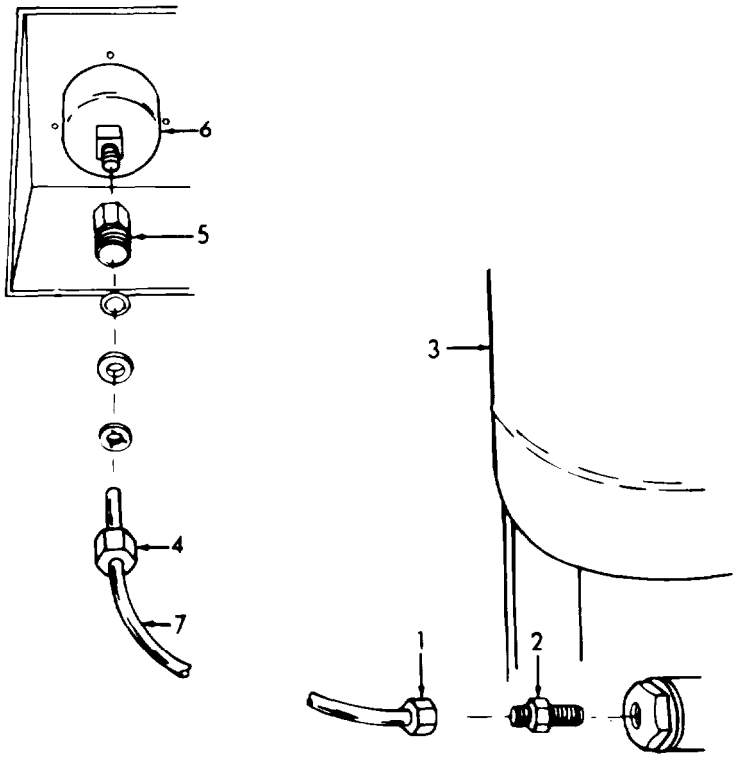
Replace defective male connector assembly or tubing as necessary with serviceable-like item.

**3-26. PRESSURE GAUGE AND VESSEL TUBING, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
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Installation

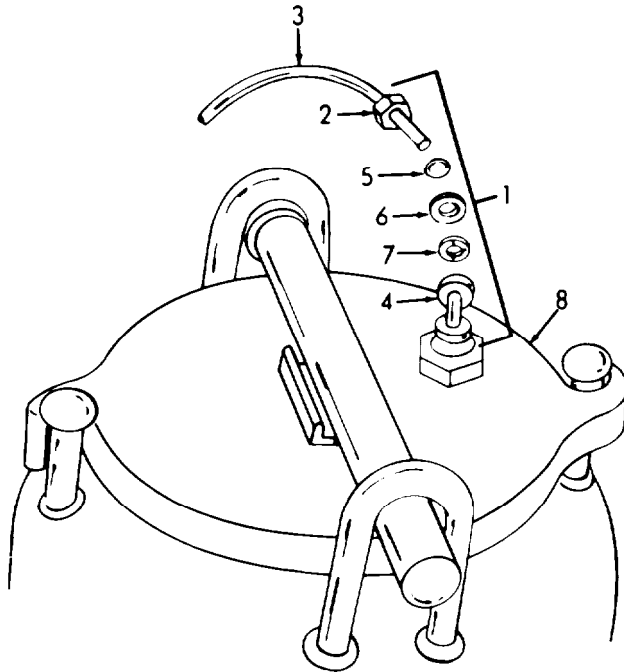
- | | | |
|----|-----------------------|--|
| 3. | Pressure gauge tubing | <ul style="list-style-type: none"> a. Install female connector (5) to back of pressure gauge (6). b. Install male connector over tubing (7). c. Place male connector (4) in female connector (5) and tighten. |
| 4. | Vessel tubing | <ul style="list-style-type: none"> a. Install male connector (2) on vessel (3). b. Install female connector (1) on tubing (7). c. Place female connector (1) on male connector (2) and tighten. |



- 1. Female Connector
- 2. Male Connector
- 3. Vessel
- 4. Female Connector
- 5. Male Connector
- 6. Pressure Gauge
- 7. Tubing

3-27. AIR DISCHARGE LINES (COVERS) (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 1. Male Connector Assembly
- 2. Nut
- 3. Air Line
- 4. Male Connector
- 5. "O" Ring
- 6. Seal
- 7. Locknut
- 8. Cover

Repair

Replace defective air line or male connector assembly with a serviceable-like item.

Installation

- 2. Install male connector
 - a. (4) on cover (8).
 - b. Insert air line (3) into nut (2).
 - c. Install nut (2) onto male connector (4) and tighten to secure.

NOTE

Install other air lines in same manner.

3-28. SUPPLY PUMP ASSEMBLY, TYPE A AND B SEPARATORS.

This task covers:

- | | |
|------------|-----------------|
| a. Test | c. Replacement |
| b. Removal | d. Installation |

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Supply pump assembly
Sealing compound
Appendix C, Item No. 6

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



Electrical shock or serious injury may result if electric power to motor is not shut off prior to performing maintenance on the supply pump assembly.

Test

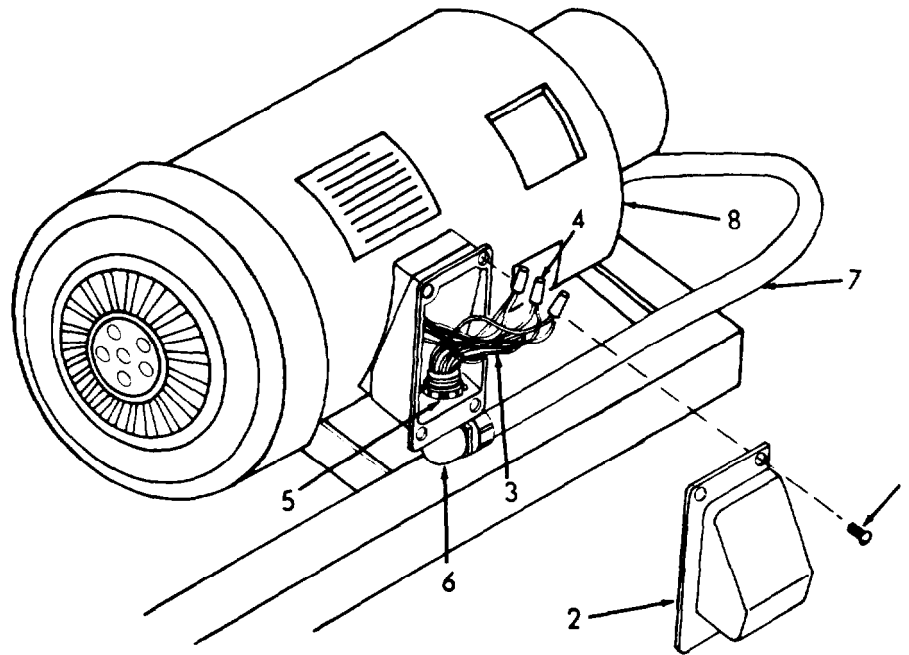
1.
 - a. Check flow rate indicator for rate of flow. Reading on gauge should be between 2 and 5 gpm.
 - b. Check pressure gauges for loss of pressure.

3-28. SUPPLY PUMP ASSEMBLY, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Removal

- | | | | |
|----|---|--|--|
| 2. | Electric power | Turn OFF. | |
| 3. | Motor electrical connections (Type A separator) | <ul style="list-style-type: none"> a. Remove screws (1) and cover (2). b. Tag and disconnect leads (3). c. Remove connectors (4) from leads (3). d. Remove locknut (5) from elbow (6) and separate cable (7) from motor (8). | |

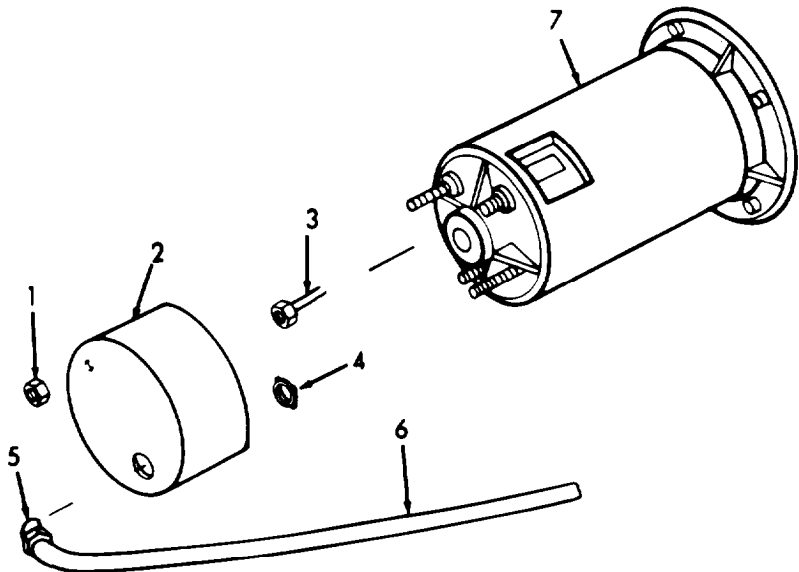


- 1. Screw
- 2. Cover
- 3. Leads
- 4. Connector
- 5. Locknut
- 6. El bow
- 7. Cable
- 8. Motor

3-28. SUPPLY PUMP ASSEMBLY, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
4.	Motor electrical connections (Type B separator)	a. Remove nuts (1). b. Gently pull cover (2) far enough from motor housing (7) to tag and disconnect leads (3). c. Remove locknut (4) from elbow (5) and separate cable (6) from motor housing (7).	

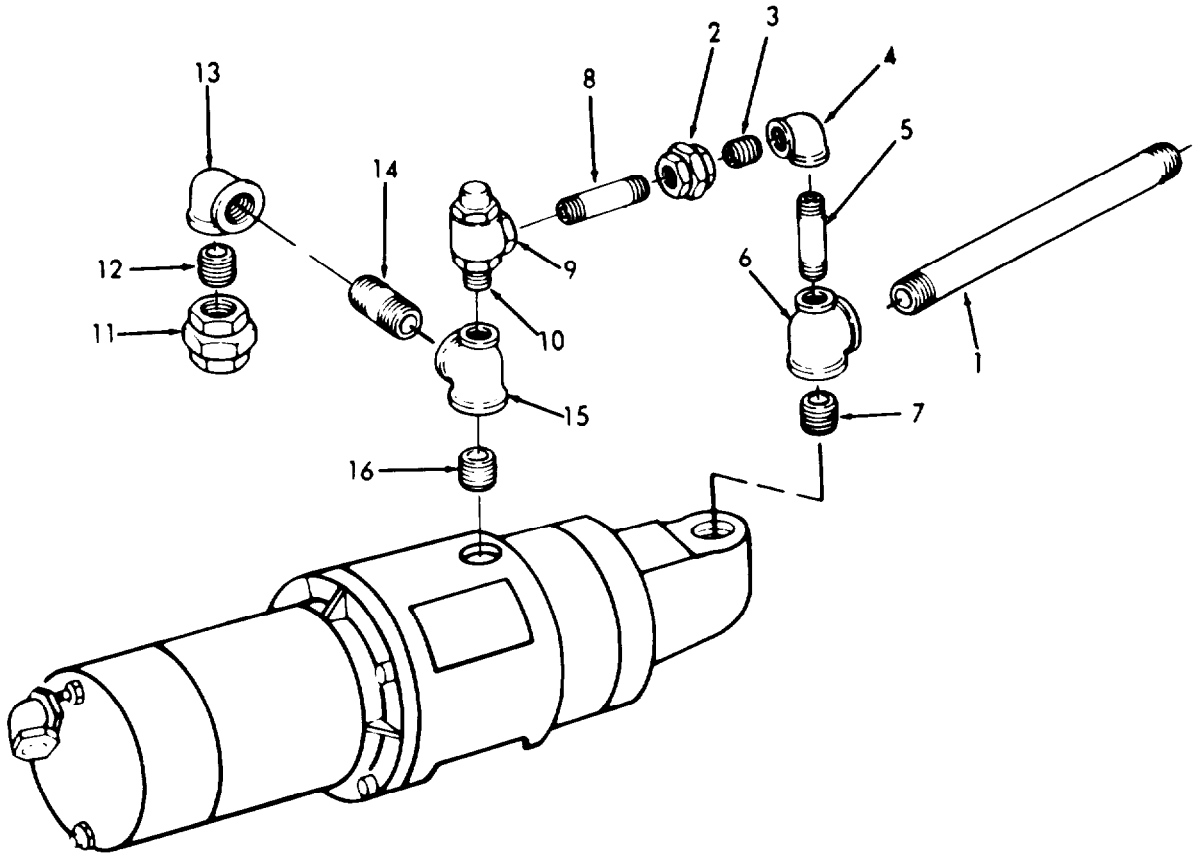
- 1. Nut
- 2. Cover
- 3. Leads
- 4. Locknut
- 5. El bow
- 6. Cable
- 7. Motor Housing



5.	Supply pump assembly piping	a. Remove inlet line (1). b. Loosen collar (2) and remove nipple (3), elbow (4), nipple (5), tee (6), nipples (7 and 8), relief valve (9) and nipple (10). c. Loosen collar (11) and remove nipple (12), elbow (13), nipple (14), reducing tee (15) and nipple (16).	
----	-----------------------------	--	--

3-28. SUPPLY PUMP ASSEMBLY, TYPE A AND B SEPARATORS (Continued).

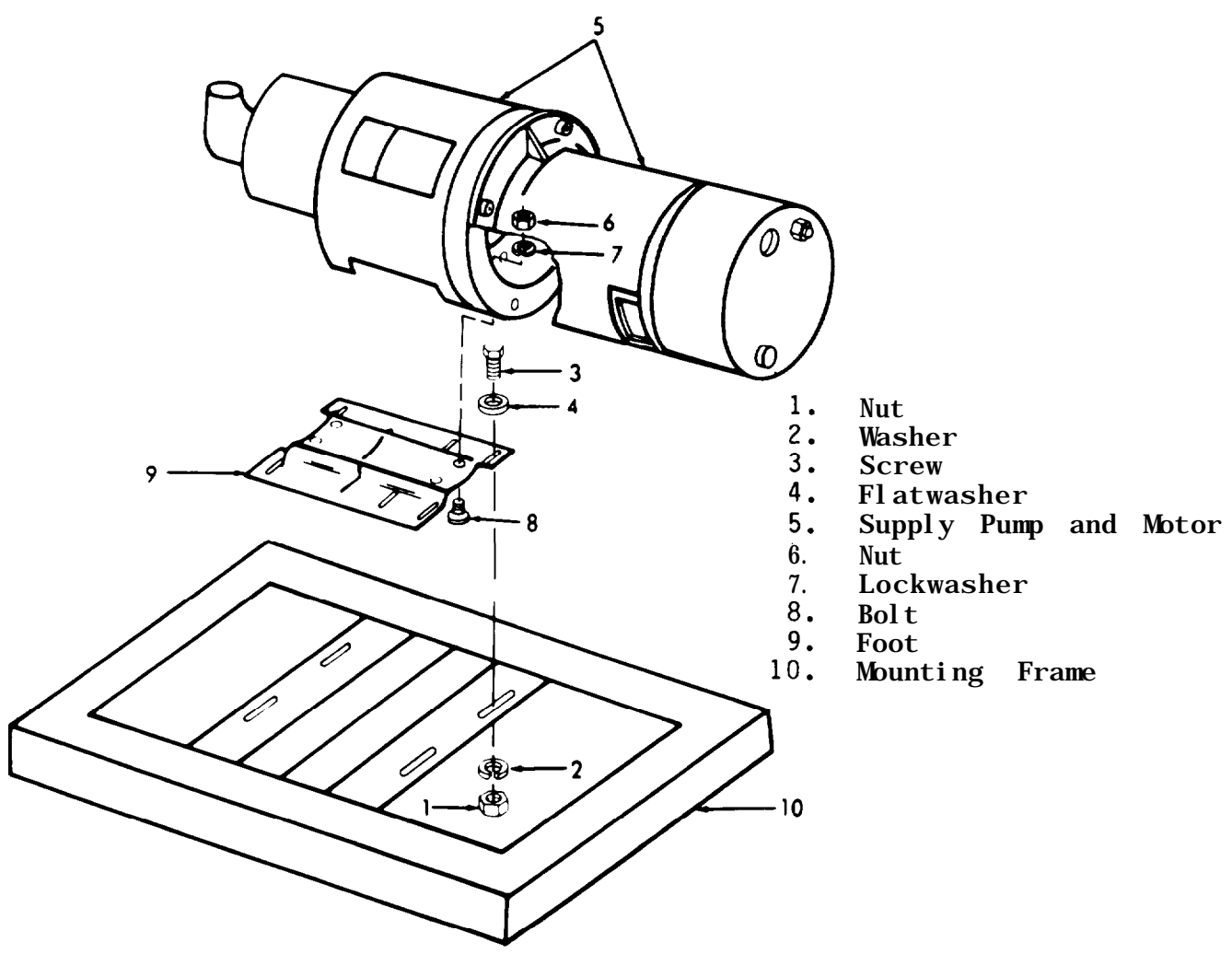
LOCATION	ITEM	ACTION	REMARKS
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1. Inlet Line
2. Collar
3. Nipple
4. Elbow
5. Nipple
6. Tee
7. Nipple
8. Nipple
9. Relief Valve
10. Nipple
11. Collar
12. Nipple
13. Elbow
14. Nipple
15. Reducing Tee
16. Nipple

3-28. SUPPLY PUMP ASSEMBLY, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
6.	Supply pump assembly	a. Remove nuts (1) washers (2). screws (3) and flat washers (4). b. Lift supply pump and motor (5) from mounting frame (10). c. Remove nuts (6), lockwashers (7) and bolts (8) securing assembly to foot (9) and remove foot from assembly.	Foot is still attached.



3-28. SUPPLY PUMP ASSEMBLY, TYPE A AND B SEPARATORS (Continued).

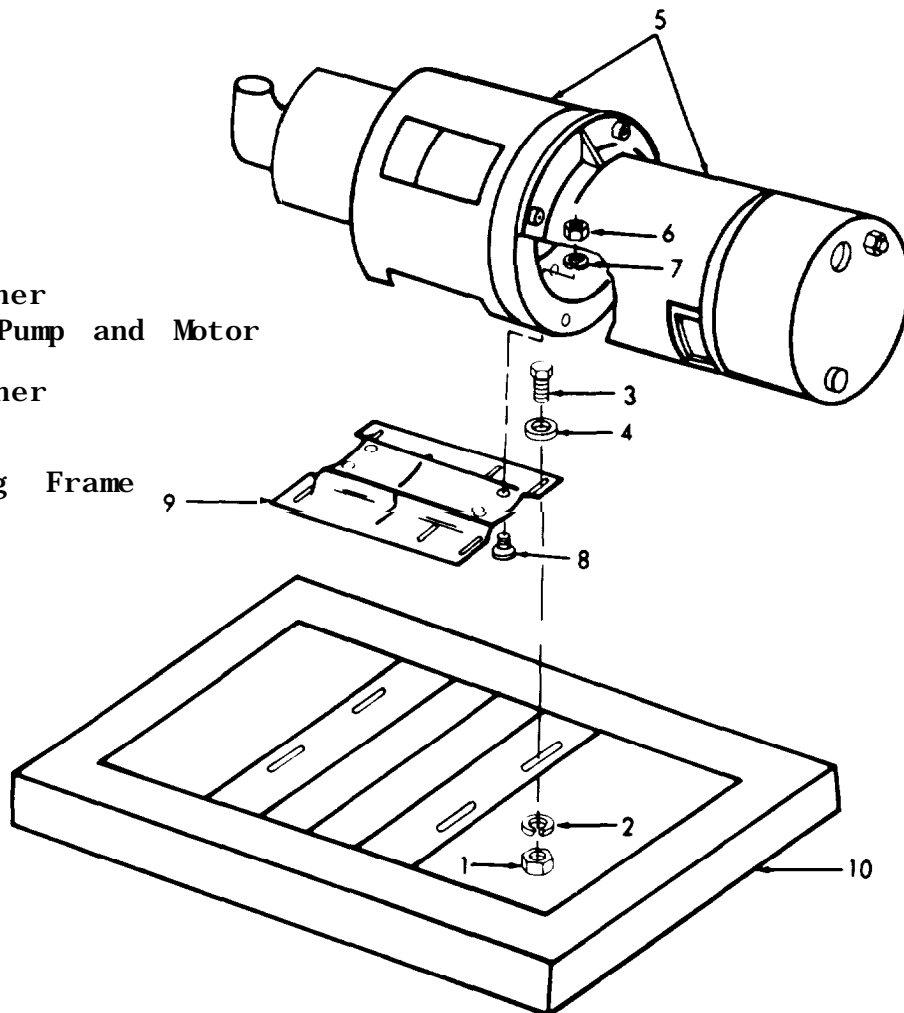
LOCATION	ITEM	ACTION	REMARKS
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Replacement

Replace defective supply pump assembly with a serviceable-like item.

- | | | |
|----|----------------------|--|
| 7. | Supply pump assembly | <p>a. Secure foot (9) to assembly using bolts (8) lockwashers (7) and nuts (6).</p> <p>b. Position supply pump assembly (5) in place on mounting frame (10) and secure with washers (4), screws (3), washers (2) and nuts (1).</p> |
|----|----------------------|--|

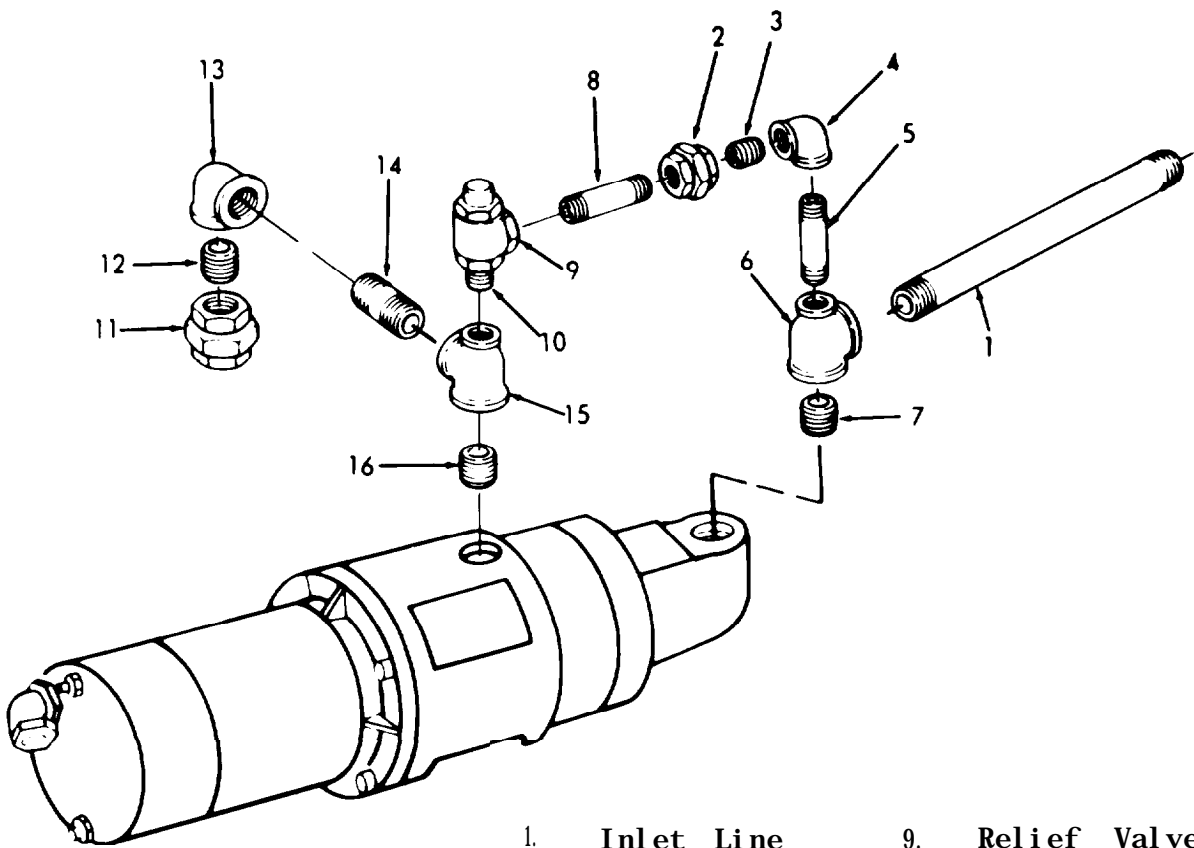
- 1. Nut
- 2. Washer
- 3. Screw
- 4. Flatwasher
- 5. Supply Pump and Motor
- 6. Nut
- 7. Lockwasher
- 8. Bolt
- 9. Foot
- 10. Mounting Frame



3-28. SUPPLY PUMP ASSEMBLY, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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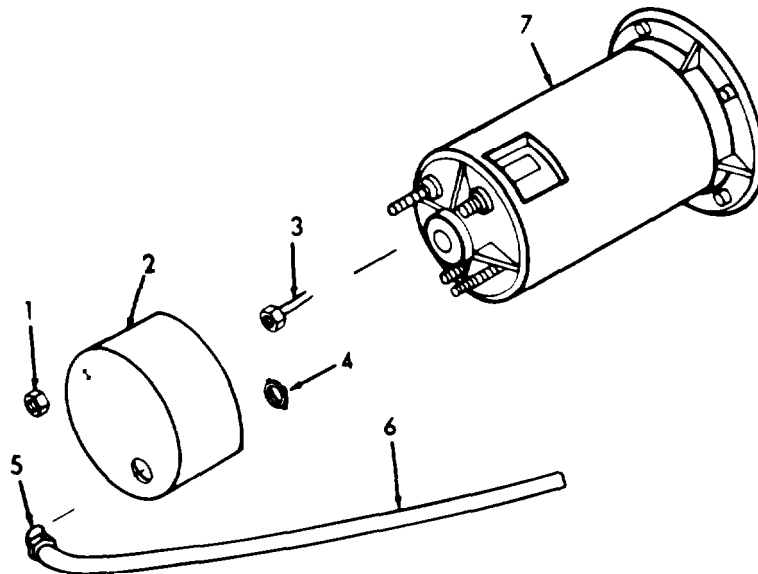
8. Piping
- a. Install nipple (16), reducing tee (15), nipple (14), elbow (13), nipple (12), and secure by tightening collar (11).
 - b. Install nipple (10), relief valve (9), nipples (8 and 7) tee (6), nipple (5), elbow (4), nipple (3) and collar (2).
 - c. Install inlet line (1).



- | | | | |
|----|------------|-----|--------------|
| 1. | Inlet Line | 9. | Relief Valve |
| 2. | Collar | 10. | Nipple |
| 3. | Nipple | 11. | Collar |
| 4. | Elbow | 12. | Nipple |
| 5. | Nipple | 13. | Elbow |
| 6. | Tee | 14. | Nipple |
| 7. | Nipple | 15. | Reducing Tee |
| 8. | Nipple | 16. | Nipple |

3-28. SUPPLY PUMP ASSEMBLY, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
9.	Motor electrical connections (Type B separator)	a. Insert cable (6) in cover (2) and install locknut (4) on elbow (5) b. Reconnect tagged leads (3) c. Secure cover (2) to motor housing (7) with nuts (1).	

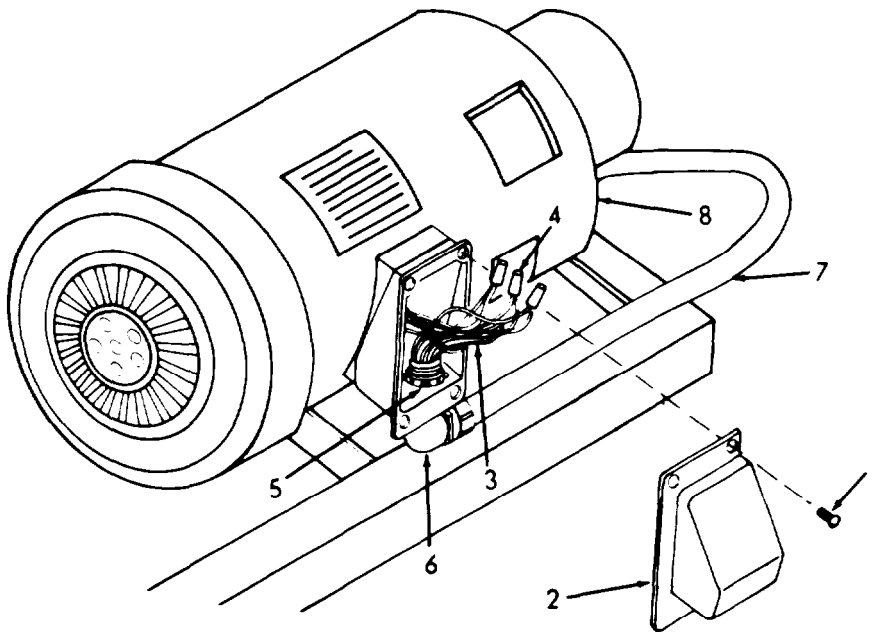


- 1. Nut
- 2. Cover
- 3. Leads
- 4. Locknut
- 5. El bow
- 6. Cabl e
- 7. Motor Housi ng

3-28. SUPPLY PUMP ASSEMBLY, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|-----|---|--|--|
| 10. | Motor electrical connections (Type A separator) | <p>Insert cable (7) and elbow (6) in motor housing (8).</p> <p>a. Secure with locknut (5).</p> <p>b. Reconnect tagged leads (3) using connectors (4).</p> <p>c. Install cover (2) with screws (1).</p> <p>d. Turn on electric power.</p> | |
|-----|---|--|--|



1. Screw
2. Cover
3. Leads
4. Connector
5. Locknut
6. El bow
7. Cable
8. Motor

3-29. SUCTION STRAINER (#).

This task covers:

- a. Removal
- b. Servicing
- c. Repair/Replace
- d. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Wire mesh
Appendix C, Item No. 7
Cleaning solvent P-D-680
Appendix C, Item No. 2

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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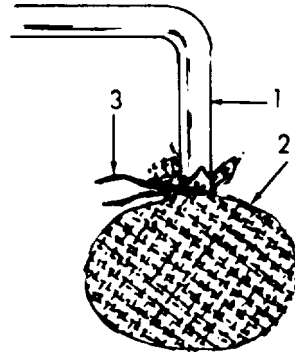
Removal

- | | | | |
|----|-------------------------|--------------------------------|--|
| 1. | Inlet line
(1) | Remove from bilge. | |
| 2. | Suction strainer
(2) | Remove wire (3) from strainer. | |

3-29. SUCTION STRAINER (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

1. Inlet Line
2. Strainer
3. Wire



Service

WARNING

Cleaning solvent Fed. Spec. P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100 ° - 138 ° F (38 ° - 59 ° C).

- a. Clean strainer in cleaning solvent Fed. Spec. P-D-680.
- b. While rotating strainer by hand direct a stream of low pressure compressed air on strainer to remove any trapped sediment not removed with solvent. Air pressure should not exceed 15 psi (1054.6 gm sq cm).

- | | | |
|--------|---|----------------------|
| Repair | Inspect strainer for torn mesh. | Discard if torn. |
| | Replace damaged or defective strainer using wire mesh with 1/32 inch perforation. | Cut to desired size. |

Installation

3. Form strainer (2) in shape of a ball and secure to inlet line (1) with wire (3).

3-30. SUPPLY PUMP, TYPE A AND B SEPARATOR.

This task covers:

- | | |
|---------------|-------------------|
| a. Inspection | c. Repair/Replace |
| b. Removal | d. Installation |

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Supply pump
Sealing compound
Appendix C. Item No. 6

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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WARNING

Disconnect power supply prior to performing maintenance on the supply pump.

Inspection

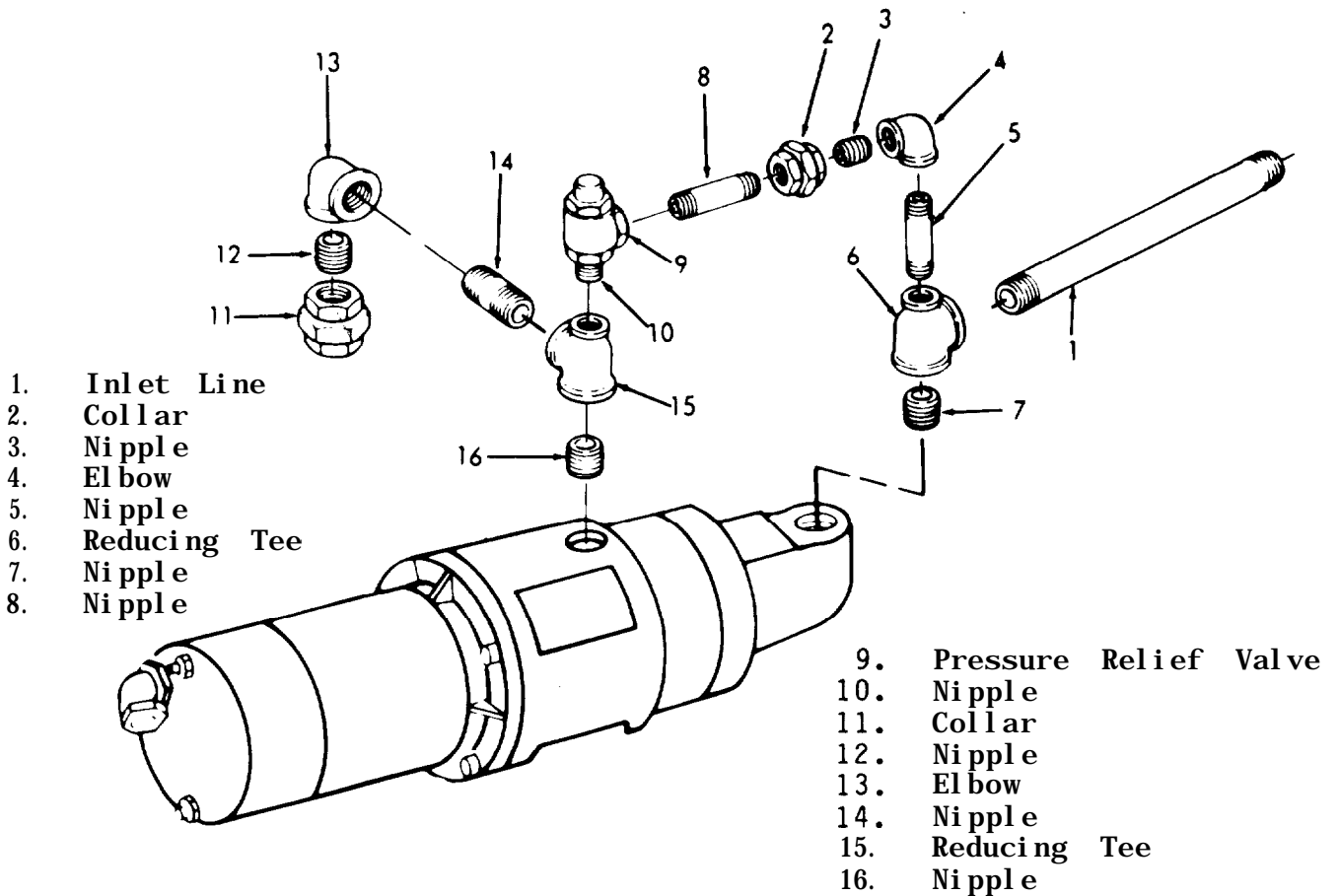
- | | |
|----|--|
| 1. | a. Inspect pump for evidence of leaking seal assembly. |
| | b. Loose flexible joint. |

Removal

- | | | |
|----|----------------|---------|
| 2. | Inlet line (1) | Remove. |
|----|----------------|---------|

3-30. SUPPLY PUMP, TYPE A AND B SEPARATOR (Continued).

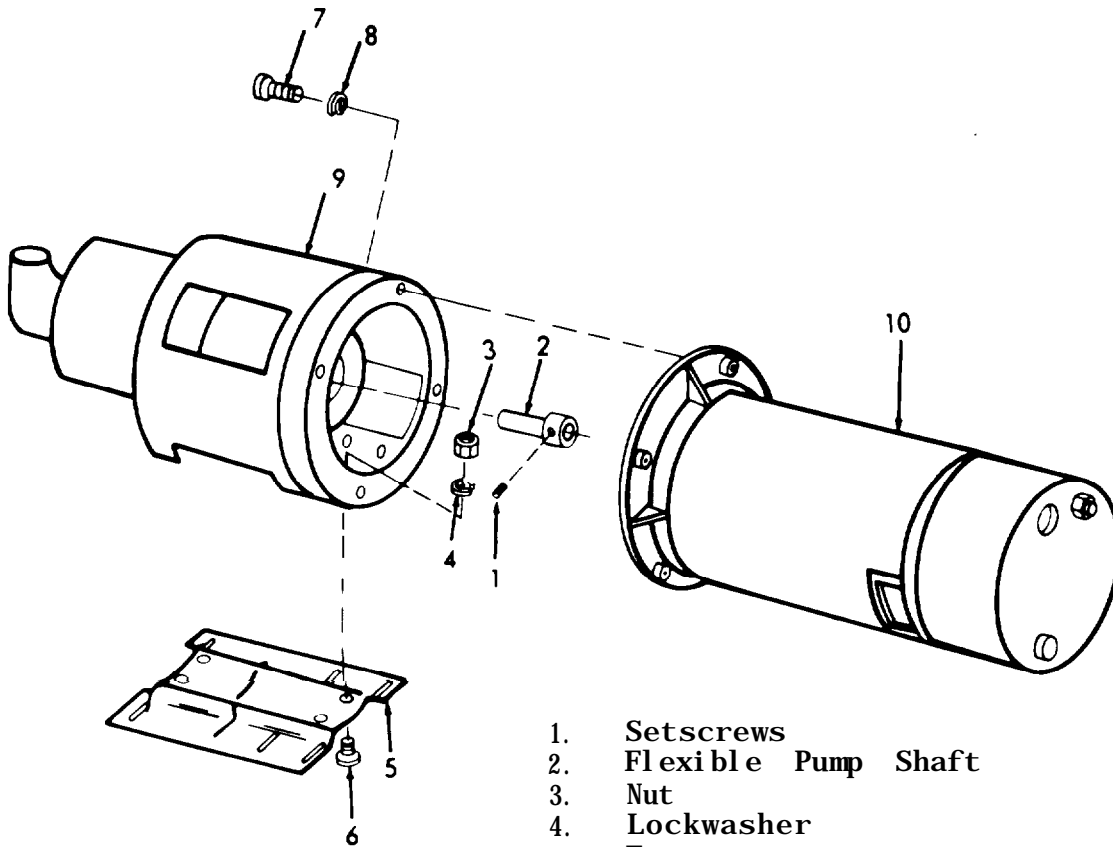
LOCATION	ITEM	ACTION	REMARKS
3.	Piping	<p>a. Unscrew collar (2) from union.</p> <p>b. Remove nipple (3), elbow (4), nipple (5), reducing tee (6) and nipple (7).</p> <p>c. Remove nipple (8), pressure relief valve (9) and nipple (10).</p> <p>d. Unscrew collar (11) from union.</p> <p>e. Remove nipple (12), elbow (13), nipple (14), reducing tee (15) and nipple (16).</p>	



3-30. SUPPLY PUMP, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

4. Supply pump
- Remove setscrews (1) from flexible pump shaft (2).
 - Remove nuts (3) and lockwashers (4) securing pump to foot (5). Remove screw (6).
 - Remove screws (7) and lockwashers (8).
 - Remove pump assembly (9) from motor (10).



- Setscrews
- Flexible Pump Shaft
- Nut
- Lockwasher
- Foot
- Screw
- Screw
- Lockwasher
- Pump Assembly
- Motor

3-30. SUPPLY PUMP, TYPE A AND B SEPARATOR (Continued).

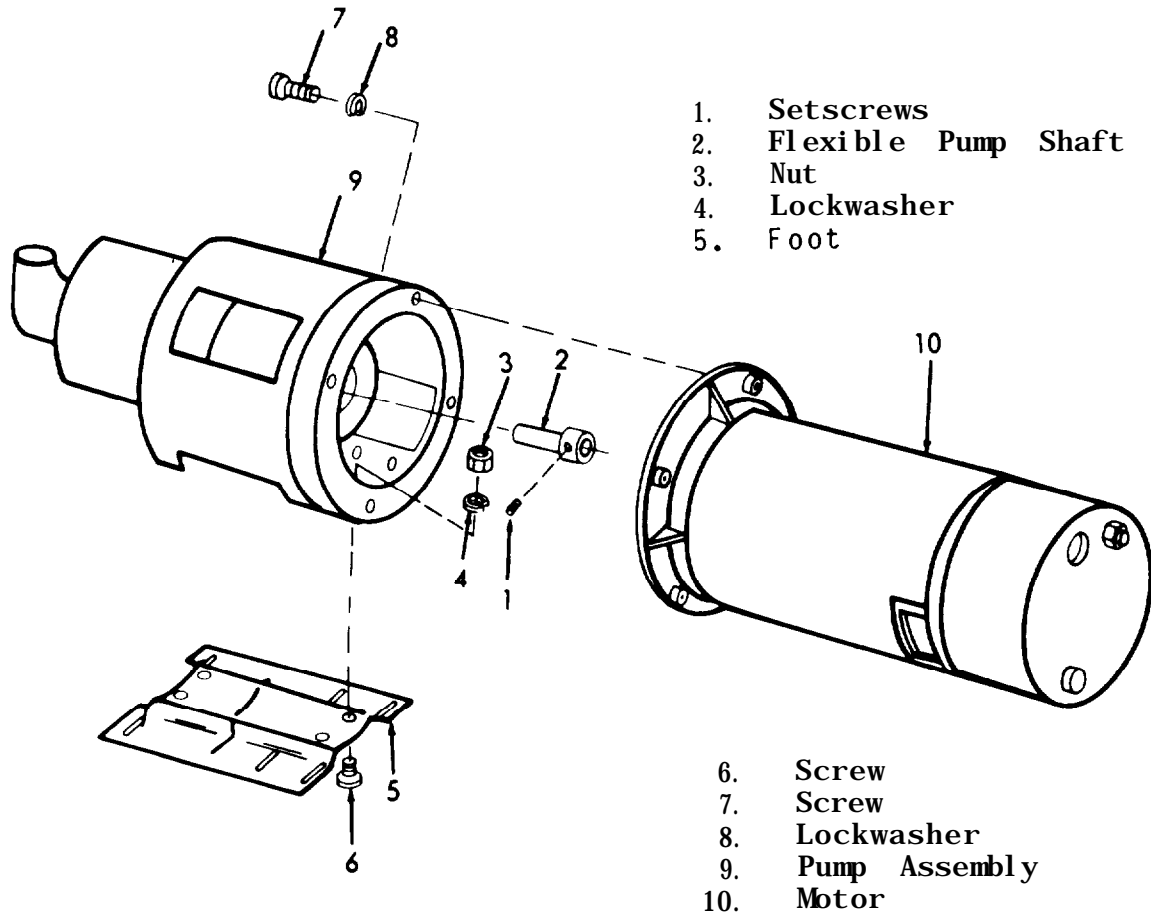
LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Repair

Replace defective pump assembly with a serviceable-like item.

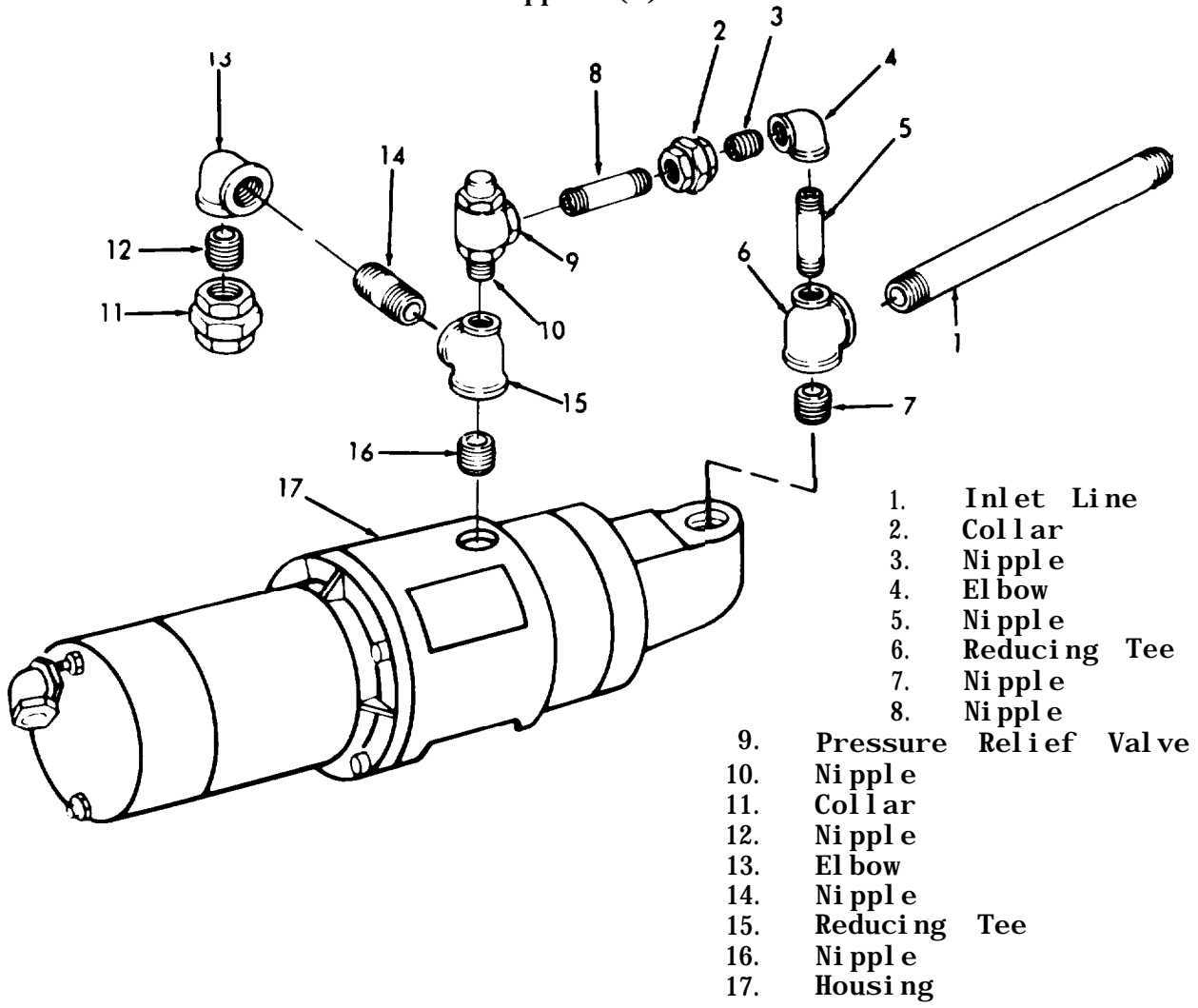
Installation

- | | | |
|----|-------------|--|
| 5. | Supply pump | <p>a. Place pump assembly (9) on motor (10).</p> <p>b. Secure with lockwashers (8) and screws (7).</p> <p>c. Secure pump assembly to foot (5) using screws (6), washers (4) and nuts (3).</p> <p>d. Install setscrews (1) in pump shaft (2).</p> |
|----|-------------|--|



3-30. SUPPLY PUMP, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
6.	Piping	a. Install nipple (16) in pump housing (17).	
		b. Install tee (15), nipple (14), elbow (13) and nipple (12).	
		c. Tighten collar (11).	
		d. Install nipple (10) in tee (15).	
		e. Install relief valve (9) and nipple (8).	



3-30. SUPPLY PUMP, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
		f. Install nipple (7), tee (6), nipple (5), elbow (4) and nipple (3).	
		g. Tighten collar (2) and install inlet line (1).	
7.	Power supply	Turn ON.	

3-31. SUPPLY PUMP MOTOR, TYPE A AND B SEPARATORS.

This task covers:

- a. Inspection
- b. Removal
- c. Repair/Replace
- d. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Motor

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

WARNING

Electrical shock or serious injury may result if electrical power is not shut off prior to performing maintenance on supply pump motor.

Inspection

Inspect for evidence of overheating or other visible damage.

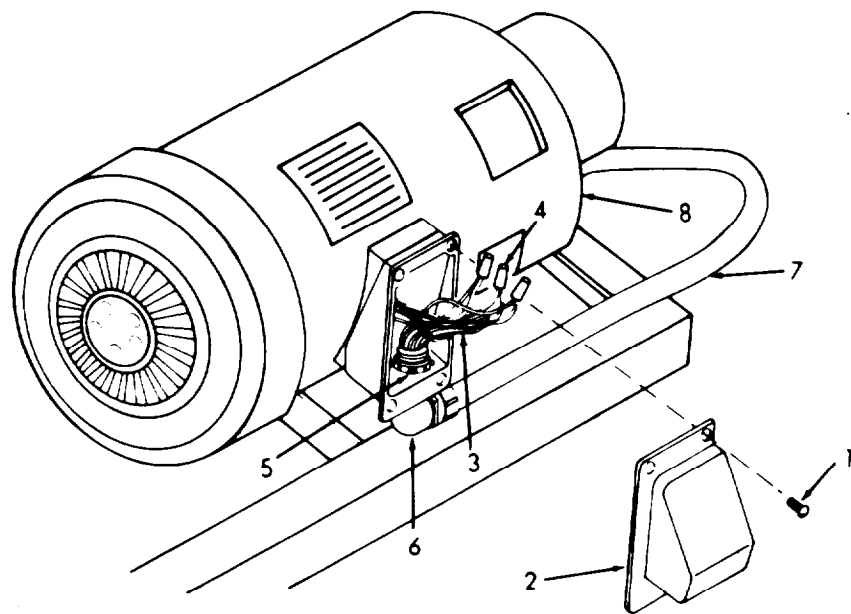
Removal

- | | | |
|----|--|---|
| 1. | Electric power | Turn OFF. |
| 2. | Motor electrical connections (Type A separators) | <ul style="list-style-type: none"> a. Remove screws (1) and cover (2). b. Tag and disconnect leads (3). c. Remove connectors (4) from leads (3). |

3-31. SUPPLY PUMP MOTOR, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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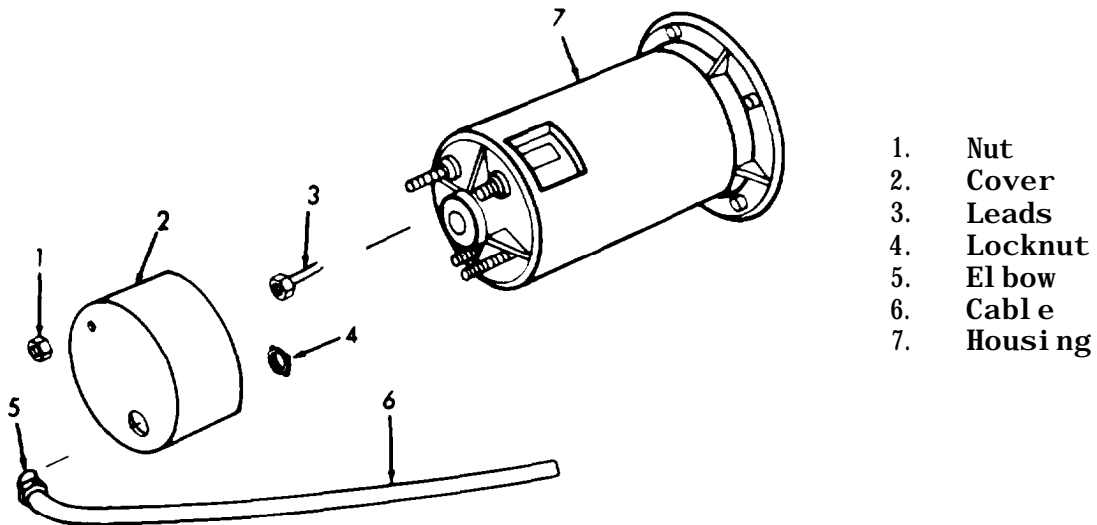
d. Remove locknut (5) from elbow (6) and separate cable (7) from motor (8).



- 1. Screw
- 2. Cover
- 3. Leads
- 4. Connector
- 5. Locknut
- 6. El bow
- 7. Cable
- 8. Motor

3-31. SUPPLY PUMP MOTOR, TYPE A AND B SEPARATORS (Continued).

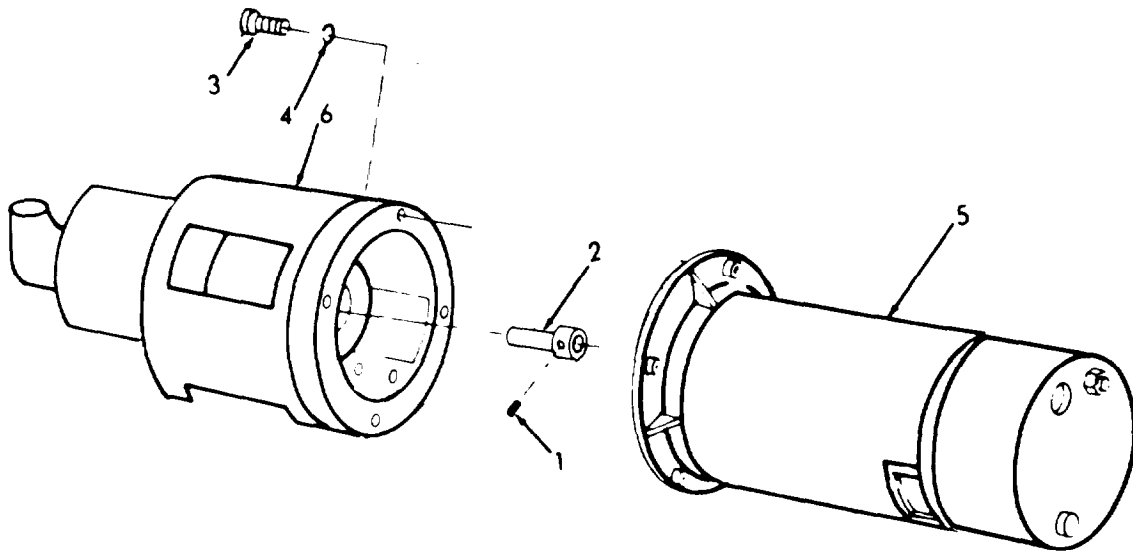
LOCATION	ITEM	ACTION	REMARKS
3.	Motor electrical connections (Type B separators)	a. Remove nuts (1). b. Gently pull cover (2) far enough from motor housing (7) to tag and disconnect leads (3). c. Remove locknut (4) from elbow (5) and separate cable (6) from motor housing (7).	



4.	Motor	a. Remove setscrews (1) from pump shaft (2). b. Remove screws (3) and lockwashers (4). c. Remove motor (5) from pump housing (6).	
----	-------	---	--

3-31. SUPPLY PUMP MOTOR, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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1. Set screw
2. Pump Shaft
3. Screw
4. Lockwasher
5. Motor
6. Pump Housing

Repair

Replace defective motor with a serviceable-like item.

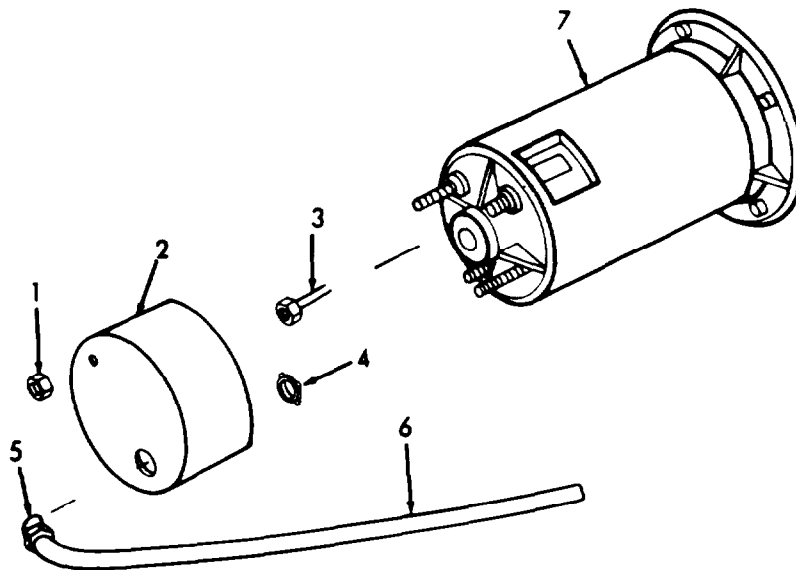
Installation

- | | | |
|----|-------|--|
| 5. | Motor | <ol style="list-style-type: none"> a. Position motor (5) in place and install with lockwashers (4) and screws (3). b. Install setscrews (1) in pump shaft (2). |
|----|-------|--|

3-31. SUPPLY PUMP MOTOR, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
6.	Motor electrical connections (Type B separators)	a. Insert cable (6) in cover (2) and install locknut (4) on elbow (5). b. Reconnect tagged leads (3). c. Secure cover (2) to motor housing (7) with nuts (1).	

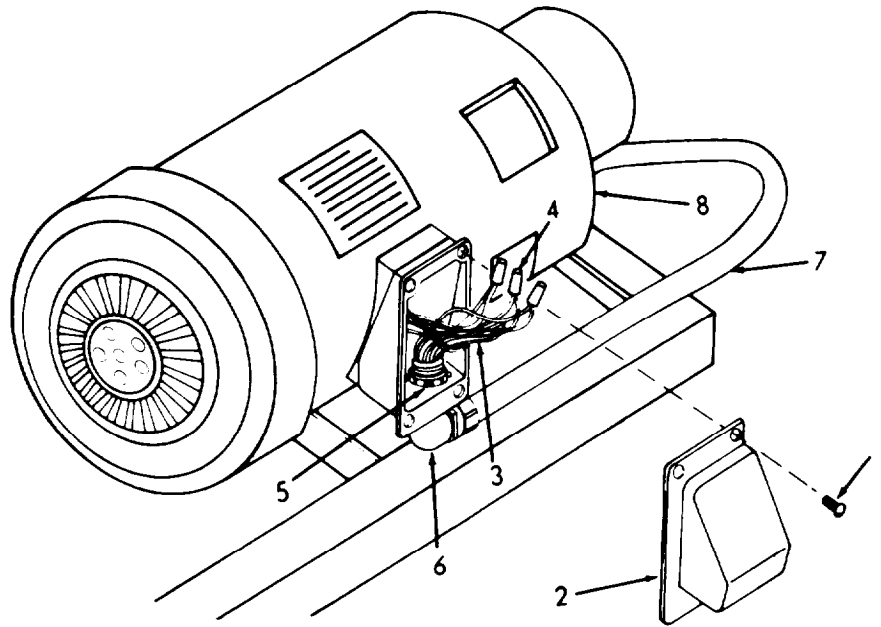
- 1. Nut
- 2. Cover
- 3. Leads
- 4. Locknut
- 5. Elbow
- 6. Cable
- 7. Housing



7.	Motor electrical connections (Type A separators)	a. Insert cable (7) and elbow (6) in motor housing (8). b. Secure with locknut (5). c. Reconnect tagged leads (3) using connectors (4). d. Install cover (2) with screws (1). e. Turn on electric power.	
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3-31. SUPPLY PUMP MOTOR, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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1. Screw
2. Cover
3. Leads
4. Connector
5. Locknut
6. El bow
7. Cable
8. Motor

3-32. RELIEF VALVE, TYPE A AND B SEPARATOR.

This task covers:

- a. Adjustment
- b. Removal
- c. Repair/Replace
- d. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Relief valve
Gasket
Sealing compound
Appendix C, Item No. 6

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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Adjustment

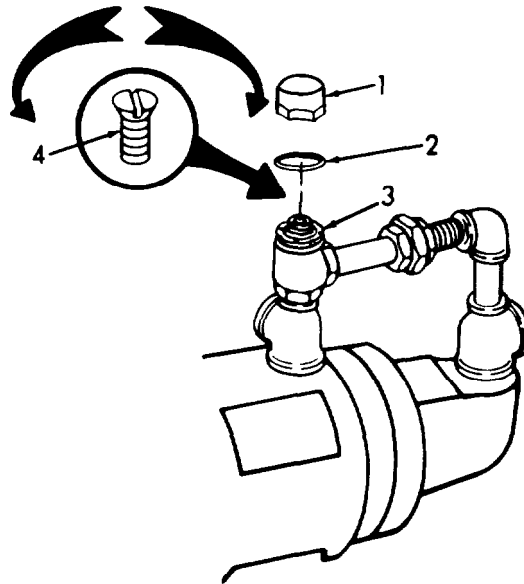
NOTE

The pressure relief valve is preset at 45 psi (3163.8 gm sq cm) and should not require adjustment. However, the following procedure is used to readjust the pressure setting if necessary.

- | | | |
|----|--------------|--|
| 1. | Relief valve | <ul style="list-style-type: none"> a. Remove cap (1) and gasket (2). b. Loosen locknut (3). c. To increase pressure setting, turn adjustment screw (4) clockwise. |
|----|--------------|--|

3-32. RELIEF VALVE, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 1. Cap
- 2. Gasket
- 3. Locknut
- 4. Adjustment Screw

- d. To decrease pressure setting turn counterclockwise.
- e. Tighten locknut (3) and install gasket (2) and cap (1).

3-32. RELIEF VALVE, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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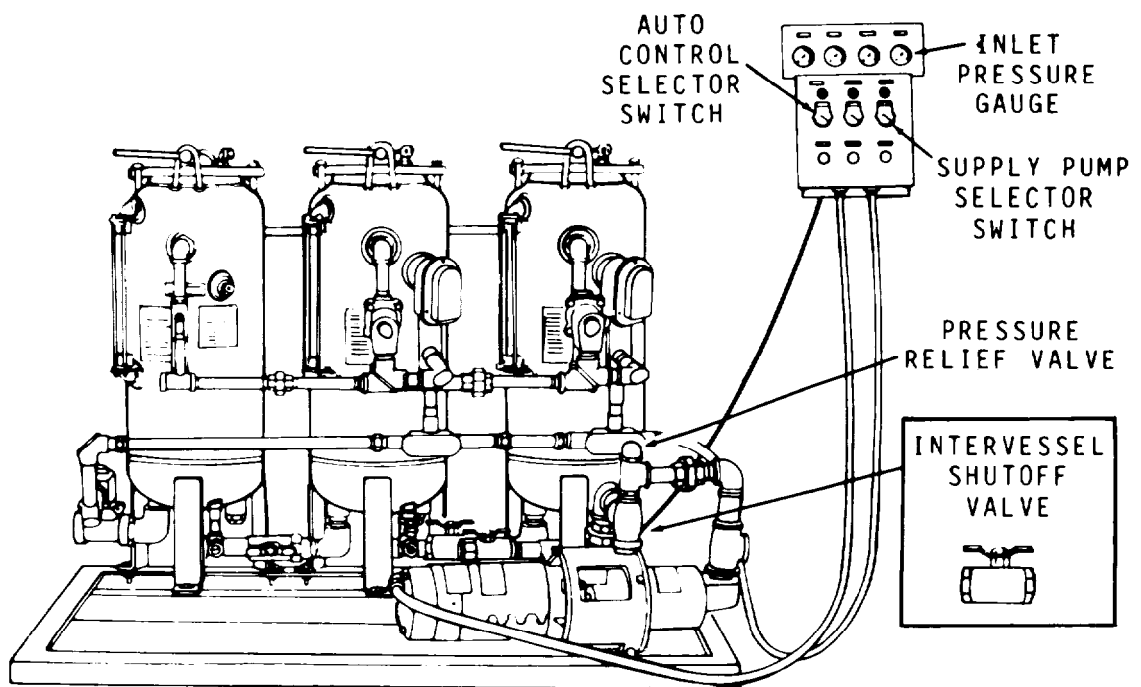
NOTE

To verify pressure setting proceed as follows:

- | | | |
|----|------------------------------|--|
| 1. | Auto control selector switch | Turn OFF. |
| 2. | Supply pump selector switch | Turn ON. |
| 3. | Intervessel shutoff valve | Slowly close until pressure relief valve activates. The pressure relief valve can be heard as it relieves pressure at the preset level, and the pressure reading as observed on the inlet pressure gauges will begin to stabilize. |
| | Supply pump selector switch | Turn OFF. |

3-32. RELIEF VALVE, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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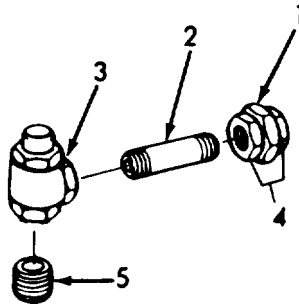


3-32. RELIEF VALVE, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Removal

- | | | | |
|----|------------------|--|--|
| 2. | Relief valve (3) | <ul style="list-style-type: none"> a. Loosen and slide collar (1) from union (4). b. Remove nipple (2). c. Remove relief valve (3). | |
|----|------------------|--|--|



- 1. Collar
- 2. Nipple
- 3. Relief Valve
- 4. Union
- 5. Nipple

Repair

Replace defective gasket or valve with a serviceable-like item.

Installation

- | | |
|----|--|
| 3. | <ul style="list-style-type: none"> a. Install valve (3) onto nipple (5). b. Install nipple (2). c. Secure collar (1) to union (4) Tighten collar (1). |
|----|--|

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR.

This task covers:

- | | |
|---------------|-------------------|
| a. Removal | c. Repair/Replace |
| b. Inspection | d. Installation |

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics
Arc Welder

Material/Parts
Vessel sub-assembly
Sealing compound
Appendix C. Item No. 6

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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WARNING

Electrical shock or serious injury may result if electrical power is not shut off prior to performing maintenance on this assembly.

Removal

- | | | |
|----|---------------------------------|---|
| | Electrical power | Turn OFF. |
| 1. | Pre-filter mini-probe cover (2) | a. Remove screws (1), cover (2) and gasket (3).
b. Disconnect terminals (4). |

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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NOTE

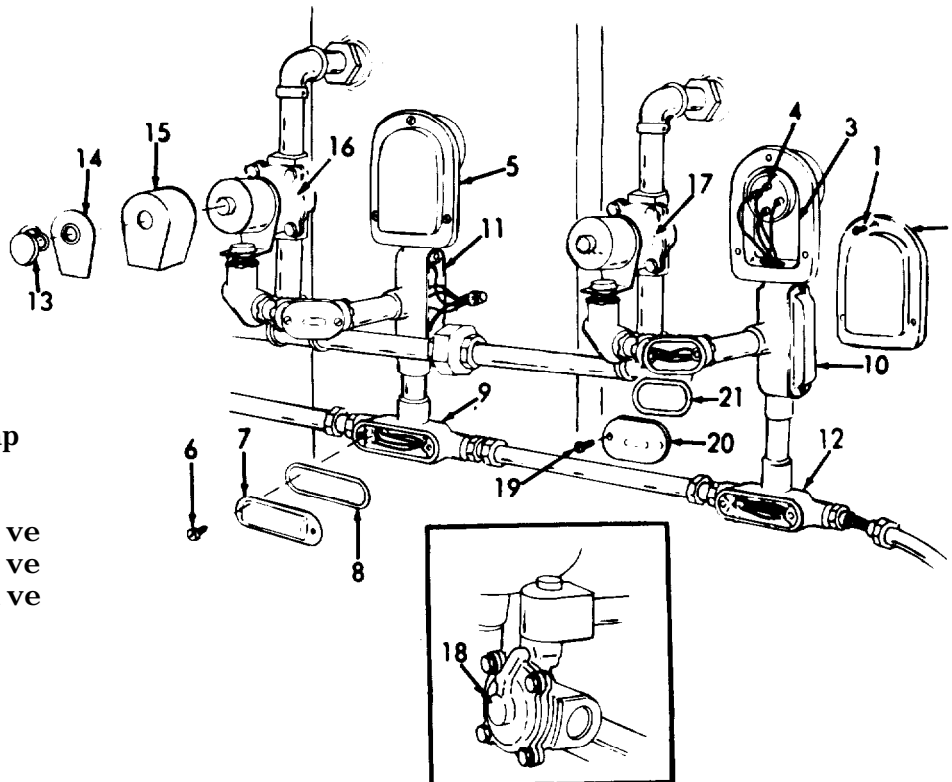
Remove second stage mini-probe cover (5) in same manner and disconnect terminals.

- | | | |
|----|------------------------------|--|
| 2. | Tee cover (9, 10, 11 and 12) | Remove screws (6), cover (7) and gasket (8) from tee's (9, 10, 11, and 12). |
| 3. | Solenoid valve housing (15) | Remove retaining cap (13), nameplate (14) and housing (15) from solenoid valves (16, 17 and 18). |
| 4. | Pulling elbow cover (20) | Remove screws (19), cover (20) and gasket (21). |

NOTE

Remove covers from other five (5) pulling elbows in same manner.

- 1. Screw
- 2. Cover
- 3. Gasket
- 4. Terminals
- 5. Cover
- 6. Screw
- 7. Cover
- 8. Gasket
- 9. Tee
- 10. Tee
- 11. Tee
- 12. Tee
- 13. Retaining Cap
- 14. Nameplate
- 15. Housing
- 16. Solenoid Valve
- 17. Solenoid Valve
- 18. Solenoid Valve
- 19. Screw
- 20. Cover
- 21. Gasket



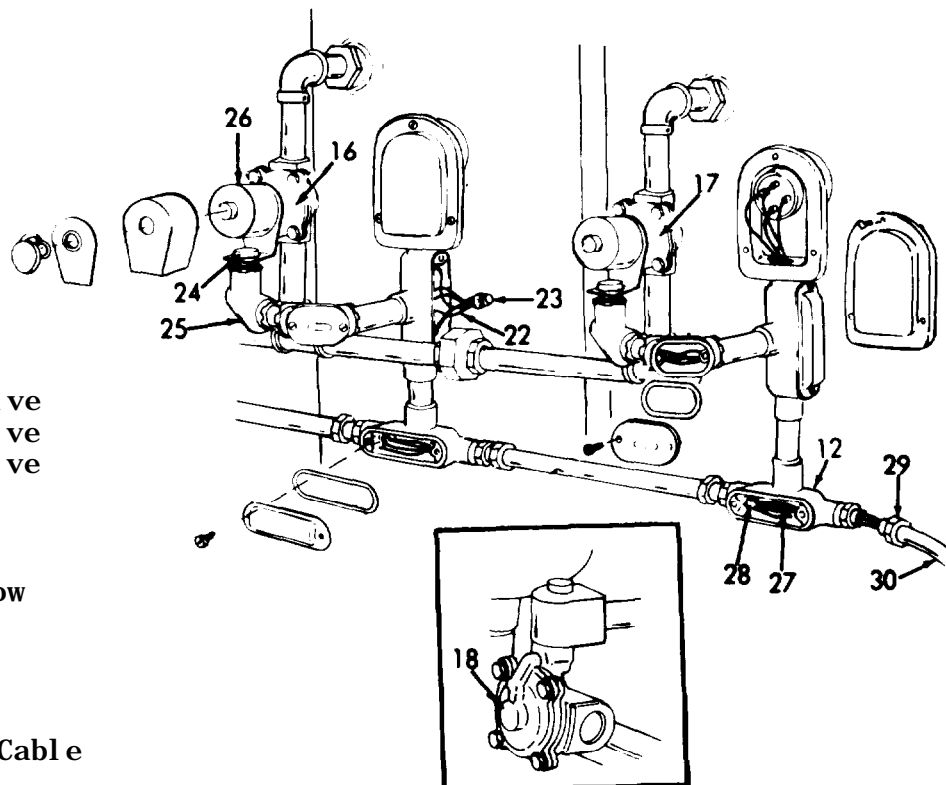
3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
5.	Solenoid valve coil	a. Tag and disconnect leads (22) by removing connectors (23) from solenoid valves (16, 17 and 18). b. Unscrew locknut (24) from pulling elbow (25). c. Pull straight out on coil (26) to remove.	

NOTE

Remove other two (2) solenoid valve coils in the same manner.

6.	Supply pump motor leads (27)	a. Tag and disconnect. b. Remove connectors (28). c. Unscrew collar (29) and remove wiring and cable (30) from tee (12).	
----	------------------------------	--	--



- 9. Tee
- 16. Solenoid Valve
- 17. Solenoid Valve
- 18. Solenoid Valve
- 22. Leads
- 23. Connector
- 24. Locknut
- 25. Pulling Elbow
- 26. Coil
- 27. Leads
- 28. Connector
- 29. Collar
- 30. Wiring and Cable

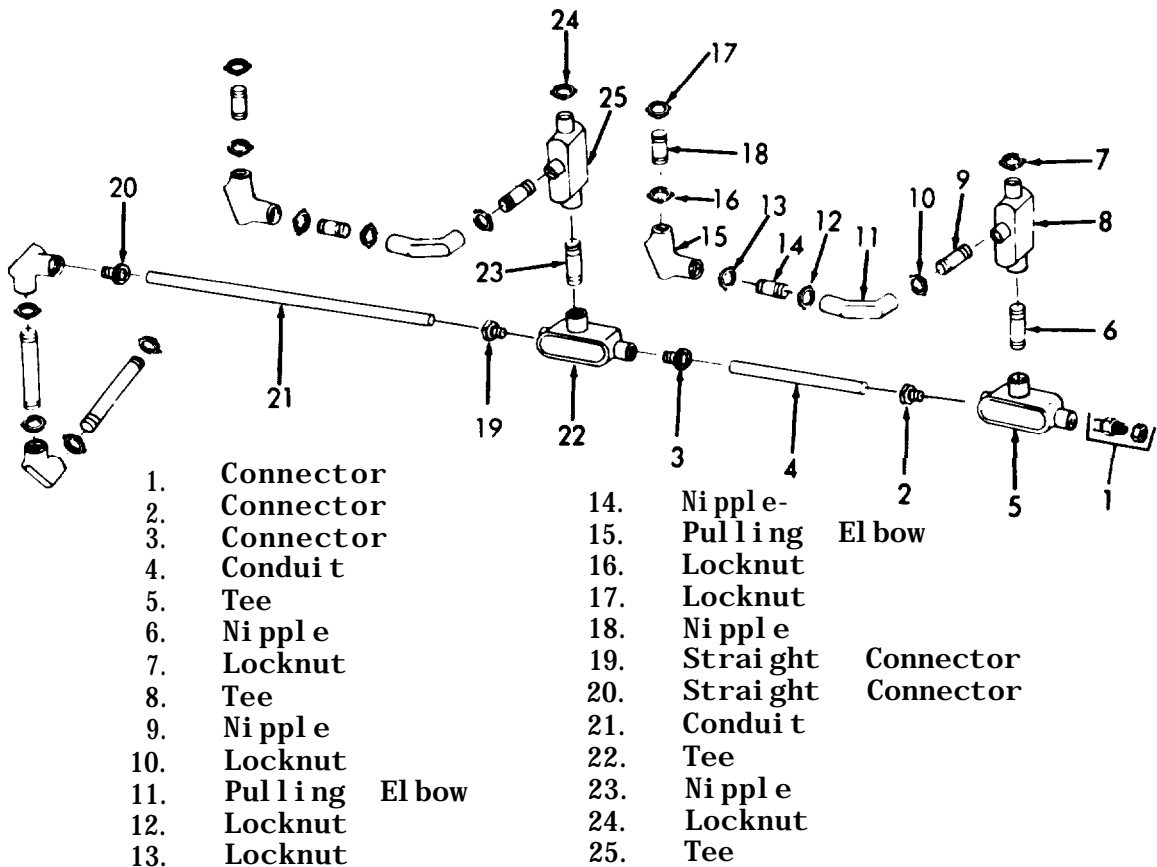
3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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NOTE

Carefully remove each wire from the various electrical components.

- | | | |
|----|------------------------|---|
| 7. | Conduit and connectors | <p>a. Remove straight connectors (1, 2 and 3), conduit (4), tee (5), nipple (6), locknut (7), tee (8), nipple (9) and locknut (10).</p> <p>b. Remove pulling elbow (11), locknuts (12 and 13), nipple (14), pulling elbow (15), locknuts (16 and 17) and nipple (18).</p> <p>c. Remove straight connectors (19 and 20), conduit (21), tee (22), nipple (23), locknut (24) and tee (25).</p> |
|----|------------------------|---|

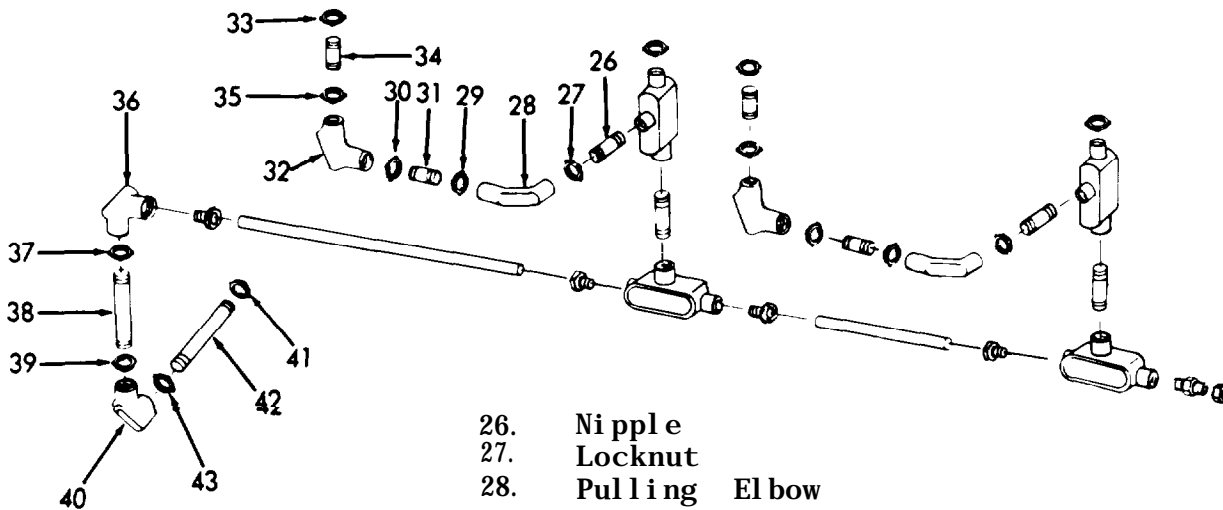


3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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d. Remove nipple (26), locknut (27), pulling elbow (28), locknuts (29 and 30), nipple (31), pulling elbow (32), locknut (33), nipple (34) and locknut (35).

e. Remove pulling elbow (36), locknut (37), nipple (38), locknut (39), pulling elbow (40), locknut (41), nipple (42) and locknut (43).



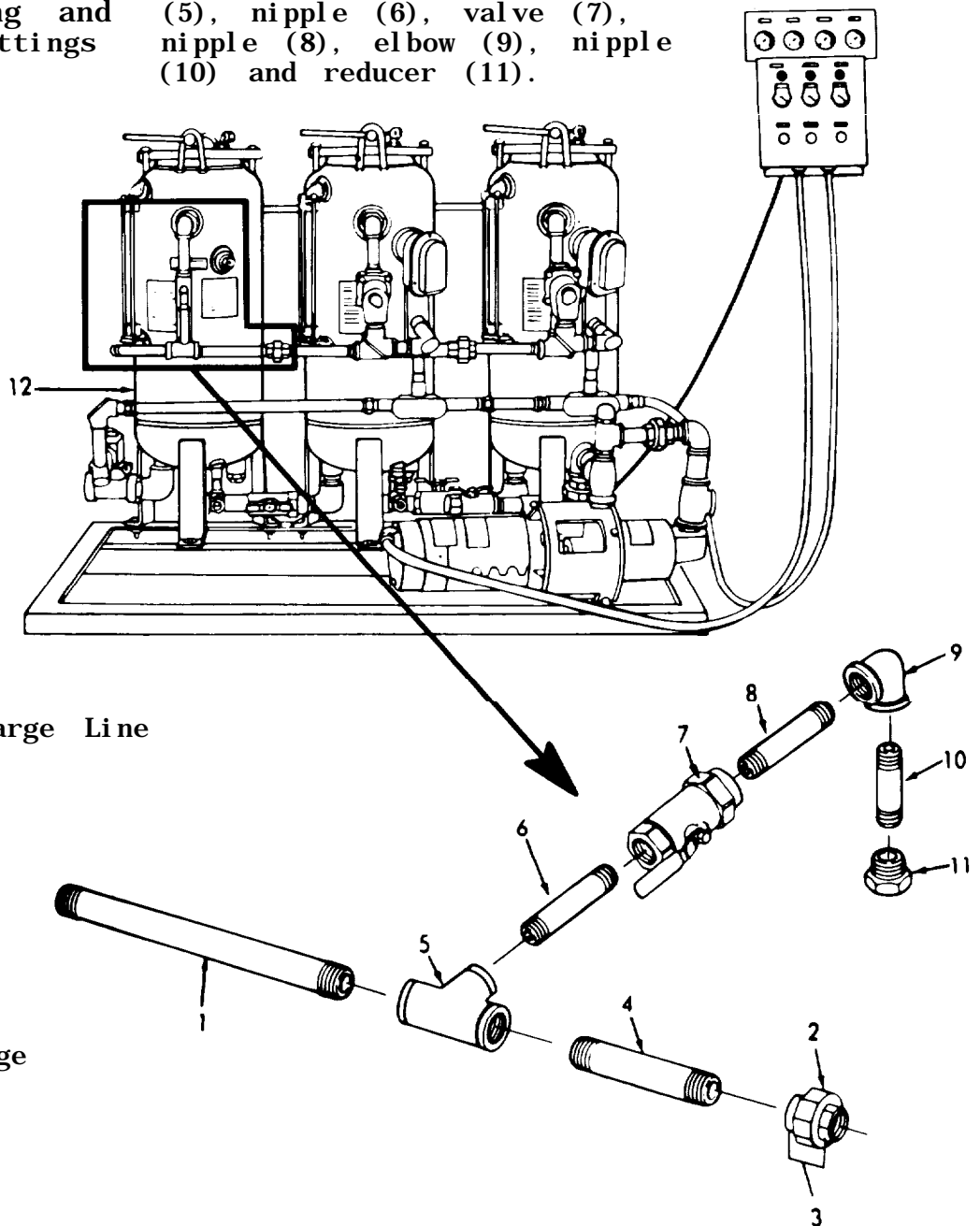
- 26. Nipple
- 27. Locknut
- 28. Pulling El bow
- 29. Locknut
- 30. Locknut
- 31. Nipple
- 32. Pulling El bow
- 33. Locknut
- 34. Nipple
- 35. Locknut
- 36. Pulling El bow
- 37. Locknut
- 38. Nipple
- 39. Locknut
- 40. Pulling El bow
- 41. Locknut
- 42. Nipple
- 43. Locknut

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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8.	Oil Dis-charge Line (1)	Remove.	
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9.	3rd stage piping and fittings	Unscrew collar (2) from union (3). Remove nipple (4), tee (5), nipple (6), valve (7), nipple (8), elbow (9), nipple (10) and reducer (11).	
----	-------------------------------	--	--



1. Oil Discharge Line
2. Collar
3. Uni on
4. Ni pple
5. Tee
6. Ni pple
7. Val ve
8. Ni pple
9. El bow
10. Ni pple
11. Reduc er
12. Thi rd Stage

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

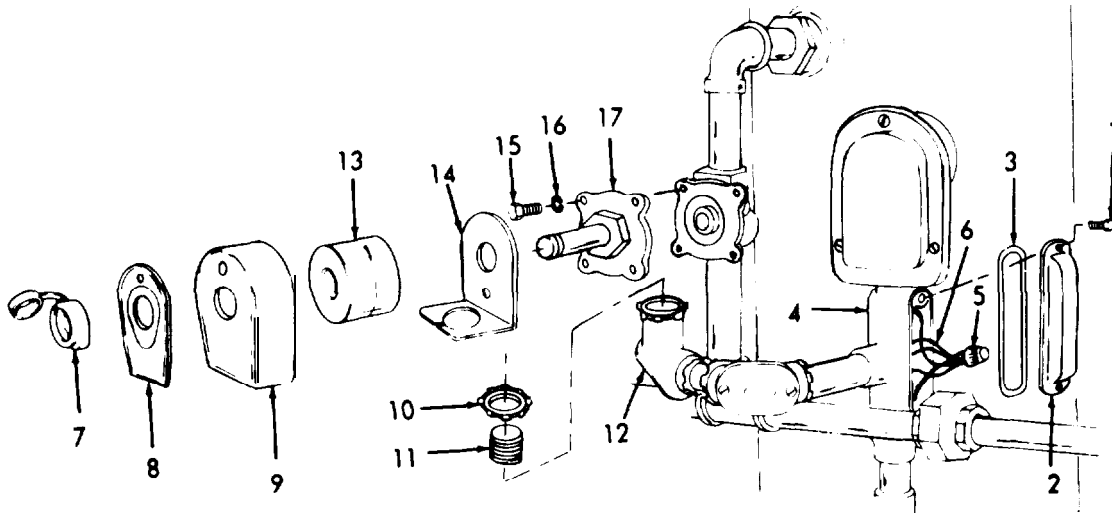
LOCATION	ITEM	ACTION	REMARKS
10. 1st (prefilter) and 2nd stage solenoid coil and valve bonnet	a. Sensor Tee (4)	Remove screws (1), tee cover (2), and gasket (3), from 2nd stage sensor tee (4).	
	b. Solenoid operated discharge valve coil (13)	Remove connectors (5) and separate coil leads (6).	
	c. Coil housing (9)	Remove retaining cap (7), nameplate (8) and coil housing (9).	
	d. Coil (13)	(1) Unscrew locknut (10) securing nipple (11) to baseplate (14). (2) Remove nipple (11) from pulling elbow (12). (3) Pull straight out on coil (13) and remove coil (13) and baseplate (14).	
	e. Valve bonnet (17)	(1) Remove bonnet screws (15) and lockwashers (16). (2) Remove valve bonnet (17) from valve body with diaphragm and related parts attached.	

NOTE

Repeat steps a thru e above to remove solenoid valve coil and valve bonnet from 1st (prefilter) stage separator.

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

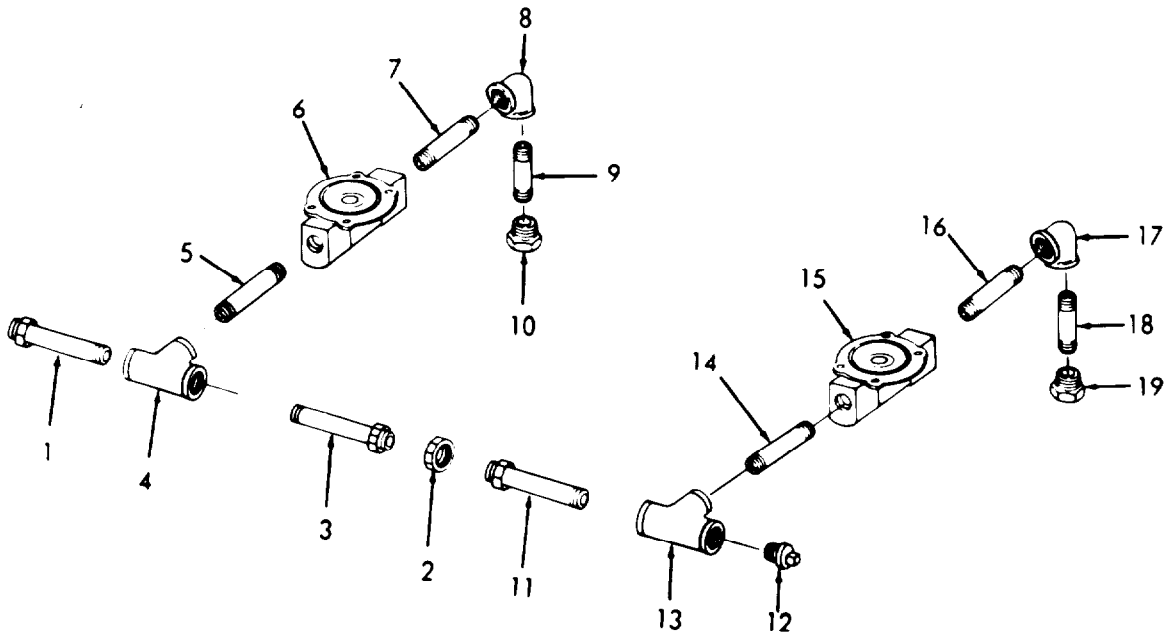
LOCATION	ITEM	ACTION	REMARKS
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1. Screw
2. Tee Cover
3. Gasket
4. Sensor Tee
5. Connector
6. Coil Lead
7. Retaining Cap
8. Nameplate
9. Coil Housing
10. Locknut
11. Nipple
12. Pulling Elbow
13. Coil
14. Baseplate
15. Bonnet Screw
16. Lockwasher
17. Valve Bonnet

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

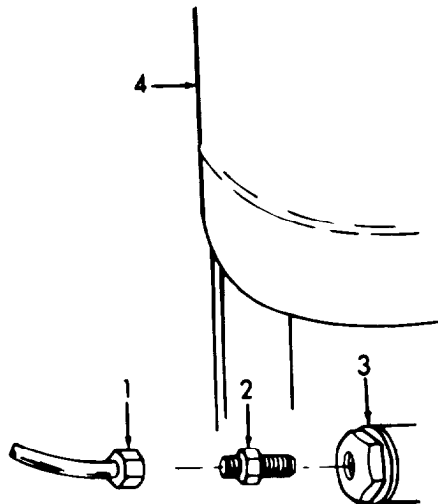
LOCATION	ITEM	ACTION	REMARKS
11.	2nd stage piping and fittings	a. Remove nipple (1) from tee (4). b. Unscrew collar (2) and remove nipple (3), tee (4), nipple (5), solenoid valve body (6), nipple (7), elbow (8), nipple (9) and reducer (10).	
12.	Primary filter piping and fittings	Remove nipple (11), pipe plug (12), tee (13), nipple (14), solenoid valve body (15), nipple (16), elbow (17), nipple (18) and reducer (19).	



- | | | | |
|-----|---------------------|-----|---------------------|
| 1. | Nipple | 11. | Nipple |
| 2. | Collar | 12. | Pipe Plug |
| 3. | Nipple | 13. | Tee |
| 4. | Tee | 14. | Nipple |
| 5. | Nipple | 15. | Solenoid Valve Body |
| 6. | Solenoid Valve Body | 16. | Nipple |
| 7. | Nipple | 17. | Elbow |
| 8. | Elbow | 18. | Nipple |
| 9. | Nipple | 19. | Reducer |
| 10. | Reducer | | |

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
13.	Vessel Tubing	Unscrew female connector (1) and remove male connector (2) from reducer bushing (3).	Located in connection at base of vessel (4) facing from rear.



1. Female Connector
2. Male Connector
3. Reducer Bushing
4. Vessel

NOTE

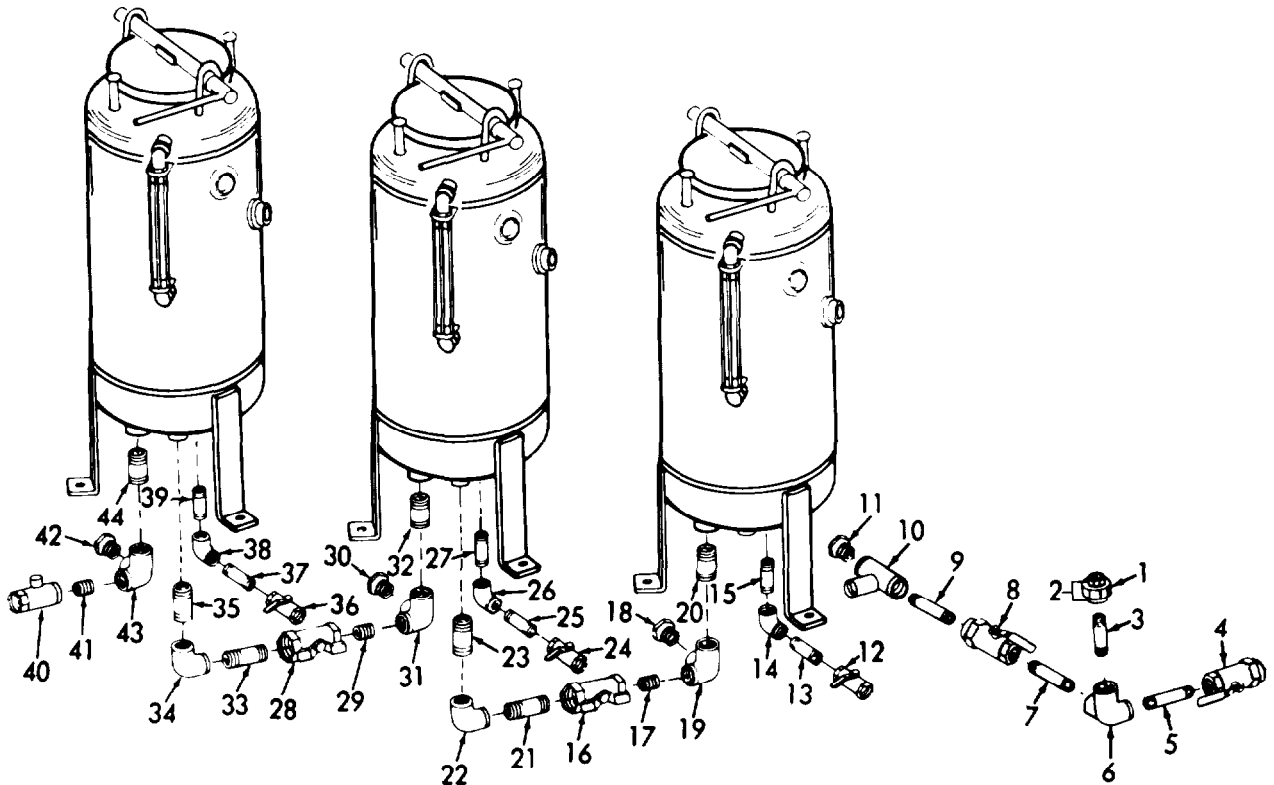
Remove other three connectors from vessels in the same manner.

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
14.	Vessel piping	<ul style="list-style-type: none"> a. Unscrew collar (1) from union (2). b. Remove nipple (3), valve (4), nipple (5), tee (6), nipple (7), valve (8), nipple (9), tee (10) and nipple (11). c. Remove valve (12), nipple (13), elbow (14) and nipple (15). d. Remove valve (16), nipple (17), reducing plug (18), tee (19), nipples (20 and 21), elbow (22), and nipple (23). e. Remove valve (24), nipple (25), elbow (26), nipple (27), valve (28), nipple (29), reducing bushing (30), tee (31), and nipple (32). f. Remove nipple (33), elbow (34), nipple (35), valve (36), nipple (37), elbow (38), nipple (39), solenoid valve (40), nipple (41), reducing bushing (42), tee (43), and nipple (44). 	

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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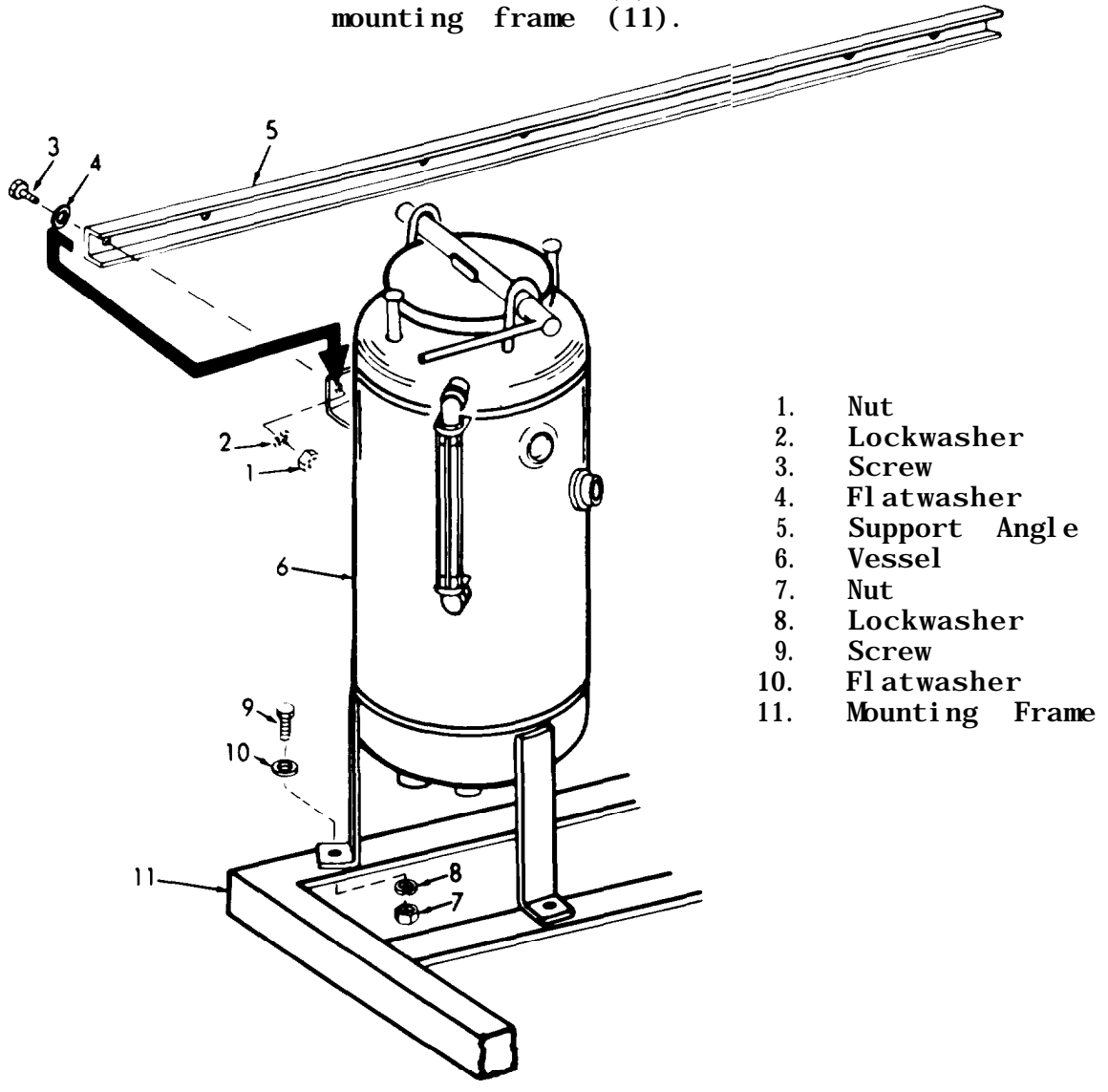


1.	Coll ar	23.	Ni ppl e
2.	Uni on	24.	Val ve
3.	Ni ppl e	25.	Ni ppl e
4.	Val ve	26.	El bow
5.	Ni ppl e	27.	Ni ppl e
6.	Tee	28.	Val ve
7.	Ni ppl e	29.	Ni ppl e
8.	Val ve	30.	Reduci ng Bushi ng
9.	Ni ppl e	31.	Tee
10.	Tee	32.	Ni ppl e
11.	Ni ppl e	33.	Ni ppl e
12.	Val ve	34.	El bow
13.	Ni ppl e	35.	Ni ppl e
14.	El bow	36.	Val ve
15.	Ni ppl e	37.	Ni ppl e
16.	Val ve	38.	El bow
17.	Ni ppl e	39.	Ni ppl e
18.	Reduci ng Plug	40.	Sol enoi d Val ve
19.	Tee	41.	Ni ppl e
20.	Ni ppl e	42.	Reduci ng Bushi ng
21.	Ni ppl e	43.	Tee
22.	El bow	44.	Ni ppl e

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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15. Support angle and vessel mounting hardware
- a. Remove nuts (1), lockwashers (2), screws, (3), flatwashers (4) and support angle (5) from vessel (6).
 - b. Remove nuts (7), lockwashers (8), screws (9) and flatwashers (10) securing vessel.
 - c. Remove vessels (6) from mounting frame (11).



- 1. Nut
- 2. Lockwasher
- 3. Screw
- 4. Flatwasher
- 5. Support Angle
- 6. Vessel
- 7. Nut
- 8. Lockwasher
- 9. Screw
- 10. Flatwasher
- 11. Mounting Frame

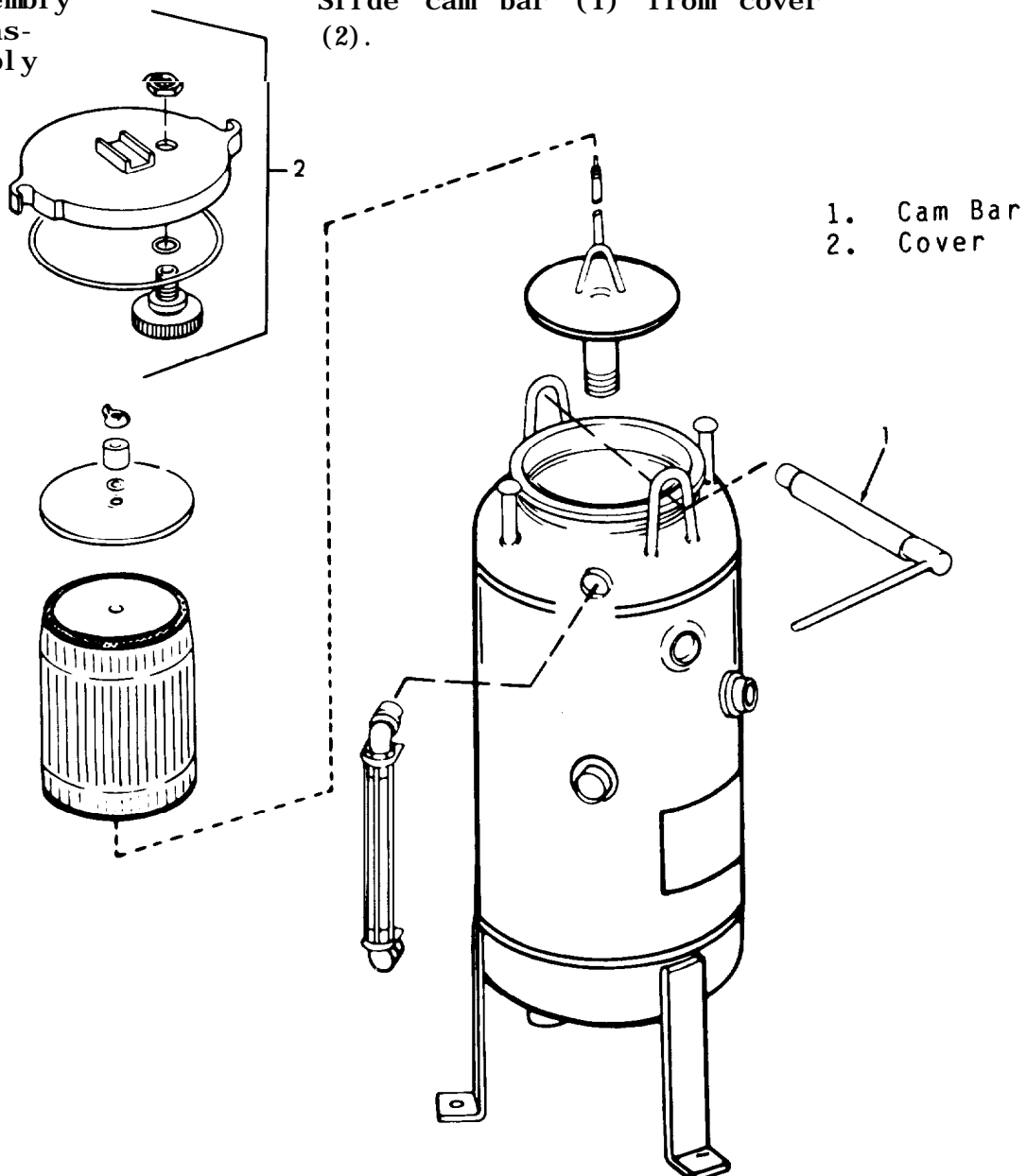
3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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NOTE

Attach a suitable sling to the prefilter separator and using a suitable hoist, lift separator from mounting frame and set on a flat surface. Detach hoist and sling.

- | | | |
|--|-------------------|--|
| 16. Separ-
tor sub-
assembly
disas-
sembly | a. Cam bar
(1) | Turn handle approximately 45°
clockwise to relieve tension.
Slide cam bar (1) from cover
(2). |
|--|-------------------|--|



3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
	b. Cover (2)	Remove.	CAUTION Turn cover over so that float faces upward.
	c. Wing nut (3)	Remove.	
	d. "O" Ring retainer (4)	Remove.	
		Remove.	
	f. Hold- down plate (6)	Remove.	



Place element in plastic bag and mark for petroleum waste disposal.

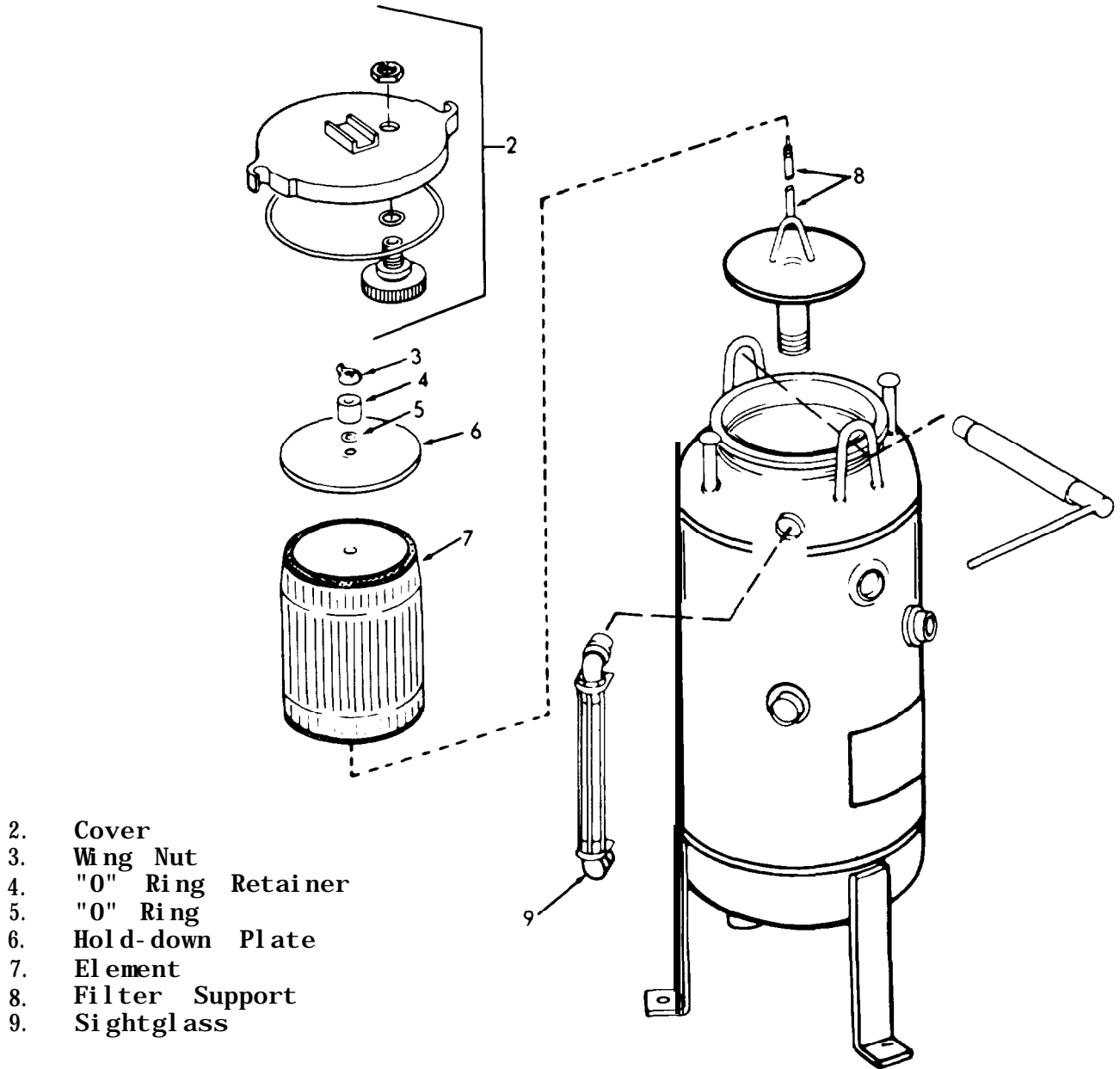
- g. Element (7) Remove.
- h. Filter support (8) Remove.
- i. Sight glass assembly (9) Remove.

NOTE

Repeat steps 16 a thru i for other two vessels.

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 2. Cover
- 3. Wing Nut
- 4. "O" Ring Retainer
- 5. "O" Ring
- 6. Hold-down Plate
- 7. Element
- 8. Filter Support
- 9. Sightglass

Inspection

Inspect threaded parts for thread damage and vessel support legs for cracked or broken welds.

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Repair

- a. Weld cracked or broken welds. Chase damaged threads.
- b. Replace sub-assembly with a serviceable-like item if damaged beyond repair.

Installation

- | | | |
|-----|-----------------------------------|--|
| 17. | Separator sub-assembly reassembly | a. Install sight glass (9) and filter support (8). |
|-----|-----------------------------------|--|

CAUTION

It is important that the filter element be handled properly. DO NOT touch or handle the sock area (side covering) of the elements. Contamination of this surface by skin oils may prevent the coalescer element from functioning properly and cause foaming of the effluent.

- b. Install filter element (7).
- c. Install hold-down plate (6).

NOTE

Center hold-down plate over the end cap of the filter element.

- d. Install O-Ring (5), O-Ring retainer (4) and wing nut (3). Tighten wing nut by hand.

CAUTION

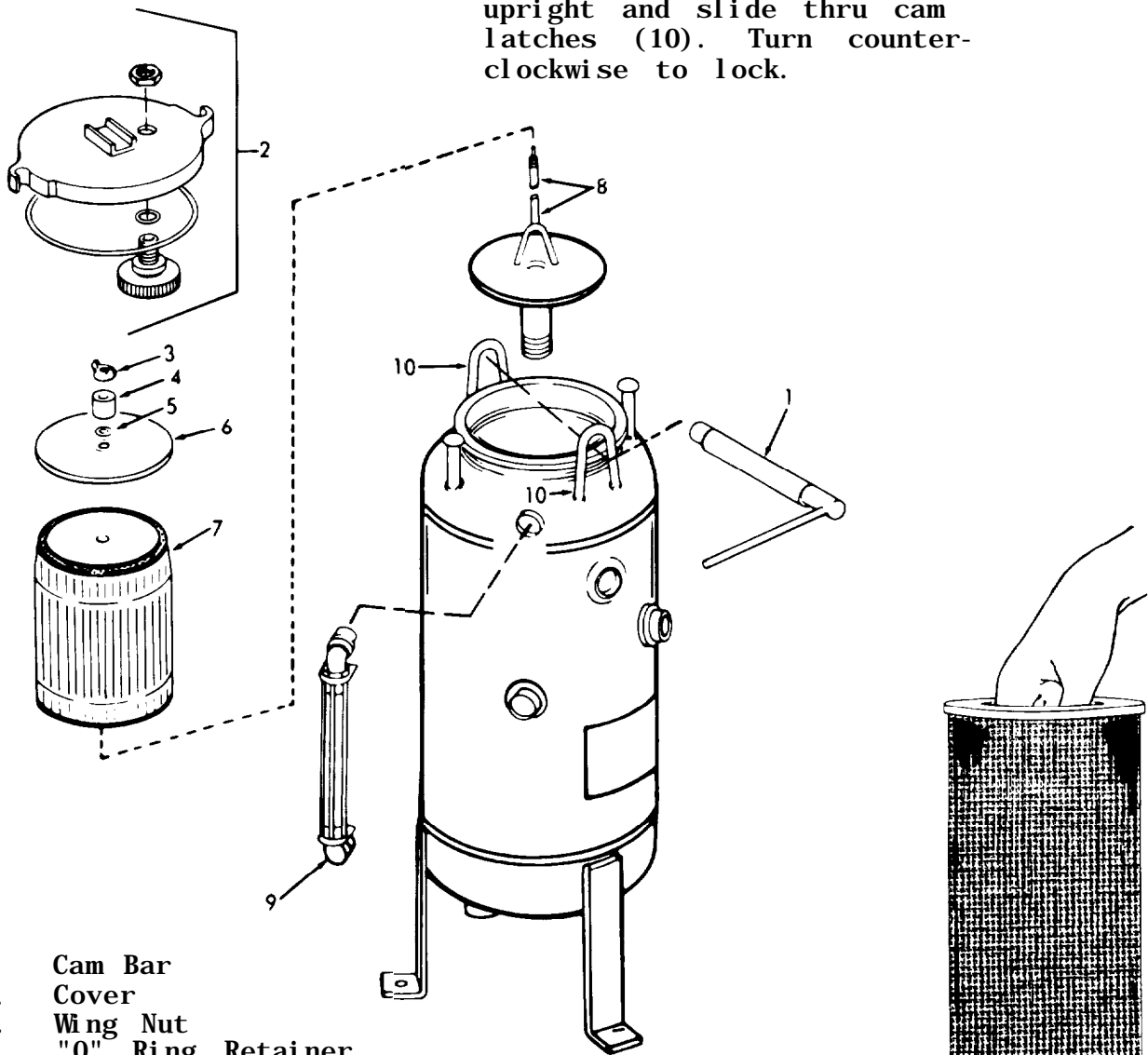
DO NOT use a wrench to tighten the wing nut, or the filter element may be damaged.

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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e. Position cover (2) on vessel.

f. Hold handle on cam bar (1) upright and slide thru cam latches (10). Turn counter-clockwise to lock.



- 1. Cam Bar
- 2. Cover
- 3. Wing Nut
- 4. "O" Ring Retainer
- 5. "O" Ring
- 6. Hold-down Plate
- 7. Element
- 8. Filter Support
- 9. Sightglass
- 10. Cam Latches

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

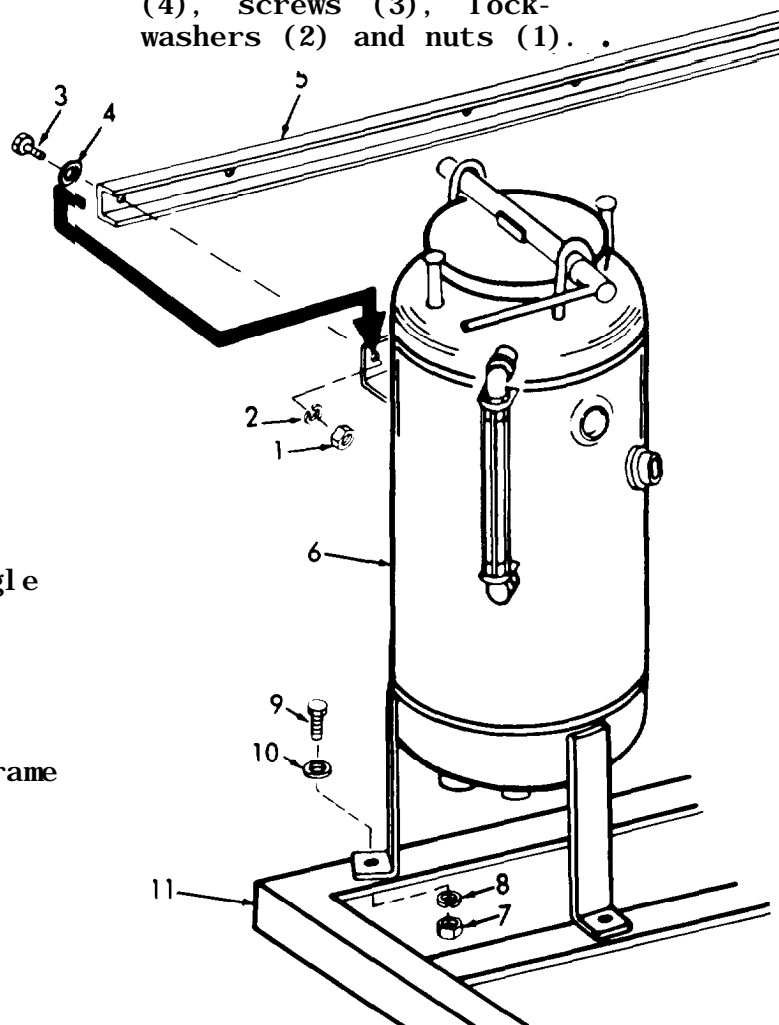
LOCATION	ITEM	ACTION	REMARKS
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NOTE

Reassemble other two vessels in same manner.

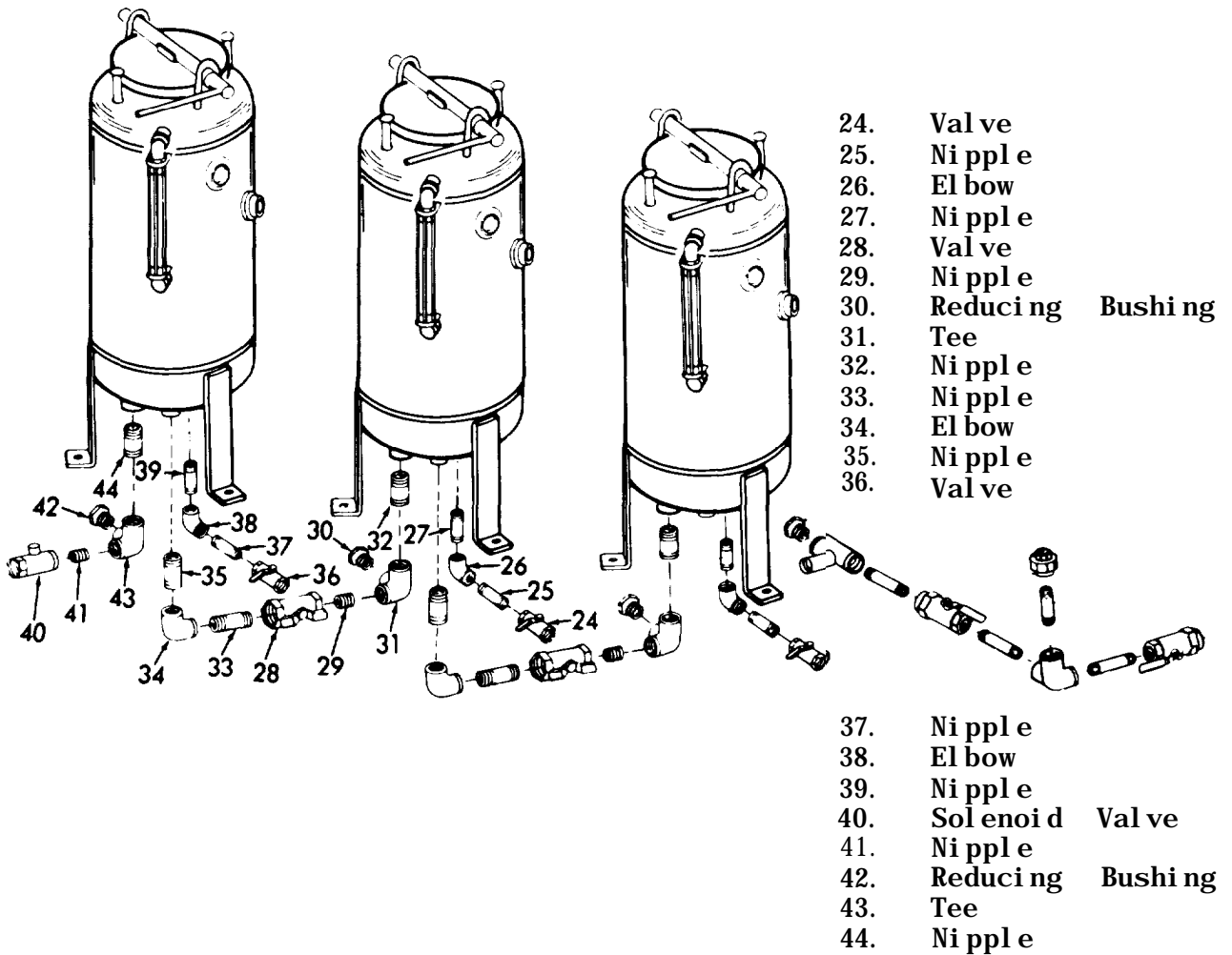
- | | | |
|-----|--|--|
| 18. | Support angle and vessel mounting hardware | <p>a. Position vessels (6) in place on mounting frame (11).</p> <p>b. Secure with screws (10), flatwashers (9), lockwashers (8) and nuts (7).</p> <p>c. Position support angle (5) in place on vessels (6).</p> <p>d. Secure with flatwashers (4), screws (3), lockwashers (2) and nuts (1).</p> |
|-----|--|--|

1. Nut
2. Lockwasher
3. Screw
4. Flatwasher
5. Support Angle
6. Vessel
7. Nut
8. Lockwasher
9. Screw
10. Flatwasher
11. Mounting Frame



3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

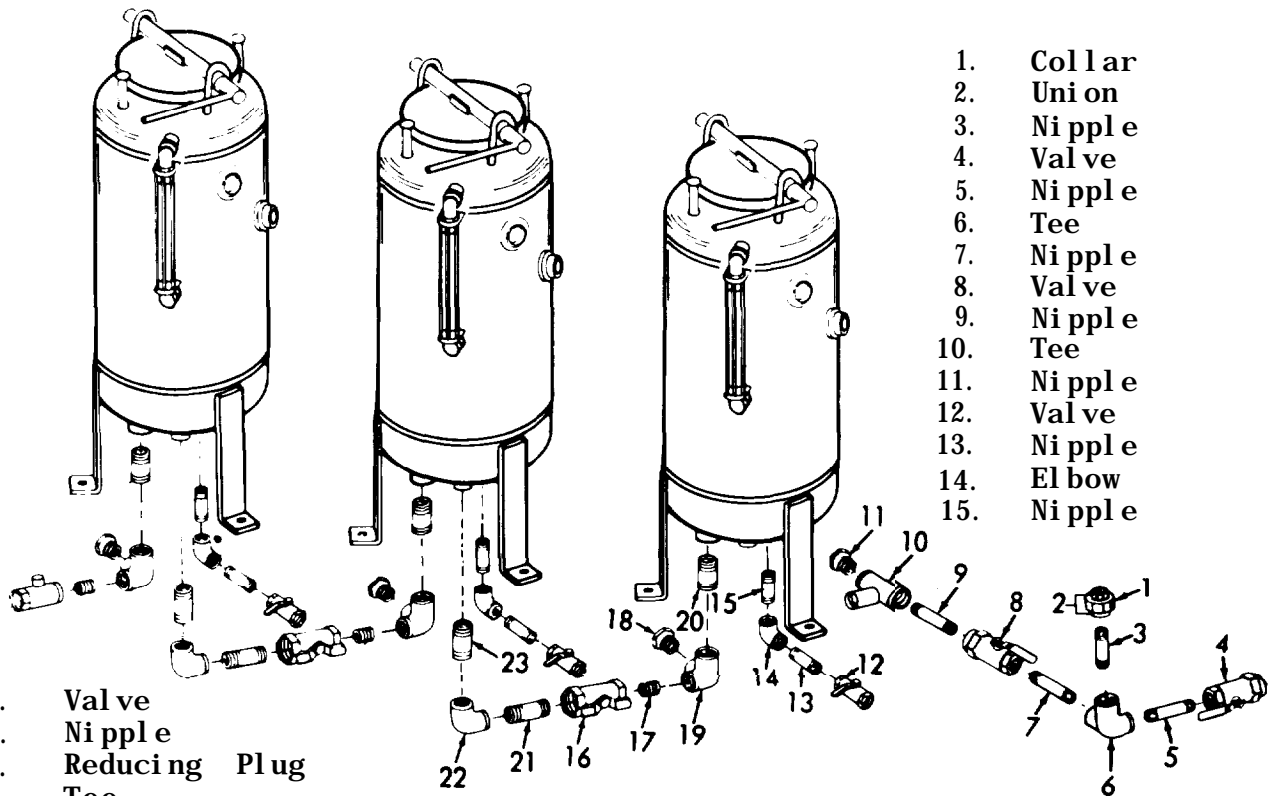
LOCATION	ITEM	ACTION	REMARKS
19.	Vessel piping	<p>a. Install nipple (44), tee (43) reducing bushing (42), nipple (41), solenoid valve (40), nipple (39), elbow (38), nipple (37), valve (36), nipple (35), elbow (34), and nipple (33).</p> <p>b. Install nipple (32), tee (31) 3% reducing bushing (30), nipple (29), valve (28), nipple (27), elbow (26), nipple (25), and valve (24).</p>	



3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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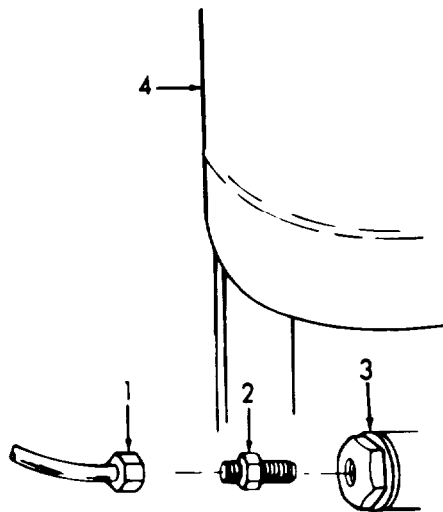
- c. Install nipple (23), elbow (22), nipples (21 and 20), tee (19), reducing bushing (18), nipple (17) and valve (16).
- d. Install nipple (15), elbow (14), nipple (13), and valve (12).
- e. Install nipple (11), tee nipple (9), valve (10) nipple (7), tee (6), nipple (5), valve (4), and nipple (3).
- f. Slide collar (1) over union (2) and tighten.



- 16. Valve
- 17. Nipple
- 18. Reducing Plug
- 19. Tee
- 20. Nipple
- 21. Nipple
- 22. Elbow
- 23. Nipple

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

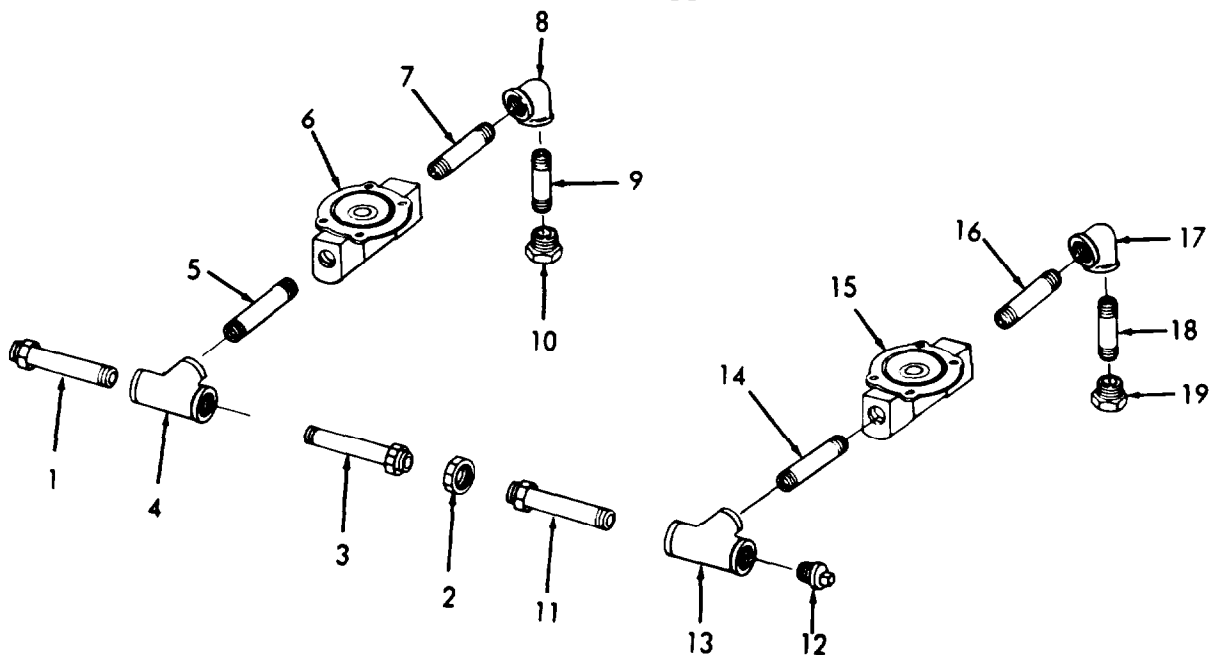
LOCATION	ITEM	ACTION	REMARKS
20.	Vessel tubing	a. Install male connector (2) in bushing (3). b. Install female connector (1) to male connector.	



- 1. Female Connector
- 2. Male Connector
- 3. Reducer Bushing
- 4. Vessel

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
21.	Primary filter piping and fittings	Install reducer (19), nipple (18) elbow (17), nipple (16), valve body (15), nipple (14), tee (13), pipe plug (12), and nipple (11).	
22.	2nd stage piping and fittings	<p>a. Install reducer (10), nipple (9), elbow (8), nipple (7), valve body (6) nipple (5), tee (4), nipple (3).</p> <p>b. Secure nipple (3) to nipple (11) by tightening collar (2).</p> <p>c. Install nipple (1).</p>	



- | | | | |
|-----|---------------------|-----|---------------------|
| 1. | Nipple | 11. | Nipple |
| 2. | Collar | 12. | Pipe Plug |
| 3. | Nipple | 13. | Tee |
| 4. | Tee | 14. | Nipple |
| 5. | Nipple | 15. | Solenoid Valve Body |
| 6. | Solenoid Valve Body | 16. | Nipple |
| 7. | Nipple | 17. | Elbow |
| 8. | Elbow | 18. | Nipple |
| 9. | Nipple | 19. | Reducer |
| 10. | Reducer | | |

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

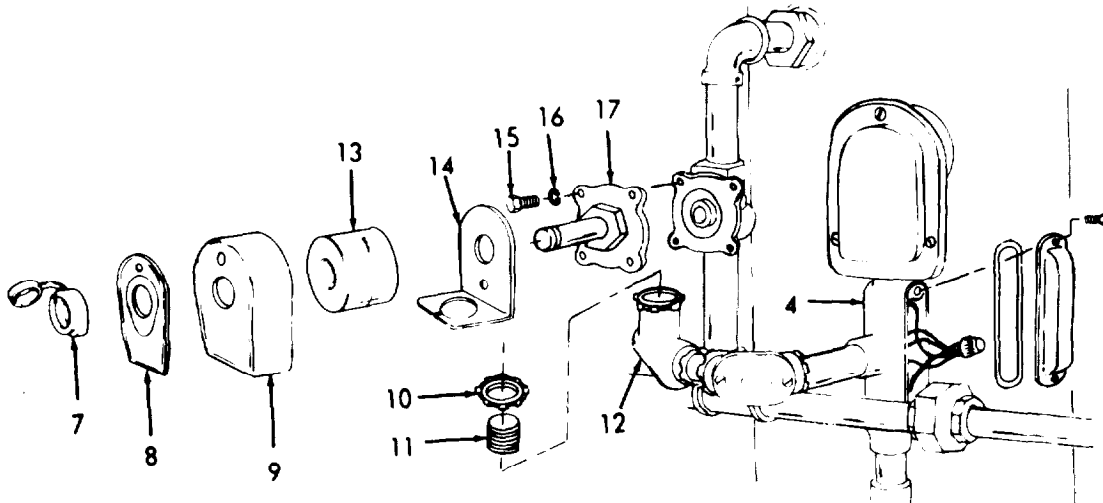
LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|---|----------------------|---|--|
| 23. Sole-noid coil (13) and valve bonnet (17) | a. Valve bonnet (17) | Install valve bonnet (17), with diaphragm and related parts attached, to valve body with lockwashers (16) and screws (15). | |
| | b. Coil (13) | (1) Install nipple (11) in pulling elbow (12).

(2) Position baseplate (14) over end of solenoid base and secure to nipple with locknut (10).

(3) Thread coil leads thru pulling elbows and into tee (4).

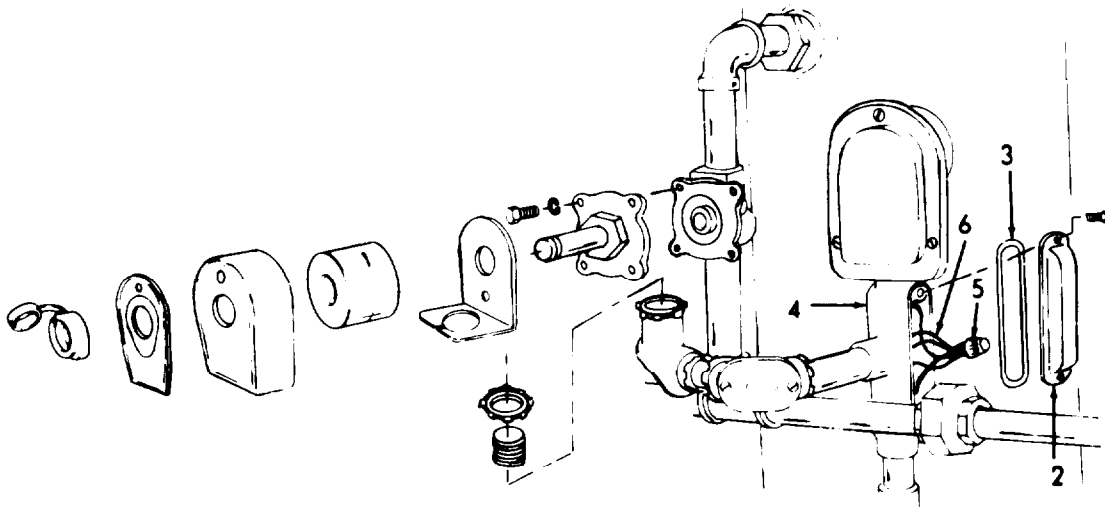
(4) Insert coil (13) over end of solenoid base. | |
| | c. Coil housing (9) | Position coil housing (9) and nameplate (8) over coil (13) and secure with retaining cap (7). | |



- | | |
|------------------|-------------------|
| 4. Sensor Tee | 12. Pulling Elbow |
| 7. Retaining Cap | 13. Coil |
| 8. Nameplate | 14. Baseplate |
| 9. Coil Housing | 15. Bonnet Screw |
| 10. Locknut | 16. Lockwasher |
| 11. Nipple | 17. Valve Bonnet |

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
	d. Leads (6) and tee cover (2)	(1) Reconnect coil leads (6) using connectors (5). (2) Position gasket (3) in place on tee (4). (3) Install cover (2) on tee (4) using screws (1).	



1. Screw
2. Tee Cover
3. Gasket
4. Sensor Tee
5. Connector
6. Coil Lead

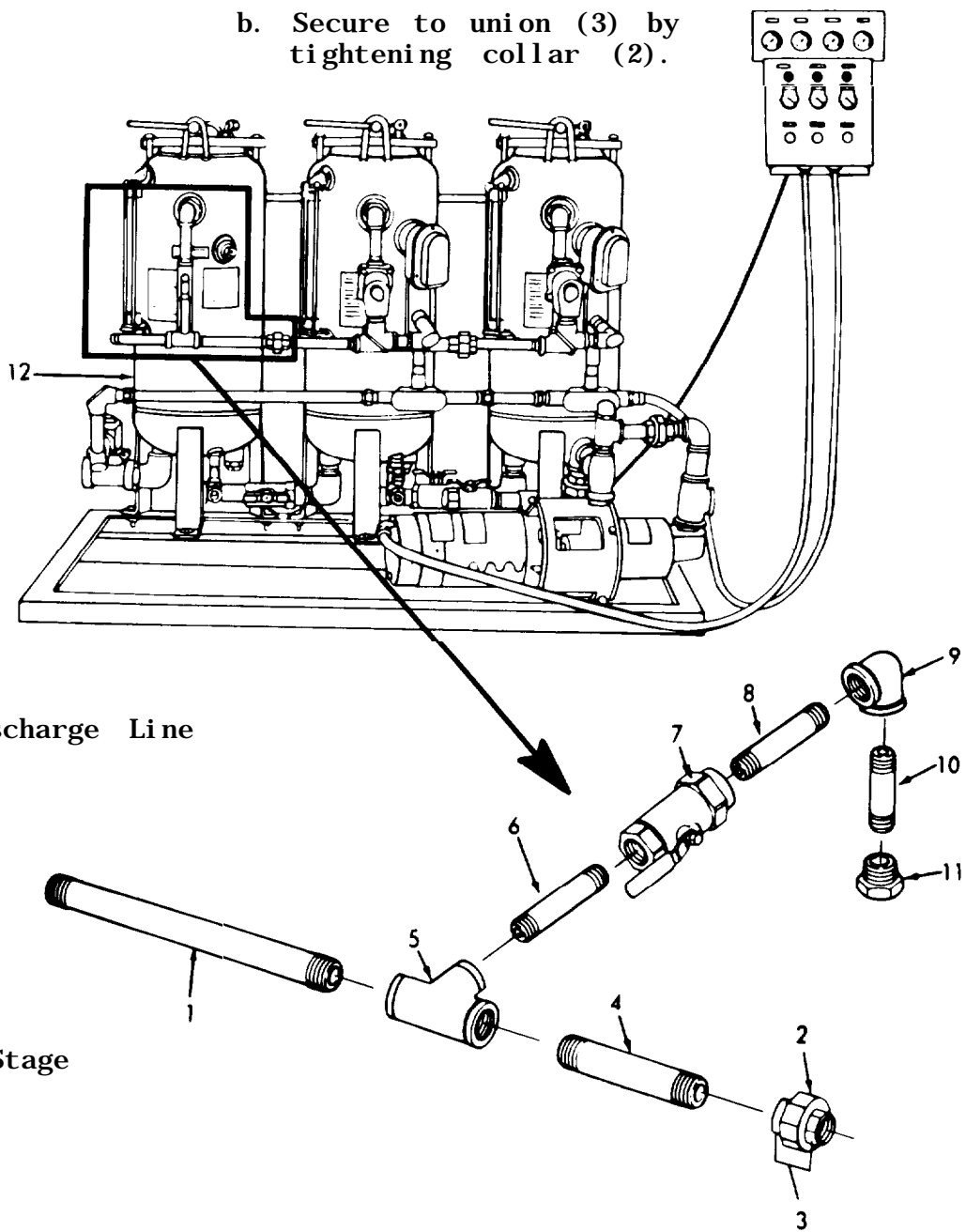
NOTE

Repeat steps 23 a thru d to install solenoid coil and valve bonnet on 1st stage (prefilter) separator.

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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24. Third stage (12) piping and fittings
- a. Install reducer (11), nipple (10), elbow (9), nipple (8), valve (7), nipple (6), tee (5) and nipple (4).
 - b. Secure to union (3) by tightening collar (2).



- 1. Oil Discharge Line
- 2. Collar
- 3. Uni on
- 4. Ni ppl e
- 5. Tee
- 6. Ni ppl e
- 7. Val ve
- 8. Ni ppl e
- 9. El bow
- 10. Ni ppl e
- 11. Reduc er
- 12. Thi rd Stage

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

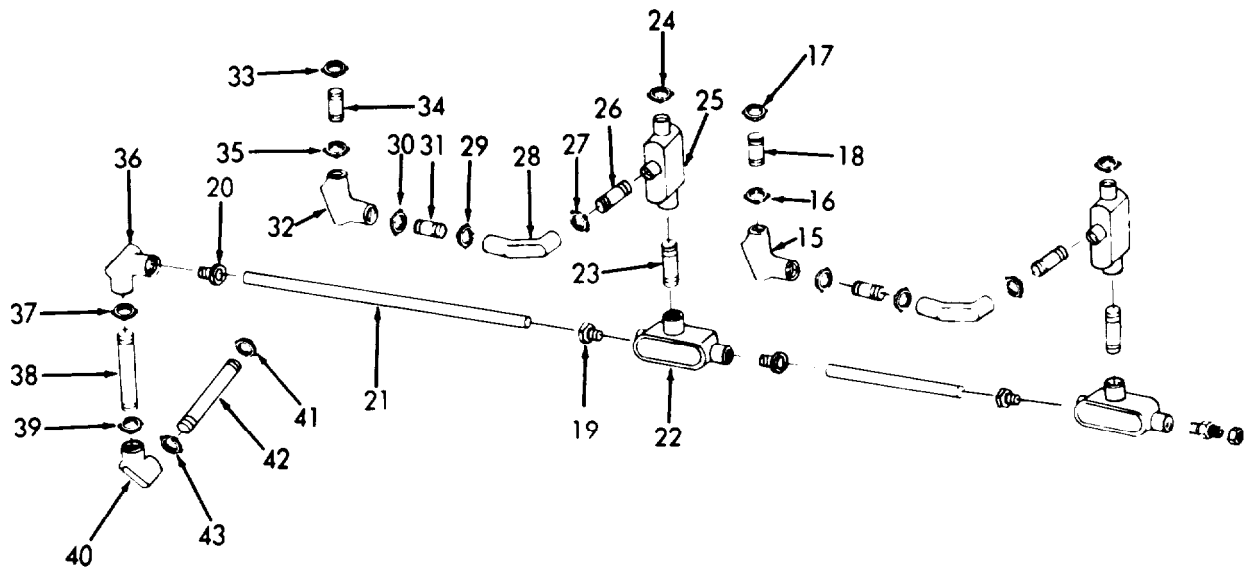
LOCATION	ITEM	ACTION	REMARKS
25.	Oil discharge line (1)	Reconnect.	
26.	Conduit and connectors	<ul style="list-style-type: none"> a. Insert nipple (42) into 3rd stage water discharge valve baseplate and secure with locknut (41). b. Install pulling elbow (40) onto nipple (42) and secure with locknut (43). c. Insert nipple (38) into elbow (40) secure with locknut (39). Install pulling elbow (36) onto nipple (38) and secure with locknut (37). d. Insert nipple (34) into 2nd stage oil discharge valve baseplate and secure with locknut (33). Install pulling elbow (32) onto nipple (34) with locknut (35). e. Install nipple (31) into elbow (32) with locknut (30). f. Install pulling elbow (28) onto nipple (31) with locknut (29). Insert nipple (26) into pulling elbow (28) and secure with locknut (27). g. Insert end of tee (25) into opening in 2nd stage sensor and secure with locknut (24). Install nipple (23) in tee (25) and tee (22) onto nipple (23). 	

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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h. Install conduit (21) onto pulling elbow (36) using connector (20). Install other end of conduit into tee (22) using connector (19).

i. Insert nipple (18) into opening of 1st stage oil discharge valve baseplate and secure with locknut (17). Install pulling elbow (15) onto nipple (18) using locknut (16).

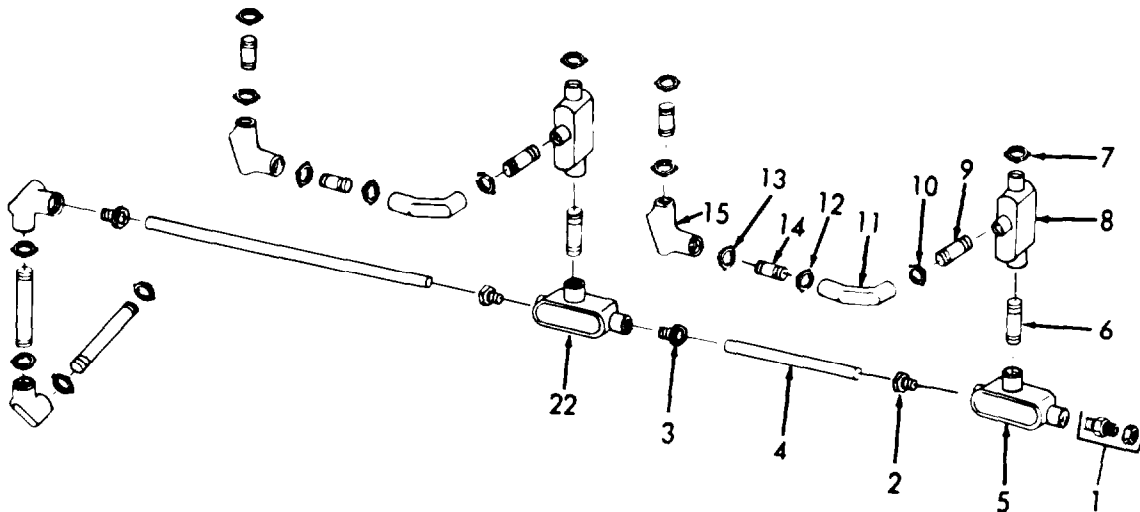


- | | | | |
|-----|--------------------|-----|-----------------|
| 15. | Pulling El bow | 30. | Locknut |
| 16. | Locknut | 31. | Ni pple |
| 17. | Locknut | 32. | Pull ing El bow |
| 18. | Ni pple | 33. | Locknut |
| 19. | Straight Connector | 34. | Ni pple |
| 20. | Straight Connector | 35. | Locknut |
| 21. | Conduit | 36. | Pull ing El bow |
| 22. | Tee | 37. | Locknut |
| 23. | Ni pple | 38. | Ni pple |
| 24. | Locknut | 39. | Locknut |
| 25. | Tee | 40. | Pull ing El bow |
| 26. | Ni pple | 41. | Locknut |
| 27. | Locknut | 42. | Ni pple |
| 28. | Pull ing El bow | 43. | Locknut |
| 29. | Locknut | | |

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- j. Install nipple (14) into elbow (15) using locknut (13). Install pulling elbow (11) onto nipple (14) using locknut (12).
- k. Install nipple (9) in elbow (11) using locknut (10). Insert end of tee (8) into opening in 1st stage sensor and secure with locknut (7).
- l. Install nipple (6) in tee (8) and tee (5) onto nipple (6).
- m. Install conduit (4) into tee (22) and (5) using connectors (3) and (2). Install connector (1) into tee (5).



- | | | | |
|----|-----------|-----|---------------|
| 1. | Connector | 9. | Nipple |
| 2. | Connector | 10. | Locknut |
| 3. | Connector | 11. | Pulling Elbow |
| 4. | Conduit | 12. | Locknut |
| 5. | Tee | 13. | Locknut |
| 6. | Nipple | 14. | Nipple |
| 7. | Locknut | 15. | Pulling Elbow |
| 8. | Tee | 22. | Tee |

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
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NOTE

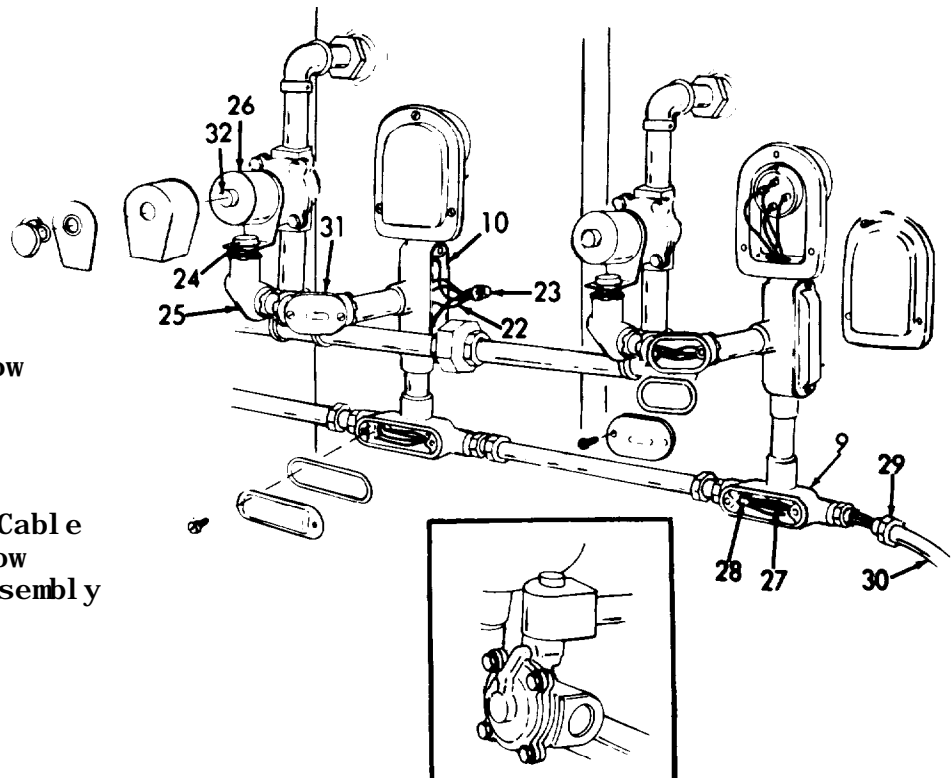
Carefully thread wiring back thru the various electrical components. Ensure that each wire matches the tagged number, i.e. 4 to 4, 5 to 5, etc.

- | | | |
|-----|------------------------------|--|
| 27. | Supply pump motor leads (27) | Insert wiring and cable (30), into tee (9) and secure by tightening collar (29). Install connectors (28) to secure leads (27). |
| 28. | Solenoid valve coil | Thread coil leads (22) thru pulling elbow (25 and 31) and tee (11). Place coil (26) over end of sub-base assembly (32). Install locknut (24) on elbow (25). Install connectors (23) on leads (22). |

NOTE

Install other two (2) solenoid valve coils in the same manner.

- 9. Tee
- 10. Tee
- 22. Leads
- 23. Connector
- 24. Locknut
- 25. Pulling Elbow
- 26. Coil
- 27. Leads
- 28. Connector
- 29. Collar
- 30. Wiring and Cable
- 31. Pulling Elbow
- 32. Sub-base Assembly

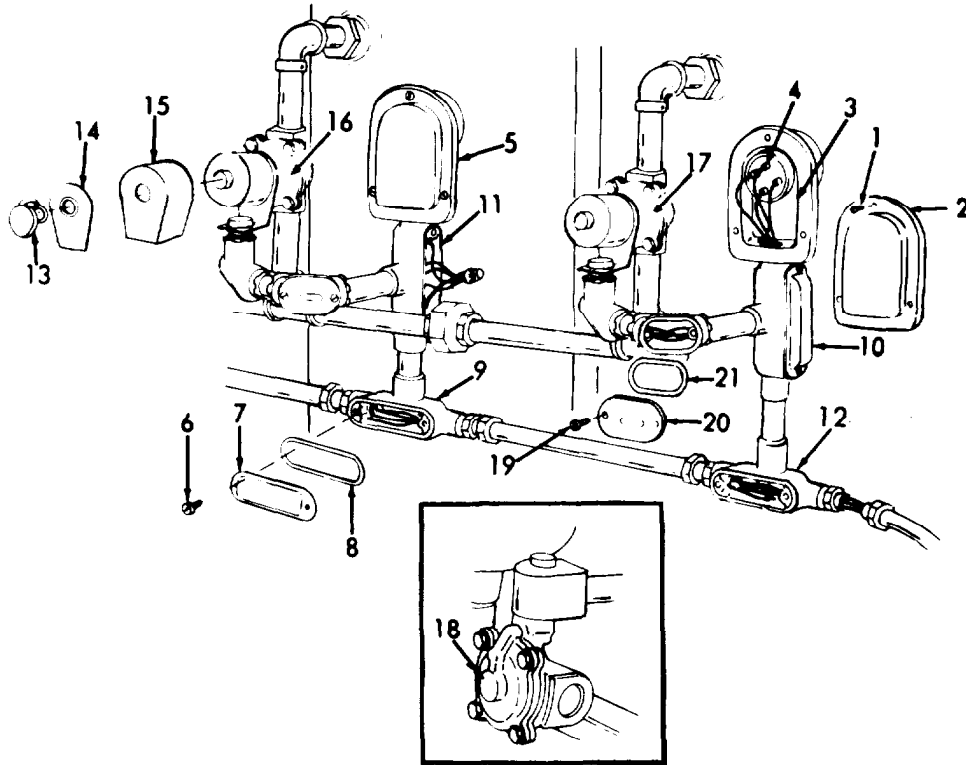


3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
29.	Pulling elbow cover (20)	Position gasket (21) in place and install cover (20) using screws (19).	
NOTE			
Install covers on other five (5) elbows in same manner.			
30.	Solenoid valve housing (15)	Position housing (15) and nameplate (14) in place on solenoid valves (16, 17, and 18) and secure with retaining cap (13).	
31.	Tee covers (9, 10, 11 and 12)	Position gasket (8) in place on tee cover and install cover (7) using screws (6).	
32.	Mini-probe covers (2 and 5)	<p>a. Reconnect terminals (4) to 2nd stage and 1st stage (prefilter) mini-probe.</p> <p>b. Position gasket (3) in place on mini-probe and install cover (2) using screws (1).</p>	
33.	Electric power	Turn ON.	

3-33. VESSEL SUB-ASSEMBLY, TYPE A AND B SEPARATOR (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 1. Screw
- 2. Cover
- 3. Gasket
- 4. Terminal
- 5. Cover
- 6. Screw
- 7. Cover
- 8. Gasket
- 9. Tee
- 10. Tee
- 11. Tee
- 12. Tee
- 13. Retaining Cap
- 14. Nameplate
- 15. Housing
- 16. Solenoid Valve
- 17. Solenoid Valve
- 18. Solenoid Valve
- 19. Screw
- 20. Cover
- 21. Gasket

3-34. CAM BAR, TYPE A AND B SEPARATORS.

This task covers:

- a. Removal
- b. Replacement
- c. Installation

INITIAL SETUP

Test Equipment
None

Material/Parts
Cam bar

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
-----------------	-------------	---------------	----------------

WARNING

Turn supply pump selector switch and auto controls selector switch OFF.

Removal

- | | | |
|----|----------------|---|
| 1. | Cam Bar
(2) | a. Turn handle (1) approximately 45° clockwise.

b. Slide cam bar (2) from cover (3). |
|----|----------------|---|

NOTE

Remove cam bars from other vessels in same manner.

Replacement

Replace defective cam bar with a serviceable-like item.

Installation

- | | |
|----|--|
| 2. | a. Hold handle (1) upright and slide cam bar (2) thru cam latches (4) on vessel (5). |
|----|--|

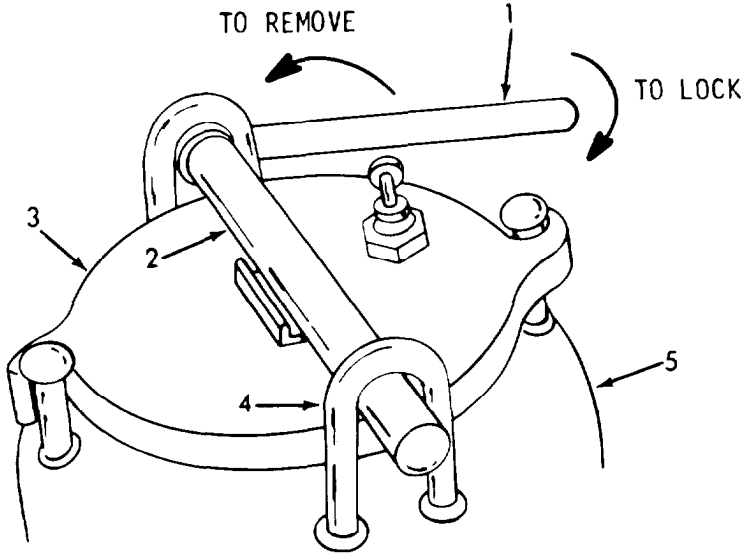
3-34. CAM BAR, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

b. Turn handle (1) approximately 45° counterclockwise to lock in place.

NOTE

Install cam bars on other vessels in same manner.



- 1. Handle
- 2. Cam Bar
- 3. Cover
- 4. Cam Latches
- 5. Vessel

3-35. VESSEL COVER, TYPE A AND B SEPARATORS.

This task covers:

- a. Removal
- b. Repair/Replace
- c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Cover
Cover seal ("O"ring)

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
-----------------	-------------	---------------	----------------

WARNING

Turn supply pump selector switch and auto controls selector switch OFF.

Removal

- 1. Air line (2)
 - a. Remove nut (1) from male connector (3).
 - b. Remove air line (2).
 - c. Remove connector (3) from cover (6).
- 2. Cam bar (5)
 - a. Turn handle (4) upward until loose.
 - b. Slide cam bar (5) from cover (6).

3-35. VESSEL COVER, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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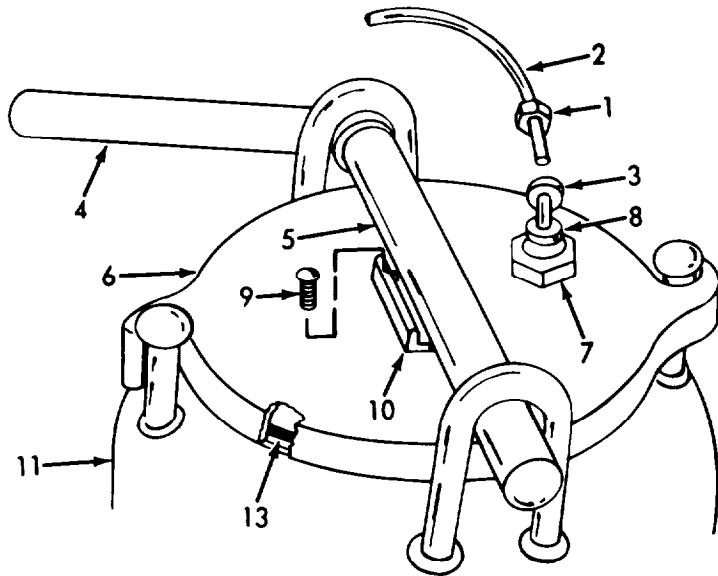
CAUTION

When removing the cover, be careful not to damage the air eliminator valve.

3.	Cover (6)	Turn cover (6) counter-clockwise to remove from vessel (11).	Remove "0" ring (13) from cover.
4.	Air eliminator valve (8)	a. Remove hex nut (7) from valve. b. Remove valve (8) from cover (6).	
5.	Locator (10)	a. Remove screws (9) from cam bar locator (10). b. Remove cam bar locator (10).	

NOTE

Remove other covers in the same manner.



1. Nut
2. Air Line
3. Connector
4. Handle
5. Cam Bar
6. Cover
7. Hex Nut
8. Valve
9. Screws
10. Locator
11. Vessel
13. "0" Ring

VESSEL COVER, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
-----------------	-------------	---------------	----------------

Repair

Replace damaged cover with a serviceable-like item.

Installation

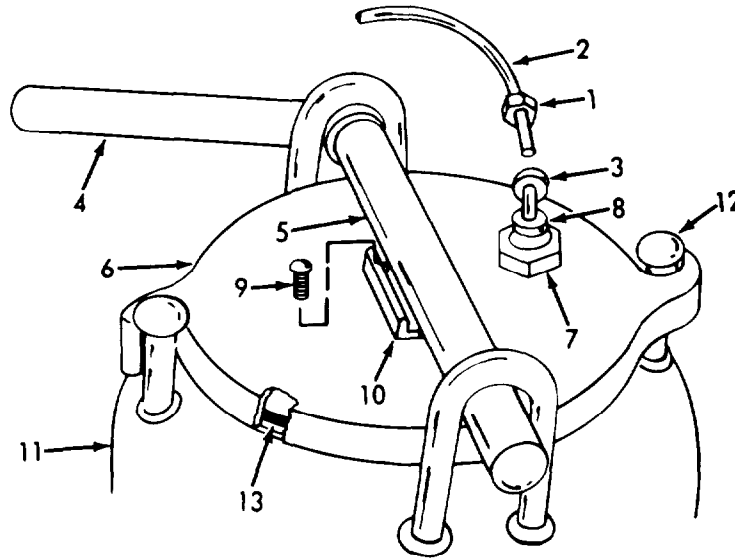
- | | | | |
|----|--------------------------------|--|--|
| 6. | Cam bar locator (10) | Install on cover (6) with screws (9). | |
| 7. | Air eliminator valve (8) | Install on cover using hexagon nut (7). | |
| 8. | Cover (6) and cam bar (5) | <ul style="list-style-type: none"> a. Install "O"ring (13) in cover (6). b. Position cover (6) in place on vessel and turn clockwise to latch on rivets (12). c. Hold handle upright and slide cam bar (5) into place. Turn approximately 45° counterclockwise to seal. | |
| 9. | Air line (2) and connector (3) | <ul style="list-style-type: none"> a. Install male connector (3) on cover. b. Secure air line (2) by tightening nut (1) on connector (3). c. Turn supply pump and auto controls switches ON. | |

NOTE

Install other covers in the same manner.

3-35 CAM BAR, TYPE A AND B SEPERATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



1. Nut
2. Air Line
3. Connector
4. Handle
5. Cam Bar
6. Cover
7. Hex Nut
8. Valve
9. Screws
10. Locator
11. Vessel
12. Ri vets
13. "O" Ri ng

3-36. COVER SEAL ("O" RING) (#)

This task covers:

- a. Removal b. Repair/Replace c. Installation

INITIAL SETUP

Test Equipment

None

Tools

Tool Kit, General Mechanics

Material/Parts

Cover seal ('O' ring)

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

WARNING

Turn Auto Controls and Supply Pump Selector Switches to OFF position prior to performing maintenance on the separators.

Removal

1. Air line (2) Disconnect by unscrewing nut (1).
2. Cam bar (4)
 - a. Turn handle (3) upward until loose.
 - b. Slide cam bar (4) from cover (5).

CAUTION

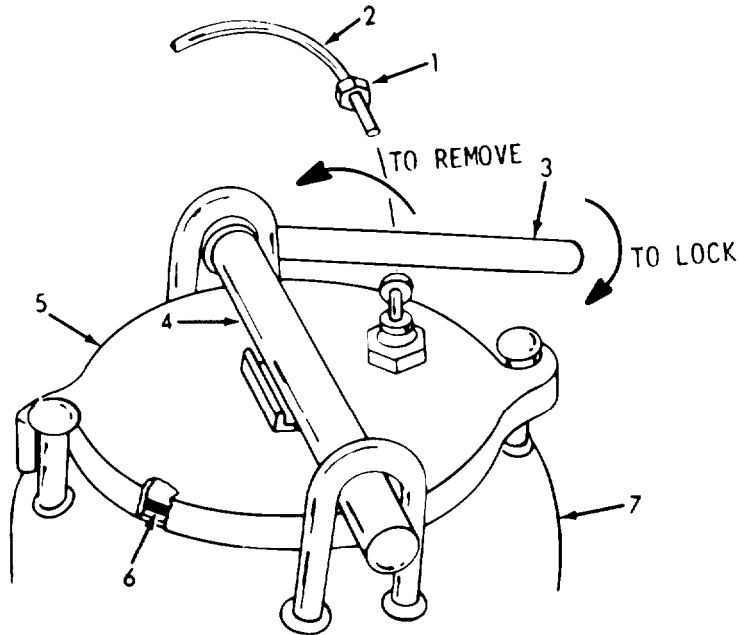
When removing the cover, be careful not to damage the air eliminator valve.

3-36. COVER SEAL ("O" RING) (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
3.	Cover (5)	<p>a. Turn cover (5) counter-clockwise to remove from vessel (7).</p> <p>b. Remove "O" Ring (6) from cover.</p>	

NOTE

Remove cover seal from other vessels in same manner.



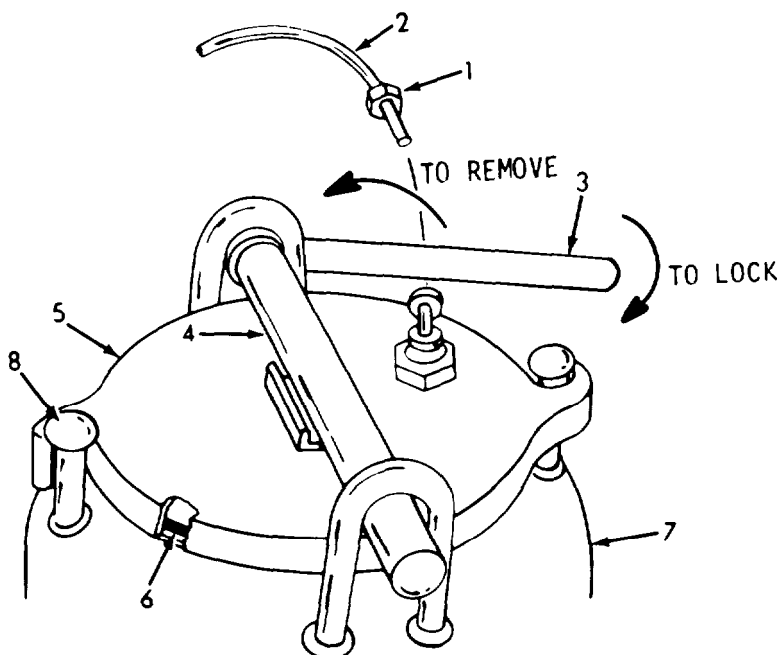
1. Nut
2. Air Line
3. Handle
4. Cam Bar
5. Cover
6. "O" Ring
7. Vessel

3-36. COVER SEAL ("O" RING) (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
Repair		Replace defective "O" Ring with a serviceable-like item	
Installation			
4.	Cover (5) and cam bar (4)	a. Install "O" Ring (6). b. Position cover (5) in place on vessel (7). c. Turn clockwise to latch on rivets (8). d. Hold cam bar handle (3) upright and slide cam bar (4) into place. e. Turn approximately 45° counterclockwise to seal.	
5.	Air Line (2)	Reconnect by tightening nut (1) onto female connector.	

NOTE

Install cover seal on other vessels in the same manner.



- 1. Nut
- 2. Air Line
- 3. Handle
- 4. Cam Bar
- 5. Cover
- 6. "O" Ring
- 7. Vessel
- 8. Rivets

3-37. AIR ELIMINATOR VALVE, TYPE A AND B SEPARATORS.

This task covers:

- | | | |
|----------------|-------------------|-----------------|
| a. Removal | d. Service | g. Installation |
| b. Disassembly | e. Repair/Replace | |
| c. Inspection | f. Assembly | |

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Cleaning solvent P-D-680
Appendix C, Item No. 2
Lint-free cloth
Valve components

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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Turn the supply pump and auto controls selector switches to the OFF position prior to performing maintenance on the separators.

Removal

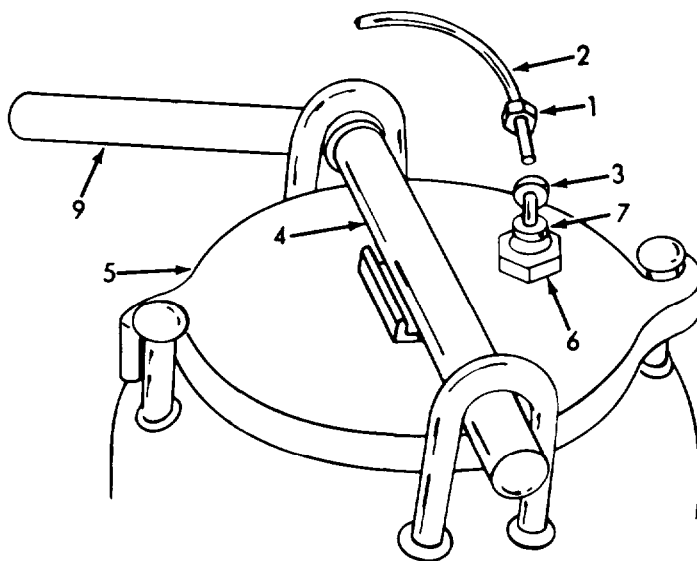
- | | | |
|----|-----------------|---|
| 1. | Air line
(2) | <ul style="list-style-type: none"> a. Loosen hex nut (1). b. Remove air line (2). c. Remove male connector (3) from cover. |
|----|-----------------|---|

3.37 AIR ELIMINATOR VALVE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
2.	Cam bar (4)	a. Turn handle (9) upward until loose. b. Slide cam bar (4) from cover.	
<div style="border: 1px dashed black; padding: 5px; width: fit-content; margin: 0 auto;"> CAUTION </div>			
<p>When removing the cover, be careful not to damage the air eliminator valve.</p>			
3.	Cover (5)	Turn counter-clockwise to remove.	
4.	Air eliminator valve (7)	a. Remove hex nut (6) from valve. b. Remove valve assembly (7).	

NOTE

Remove air eliminator valve from other vessels in same manner.



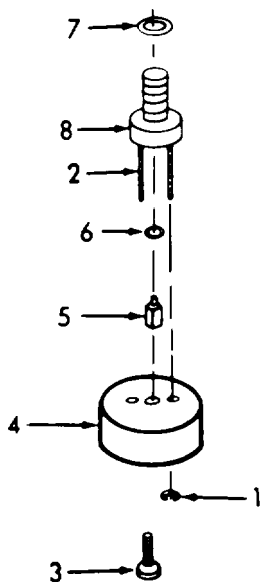
- 1. Nut
- 2. Air Line
- 3. Connector
- 4. Cam Bar
- 5. Cover
- 6. Hex Nut
- 7. Valve Assembly
- 9. Handle

3-37. AIR ELIMINATOR VALVE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Disassembly

- | | | | |
|----|----------------------|--|--|
| 5. | Air eliminator valve | <ol style="list-style-type: none"> Remove snap rings (1) from float guide pins (2). Remove capscrew (3) from needle valve (5). Remove float (4) and needle valve (5). Remove "O" Ring (6) from needle valve (5). Remove "O" Ring (7) from valve body (8). | |
|----|----------------------|--|--|



- Snap Rings
- Float Guide Pins
- Capscrew
- Float
- Needle Valve
- "O" Ring
- "O" Ring
- Valve Body

3-37. AIR ELIMINATOR VALVE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Inspection

- | | | | |
|--|--|--|--------------------------|
| | | a. Inspect "O" Rings for wear or damage. | |
| | | b. Inspect guide pins for distortion. | Straighten if distorted. |
| | | c. Inspect valve body for damaged threads. | |

Service

WARNING

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

- | | | | |
|--|--|---|--|
| | | a. Clean valve body and needle valve using cleaning solvent P-D-680 and dry thoroughly. | |
| | | b. Clean float using a clean lint free cloth. | |

Repair

		Replace damaged or defective parts with serviceable-like item.	
--	--	--	--

3-37. AIR ELIMINATOR VALVE, TYPE A AND B SEPARATORS (Continued).

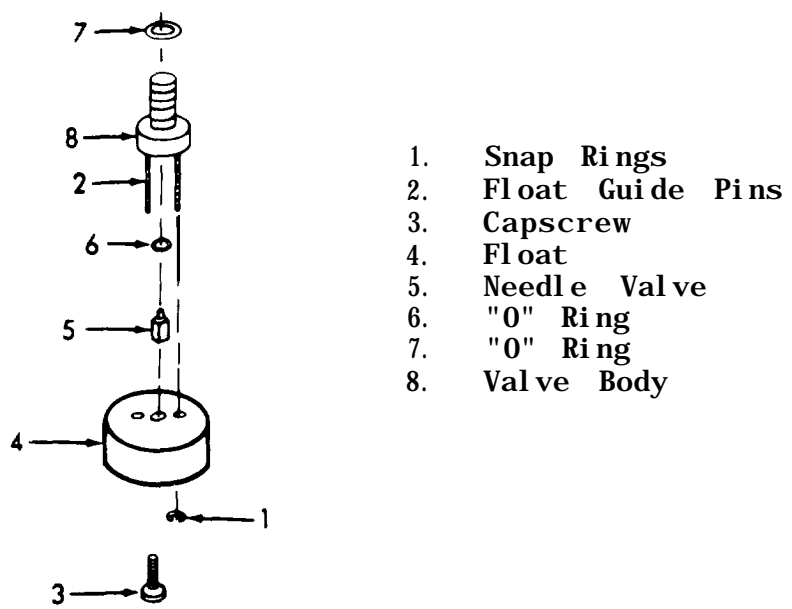
LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Assembly

- | | | | |
|----|----------------------|---|--|
| 6. | Air eliminator valve | <ul style="list-style-type: none"> a. Install "O" ring (7) on valve body (8). b. Install "O" ring (6) on needle valve (5). c. Secure needle valve (5) to float (4) with capscrew (3). d. Slide float (4) over guide pins (2). e. Install snap rings (1) on guide pins to secure float. | |
|----|----------------------|---|--|

NOTE

Assemble air eliminator valve from other vessels in the same manner.

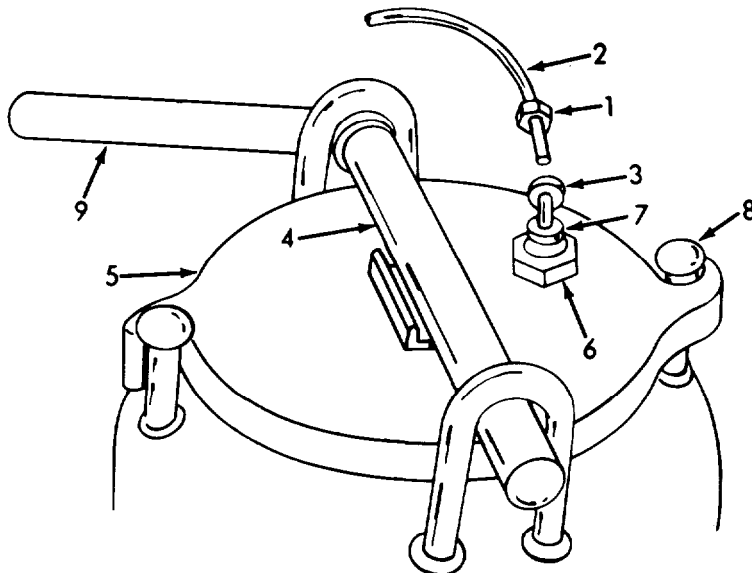


3-37. AIR ELIMINATOR VALVE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Installation

- | | | | |
|----|---------------------------|---|--|
| 7. | Air eliminator valve (7) | Install on cover (5) using hex nut (6). | |
| 8. | Cover (5) and cam bar (4) | <p>a. Position in place on vessel and turn clockwise to secure to rivets (8).</p> <p>b. Hold cam bar handle (9) upright and slide cam bar (4) into place.</p> <p>c. Turn approximately 45° clockwise to seal.</p> | |
| 9. | Air line (2) | <p>a. Install male connector (3) to cover.</p> <p>b. Secure air line (2) by tightening nut (1) onto male connector.</p> | |



1. Nut
2. Air Line
3. Connector
4. Cam Bar
5. Cover
6. Hex Nut
7. Valve Assembly
8. Rivets
9. Handle

3-38. FILTER ELEMENT (#).

This task covers:

- a. Inspection
- b. Removal
- c. Repair/Replace
- d. Installation

INITIAL SETUP

Test Equipment
None

Tool Kit, General Mechanics

<u>Material/Parts</u>	<u>Equipment, Condition</u>
Filter element MIL-F-52847 Type II	
Filter element MIL-F-52847 Type III	
"O" ring	

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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NOTE

Differential pressure as used throughout the operating procedures refers to the difference in pressure between the inlet and outlet. Pressure differentials in the filter elements result from elements becoming clogged with particles and other contaminants which impede the flow of fluid. As fluid flowing through an element is reduced, pressure increases on one side of the element (inlet side) and is reduced on the other side (outlet). The difference between these pressures is referred to as differential pressure.

NOTE

Replace prefilter element when the differential pressure in the stage reaches 30 psid (2109.2 gm sq cm) and coalescer element when differential pressure reaches 25 psid (1757.7 gm sq cm).

Inspection

Inspection is performed by determining differential pressure calculations.

3- 38. FILTER ELEMENT (#) (Continued).
--

LOCATION	ITEM	ACTION	REMARKS
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1. Perform differential pressure calculation as follows:

The pressure differential in the first stage prefilter (2) is obtained by subtracting the first stage pressure (3) from the inlet pressure (1).

Example:

40 psi (2812.3 gm sq cm)	inlet pressure
- 25 psi (1757.7 gm sq cm)	first stage pressure
<u>15 psi (1054.6 gm sq cm)</u>	differential in first stage prefilter

Replace the pre-filter element when the pressure differential is more than 30 psi (2109.2 gm sq cm).

The pressure differential in the second stage separator (4) is obtained by subtracting the second stage pressure (5) from the first stage pressure (3).

Example:

35 psi (2460.7 gm sq cm)	first stage pressure
- 25 psi (1757.7 gm sq cm)	second stage pressure
<u>10 psi (703.0 gm sq cm)</u>	differential in second stage separator

Replace the coalescer element when the pressure differential is more than 25 psi (1757.7 gm sq cm).

The pressure differential in the third stage separator (6) is obtained by subtracting the outlet pressure (7) from the second stage pressure (5).

Example:

20 psi (1506.0 gm sq cm)	second stage pressure
- 5 psi (351.6 gm sq cm)	outlet pressure
<u>15 psi (1054.4 gm sq cm)</u>	differential in third stage separator

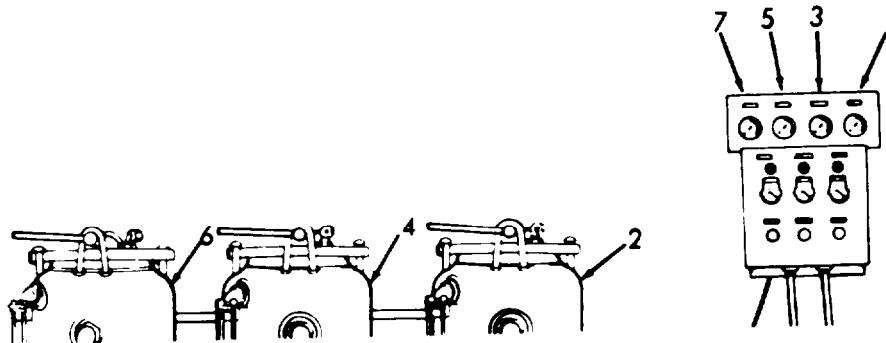
Replace the coalescer element when the pressure differential is greater than 25 psi (1757.7 gm sq cm).

NOTE

The pressure differentials for the other stages may be obtained in the same manner by using the appropriate pressure gauges.

3-38. FILTER ELEMENT (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
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1. Inlet Pressure
2. First Stage Prefilter
3. First Stage Pressure
4. Second Stage Separator
5. Second Stage Pressure
6. Third Stage Separator
7. Outlet Pressure

3-38. FILTER ELEMENT (#) (Continued)

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Removal

2.	Element		
----	---------	--	--

NOTE

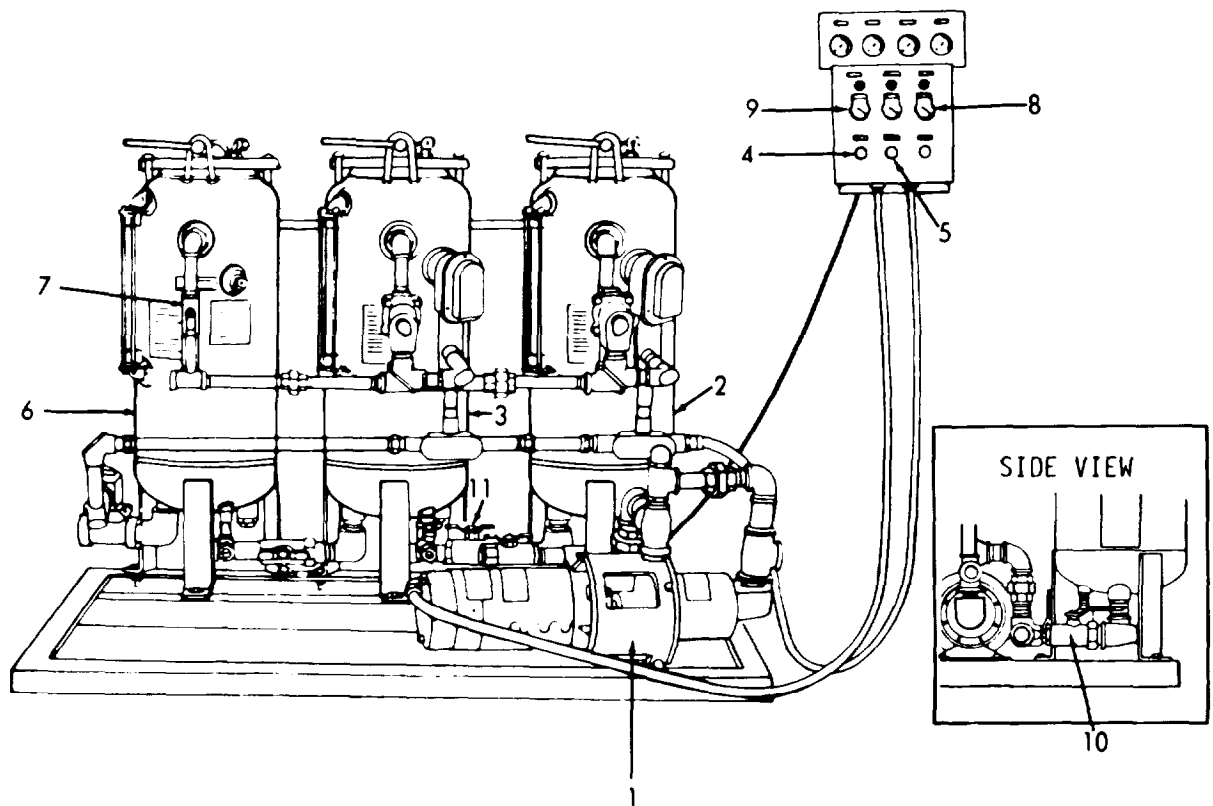
Two types of filter elements are used, the prefilter element 614-501, (MIL-F-52847, Type II), in the first stage, and the coalescer element 611-100, (MIL-F-52847, Type III), in the second and third stages (3 and 6).

- a. With the pump (1), running and control power on, discharge as much oil as possible from the separator stage in which the element is to be replaced according to the following:
 - (1) To discharge from the first (prefilter) or second stages (2 or 3), manually depress the oil dump light/button (4 or 5) for the respective stage.
 - (2) To discharge oil from the third stage (6), open the manual oil discharge valve (7) until all oil has been discharged.
- b. Stop the supply pump (1) by turning the supply pump selector switch (8) OFF.
- c. Turn the auto controls selector switch (9) OFF.
- d. To drain water from the first stage (prefilter) (2):

3-38. FILTER ELEMENT (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
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		(1) Close the two manual shutoff valves (10 and 11) located on the main flow line at the inlet to the first stage (pre-filter) (2) and between the first (prefilter) and second stages.	
--	--	---	--



1. Pump
2. First (Prefilter) Stage
3. Second Stage
4. Oil Dump Light/Button
5. Oil Dump Light/Button
6. Third Stage
7. Discharge Valve
8. Supply Pump Selector Switch
9. Auto Controls Selector Switch
10. Manual Shutoff Valve
11. Manual Shutoff Valve

3-38. FILTER ELEMENT (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
		(2) Open the drain valve (12) at the base of the vessel. Continue to step f.	
		e. To drain water from the second or third stages (3 or 6):	
		(1) Close the two inter-vessel shutoff valves (13 and 14) on either side of the second stage (3) or the inter-vessel shutoff valve (13) for drainage of the third stage (6).	
		(2) Open the drain valve (15 or 16) at the base of the vessel.	

NOTE

Wait until the water level has dropped slightly before opening the cover.

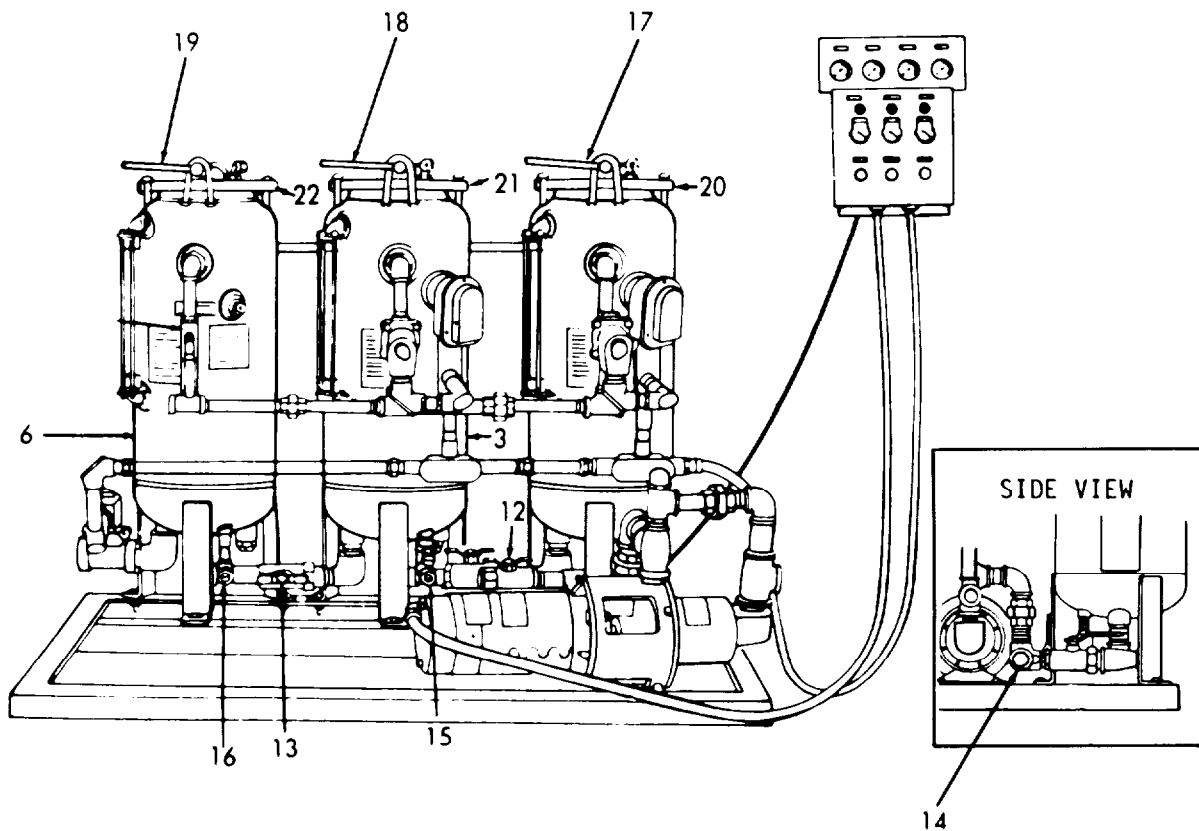
CAUTION

When removing the cover, be careful not to damage the float on the bottom of the air eliminator valve.

- f. Release and remove the cam bar (17, 18 or 19) and remove the cover (20, 21 or 22) of the separator stage being serviced. Turn cover over so that the float faces upward and is not in contact with surface.

3-38. FILTER ELEMENT (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
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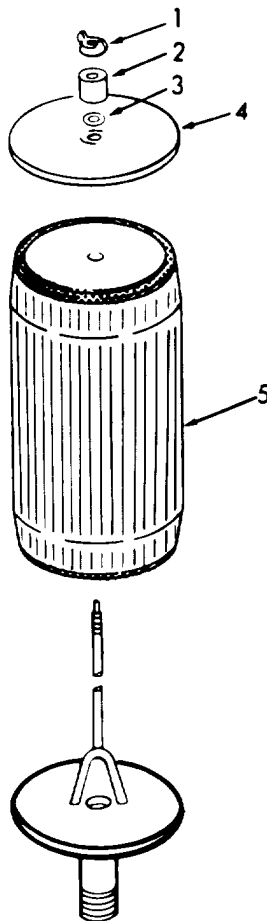
- 3. Second Stage
- 6. Third Stage
- 12. Drain Valve
- 13. Intervessel Shutoff Valve
- 14. Intervessel Shutoff Valve
- 15. Drain Valve
- 16. Drain Valve
- 17. Cam Bar
- 18. Cam Bar
- 19. Cam Bar
- 20. Cover
- 21. Cover
- 22. Cover

3-38. FILTER ELEMENT (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
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9. Loosen the wing nut on the threaded element stand and remove:

- (1) wing nut (1);
- (2) 0-ring retainer (2),
0-ring (3);
- (3) hold-down plate (4);
- (4) filter element (5)



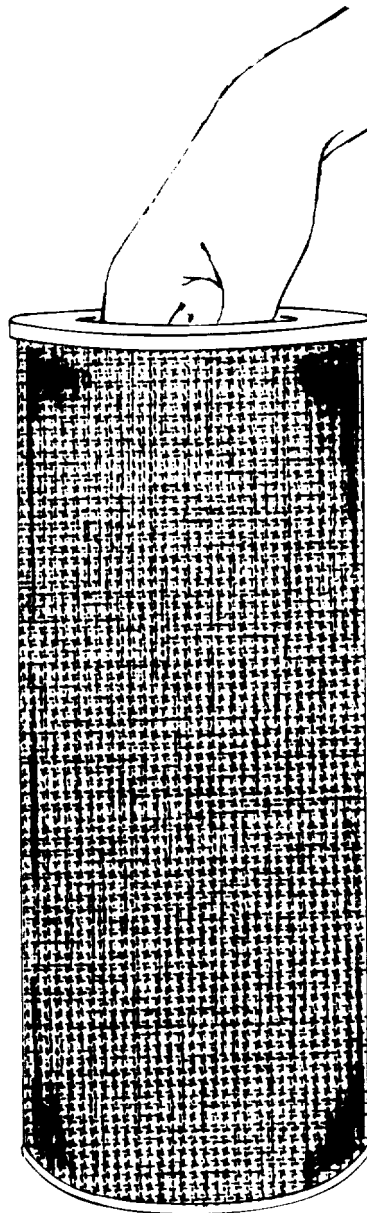
- 1. Wing Nut
- 2. Retainer
- 3. "O" Ring
- 4. Hold-Down Plate
- 5. Filter Element

3-38. FILTER ELEMENT (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
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WARNING

Filter elements are subject to contamination by the human hand. Place used filter elements in a plastic bag and mark for petroleum waste disposal.



3-38. FILTER ELEMENT (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Repair

Replace used filter element with a serviceable-like item.
Replace damaged "O" ring.

Installation

3. Element

a. To install a new filter element:

- (1) Clean the interior of the vessel by flushing with clean water.

NOTE

Be sure that the correct element is selected for each stage. Use only 614-501 prefilter elements (MIL-F-52847, Type II) in the first stage (prefilter) and 611-100 coalescer elements (MIL-F-52847, Type III) in the second and third stages. The prefilter element is longer than the coalescer element.

- (2) Handle the filter elements only by the end caps. When installing an element, insert hand through the opening in the end cap.

CAUTION

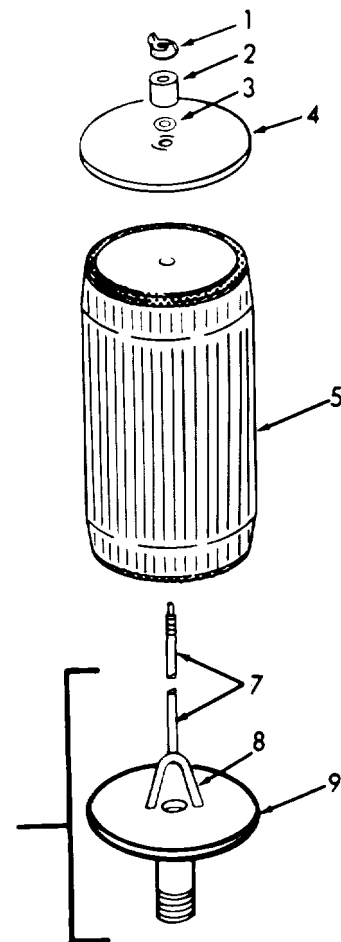
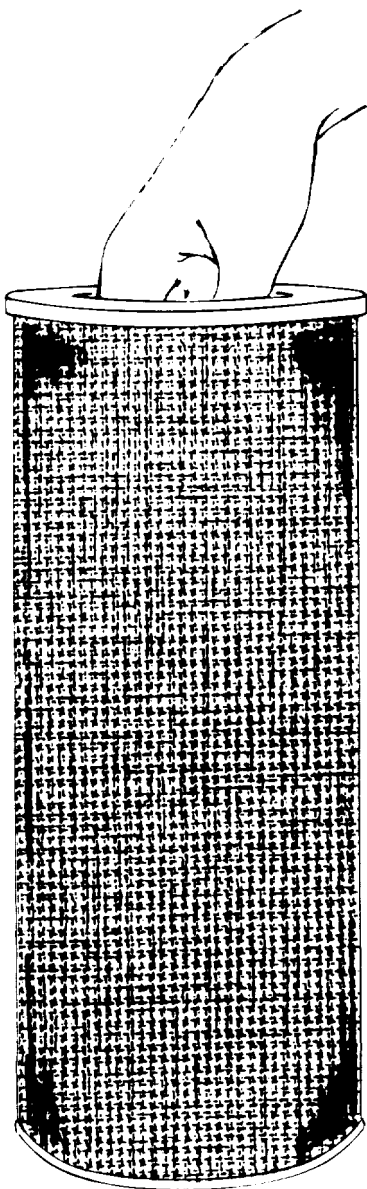
It is important that the filter element be handled properly. DO NOT touch or handle the sock area (side covering) of the elements. Contamination of this surface by skin oils may prevent the coalescer element from functioning properly and cause foaming of the effluent.

- (3) Place a filter element (5) over the threaded element stand (6). Position the element so that it is centered over the element positioning guide (7) attached to the striker plate (8).

3- 38. FILTER ELEMENT (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- (4) Replace and center the hold-down plate (4) over the end cap of the filter element.
- (5) Place 0-ring (3), 0-ring retainer (2), and wing nut (1) on the element stand.



- 1. Wing Nut
- 2. Retainer
- 3. "O" Ring
- 4. Hold-Down Plate
- 5. Filter Element
- 6. Element Stand
- 7. Guide
- 8. Striker Plate

3-38. FILTER ELEMENT (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
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CAUTION

DO NOT use a wrench to tighten the wing nut, or the filter element may be damaged.

- (6) Tighten the wing nut as tightly as possible by hand.
- (7) Replace the cover on the stage being serviced.
- (8) Secure the cam bar to the cover.
- (9) To restart the system, refer to paragraph 2-4.

3-39. FILTER SUPPORT, TYPE A AND B SEPARATORS.

This task covers:

- a. Removal b. Repair/Replace c. Installation

INITIAL SETUP

Test Equipment
None

Tool Kit, Tools General Mechanics

Material/Parts
Filter Support

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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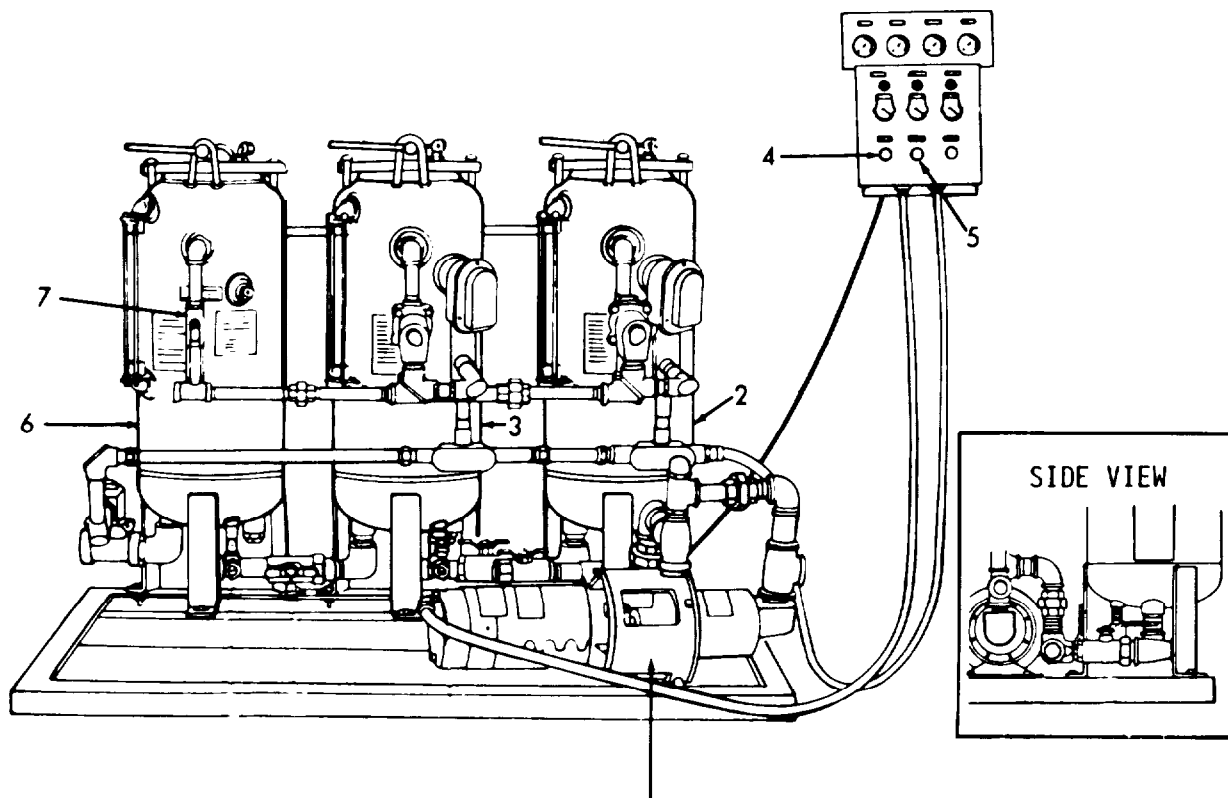
Removal

- | | | | |
|----|-----------------|---|--|
| 1. | Draining system | <p>a. With the pump (1) running and control power on, discharge as much oil as possible from the separator stage in which the filter support is to be replaced according to the following:</p> <p>(1) To discharge from the first (prefilter) or second stages (2 or 3), manually depress the oil dump light/ button (4 or 5) for the respective stage.</p> | |
|----|-----------------|---|--|

3-39. FILTER SUPPORT, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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		(2) To discharge oil from the third stage (6), open the manual oil discharge valve (7) until all oil has been discharged.	
--	--	---	--



1. Pump
2. First (Prefilter) Stage
3. Second Stage
4. Oil Dump Light/Button
5. Oil Dump Light/Button
6. Third Stage
7. Manual Oil Discharge Valve

3-39. FILTER SUPPORT, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
		b. Stop the supply pump (1) by turning the supply pump selector switch (8) OFF.	
		c. Turn the auto controls selector switch (9)	
		d. To drain water from the first stage (prefilter) (2):	
		(1) Close the two manual shutoff valves (10 and 11) located on the main flow line at the inlet to the first stage (prefilter) (2) and between the first (pre-filter) and second stages.	
		(2) Open the drain valve (12) at the base of the vessel. Continue to step f.	
		e. To drain water from the second or third stages (3 or 6):	
		(1) Close the two intervessel shutoff valves (13 and 14) on either side of the second stage (3) or the intervessel shutoff valve (13) for drainage of the third stage (6).	

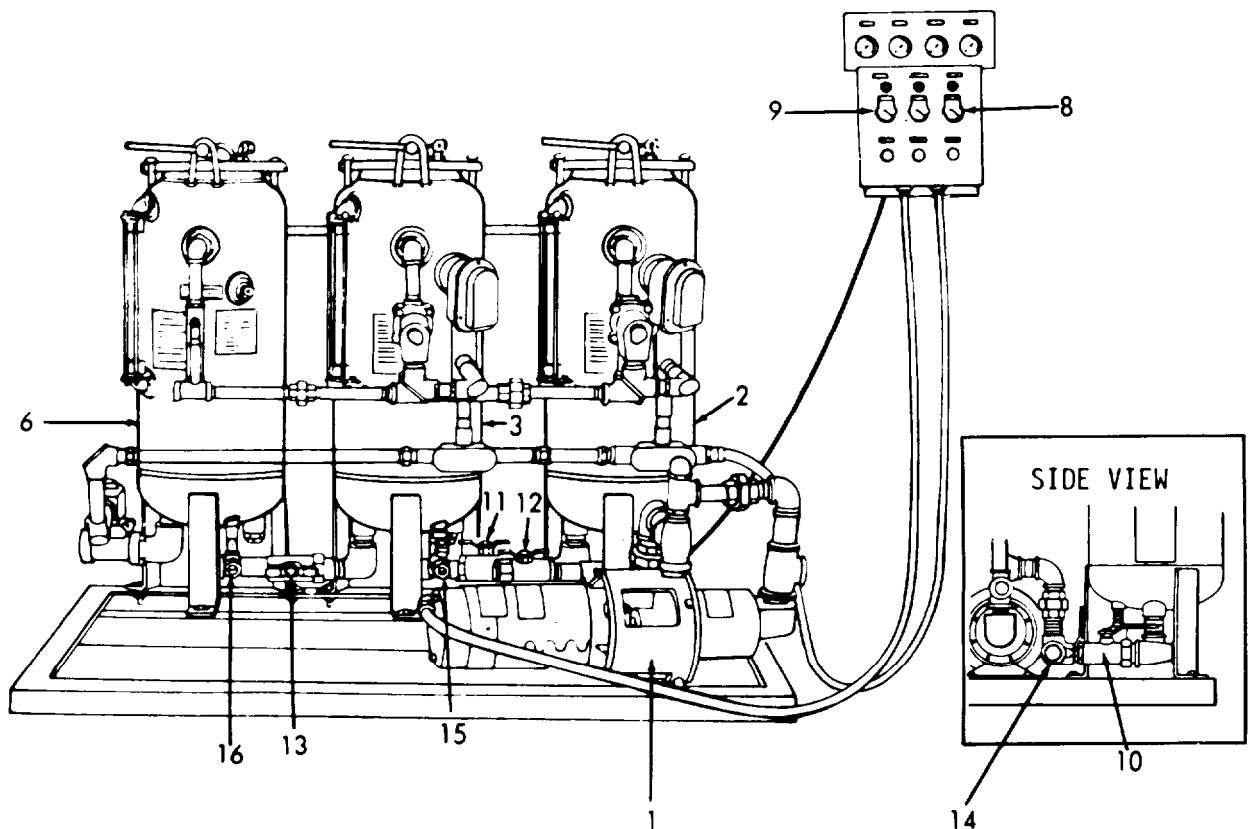
3-39. FILTER SUPPORT, TYPE A AND B SPEARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

(2) Open the drain valve (15 or 16) at the base of the vessel.

NOTE

Wait until the water level has dropped slightly before opening the cover.



- | | |
|----------------------------------|-------------------------------|
| 1. Pump | 11. Manual Shutoff Valves |
| 2. First (Prefilter) Stage | 12. Drain Valve |
| 3. Second Stage | 13. Intervessel Shutoff Valve |
| 6. Third Stage | 14. Intervessel Shutoff Valve |
| 8. Supply Pump Selector Switch | 15. Drain Valve |
| 9. Auto Controls Selector Switch | 16. Drain Valve |
| 10. Manual Shutoff Valves | |

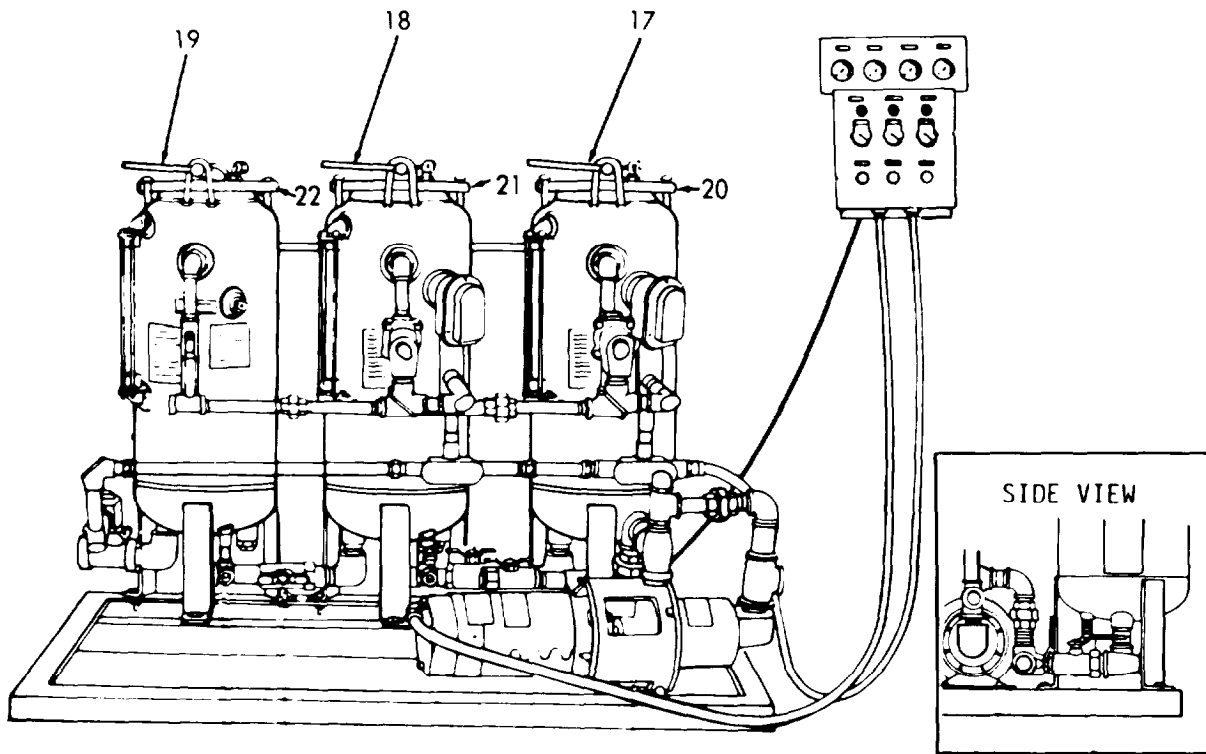
3-39. FILTER SUPPORT, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

CAUTION

When removing the cover, be careful not to damage the float on the bottom of the air eliminator valve.

- f. Release and remove the cam bar (17, 18 or 19) and remove the cover (20, 21 or 22) of the separator stage being serviced. Turn cover over so that the float guard faces upward and is not in contact with surface.



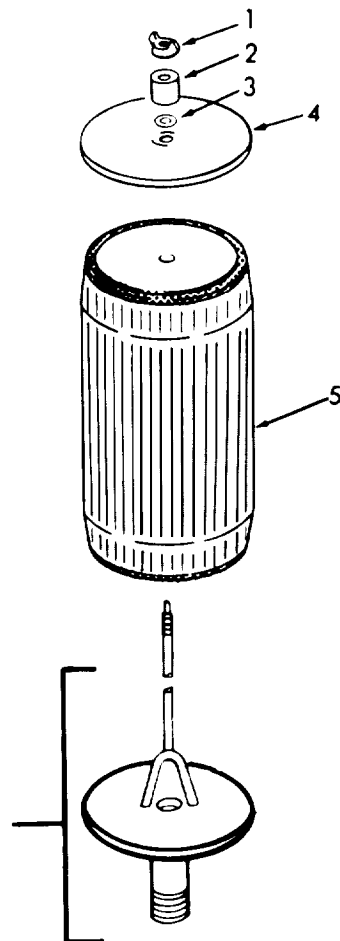
- 17. Cam Bar
- 18. Cam Bar
- 19. Cam Bar
- 20. Cover
- 21. Cover
- 22. Cover

3-39. FILTER SUPPORT, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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9. Loosen the wing nut on the threaded element stand and remove:

- (1) wing nut (1);
- (2) 0-ring retainer (2)
0-ring (3);
- (3) hold-down plate (4);
- (4) filter element (5);
- (5) filter support (6).



- 1. Wing Nut
- 2. Retainer
- 3. O-ring
- 4. Hold-Down Plate
- 5. Filter Element
- 6. Support

3-39. FILTER SUPPORT, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
Repair		Replace damaged or defective filter support with a serviceable-like item.	
Installation			
2.	Filter support	Install.	
3.	Element		

CAUTION

Filter elements are subject to contamination by the human hand.

NOTE

Be sure that the correct element is selected for each stage. Use only 614-501 prefilter elements (MIL-F-52847, Type II) in the first stage (prefilter) and 611-100 coalescer elements (MIL-F-52847, Type III) in the second and third stages. The prefilter element is longer than the coalescer element.

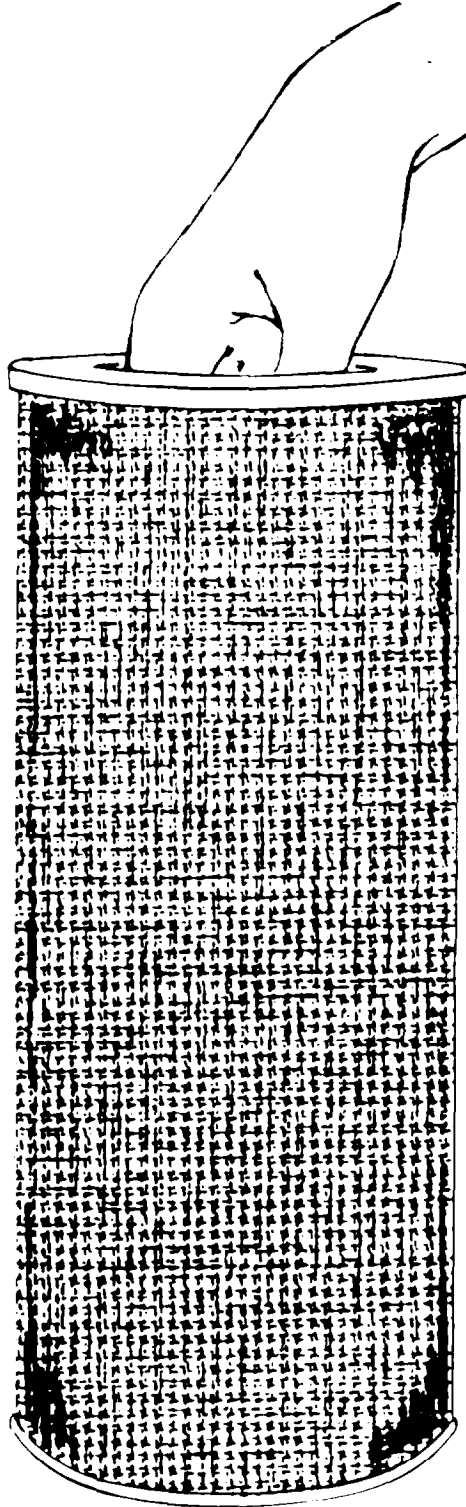
- a. Handle the filter elements only by the end caps. When installing an element, insert hand through the opening in the end cap.

CAUTION

It is important that the filter element be handled properly. DO NOT touch or handle the sock area (side covering) of the elements. Contamination of this surface by skin oils may prevent the coalescer element from functioning properly and cause foaming of the effluent.

3-39. FILTER SUPPORT, TYPE A AND B SEPERATORS (Continued).

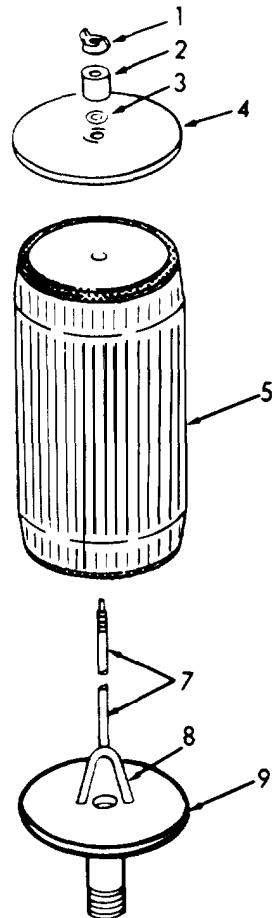
LOCATION	ITEM	ACTION	REMARKS
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3-39. FILTER SUPPORT, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- b. Place a filter element (5) over the threaded element stand (7). Position the element so that it is centered over the element positioning guide (8) attached to the striker plate (9).
- c. Replace and center the hold-down plate (4) over the end cap of the filter element.
- d. Place 0-ring (3), 0-ring retainer (2), and wing nut (1) on the element stand.



- 1. Wing Nut
- 2. 0-ring Retainer
- 3. 0-ring
- 4. Hold-down Plate
- 5. Filter Element
- 7. Element Stand
- 8. Element Positioning Guide
- 9. Striker Plate

3- 39. FILTER SUPPORT, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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CAUTION

DO NOT use a wrench to tighten the wing nut, or the filter element may be damaged.

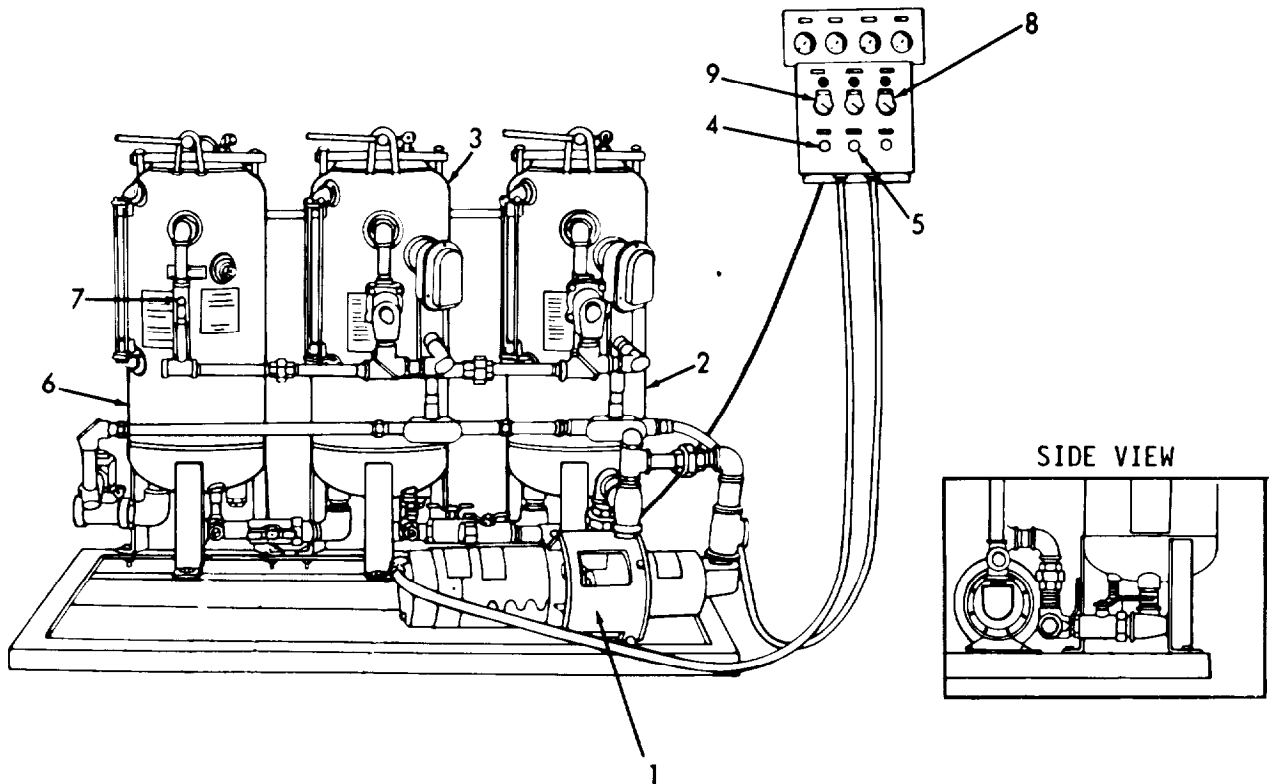
- e. Tighten the wing nut as tightly as possible by hand.
- f. Replace the cover on the stage being serviced.
- g. Secure the cam bar to the cover.
- h. To restart the system, refer to paragraph 2-4, Operating under usual conditions.

3-40. SIGHT GLASS AND FITTINGS, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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b. Stop the supply pump (1) by turning the supply pump selector switch (8) OFF.

c. Turn the auto controls selector switch (9) OFF.



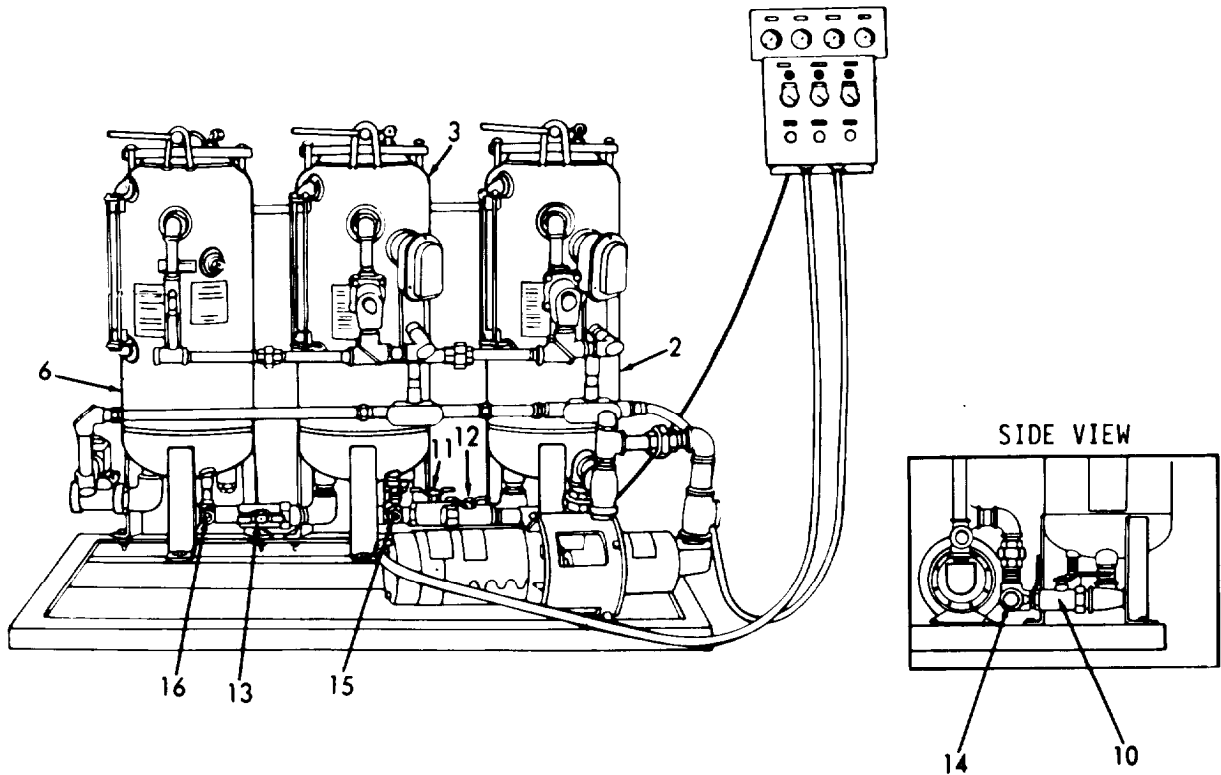
1. Pump
2. First (Prefilter) Stage
3. Second Stage
4. Oil Dump Light/Button
5. Oil Dump Light/Button
6. Third Stage
7. Manual Oil Discharge Valve
8. Supply Pump Selector Switch
9. Auto Controls Selector Switch

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|--|--|---|--|
| | | <p>d. To drain water from the first stage (prefilter) (2):</p> <p>(1) Close the two manual shutoff valves (10 and 11) located on the main flow line at the inlet to the first stage (prefilter) (2) and between the first and second stages.</p> <p>(2) Open the drain valve (12) at the base of the vessel.</p> | |
| | | <p>e. To drain water from the second or third stages (3 or 6):</p> <p>(1) Close the two inter-vessel shutoff valves (13 and 14) on either side of the second stage (3) or the inter-vessel shut-off valve (13) for drainage of the third stage (6).</p> <p>(2) Open the drain valve (15 or 16) at the base of the vessel.</p> | |

3-40. SIGHT GLASS AND FITTINGS, A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 2. First (Prefilter) Stage
- 3. Second Stage
- 6. Third Stage
- 10. Manual Shutoff Valves
- 11. Manual Shutoff Valves
- 12. Drain Valve
- 13. Intervessel Shutoff Valve
- 14. Intervessel Shutoff Valve
- 15. Drain Valve
- 16. Drain Valve

3-40. SIGHT GLASS AND FITTINGS, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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CAUTION

Use extreme care when handling sightglass.

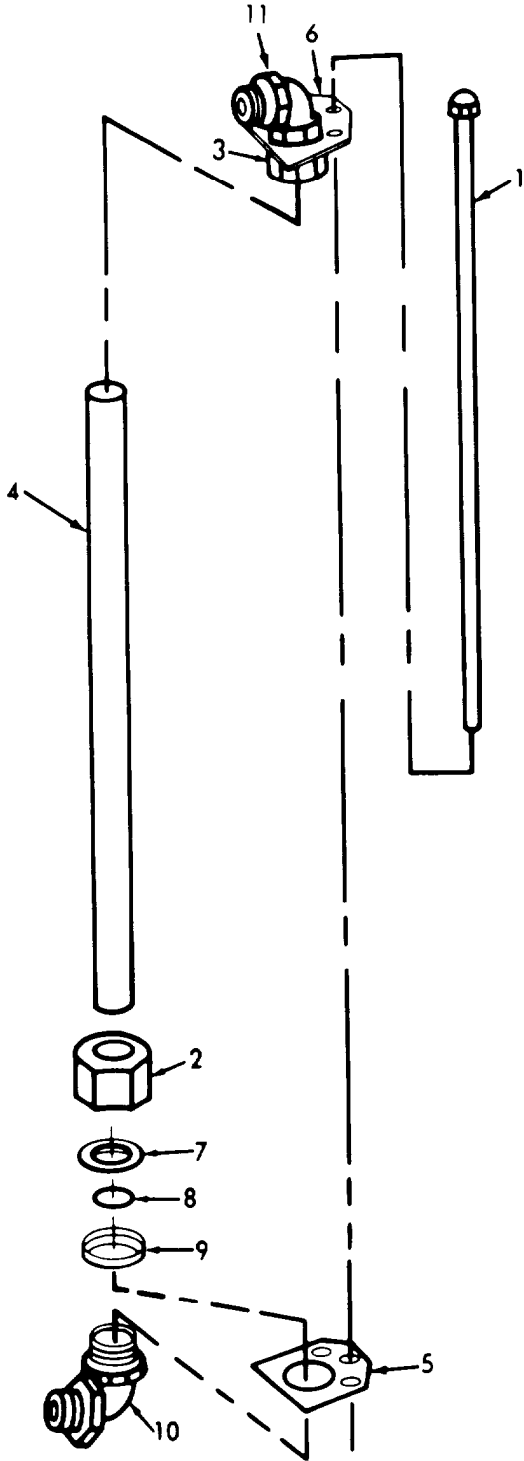
2.	Sightglass and fittings	<ul style="list-style-type: none"> a. Remove rods (1). b. Unscrew collars (2 and 3) from elbows. c. Remove sightglass (4), slide sightglass (4) upward, turn lower elbow (10) 1/4 turn counterclockwise, slide sightglass down and out. Remove guard brackets (5 and 6). d. Remove O-ring (7) and washers (8 and 9). e. Remove elbows (10 and 11) from vessel. 	Discard if defective or damaged.
----	-------------------------	---	----------------------------------

NOTE

Remove sight glass and fittings from other two vessels in the same manner.

3-40. SIGHT GLASS AND FITTINGS, TYPE A AND B SEPARATORS (Continued).

LOCATION ITEM ACTION REMARKS



- 1. Rods
- 2. Collars
- 3. Collars
- 4. Sightglass
- 5. Guard Bracket
- 6. Guard Bracket
- 7. O-ring
- 8. Washer
- 9. Washer
- 10. El bow
- 11. El bow

3-40. SIGHT GLASS AND FITTINGS, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Repair

Replace damaged or defective parts with a serviceable-like item.

Installation

- | | | |
|----|-------------------------|---|
| 3. | Sightglass and fittings | <ul style="list-style-type: none"> a. Install elbows (10 and 11) in vessel. b. Install washers (8 and 9), and O-ring (7), collar (2 and 3) on sightglass. c. Place guard brackets (5 and 6) over sightglass (4), install sightglass. d. Secure to elbows (10 and 11) by tightening collars (2 and 3). e. Install rods (1). |
|----|-------------------------|---|

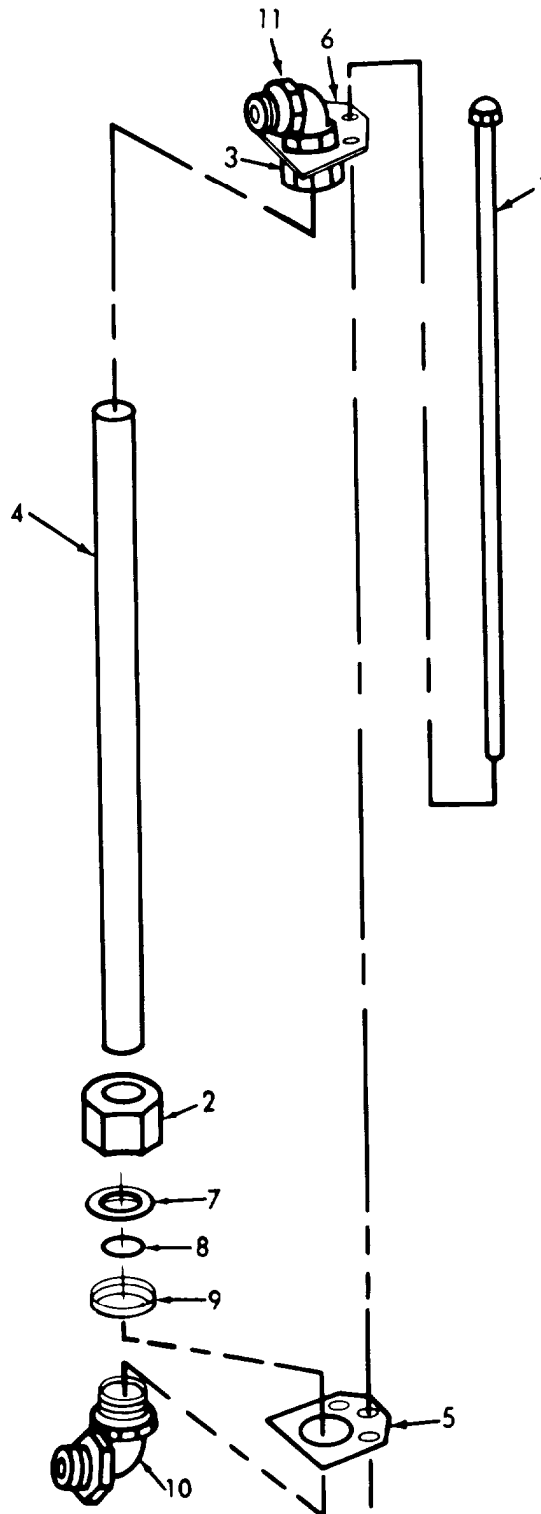
NOTE

Install sightglass and fittings on other vessel(s) in same manner.

- | | | |
|----|----------------|--|
| 4. | System startup | Refer to paragraph 2-4 and restart system. |
|----|----------------|--|

3-40. SIGHT GLASS AND FITTINGS, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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1. Rods
2. Collars
3. Collars
4. Sight glass
5. Guard Bracket
6. Guard Bracket
7. O-ring
8. Washer
9. Washer
10. Elbow
11. Elbow

3-41. ANODE (#).

This task covers:

- | | |
|---------------|-------------------|
| a. Removal | c. Repair/Replace |
| b. Inspection | d. Installation |

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Anode element

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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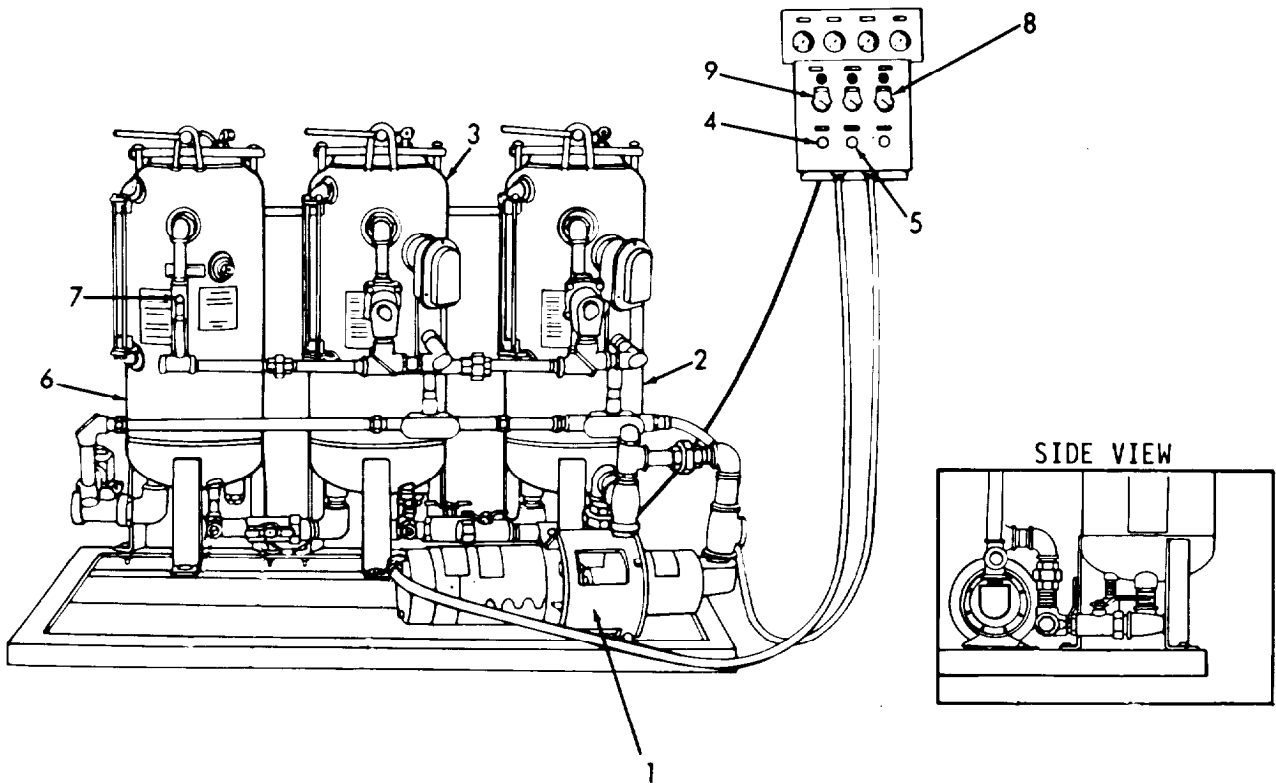
Removal

- | | | |
|----|---|---|
| 1. | Draining system Type A and B separators | <p>a. With the pump (1) running and control power on, discharge as much oil as possible from the separator stage in which the anode is to be removed according to the following:</p> <p>(1) To discharge from the first (prefilter) or second stages (2 or 3), manually depress the oil dump light/button (4 or 5) for the respective stage.</p> <p>(2) To discharge oil from the third stage (6), open the manual oil discharge valve (7) until all oil has been discharged.</p> |
|----|---|---|

3-41. ANODE (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- b. Stop the supply pump (1) by turning the supply pump selector switch (8) OFF.
- c. Turn the auto controls selector switch (9) OFF.



- 1. Pump
- 2. First (Prefilter) Stage
- 3. Second Stage
- 4. Oil Dump Light/Button
- 5. Oil Dump Light/Button
- 6. Third Stage
- 7. Manual Oil Discharge Valve
- 8. Supply Pump Selector Switch
- 9. Auto Controls Selector Switch

3-41. ANODE (#) (Continued).

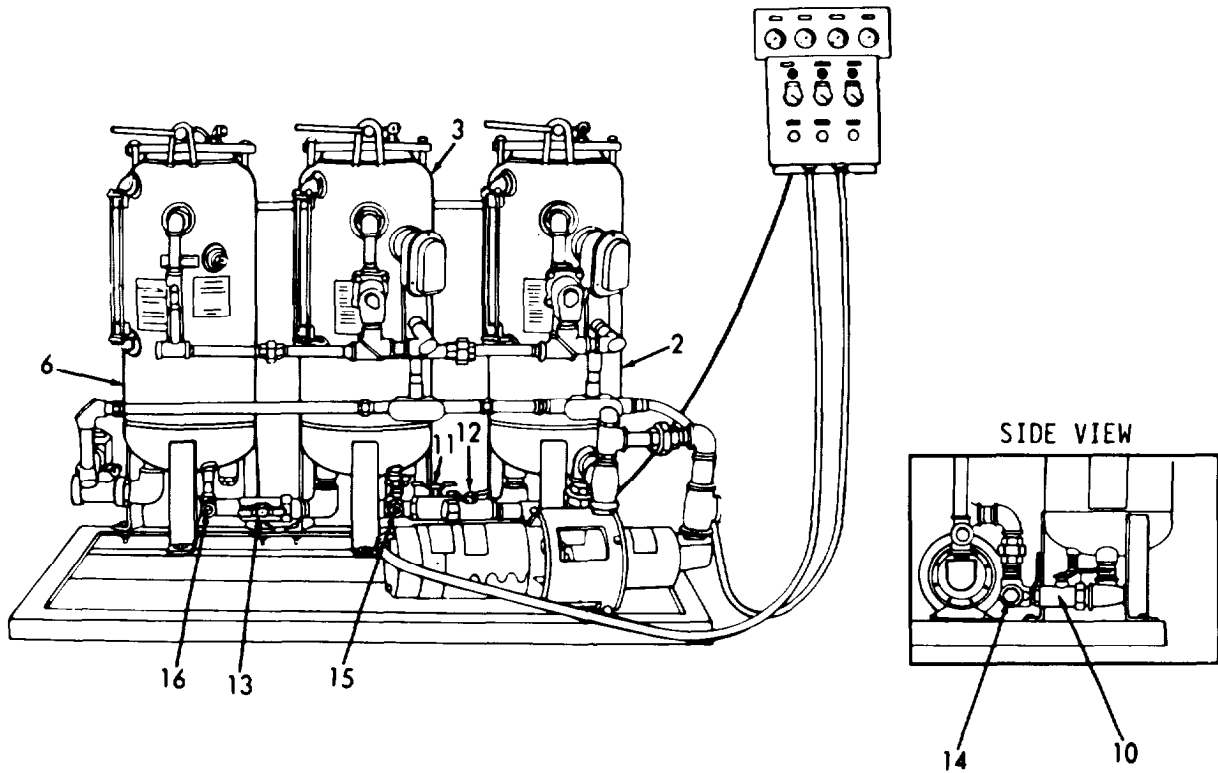
LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- d. To drain water from the first stage (prefilter) (2):
 - (1) Close the two manual shutoff valves (10 and 11) located on the main flow line at the inlet to the first stage (prefilter) (2) and between the first (prefilter) and second stages.
 - (2) Open the drain valve (12) at the base of the vessel.

- e. To drain water from the second or third Stages (3 or 6):
 - (1) Close the two inter-vessel shutoff valves (13 and 14) on either side of the second stage (3) or the intervessel shut-off valve (13) for drainage of the third stage (6).
 - (2) Open the drain valve (15 and 16) at the base of the vessel.

3-41. ANODE (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 2. First (Prefilter) Stage
- 3. Second Stage
- 6. Third Stage
- 10. Manual Shutoff Valves
- 11. Manual Shutoff Valves
- 12. Drain Valve
- 13. Intervessel Shutoff Valve
- 14. Intervessel Shutoff Valve
- 15. Drain Valve
- 16. Drain Valve

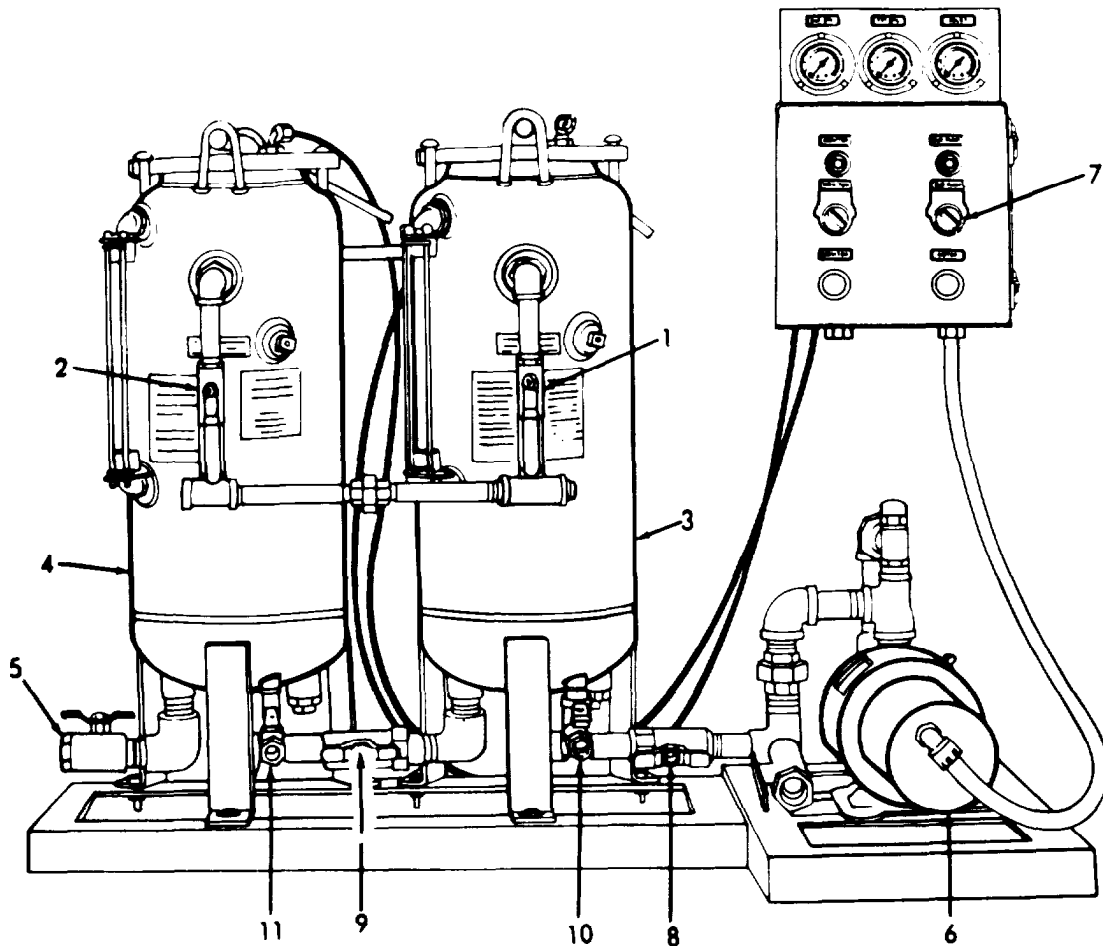
3- 41. ANODE (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
2.	Draining system Type C and D separators	<ul style="list-style-type: none"> a. With pump (6) running, open oil discharge valve (1 or 2) on either the first (prefilter) or second stage (3 or 4). b. Close water discharge valve (5). c. After oil has drained from the stage, open water discharge valve (5) and close oil discharge valve (1 or 2). d. Stop the supply pump (6) by turning the supply pump selector switch (7) OFF. e. Close the water discharge valve (5). f. To drain water from the first stage (prefilter) (3): <ul style="list-style-type: none"> (1) Close the inlet valve (8) located at the inlet to the first stage (prefilter) (3) and intervessel shutoff valve (9) between the first (prefilter) and second stages. (2) Open the drain valve (10) at the base of the vessel. 	
		<ul style="list-style-type: none"> 9. To drain water from the second stage (4): <ul style="list-style-type: none"> (1) Close the intervessel shutoff valve (9) located between the first (prefilter) and second stages. 	

3-41. ANODE (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

(2) Open the drain valve (11) at the base of the vessel.



- 1. Oil Discharge Valve
- 2. Oil Discharge Valve
- 3. First (Prefilter) Stage
- 4. Second Stage
- 5. Water Discharge Valve
- 6. Pump
- 7. Supply Pump Selector Switch
- 8. Inlet Valve
- 9. Intervessel Shutoff Valve
- 10. Drain Valve
- 11. Drain Valve

3-41. ANODE (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|----|-------|--|--|
| 3. | Anode | <ol style="list-style-type: none"> a. Remove hex bolt (1) from bottom of vessel; b. Unscrew anode (2) from retainer. | |
|----|-------|--|--|

Inspection

Inspect anode for excessive build up of deposits and wear, clean off deposits.

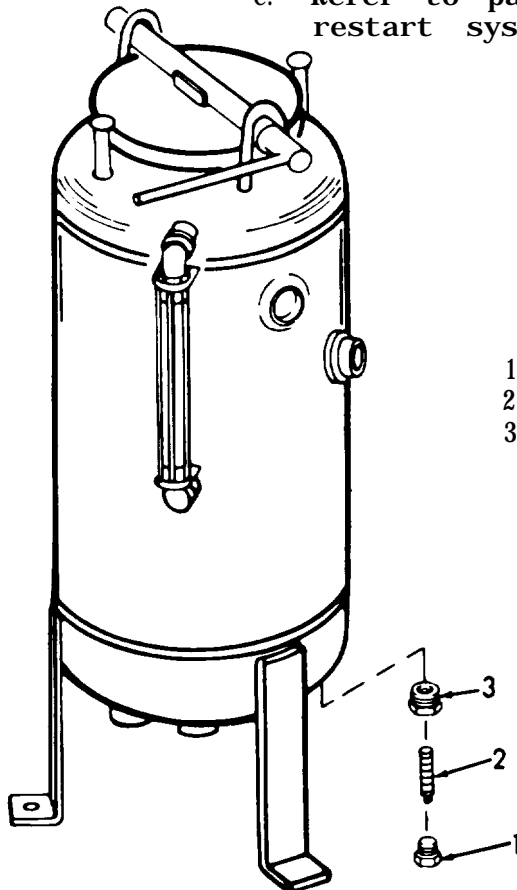
If erroded 50% or greater, replace.

Repair

Replace worn anode with a new one.

Installation

- a. Install new anode (2) in retainer (3).
- b. Install hex bolt (1) in vessel and tighten securely.
- c. Refer to paragraph 2-4 and restart system.



1. Hex Bolt
2. Anode
3. Retainer

3-42. PREFILTER SEPARATOR, TYPE A AND B.

This task covers:

- | | |
|-------------------------------------|---|
| <p>a. Removal</p> <p>b. Service</p> | <p>c. Repair/Replace</p> <p>d. Installation</p> |
|-------------------------------------|---|

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics
Socket
Adapter

Material/Parts
Prefilter separator
Sealing compound
Appendix C. Item No. 6

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Removal

- | | | |
|-----------|------------------------|--|
| <p>1.</p> | <p>Draining system</p> | <p>a. With the pump (1) running and control power on, discharge as much oil as possible from the separator stage which is to be serviced or replaced according to the following:</p> <p>b. To discharge from the first stage (prefilter) (2), manually depress the oil dump light/button (3).</p> <p>c. Stop the supply pump (1) by turning the supply pump selector switch (4) OFF.</p> |
|-----------|------------------------|--|

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

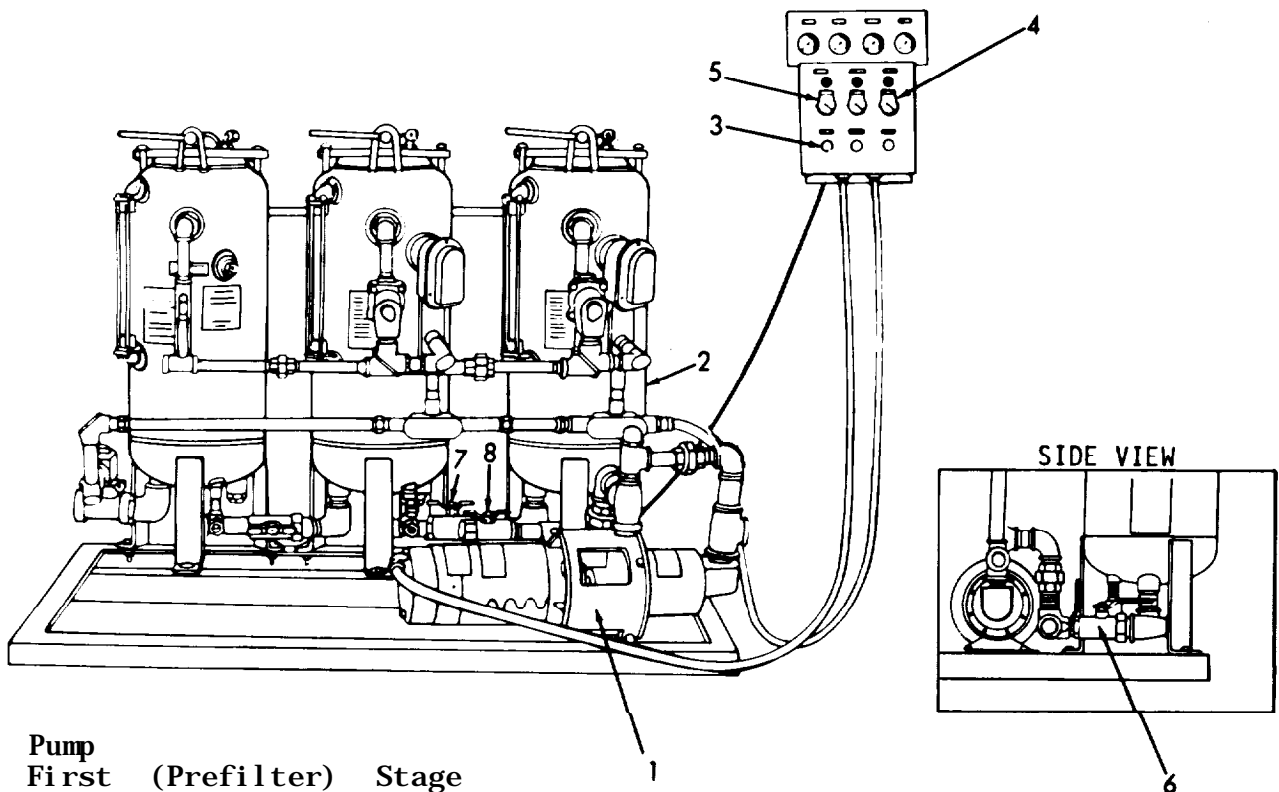
LOCATION	ITEM	ACTION	REMARKS
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d. Turn the auto control selector switch (5) OFF.

e. To drain water from the first stage (prefilter) (2):

(1) Close the two manual shutoff valves (6 and 7) located on the main flow line at the inlet to the first stage (prefilter) (2) and between the first (prefilter) and second stages.

(2) Open the drain valve (8) at the base of the vessel.



- | | |
|----------------------------------|-------------------------|
| 1. Pump | |
| 2. First (Prefilter) Stage | |
| 3. Oil Dump Light/Button | |
| 4. Supply Pump Selector Switch | |
| 5. Auto Controls Selector Switch | 7. Manual Shutoff Valve |
| 6. Manual Shutoff Valve | 8. Drain Valve |

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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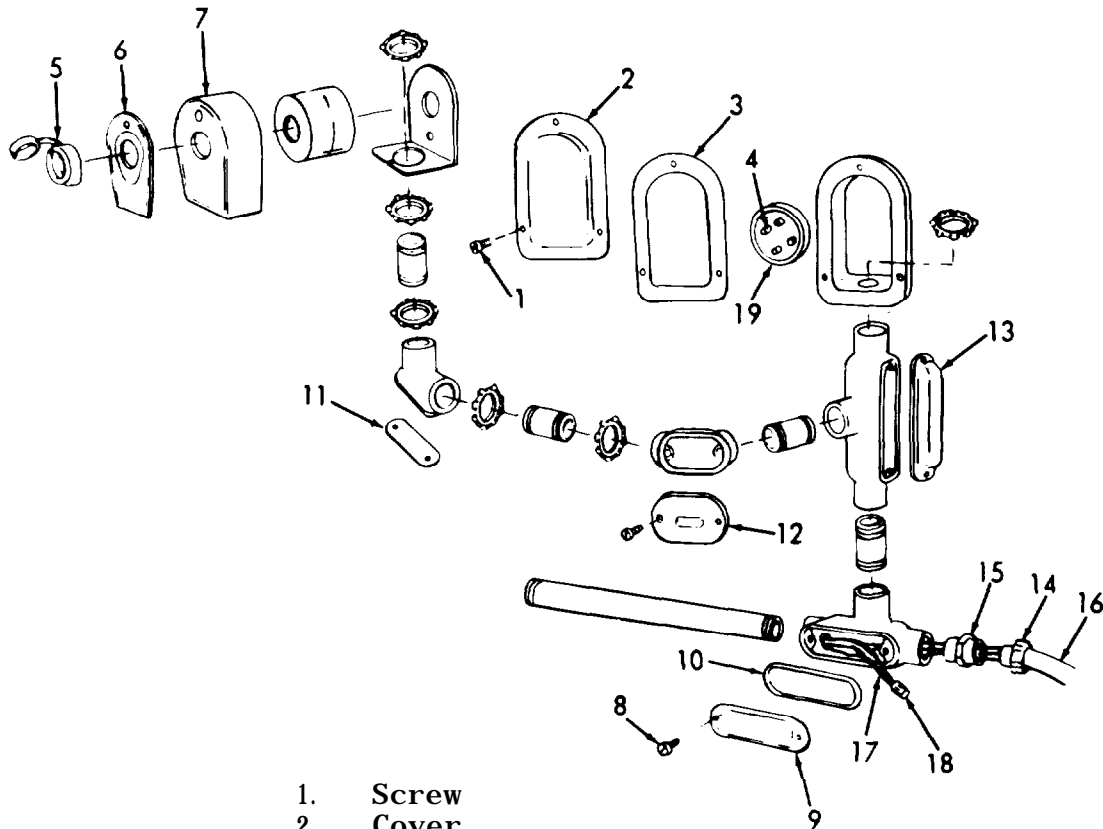
WARNING

Electrical shock or serious injury may result if electrical power is not turned off before continuing maintenance on the 1st stage (prefilter) separator.

2.	1st stage (pre-filter) separator electrical connections	<p>a. Mini probe cover (2)</p> <p>b. Solenoid valve housing</p> <p>c. Tees and pulling elbow covers (11, 12 and 13)</p> <p>d. Motor cable (16)</p> <p>e. Mini-probe (19)</p>	<p>(1) Remove screws (1), cover (2) and gasket (3).</p> <p>(2) Tag and disconnect terminals (4).</p> <p>Remove retaining cap (5), nameplate (6) and housing (7).</p> <p>Remove screws (8), cover (9) and gasket (10).</p> <p>(1) Unscrew collar (14) from connector (15).</p> <p>(2) Tag and disconnect leads (17) by removing connectors (18).</p> <p>(3) Tag and disconnect other wiring and carefully remove each wire individually from electrical connections.</p> <p>Unscrew.</p>	<p>Use thin wall socket NSN 5120-00-277-1465 with 1/2 in. drive ratchet.</p>
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3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

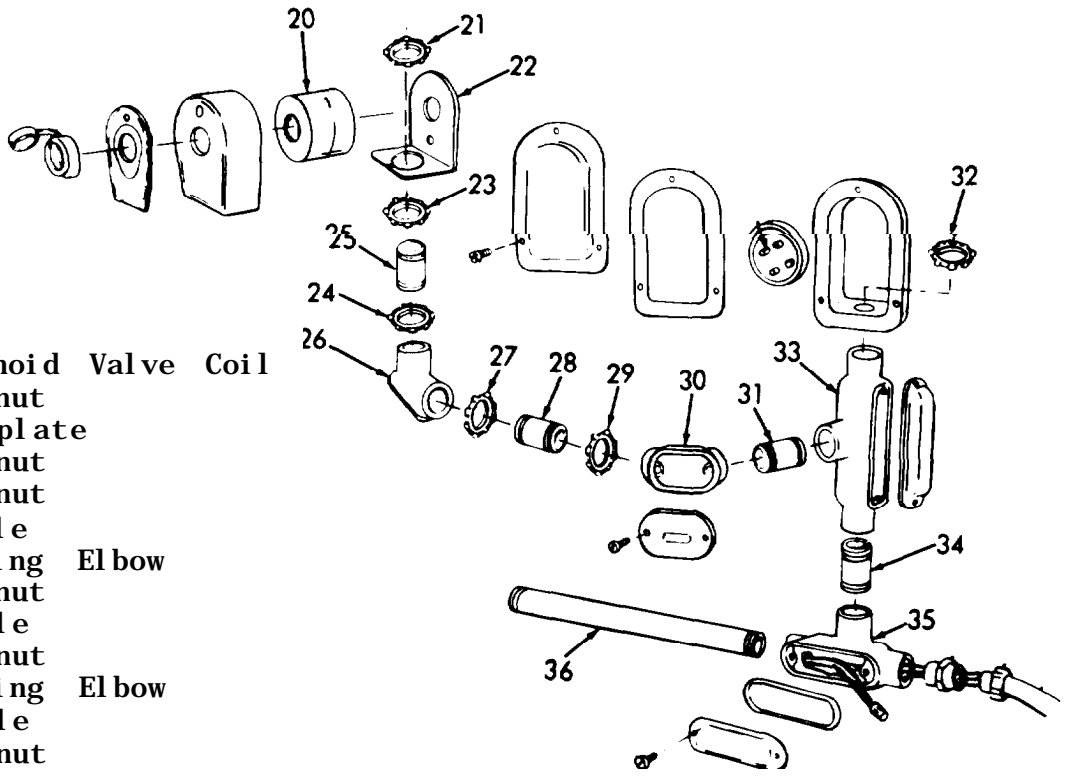
LOCATION	ITEM	ACTION	REMARKS
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1. Screw
2. Cover
3. Gasket
4. Terminals
5. Retaining Cap
6. Nameplate
7. Housing
8. Screws
9. Cover
10. Gasket
11. Pulling Elbow Cover
12. Pulling Elbow Cover
13. Tee Cover
14. collar
15. Connector
16. Motor Cable
17. Leads
18. Connectors
19. Mini - probe

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

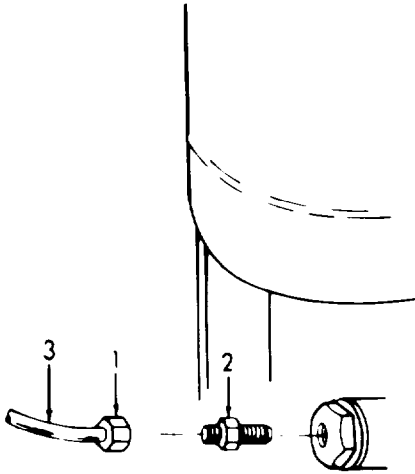
LOCATION	ITEM	ACTION	REMARKS
	f. Solenoid valve coil (20)	Pull straight out to remove from base.	Leads will be attached to coil.
	g. Connectors and connections	<p>(1) Remove locknut (21), baseplate (22) and locknut (23).</p> <p>(2) Remove locknut (24), nipple (25), pulling elbow (26), locknut nipple (28) locknut (29), pulling elbow (30) and nipple (31).</p> <p>(3) Removal locknut (32), tee (33), nipple (34), tee (35) and conduit (36).</p>	



- 20. Solenoid Valve Coil
- 21. Locknut
- 22. Baseplate
- 23. Locknut
- 24. Locknut
- 25. Nipple
- 26. Pulling Elbow
- 27. Locknut
- 28. Nipple
- 29. Locknut
- 30. Pulling Elbow
- 31. Nipple
- 32. Locknut
- 33. Tee
- 34. Nipple
- 35. Tee
- 36. Conduit

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

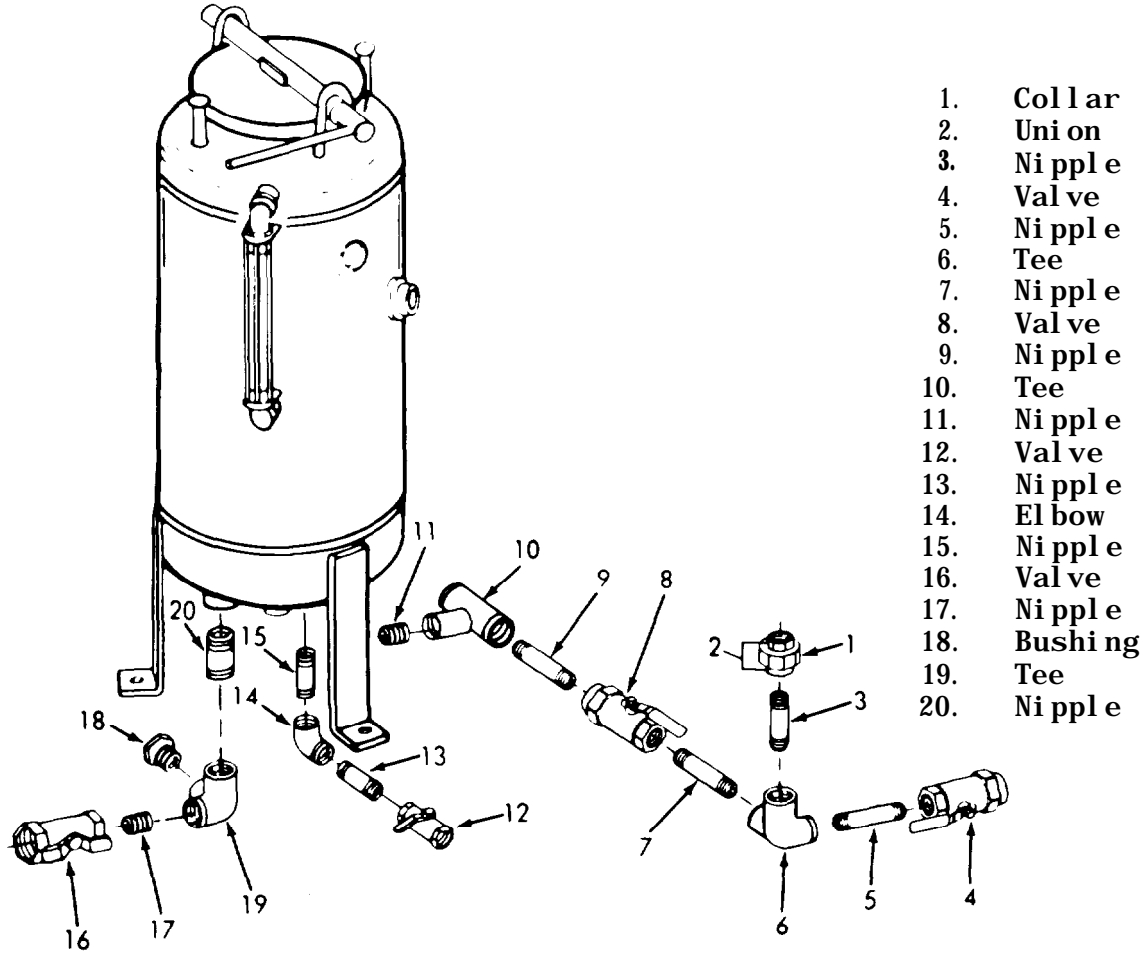
LOCATION	ITEM	ACTION	REMARKS
3.	1st stage (pre-filter) air line	a. Unscrew female connector (1) securing air line (3). b. Remove male connector (2).	



- 1. Female Connector
- 2. Male Connector
- 3. Air Line

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
4.	1st stage (pre-filter) piping	<p>a. Unscrew collar (1) from union (2).</p> <p>b. Remove nipple (3) from tee (6).</p> <p>c. Remove valve (4), nipple (5) and tee (6).</p> <p>d. Remove nipple (7), valve (8), nipple (9), tee (10), nipple (11), valve (12), nipple (13), elbow (14) and nipple (15).</p> <p>e. Remove valve (16), nipple (17), bushing (18), tee (19) and nipple (20).</p>	

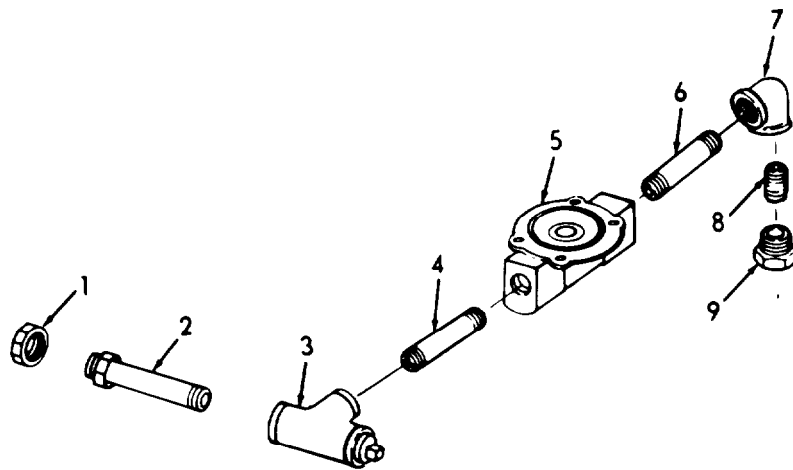


- 1. Collar
- 2. Union
- 3. Nipple
- 4. Valve
- 5. Nipple
- 6. Tee
- 7. Nipple
- 8. Valve
- 9. Nipple
- 10. Tee
- 11. Nipple
- 12. Valve
- 13. Nipple
- 14. Elbow
- 15. Nipple
- 16. Valve
- 17. Nipple
- 18. Bushing
- 19. Tee
- 20. Nipple

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- f. Unscrew collar (1).
- g. Remove nipple (2), tee (3), nipple (4), solenoid valve (5), nipple (6), elbow (7), nipple (8) and bushing (9).



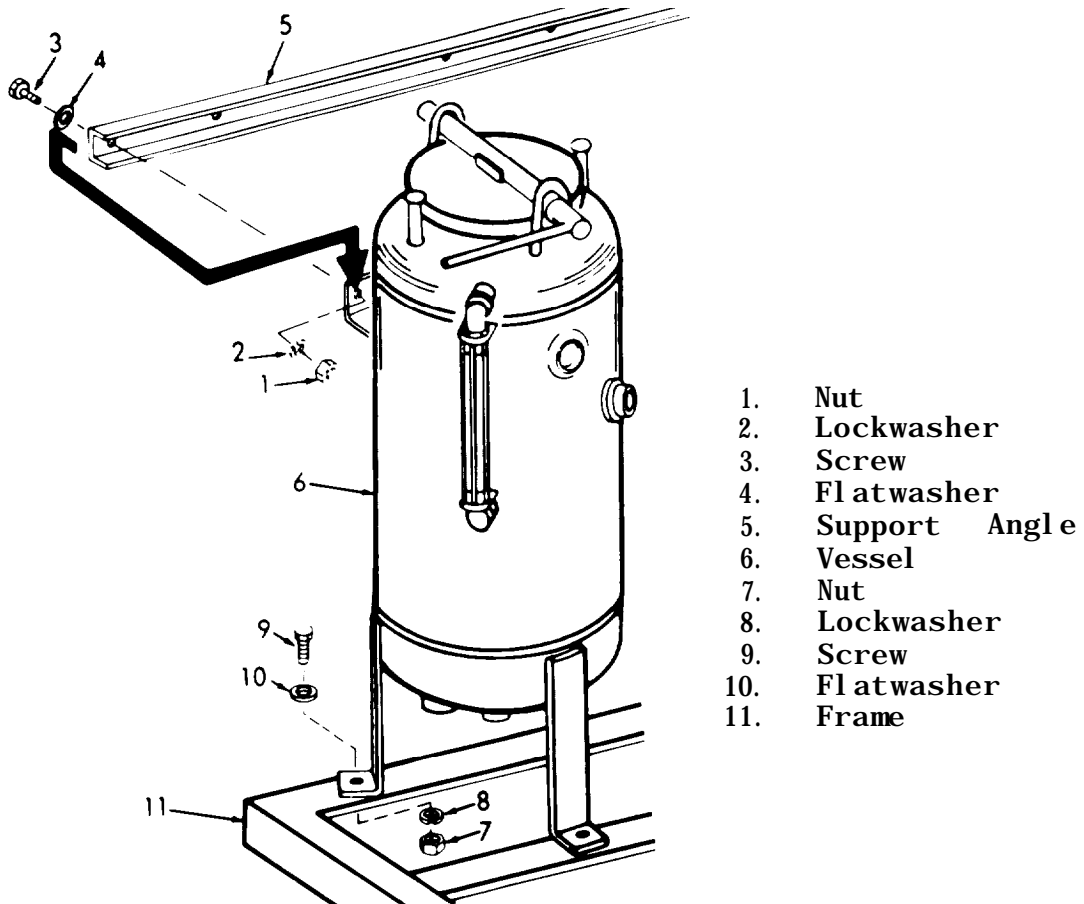
- 1. Collar
- 2. Nipple
- 3. Tee
- 4. Nipple
- 5. Solenoid Valve
- 6. Nipple
- 7. Elbow
- 8. Nipple
- 9. Bushing

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
5.	Support angle and prefilter mounting hardware	<p>a. Remove nuts (1), lockwashers (2), screws (3), flatwashers (4) and support angle (5) from vessels (6).</p> <p>b. Remove nuts (7), lockwashers (8), screws (9), and flatwashers (10) securing prefilter.</p> <p>c. Remove prefilter (6) from mounting frame (11).</p>	

NOTE

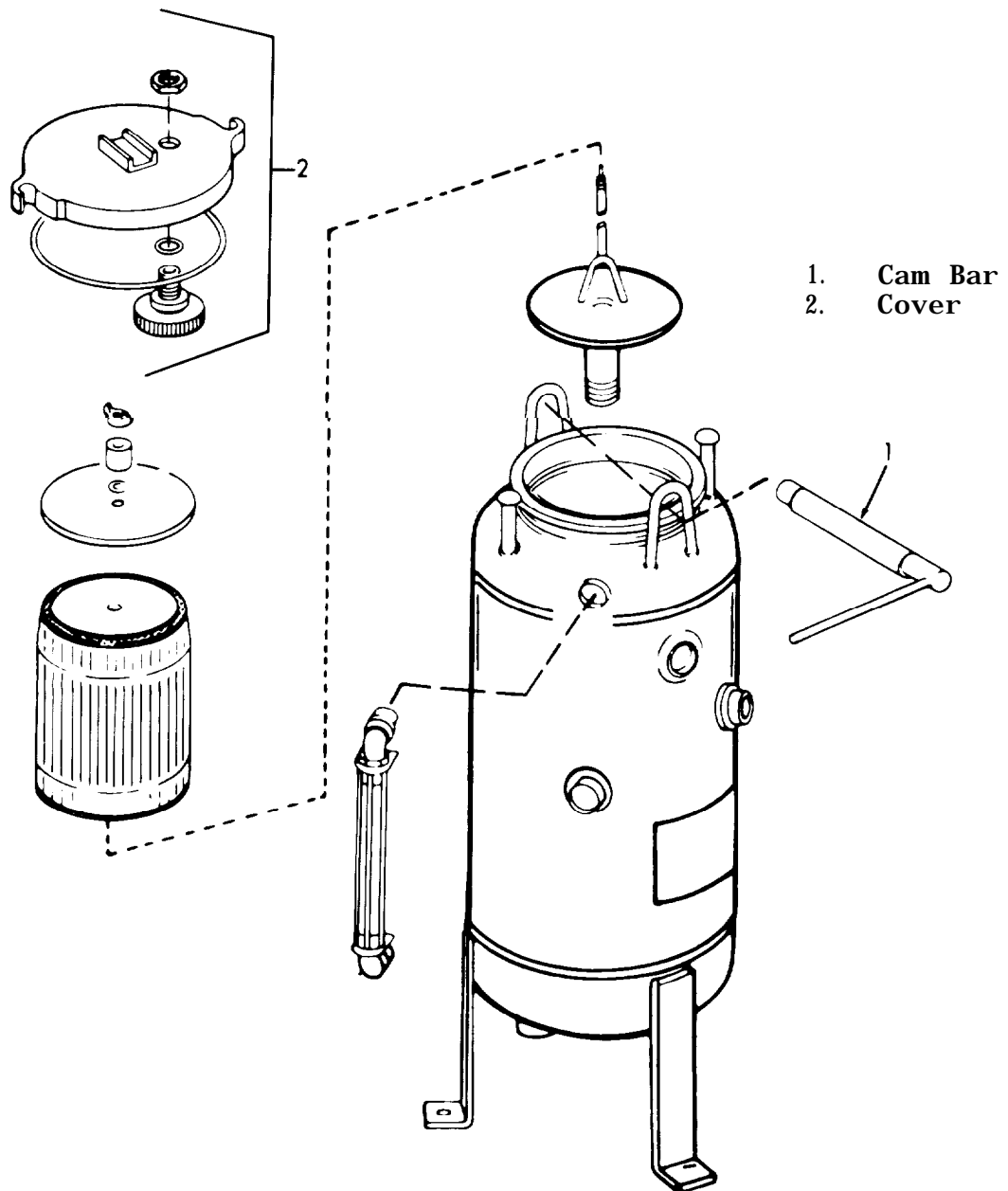
Attach a suitable sling to the prefilter separator and using a suitable hoist, lift separator from mounting frame and set on a flat surface. Detach hoist and sling



- 1. Nut
- 2. Lockwasher
- 3. Screw
- 4. Flatwasher
- 5. Support Angle
- 6. Vessel
- 7. Nut
- 8. Lockwasher
- 9. Screw
- 10. Flatwasher
- 11. Frame

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
6. Separator sub-assembly disassembly	a. Cam Bar (1)	Turn handle approximately 45° clockwise to relieve tension. Slide cam bar from cover (2).	
	b. Cover (2)	Remove.	



3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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CAUTION

Turn cover over so that float guard faces upward.

- c. Wing nut (3) Remove. Refer to paragraph 3-38.
- d. "0"ring retainer (4) Remove. Refer to paragraph 3-38.
- e. "0"ring (5) Remove. Refer to paragraph 3-38.
- f. Hold-down plate (6) Remove. Refer to paragraph 3-38.

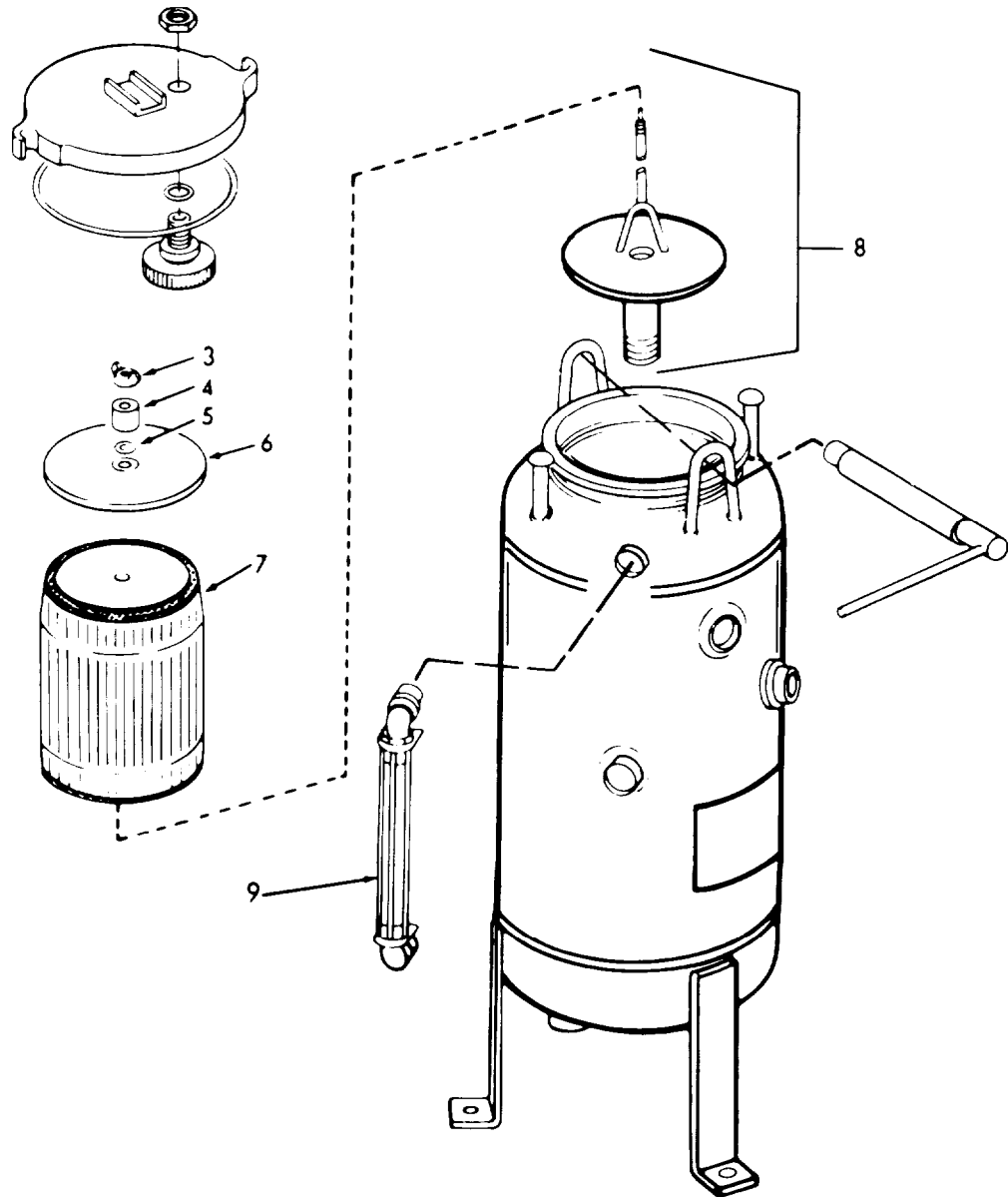
WARNING

Filter elements are subject to contamination by human hand.

- g. Element (7) Remove. Refer to paragraph 3-38.
- h. Filter support (8) Remove. Refer to paragraph 3-39.
- i. Sight glass assembly (9) Remove. Refer to paragraph 3-40.

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 3. Wing Nut
- 4. "O" Ring Retainer
- 5. "O" Ring
- 6. Hold-down Plate
- 7. Element
- 8. Filter Support
- 9. Sightglass

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Service

- | | | | |
|----|----------------------|---|--|
| 7. | Sightglass | Clean using a lint free cloth, detergent and warm water. Dry thoroughly. | |
| 8. | Separator interior | Flush thoroughly with clean water. | |
| 9. | Air eliminator valve | Clean using a lint free cloth and a mild detergent and water. Dry thoroughly. | |

Repair

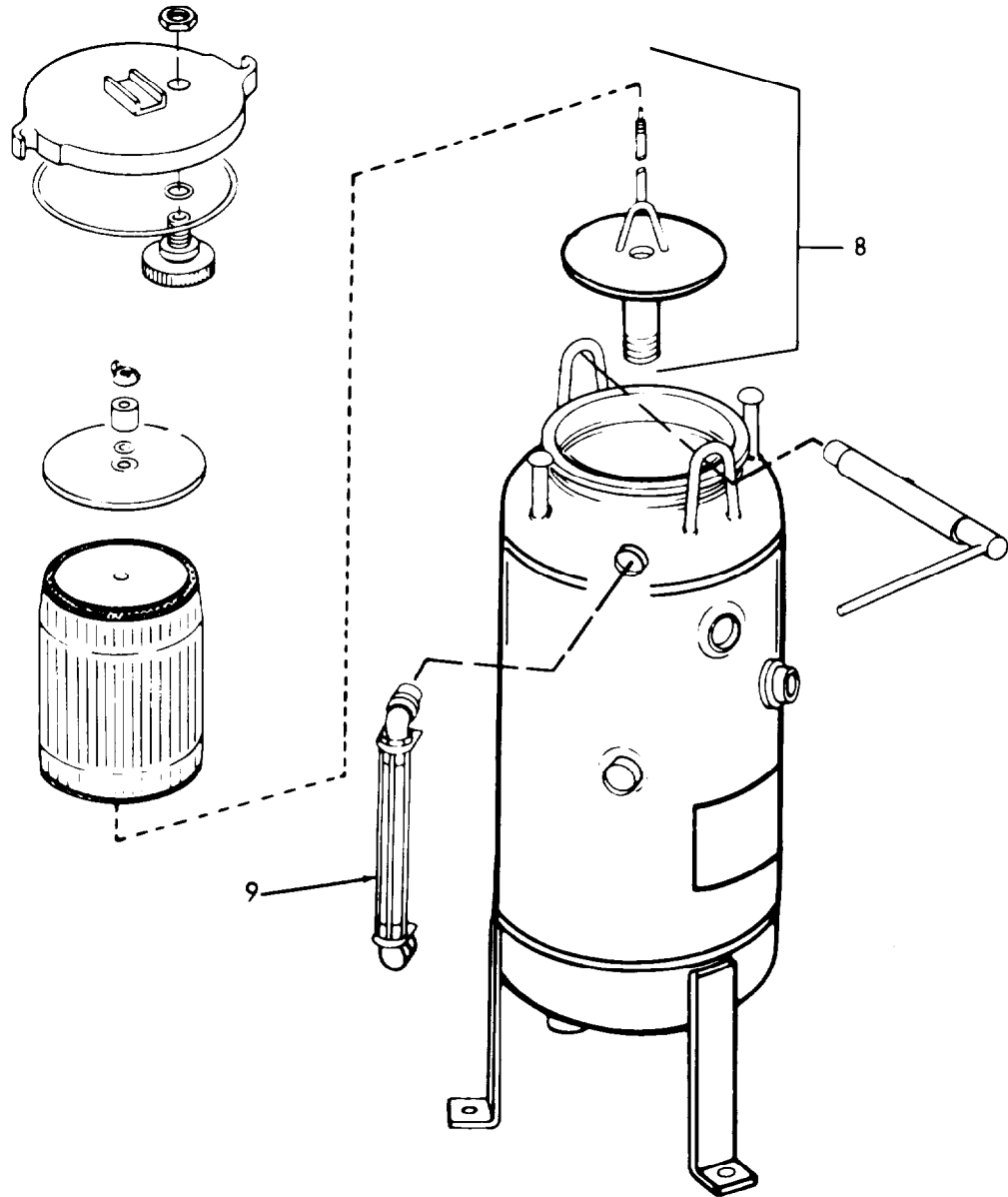
Replace a damaged or defective separator with a serviceable-like item.

Installation

- | | | | |
|-----|--------------------|-----------------------------------|--|
| 10. | Sight-glass (9) | Install. Refer to paragraph 3-40. | |
| 11. | Filter support (8) | Install. Refer to paragraph 3-39. | |

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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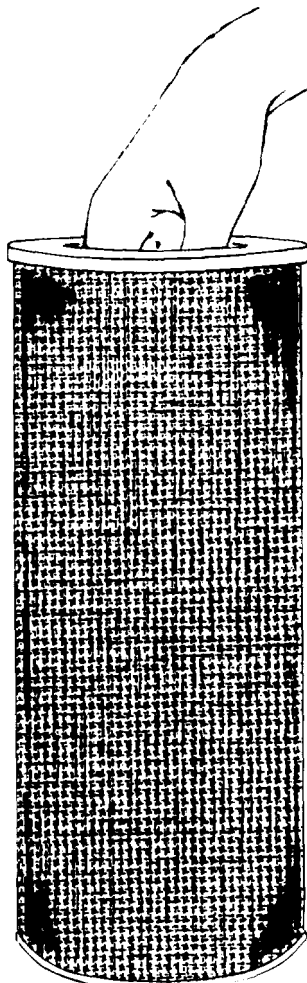
- 8. Filter Support
- 9. Sightglass

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
12.	Filter element	a. Handle the filter elements only by the end caps. When installing an element, insert hand through the opening in the end cap.	

CAUTION

It is important that the filter element be handled properly. DO NOT touch or handle the sock area (side covering) of the elements. Contamination of this surface by skin oils may prevent the coalescer element from functioning properly and cause foaming of the effluent.

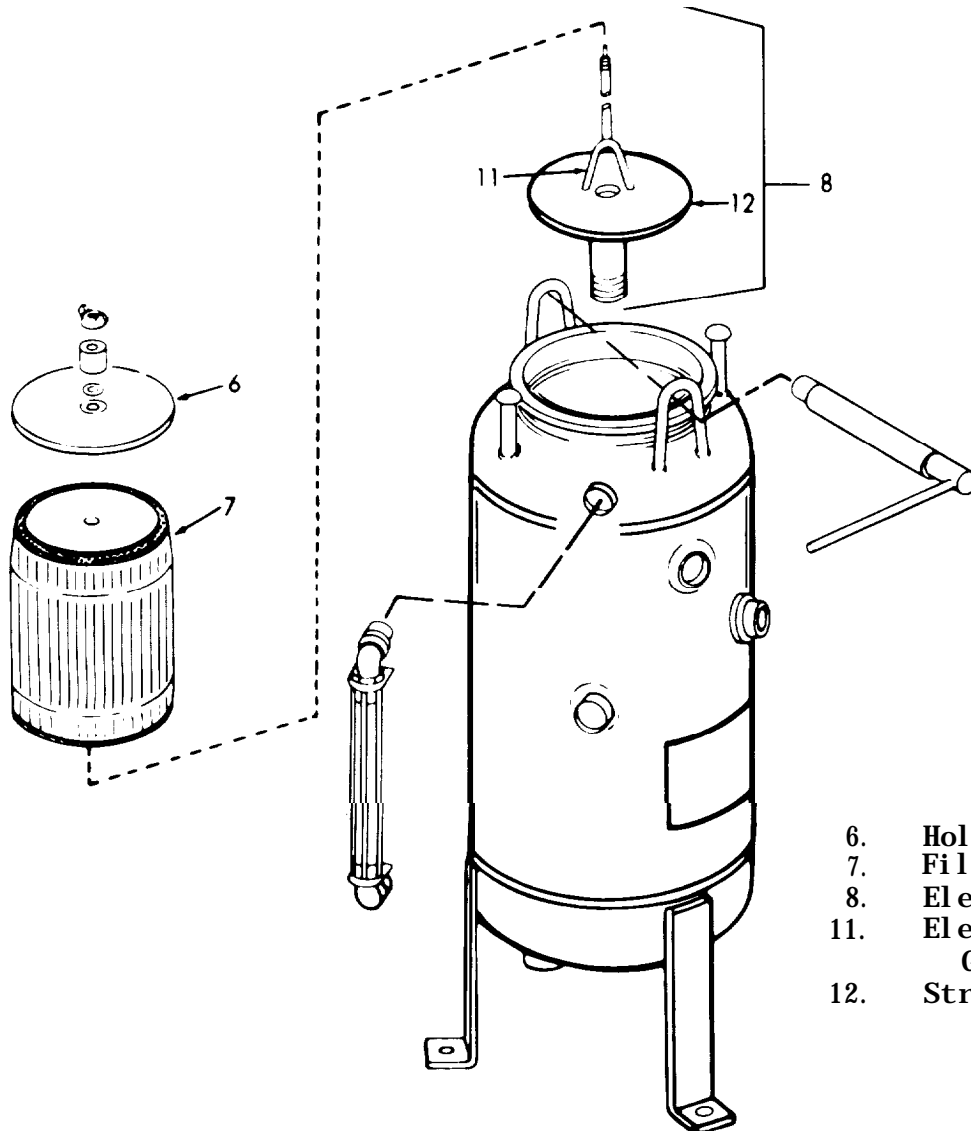


3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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b. Place a filter element (7) over the threaded element stand (8). Position the element so that it is centered over the element positioning guide (11) attached to the striker plate (12).

c. Replace and center the hold-down plate (6) over the end cap of the filter element.



- 6. Hold-down Plate
- 7. Filter Element
- 8. Element Stand
- 11. Element Positioning Guide
- 12. Striker Plate

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- d. Place O-ring (5), O-ring retainer (4), and wing nut (3) on the element stand.

CAUTION

DO NOT use a wrench to tighten the wing nut or the filter element may be damaged.

- e. Tighten the wing nut (3) as tightly as possible by hand.

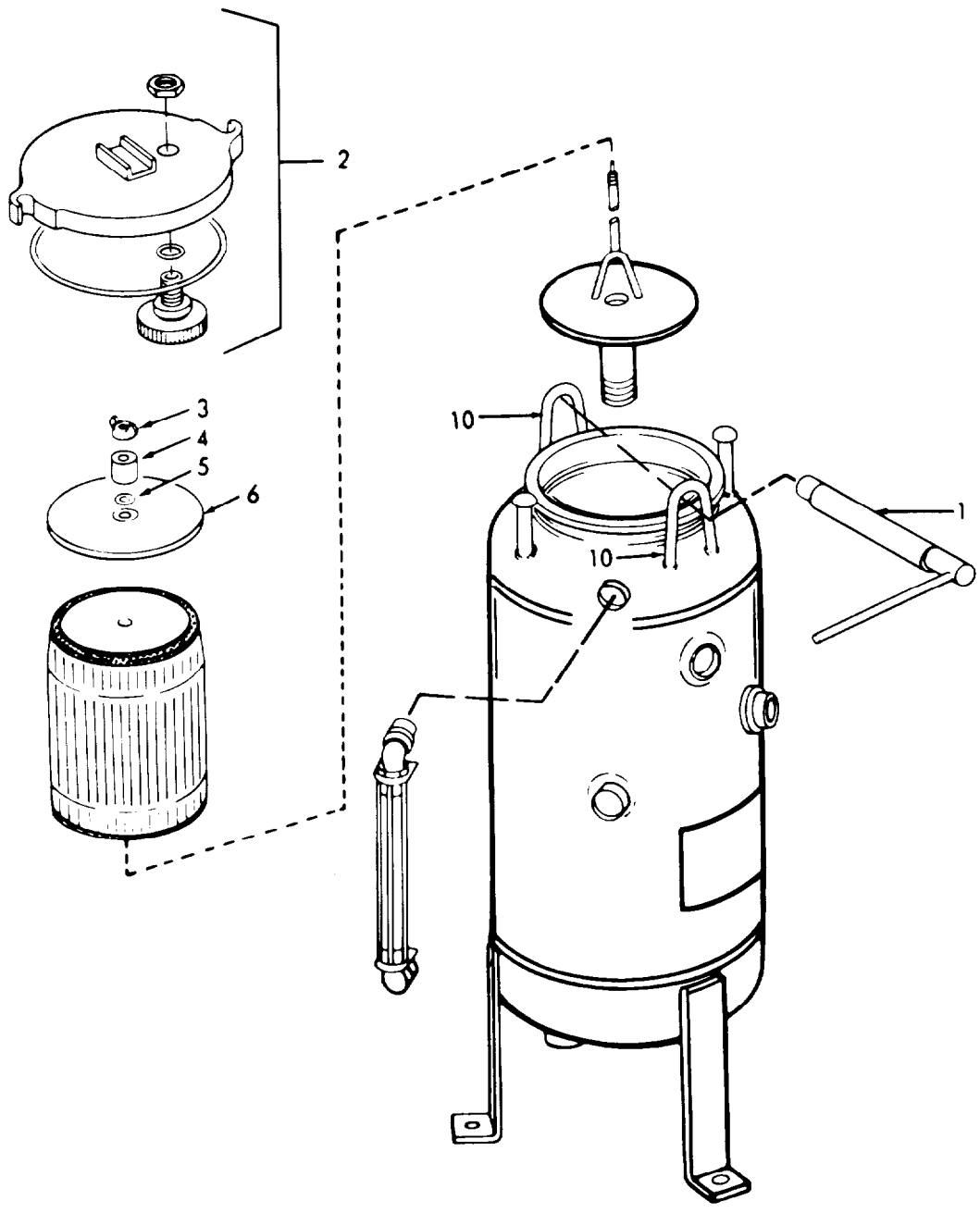
- | | | |
|-----|-------|---|
| 13. | Cover | <ul style="list-style-type: none"> a. Replace the cover (2) on the stage being serviced. b. Secure the cam bar (1) to the cam latches (10). |
|-----|-------|---|

NOTE

Attach a suitable sling to the prefilter separator and using a suitable hoist, position the separator in place on the mounting frame.

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

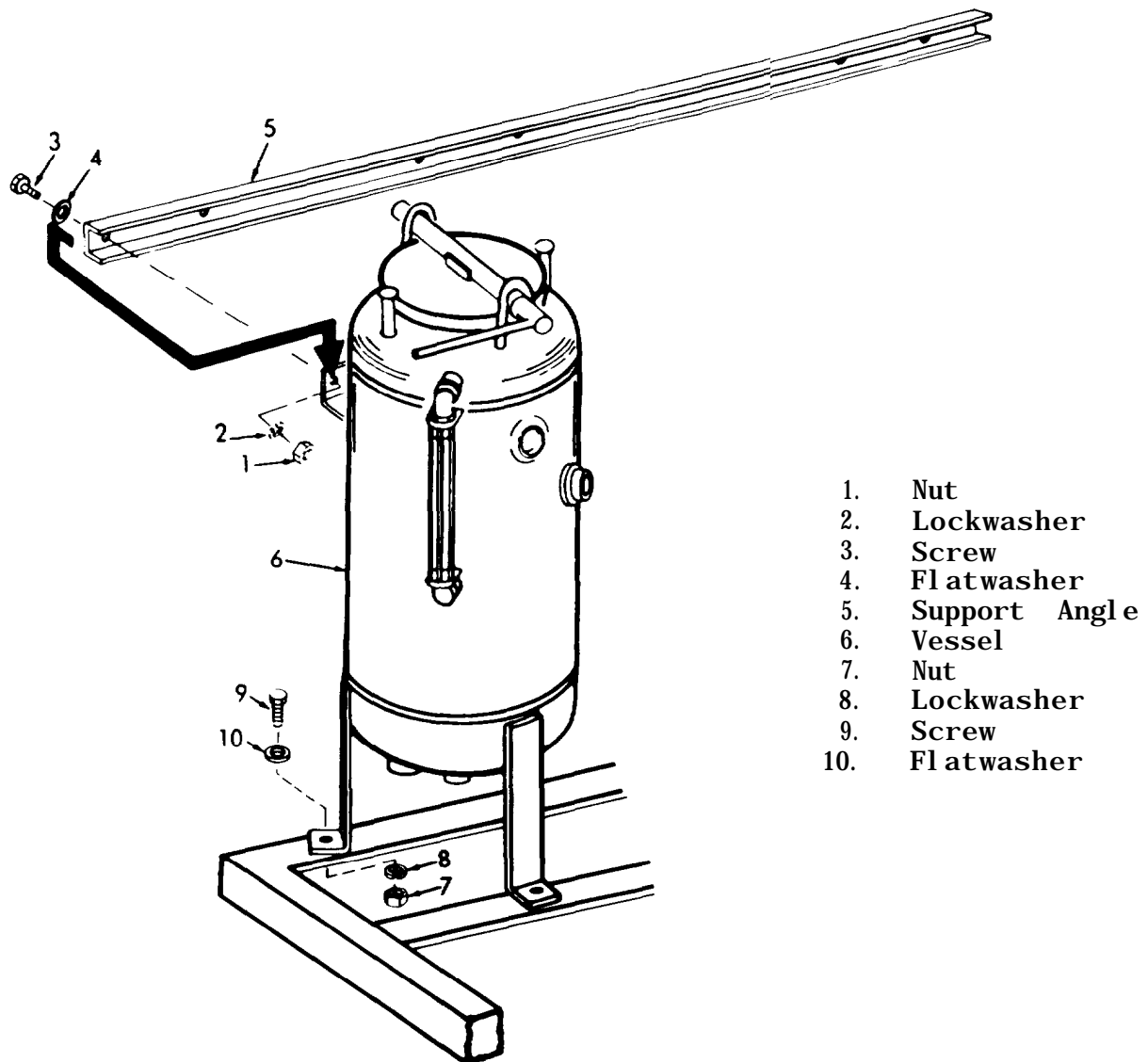
LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 1. Cam Bar
- 2. Cover
- 3. Wing Nut
- 4. O-ring Retainer
- 5. O-ring
- 10. Cam Latches

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

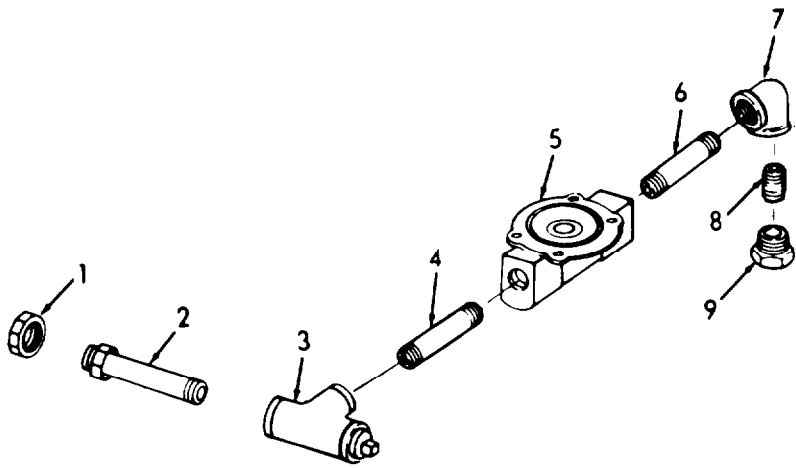
LOCATION	ITEM	ACTION	REMARKS
14. Support angle and pre-filter mounting hardware	a. Mounting hardware	Install flatwashers (10), screws (9), lockwashers (8) and nuts (7).	
	b. Support angle (5)	Secure to vessel (6) with flatwashers (4), screws (3), lockwashers (2) and nuts (1).	



3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

15. 1st stage (pre filter) piping
- a. Install bushing (9) nipple (8), elbow (7), nipple (6), solenoid valve (5), nipple (4), tee (3) and nipple (2).
 - b. Secure to union halves by tightening collar (1).

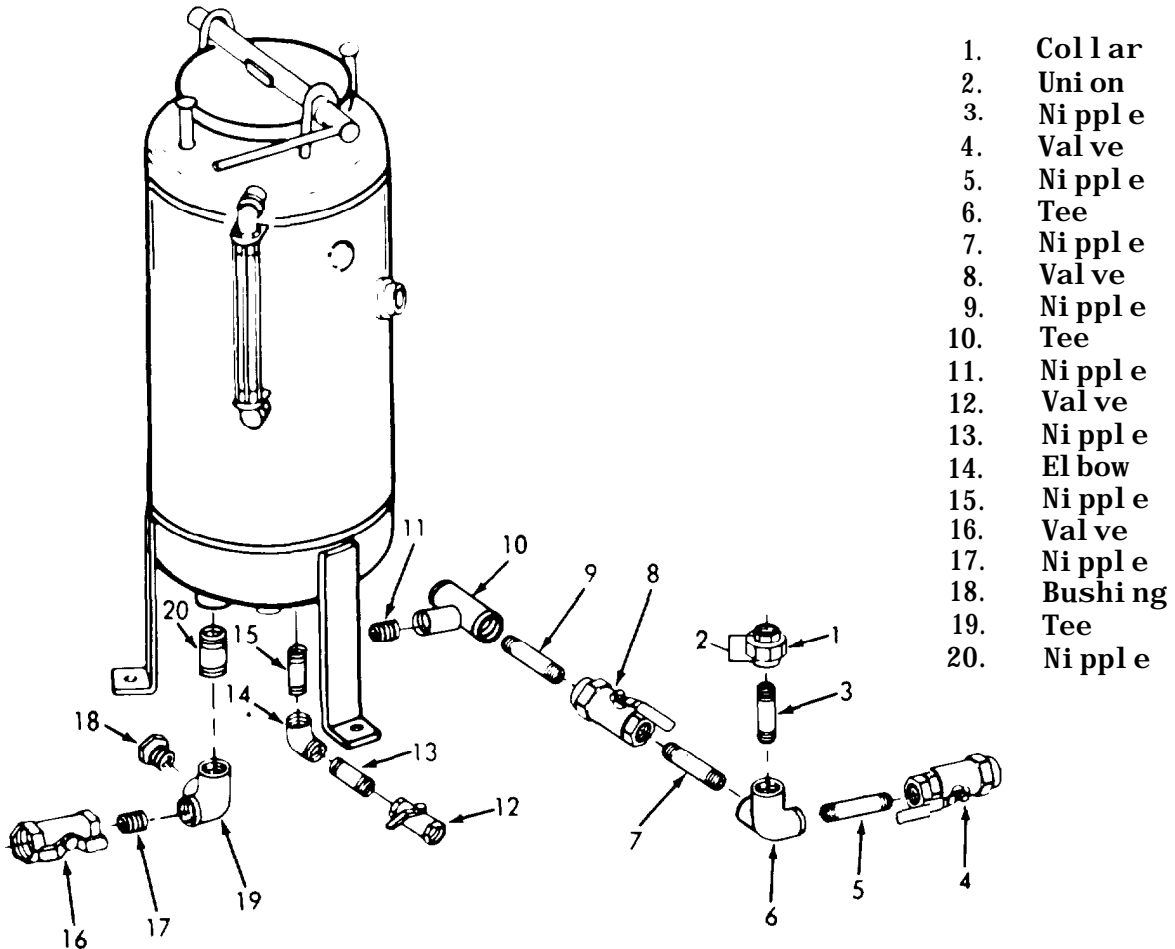


- 1. Collar
- 2. Nipple
- 3. Tee
- 4. Nipple
- 5. Solenoid Valve
- 6. Nipple
- 7. Elbow
- 8. Nipple
- 9. Bushing

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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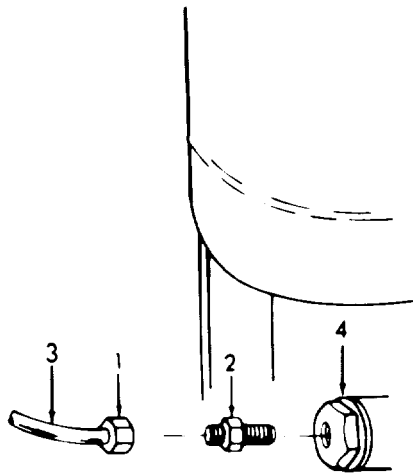
- c. Install nipple (20), tee (19), bushing (18), nipple (17) and valve (16).
- d. Install nipple (15), elbow (14), nipple (13), valve (12), nipple (11), tee (10), nipple (9) valve (8) and nipple (7).
- e. Install tee (6), nipple (5), valve (4) and nipple (3).
- f. Secure piping by tightening collar (1) on union (2).



3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|-----|----------|--|--|
| 16. | Air line | <p>a. Install male connector (2) in bushing (4).</p> <p>b. Secure air line (3) by tightening female connector (1).</p> | |
|-----|----------|--|--|



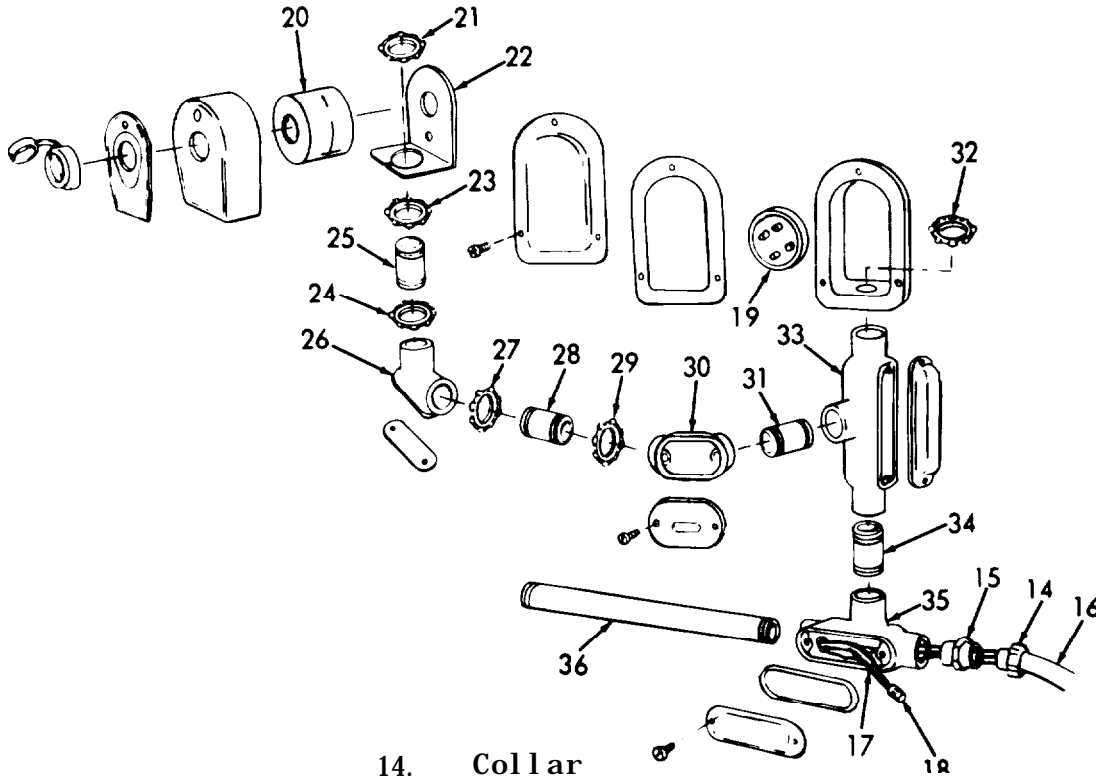
1. Female Connector
2. Male Connector
3. Air Line
4. Bushing

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
17. Electrical connections	a. Connectors and connections	(1) Install conduit (36) in tee.	
		(2) Install tee (35), nipple (34) and tee (33).	
		(3) Secure tee (33) with locknut (32).	
		(4) Install nipple (31), pulling elbow (30), locknut (29), nipple (28), locknut (27), pulling elbow (26), nipple (25) and locknuts (24 and 23).	
		(5) Position baseplate (22) in place on solenoid valve base and secure with locknut (21).	
	b. Solenoid valve coil (20)	(1) Thread coil leads thru electrical connections.	
		(2) Slide coil (20) over base.	
	c. Mini-probe (19)	Install in vessel.	Use thin wall socket NSN 5120-00-227-1465 with 1/2 in. drive ratchet.
	d. Motor cable (16)	(1) Thread each wire individually thru various electrical connections to their tagged component end.	
		(2) Reconnect leads (17) using connectors (18).	
		(3) Secure motor cable (16) by tightening collar (14) onto connector (15).	

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

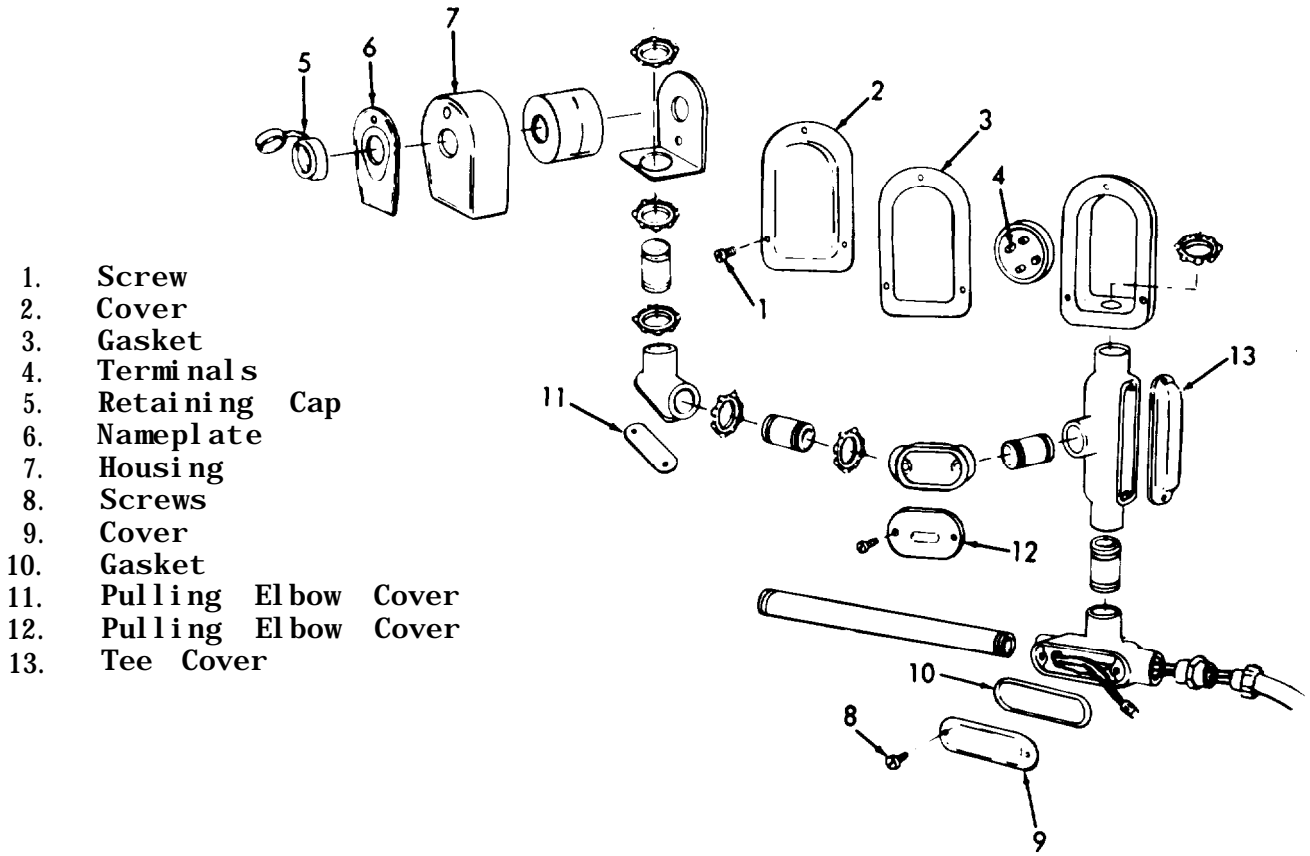
LOCATION	ITEM	ACTION	REMARKS
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- 14. Collar
- 15. Connector
- 16. Motor Cable
- 17. Leads
- 18. Connectors
- 19. Mini - probe
- 20. Solenoid Valve Coil
- 21. Locknut
- 22. Baseplate
- 23. Locknut
- 24. Locknut
- 25. Nipple
- 26. Pulling Elbow
- 27. Locknut
- 28. Nipple
- 29. Locknut
- 30. Pulling Elbow
- 31. Nipple
- 32. Locknut
- 33. Tee
- 34. Nipple
- 35. Tee
- 36. Conduit

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
	e. Tees and pulling elbow covers (11, 12, and 13)	Position gasket (10) in place and install cover (9) using screws (8).	
	f. Solenoid valve housing (7)	Install using nameplate (6) and retaining cap (5).	
	g. Mini-probe cover (2)	(1) Reconnect terminals (4). (2) Position gasket (3) in place and install cover (2) using screws (1).	



- 1. Screw
- 2. Cover
- 3. Gasket
- 4. Terminals
- 5. Retaining Cap
- 6. Nameplate
- 7. Housing
- 8. Screws
- 9. Cover
- 10. Gasket
- 11. Pulling Elbow Cover
- 12. Pulling Elbow Cover
- 13. Tee Cover

3-42. PREFILTER SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
18.	Electric power	Turn ON.	
19.	Restart system	Refer to paragraph 2-4 for instructions.	

3-43. 2ND STAGE SEPARATOR, TYPE A AND B

This task covers:

- | | |
|------------|-------------------|
| a. Removal | c. Repair/Replace |
| b. Service | d. Installation |

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics
Socket
Adapter

Material/Parts
2nd stage separator
Sealing compound
Appendix C. Item No. 6

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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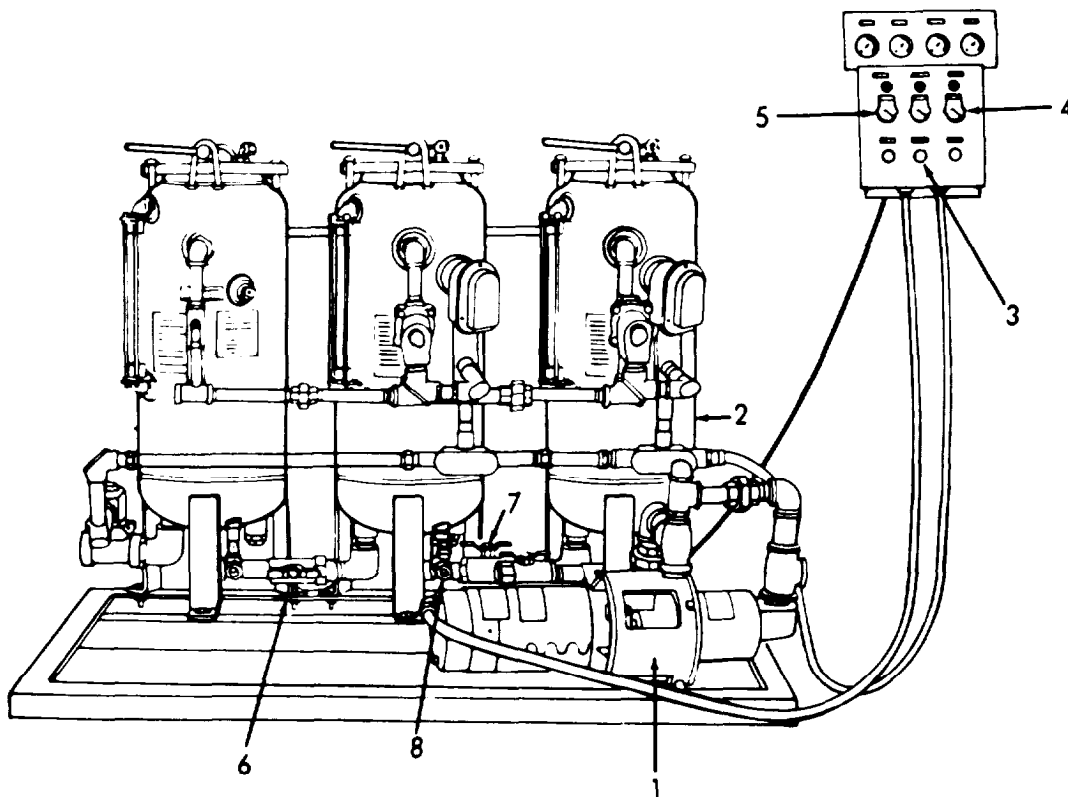
Removal

- | | | | |
|----|-----------------|--|--|
| 1. | Draining system | <ul style="list-style-type: none"> a. With the pump (1) running and control power on, discharge as much oil as possible from the separator stage which is to be serviced or replaced according to the following: b. To discharge from the second stage (2), manually depress the oil dump light/button (3). c. Stop the supply pump (1) by turning the supply pump selector switch (4) OFF. d. Turn the auto controls selector switch (5) OFF. | |
|----|-----------------|--|--|

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- e. To drain water from the second stage (2):
- (1) Close the two inter-vessel shutoff valves (6 and 7) on either stage (2).
 - (2) Open the drain valve (8) at the base of the vessel.



1. Pump
2. Second Stage
3. Oil Dump Light/Button
4. Supply Pump Selector Switch
5. Auto Controls Selector Switch
6. Intervessel Shutoff Valve
7. Intervessel Shutoff Valve
8. Drain Valve

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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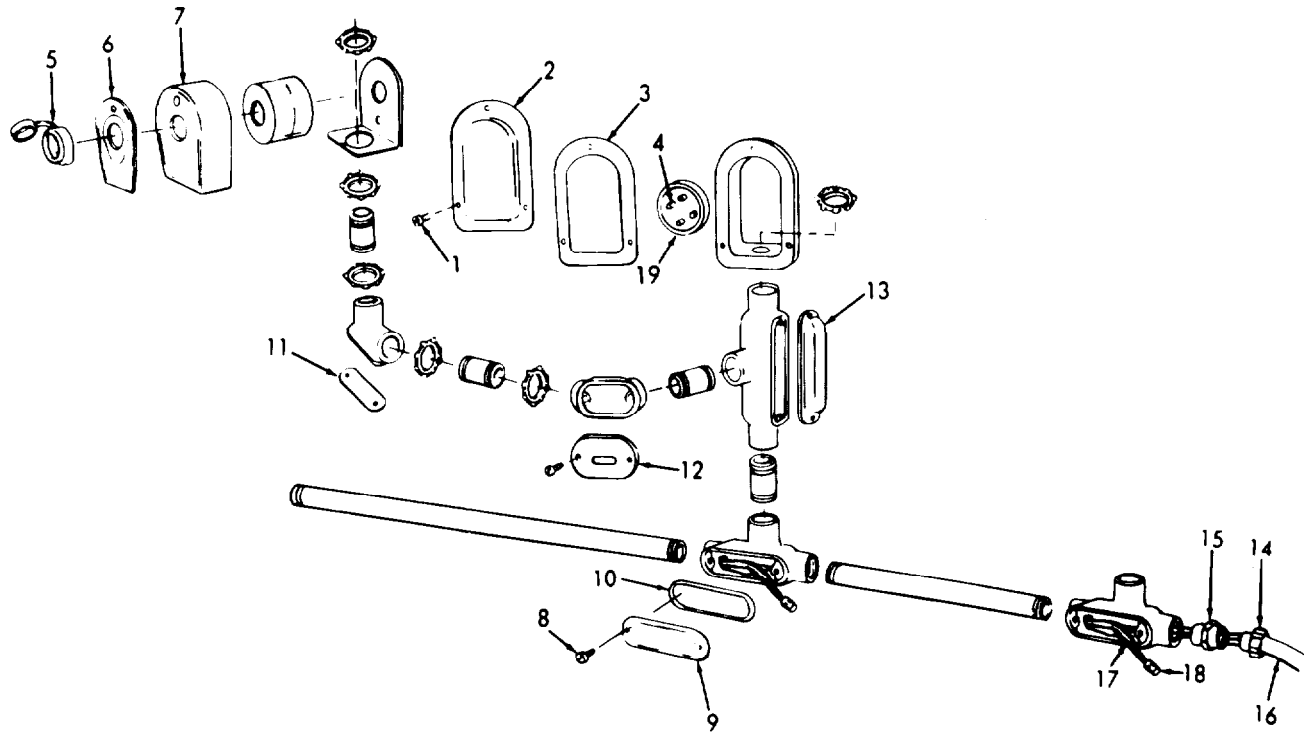
WARNING

Electrical shock or serious injury may result if electrical power is not shut off before continuing maintenance on the 2nd stage separator.

2.	2nd stage separator electrical connections	<p>a. Mini-probe cover (2)</p> <p>(1) Remove screws (1), cover (2) and gasket (3).</p> <p>(2) Tag and disconnect terminals (4).</p>	
	b. Solenoid valve housing (7)	Remove retaining cap (5), nameplate (6) and housing (7).	
	c. Tee and pulling elbow covers (11, 12 and 13)	Remove screws (8), cover (9) and gasket (10).	
	d. Motor cable (16)	<p>(1) Unscrew collar (14) from connector (15).</p> <p>(2) Tag and disconnect leads (17) by removing connectors (18).</p> <p>(3) Tag and disconnect other wiring and carefully remove each wire individually from electrical connections.</p>	
	e. Mini-probe (19)	Unscrew.	Use thin wall socket NSN 5120-00-277-1465 with 1/2 in. drive ratchet.

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 1. Screws
- 2. Cover
- 3. Gasket
- 4. Terminals
- 5. Retaining Cap
- 6. Nameplate
- 7. Housing
- 8. Screws
- 9. Cover
- 10. Gasket
- 11. Pulling Elbow Cover
- 12. Pulling Elbow Cover
- 13. Tee Cover
- 14. Collar
- 15. Connector
- 16. Motor Cable
- 17. Leads
- 18. Connectors
- 19. Mini-probe

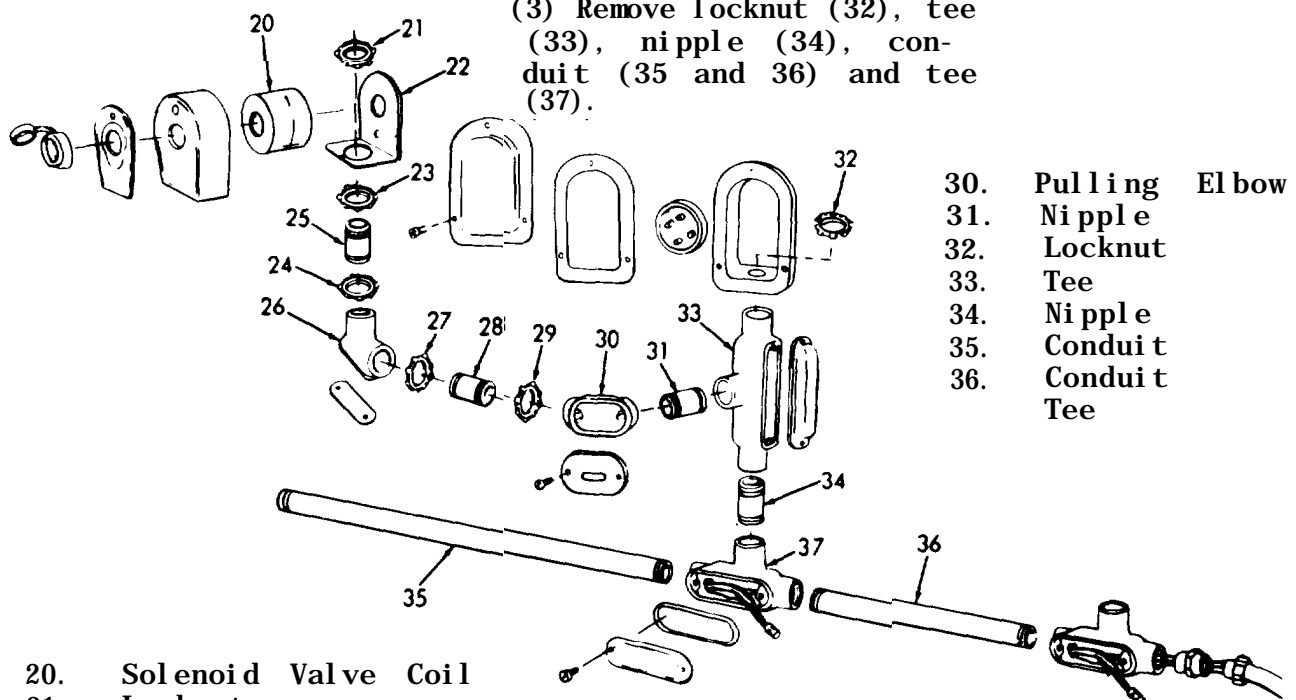
3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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f.	Solenoid valve coil (20)	Pull straight out to remove from base.	Leads will be attached to coil.
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9.	Connectors and connections	<p>(1) Remove locknut (21), baseplate (22) and locknut (23).</p> <p>(2) Remove locknut (24), nipple (25), pulling elbow (26), locknut (27), nipple (28), locknut (29), pulling elbow (30) and nipple (31).</p>	
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(3) Remove locknut (32), tee (33), nipple (34), conduit (35 and 36) and tee (37).

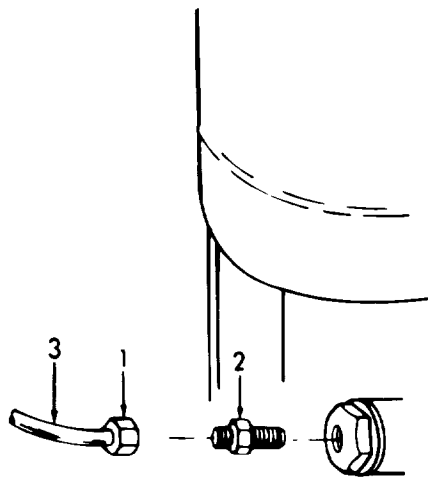


- 20. Solenoid Valve Coil
- 21. Locknut
- 22. Baseplate
- 23. Locknut
- 24. Locknut
- 25. Nipple
- 26. Pulling Elbow
- 27. Locknut
- 28. Nipple
- 29. Locknut

- 30. Pulling Elbow
- 31. Nipple
- 32. Locknut
- 33. Tee
- 34. Nipple
- 35. Conduit
- 36. Conduit
- 37. Tee

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

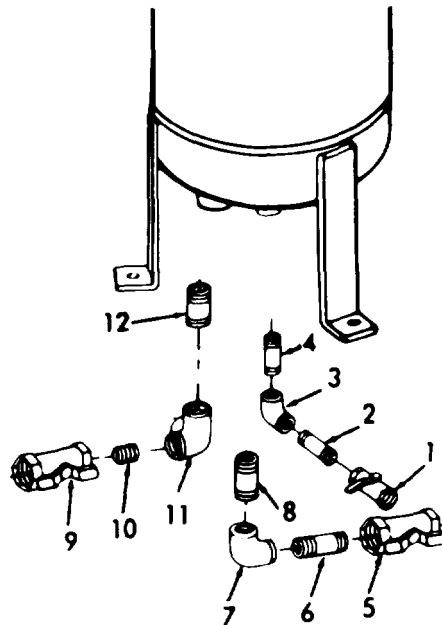
LOCATION	ITEM	ACTION	REMARKS
3.	2nd stage air line (3)	a. Unscrew female connector (1) securing air line (3). b. Remove male connector (2).	



- 1. Female Connector
- 2. Male Connector
- 3. Air line

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
4.	2nd stage piping	<p>a. Remove valve (1), nipple (2), elbow (3) and nipple (4).</p> <p>b. Remove valve (5), nipple (6), elbow (7) and nipple (8).</p> <p>c. Remove valve (9), nipple (10), tee (11) and nipple (12).</p>	

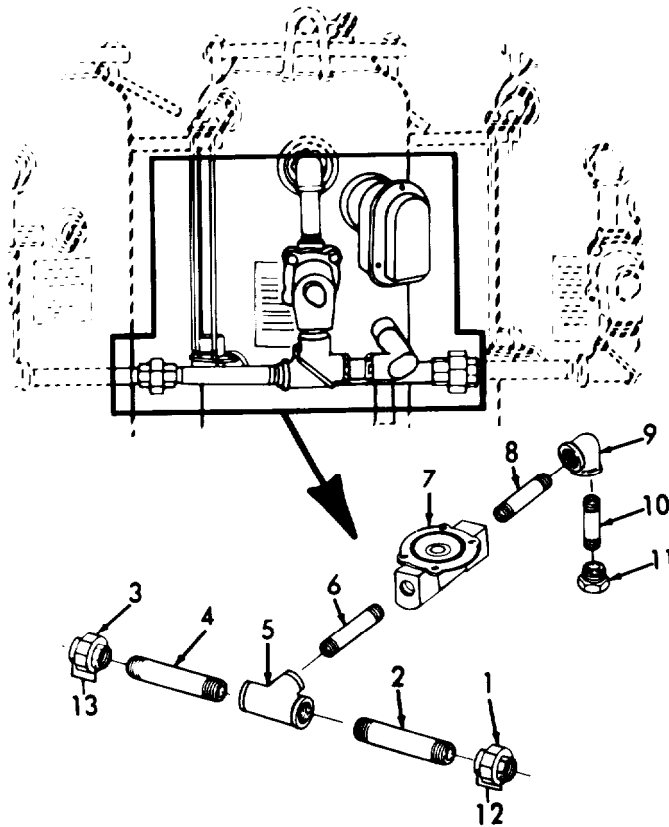


1. Valve
2. Nipple
3. Elbow
4. Nipple
5. Valve
6. Nipple
7. Elbow
8. Nipple
9. Valve
10. Nipple
11. Tee
12. Nipple

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- d. Unscrew collar (1) from union (12) and remove nipple (2).
- e. Unscrew collar (3) from union (13).
- f. Remove nipple (4), tee (5), nipple (6), valve (7), nipple (8), elbow (9), nipple (10) and bushing (11).



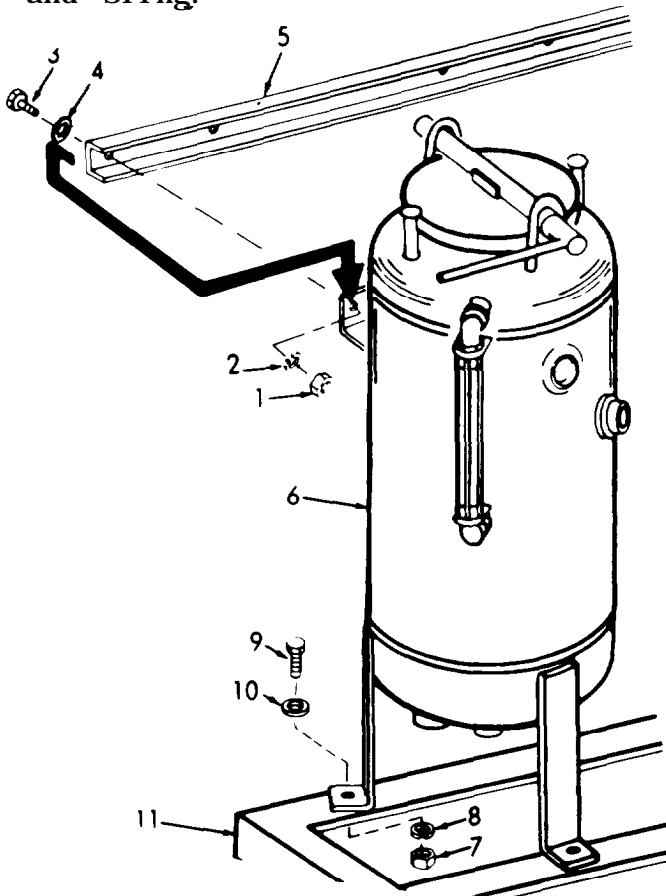
- | | | | |
|----|--------|-----|---------|
| 1. | Collar | 8. | Nipple |
| 2. | Nipple | 9. | Elbow |
| 3. | Collar | 10. | Nipple |
| 4. | Nipple | 11. | Bushing |
| 5. | Tee | 12. | Union |
| 6. | Nipple | 13. | Union |
| 7. | Valve | | |

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
5.	Support angle and vessel mounting hardware	<p>a. Remove nuts (1), lockwashers (2), screws (3), flatwashers (4) and support angle (5) from vessels (6).</p> <p>b. Remove nuts (7), lockwashers (8), screws (9), and flatwashers (10) securing vessel.</p> <p>c. Remove vessel (6) from mounting frame (11).</p>	

NOTE

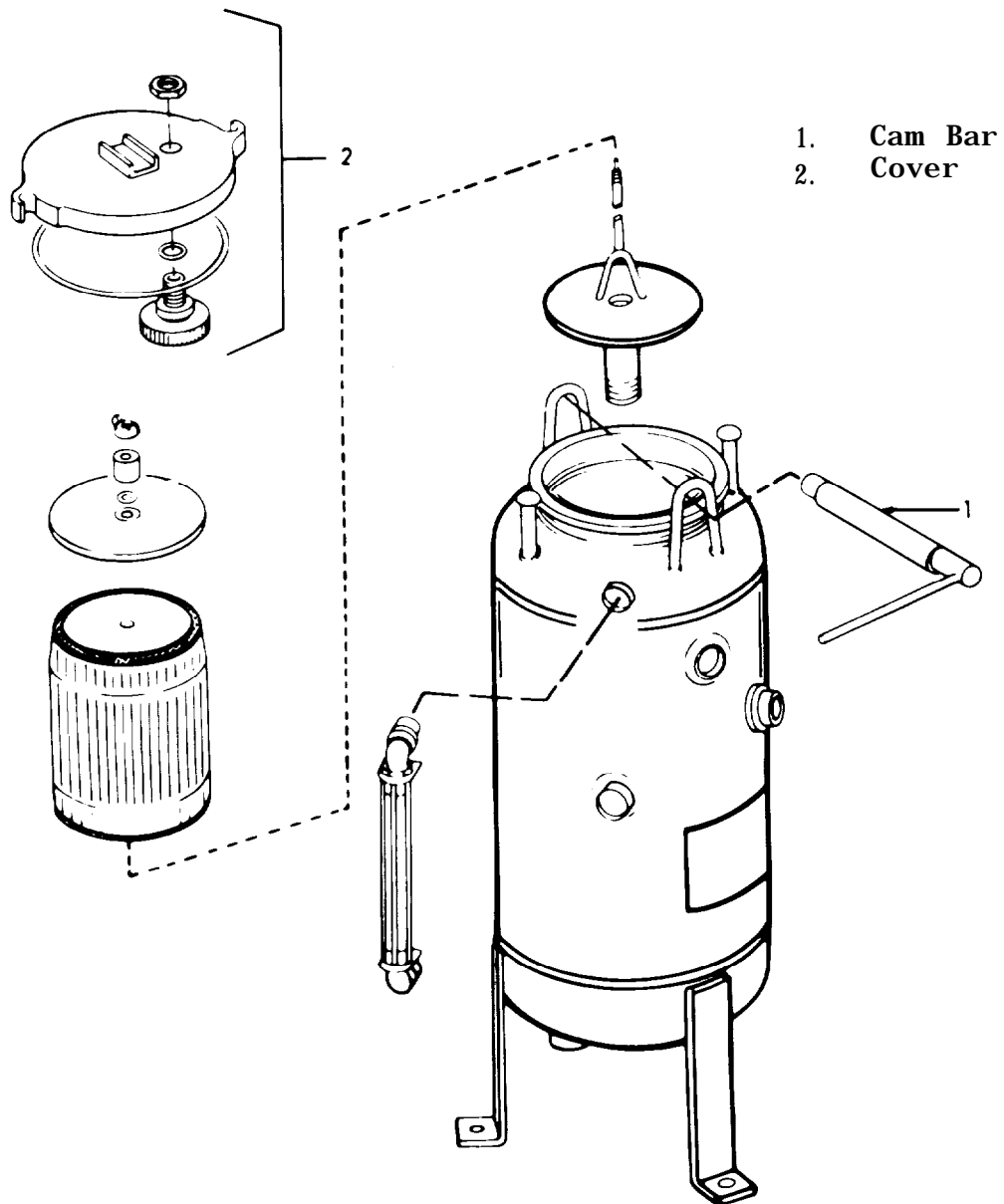
Attach a suitable sling to 2nd stage separator and using a suitable hoist, lift separator from mounting frame and set on a flat surface. Detach hoist and sling.



- 1. Nut
- 2. Lockwashers
- 3. Screws
- 4. Flatwashers
- 5. Support Angle
- 6. Vessel
- 7. Nuts
- 8. Lockwashers
- 9. Screws
- 10. Flatwashers
- 11. Mounting Frame

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
6. Separ- tor sub- assembly disassem- bly	a. Cam bar (1)	Turn handle approximately 45° clockwise to relieve tension. Slide cam bar from cover (2).	
	b. Cover (2)	Remove.	



3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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CAUTION

Turn cover over so that float faces upward.

- | | | | |
|----|-----------------------|------------------|--------------------|
| c. | Wing nut (3) | Remove.
3-38. | Refer to paragraph |
| d. | 'O' ring retainer (4) | Remove.
3-38. | Refer to paragraph |
| e. | "O' ring (5) | Remove.
3-38. | Refer to paragraph |
| f. | Hold-down plate (6) | Remove.
3-38. | Refer to paragraph |

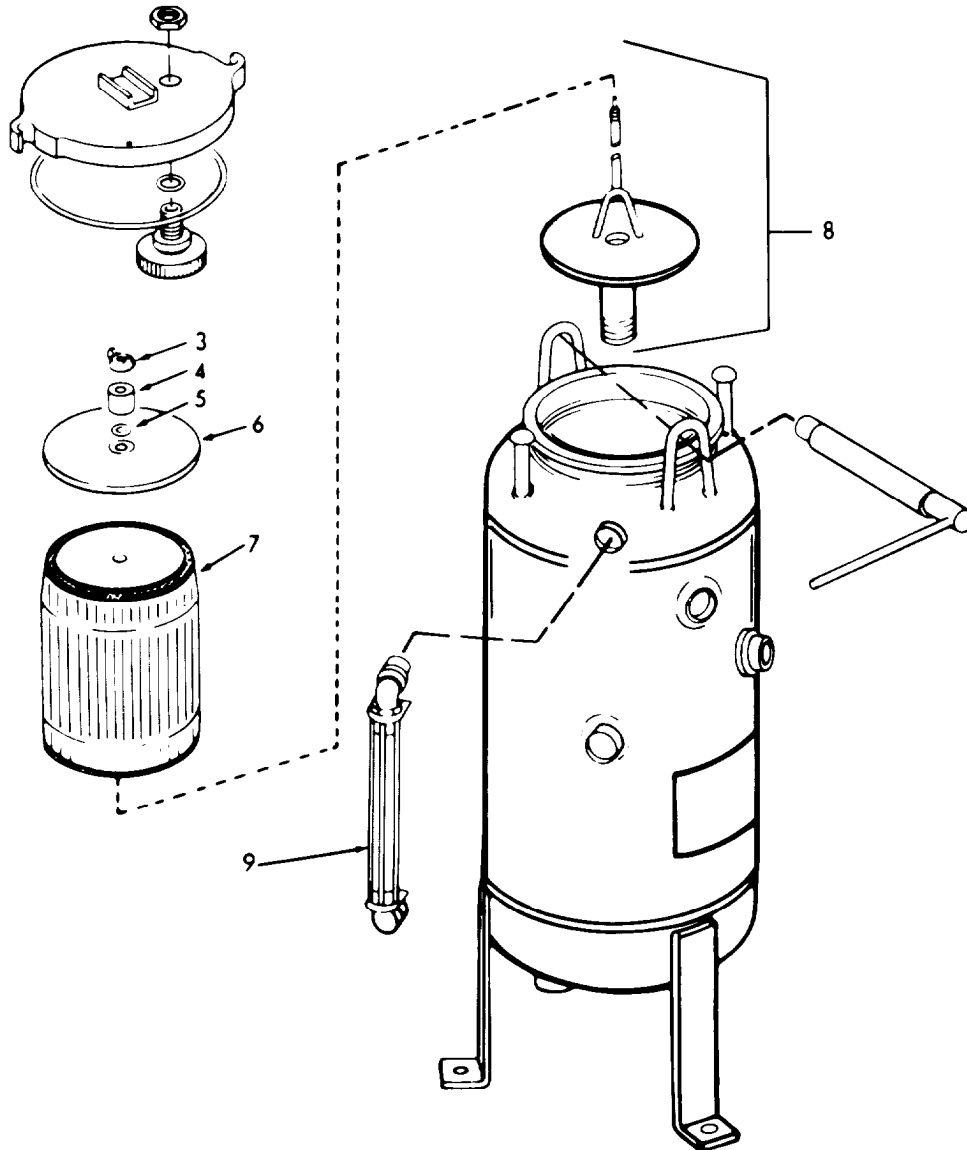
WARNING

Filter elements are subject to contamination by human hand.

- | | | | |
|----|--------------------------|------------------|--------------------|
| g. | Element (7) | Remove.
3-38. | Refer to paragraph |
| h. | Filter support (8) | Remove.
3-39. | Refer to paragraph |
| i. | Sight glass assembly (9) | Remove.
3-40. | Refer to paragraph |

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 3. Wing Nut
- 4. "O" Ring Retainer
- 5. "O" Ring
- 6. Hold-down Plate
- 7. Element
- 8. Filter Support
- 9. Sightglass

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
Service			
9.	Air eliminator valve	Clean using a lint free cloth and a mild detergent and water. Dry thoroughly.	
Repair			
		Replace a damaged or defective separator with a serviceable-like item.	
Installation			
10.	Sight-glass (9)	Install. Refer to paragraph 3-40.	
11.	Filter support (8)	Install.	
12.	Filter element (7)	<p>Handle the filter elements</p> <p>a. (7) only by the end caps. When installing an element, insert hand through the opening in the end cap.</p>	

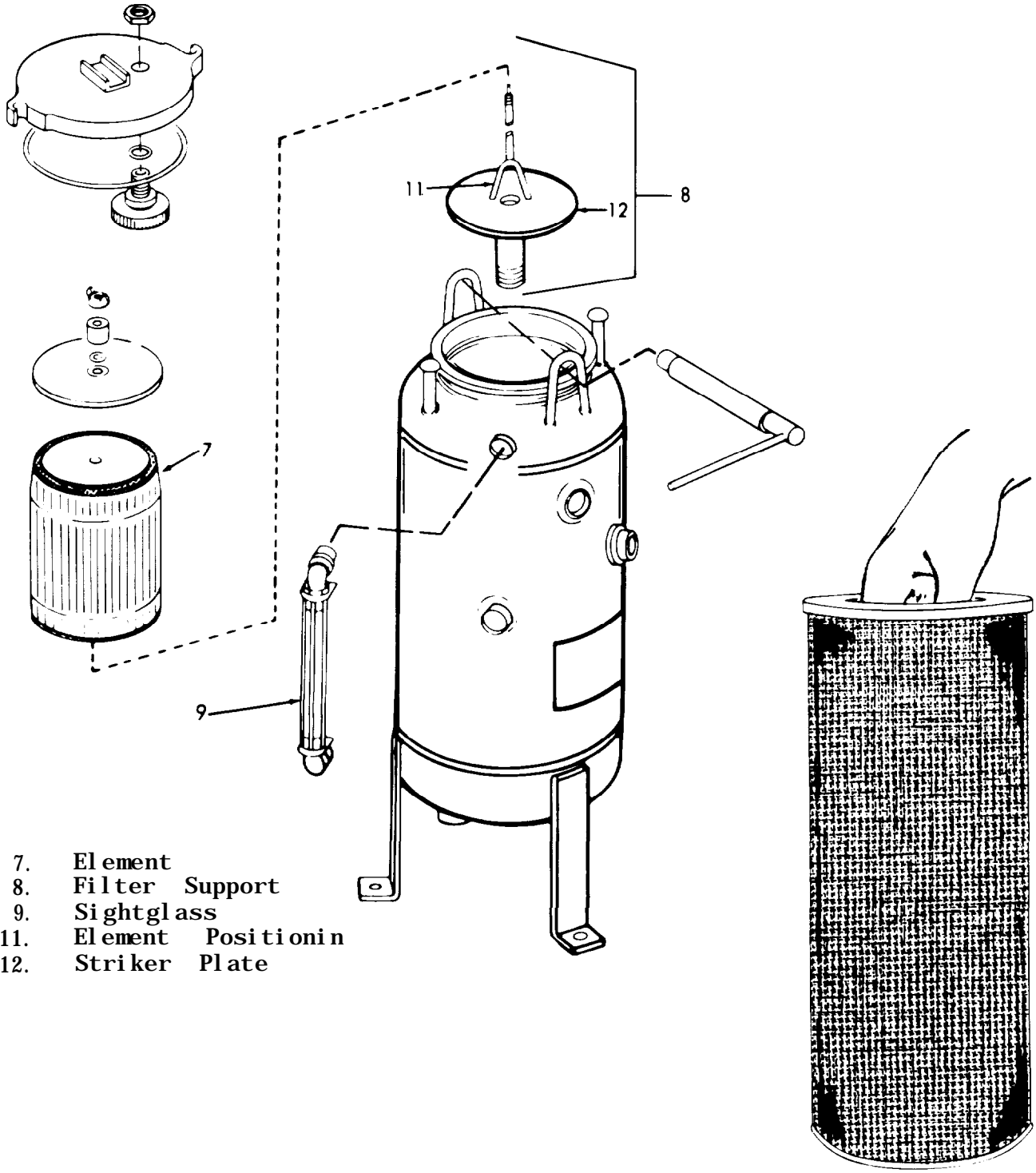
CAUTION

It is important that the filter element be handled properly. DO NOT touch or handle the sock area (side covering) of the elements. Contamination of this surface by skin oils may prevent the coalescer element from functioning properly and cause foaming of the effluent.

- b. Place a filter element (7) over the threaded element stand (8). Position the element so that it is centered over the element positioning guide (11) attached to the striker plate (12).

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 7. Element
- 8. Filter Support
- 9. Sightglass
- 11. Element Positionin
- 12. Striker Plate

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

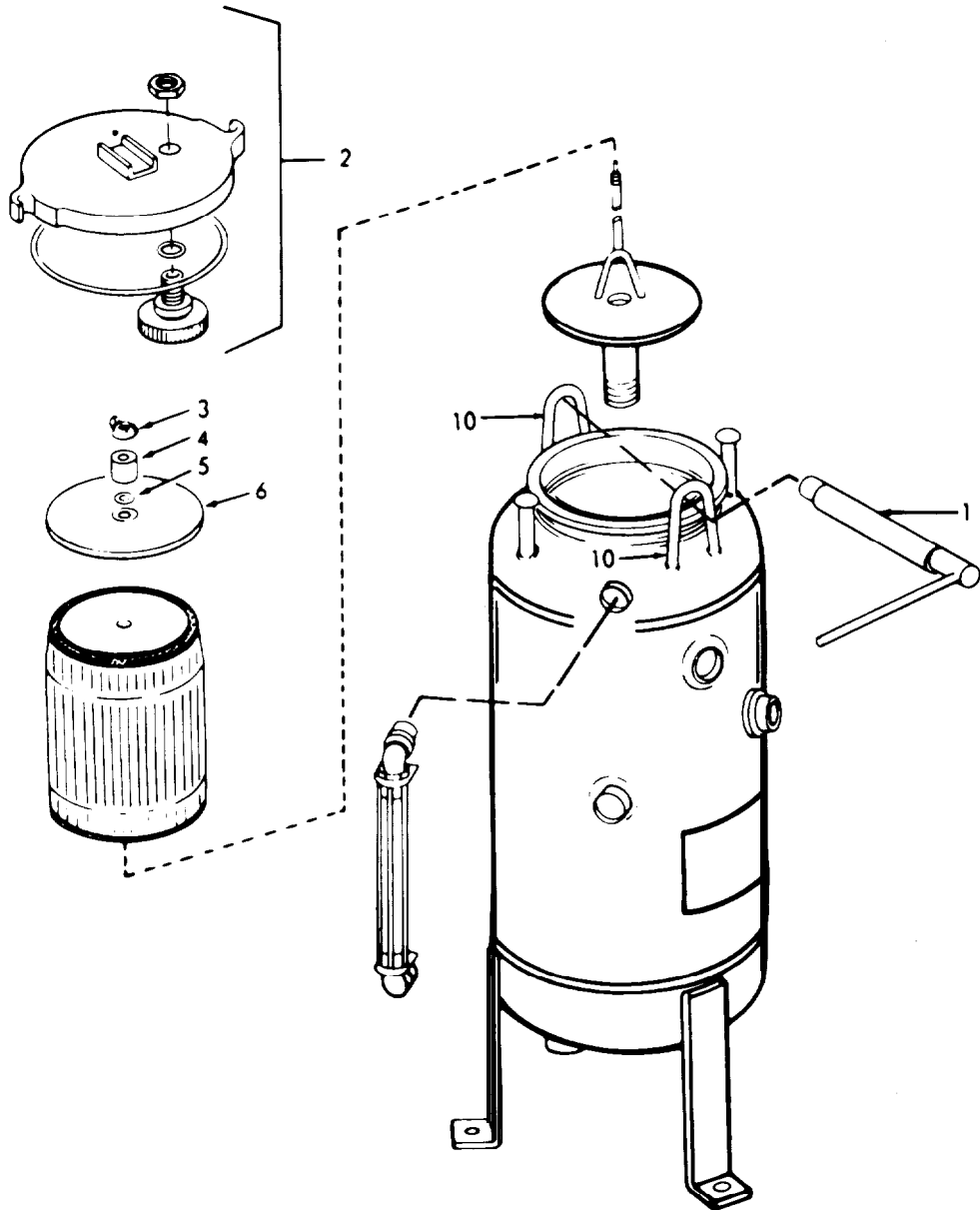
LOCATION	ITEM	ACTION	REMARKS
		<ul style="list-style-type: none">c. Replace and center the hold-down plate (6) over the end cap of the filter element.d. Place 0-ring (5), 0-ring retainer (4), and wing nut (3) on the element stand.	
<p>CAUTION</p>			
<p>DO NOT use a wrench to tighten the wing nut, or the filter element may be damaged.</p>			
		<ul style="list-style-type: none">e. Tighten the wing nut (3) as tightly as possible by hand.	
13.	Cover	<ul style="list-style-type: none">a. Replace the cover (2) on the stage being serviced.b. Slide the cam bar (1) thru can latches (10) to secure cover.	

NOTE

Attach a suitable sling to the prefilter separator and using a suitable hoist, position the separator in place on the mounting frame.

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

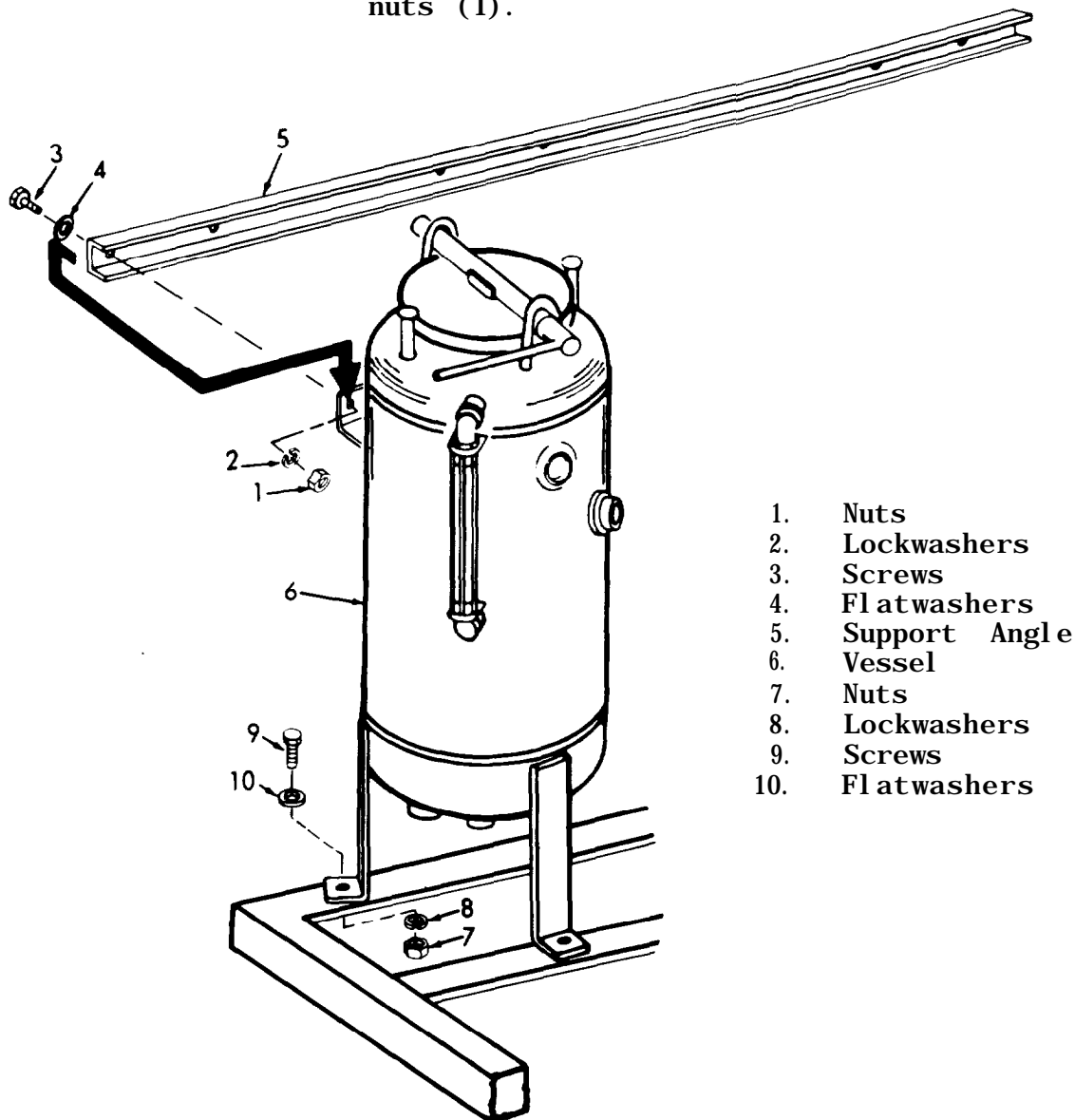
LOCATION	ITEM	ACTION	REMARKS
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1. Cam Bar
2. Cover
3. Wing Nut
4. "O" Ring Retainer
5. "O" Ring
6. Hold-down Plate
10. Cam Latch

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

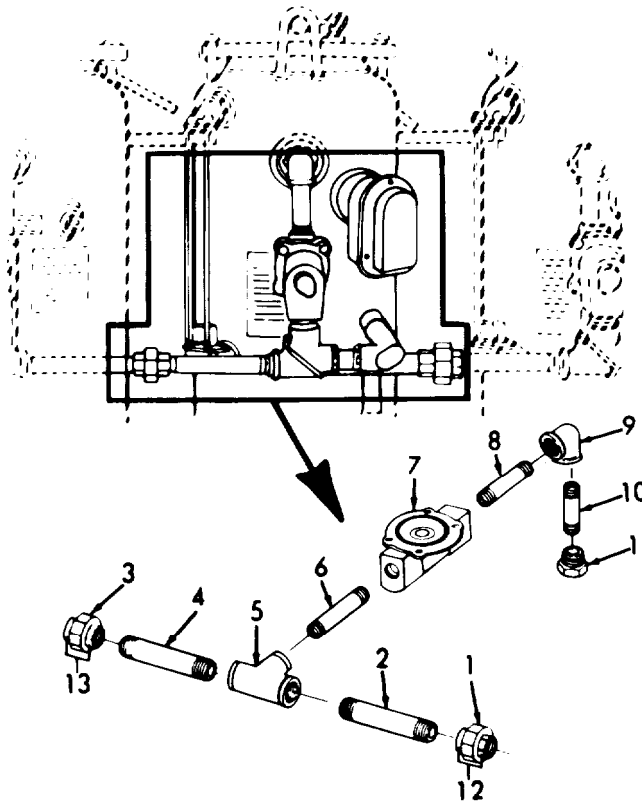
LOCATION	ITEM	ACTION	REMARKS
14. Support angle and pre-filter mounting hardware	a. Mounting hardware	Install flatwashers (10), screws (9), lockwashers (8) and nuts (7).	
	b. Support angle (5)	Secure to vessel (6) with flatwashers (4), screws (3), lockwashers (2) and nuts (1).	



- 1. Nuts
- 2. Lockwashers
- 3. Screws
- 4. Flatwashers
- 5. Support Angle
- 6. Vessel
- 7. Nuts
- 8. Lockwashers
- 9. Screws
- 10. Flatwashers

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
15.	2nd stage piping	<p>a. Install bushing (11), nipple (10), elbow (9), nipple (8), solenoid valve (7), nipple (6), tee (5) and nipple (4).</p> <p>b. Secure to union (13) by tightening collar (3).</p> <p>c. Install nipple (2) and tighten collar (1) to union (12).</p>	

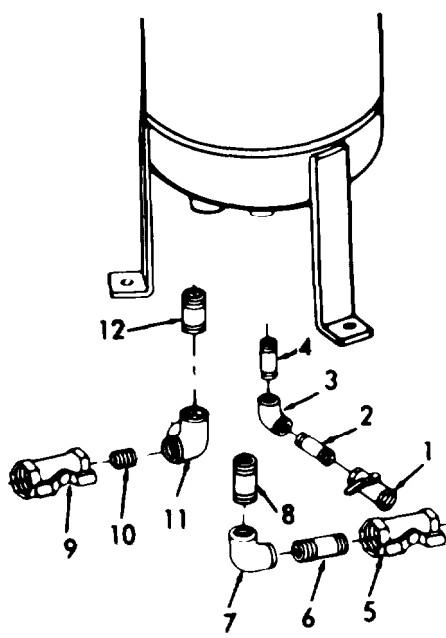


- | | | | |
|----|--------|-----|---------|
| 1. | Collar | 8. | Nipple |
| 2. | Nipple | 9. | Elbow |
| 3. | Collar | 10. | Nipple |
| 4. | Nipple | 11. | Bushing |
| 5. | Tee | 12. | Union |
| 6. | Nipple | 13. | Union |
| 7. | Valve | | |

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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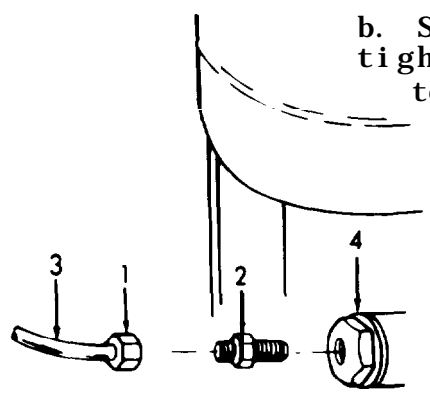
d. Install nipple (12), tee (11), nipple (10) and valve (9).
 Install nipple (8), elbow (7), nipple (6), valve (5), nipple (4), elbow (3), nipple (2) and valve (1).



- 1. Valve
- 2. Ni pple
- 3. El bow
- 4. Ni pple
- 5. Val ve
- 6. Ni pple
- 7. El bow
- 8. Ni pple
- 9. Val ve
- 10. Ni pple
- 11. Tee
- 12. Ni pple

16. Air line a. Install male connector (2) in bushing (4).

b. Secure air line (3) by tightening female connector (1).

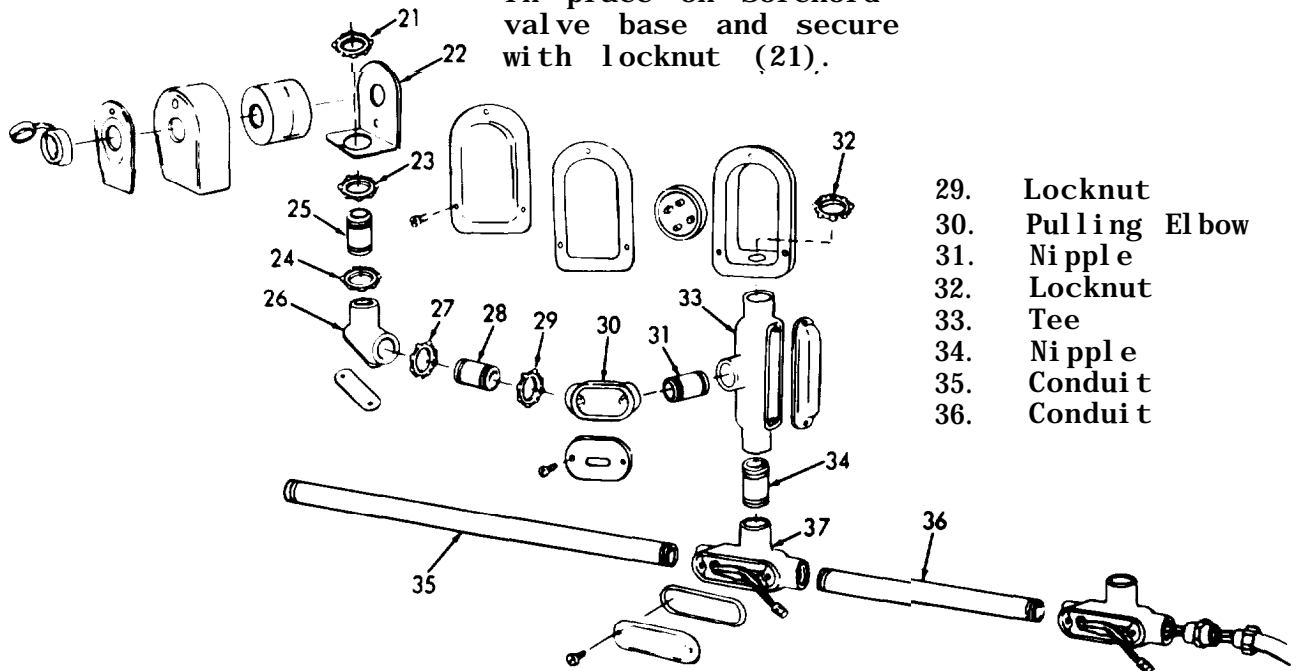


- 1. Female Connector
- 2. Male Connector
- 3. Air Line
- 4. Bushing

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- | | | | |
|----------------------------|-------------------------------|---|--|
| 17. Electrical connections | a. Connectors and connections | (1) Install conduit (35 and 36) in tee (37). | |
| | | (2) Install tee (37), nipple (34), tee (33). | |
| | | (3) Secure tee (33) with locknut (32). | |
| | | (4) Install nipple (31), pulling elbow (30), locknut (29), nipple (28), locknut (27), pulling elbow (26), nipple (25) and locknuts (24 and 23). | |
| | | (5) Position baseplate (22) in place on solenoid valve base and secure with locknut (21). | |



- 21. Locknut
- 22. Baseplate
- 23. Locknut
- 24. Locknut
- 25. Nipple
- 26. Pulling Elbow
- 27. Locknut
- 28. Nipple

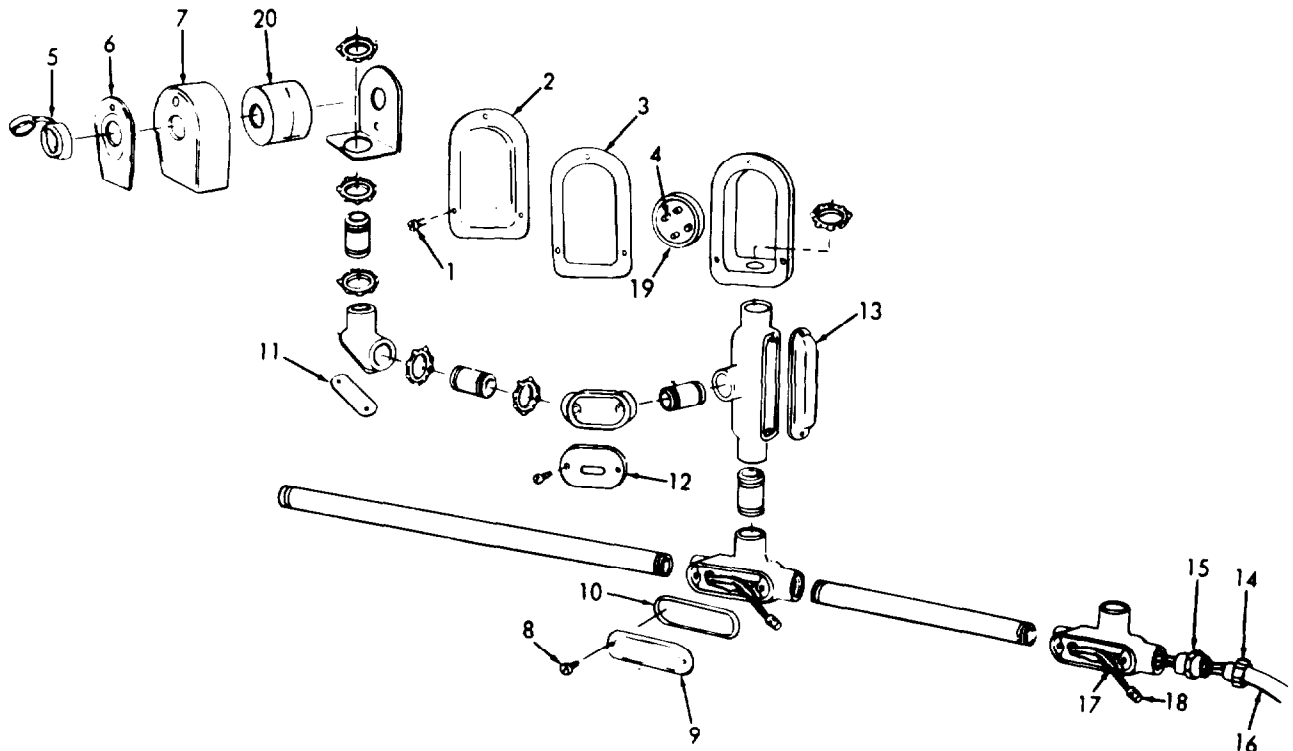
- 29. Locknut
- 30. Pulling Elbow
- 31. Nipple
- 32. Locknut
- 33. Tee
- 34. Nipple
- 35. Conduit
- 36. Conduit

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
	b. Solenoid valve coil (20)	(1) Thread coil leads thru electrical connections. (2) Slide coil (20) over base.	
	c. Mini-probe (19)	Install.	Use thin wall socket NSN 5120-00-227-1465 with 1/2 in. drive ratchet.
	d. Motor cable (16)	(1) Thread each wire individually thru various electrical connections to their tagged component end. (2) Reconnect leads (17) using connectors (18). (3) Secure motor cable (16) by tightening collar (14) onto connector (15).	
	e. Tee and pulling elbow covers (11, 12, and 13)	Position gasket (10) in place and install cover (9) using screws (8).	
	f. Solenoid valve housing (7)	Install using nameplate (6) and retaining cap (5).	
	g. Mini-probe cover (2)	(1) Reconnect terminals (4). (2) Position gasket (3) in place and install cover (2) using screws (1).	
18.	Restart System	Refer to paragraph 2-4.	

3-43. 2ND STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 1. Screws
- 2. Cover
- 3. Gasket
- 4. Terminals
- 5. Retaining Cap
- 6. Nameplate
- 7. Housing
- 8. Screws
- 9. Cover
- 10. Gasket
- 11. Pulling Elbow Cover
- 12. Pulling Elbow Cover
- 13. Tee Cover
- 14. Collar
- 15. Connector
- 16. Motor Cable
- 17. Leads
- 18. Connectors
- 19. Mini-probe
- 20. Solenoid Valve Coil

3-44. 3RD STAGE SEPARATOR, TYPE A AND B

This task covers:

- | | |
|------------|-------------------|
| a. Removal | c. Repair/Replace |
| b. Service | d. Installation |

INITIAL SETUP

Test Equipment

None

Tools

Tool Kit, General Mechanics

Material/Parts

Sealing compound
Appendix C. Item No. 6
3rd Stage Separator

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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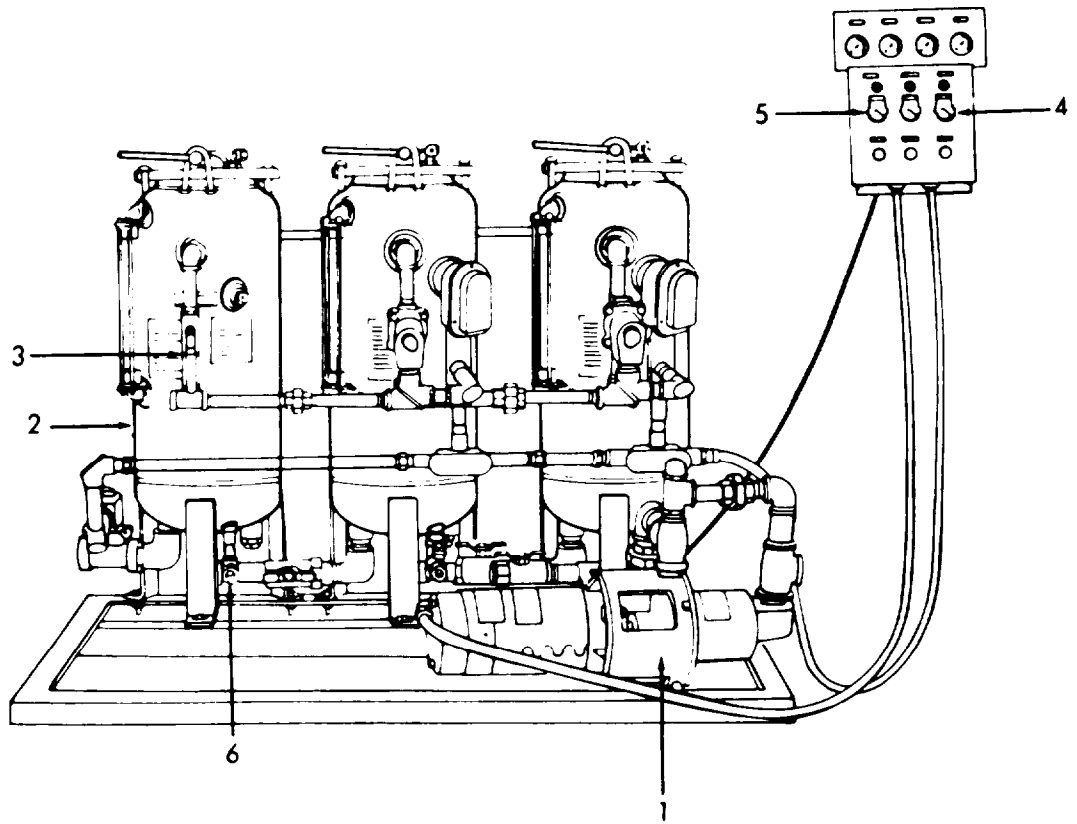
Removal

- | | | | |
|----|-----------------|--|--|
| 1. | Draining system | <ul style="list-style-type: none"> a. With the pump (1), running and control power on, discharge as much oil as possible from the 3rd stage separator which is to be serviced or removed according to the following: b. To discharge from the third stage (2), open the manual oil discharge valve (3) until all oil has been discharged. c. Stop the supply pump (1) by turning the supply pump selector switch (4) OFF. d. Turn the auto controls selector switch (5) OFF. | |
|----|-----------------|--|--|

3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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e. To drain water from the third stage, open the drain valve (6) at base of separator.



- 1. Pump
- 2. Third Stage
- 3. Manual Oil Discharge Valve
- 4. Supply Pump Selector Switch
- 5. Auto Controls Selector Switch
- 6. Drain Valve

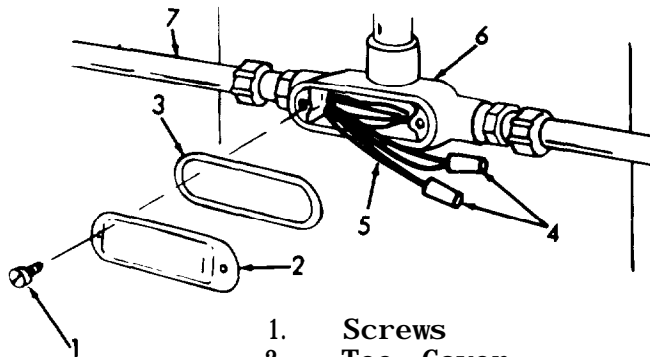
3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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WARNING

Electrical shock or serious injury may result if electrical power is not shut off before continuing maintenance on the 3rd stage separator.

- | | | |
|--|------------------------------|--|
| 2. 3rd stage electrical connections and air line | a. Tee cover | Remove screws (1), tee cover (2) and gasket (3) from tee (6). |
| | b. Leads (5) and conduit (7) | (1) Remove connectors (4).
(2) Tag and disconnect leads (5) and remove wiring.
(3) Remove conduit (7). |



1. Screws
2. Tee Cover
3. Gasket
4. Connectors
5. Leads
6. Tee
7. Conduit

- | | | |
|--|-----|--|
| c. Pulling elbows (1 and 5) and solenoid coil (11) | (1) | Remove pulling elbow (1), locknut (2), nipple (3), locknut (4), pulling elbow (5) and locknut (6). |
| | (2) | Remove retaining cap (7), nameplate (8), housing (9) and locknut (10). |

3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

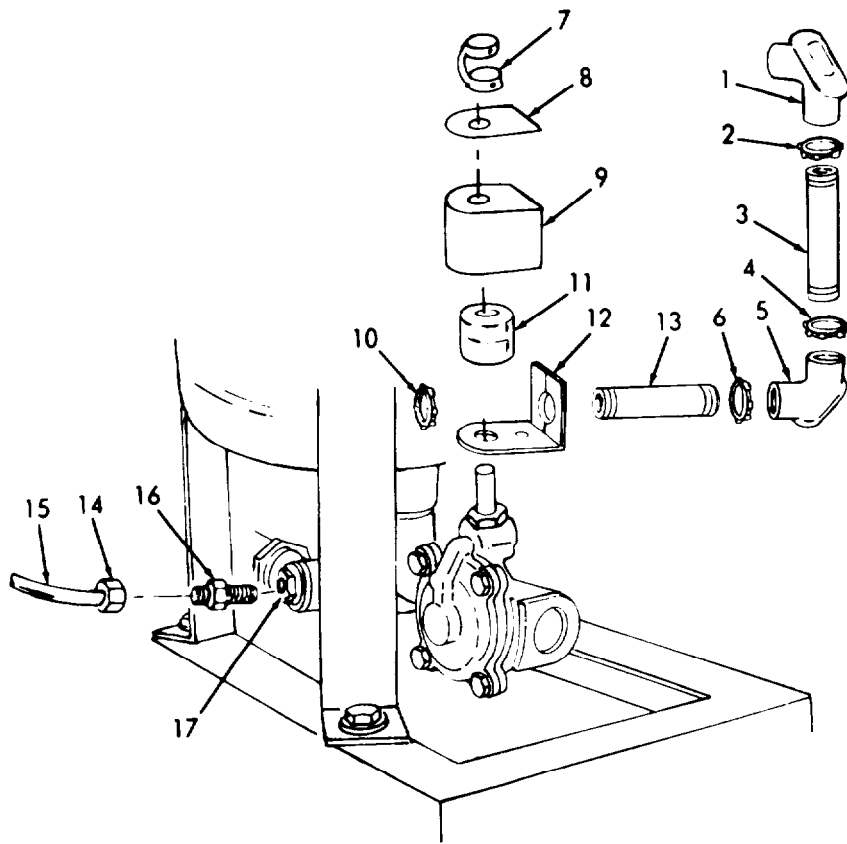
LOCATION	ITEM	ACTION	REMARKS
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(3) Pull straight out on solenoid coil (11) to remove.

(4) Remove baseplate (12) and nipple (13).

d. Air line (1) Unscrew female connector (14) freeing air line (15).

(2) Remove male connector (16) from bushing (17).



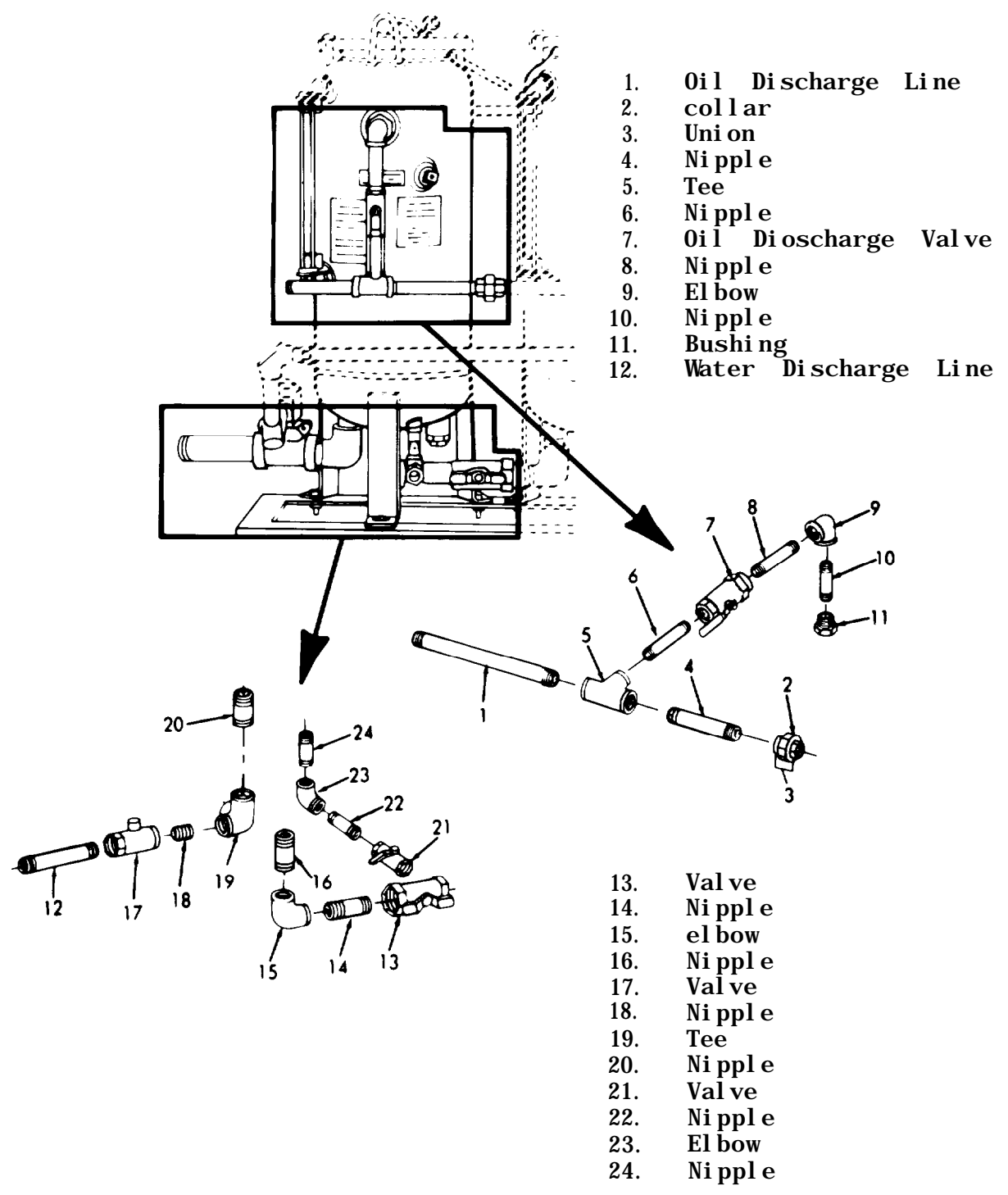
- 1. Pulling Elbow
- 2. Locknut
- 3. Nipple
- 4. Locknut
- 5. Pulling Elbow
- 6. Locknut
- 7. Retaining Cap
- 8. Nameplate
- 9. Housing
- 10. Locknut
- 11. Solenoid Coil
- 12. Baseplate
- 13. Nipple
- 14. Female Connector
- 15. Air Line
- 16. Male Connector
- 17. Bushing

3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
3.	3rd stage piping	<ul style="list-style-type: none"> a. Remove oil discharge line (1). b. Unscrew collar (2) from union (3). c. Remove nipple (4), tee (5), nipple (6), oil discharge valve (7), nipple (8), elbow (9), nipple (10) and bushing (11). d. Remove water discharge line (12). e. Remove valve (13), nipple (14), elbow (15) and nipple (16). f. Remove valve (17), nipple (18), tee (19) and nipple (20). g. Remove valve (21), nipple (22), elbow (23) and nipple (24). 	

3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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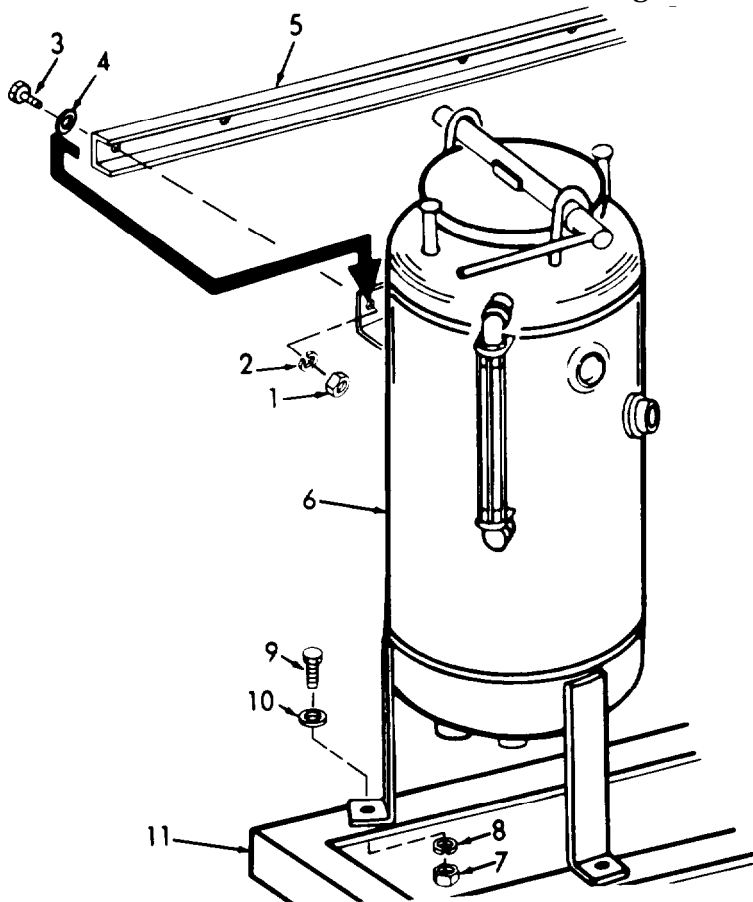
3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
4. Support angle and separator mounting hardware	a. Support angle	(1) Remove nuts (1), washers (2), screws (3), and washers (4) from support angle (5). (2) Remove support angle (5).	

NOTE

Attach a suitable sling to the separator and using a suitable hoist, lift separator from mounting frame (11) and set on a flat surface. Detach hoist and sling.

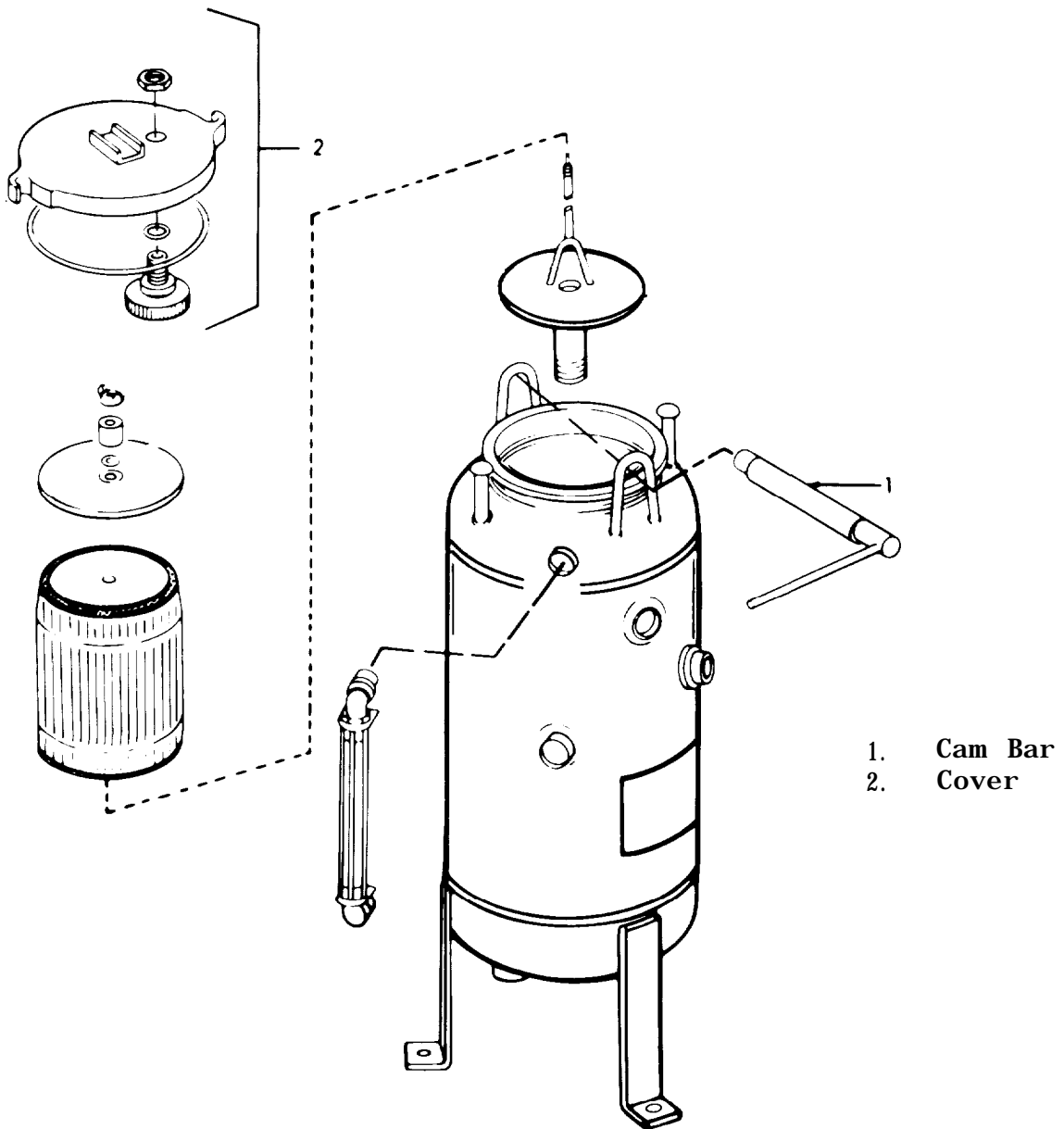
b. Separator mounting hardware	(1) Remove nuts (7), washers (8), bolts (9) and washers (10) securing separator (6).
	(2) Lift separator (6) from mounting frame (11).



- 1. Nuts
- 2. Washers
- 3. Screws
- 4. Washers
- 5. Support Angle
- 6. Separator
- 7. Nut
- 8. Washer
- 9. Bolt
- 10. Washer
- 11. Mounting Frame

3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
5. Separator sub-assembly disassembly	a. Cam bar (1)	Turn handle approximately 45° clockwise to relieve tension. Slide cam bar from cover (2).	
	b. Cover (2)	Remove.	



3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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CAUTION

Turn cover over so that float guard faces upward.

- | | | | |
|----|-----------------------|------------------|--------------------|
| c. | Wing nut
(3) | Remove.
3-38. | Refer to paragraph |
| d. | "0" ring retainer (4) | Remove.
3-38. | Refer to paragraph |
| e. | "0" ring (5) | Remove.
3-38. | Refer to paragraph |
| f. | Hold-down plate (6) | Remove.
3-38. | Refer to paragraph |

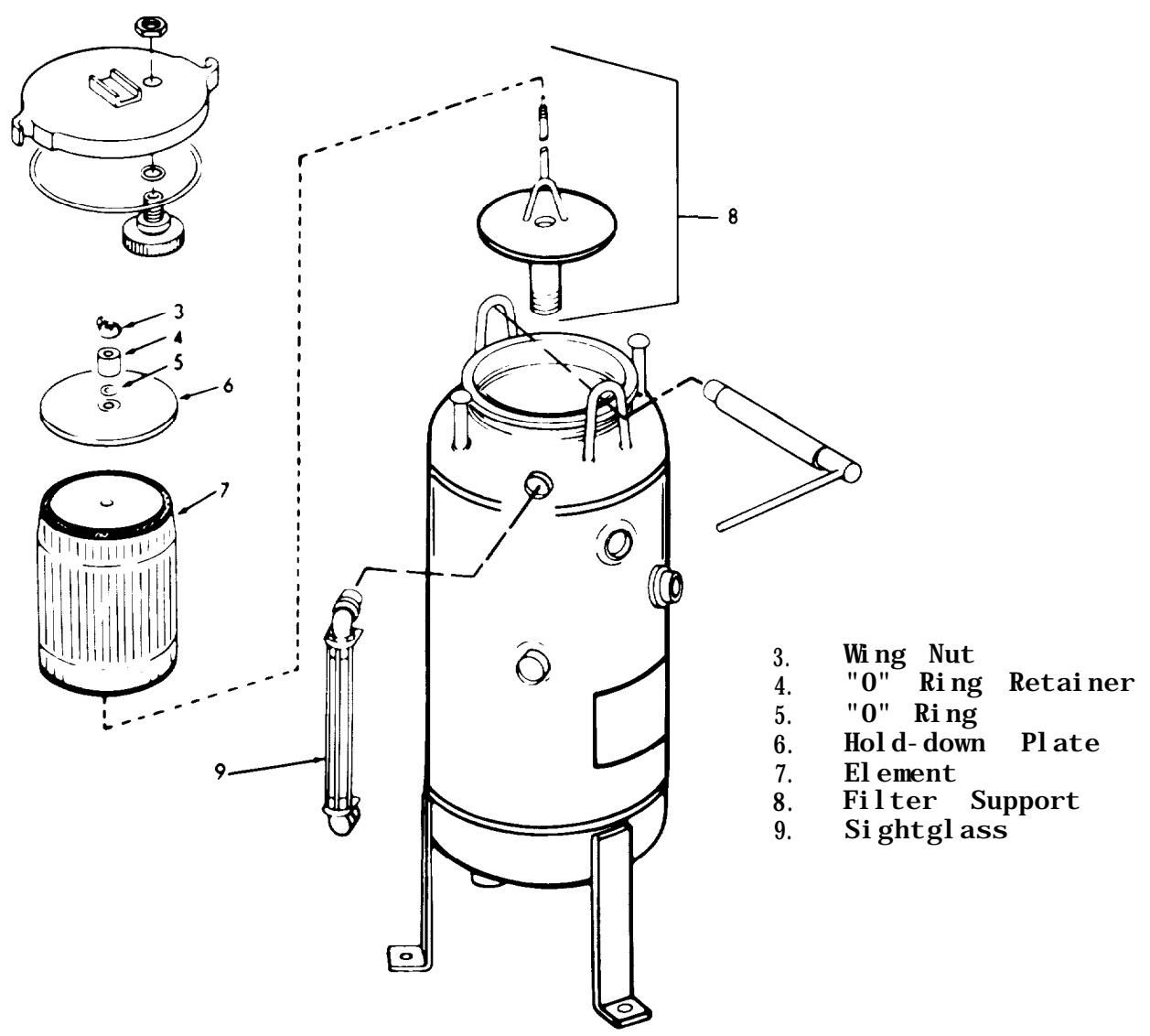
WARNING

Filter elements are subject to contamination by human hand.

- | | | | |
|----|--------------------------|------------------|--------------------|
| g. | Element (7) | Remove.
3-38. | Refer to paragraph |
| h. | Filter support (8) | Remove.
3-39. | Refer to paragraph |
| i. | Sight-glass assembly (9) | Remove.
3-40. | Refer to paragraph |

3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Service

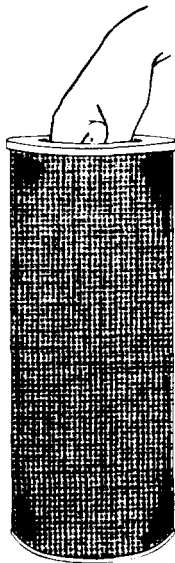
6.	Sightglass	Clean using a lint free cloth, detergent and warm water. Dry thoroughly.
7.	Separator interior	Flush thoroughly with clean water.
8.	Air eliminator valve	Clean using a lint free cloth and a mild detergent and water. Dry thoroughly.

3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
Repair			
		Replace a damaged or defective separator with a serviceable-like item.	
Installation			
	Sightglass (9)	Install. Refer to paragraph 3-40.	
10.	Filter support (8)	Install. Refer to paragraph 3-39.	
11.	Filter element (7)	a. Handle the filter elements (7) only by the end caps. When installing an element, insert hand through the opening in the end cap.	

CAUTION

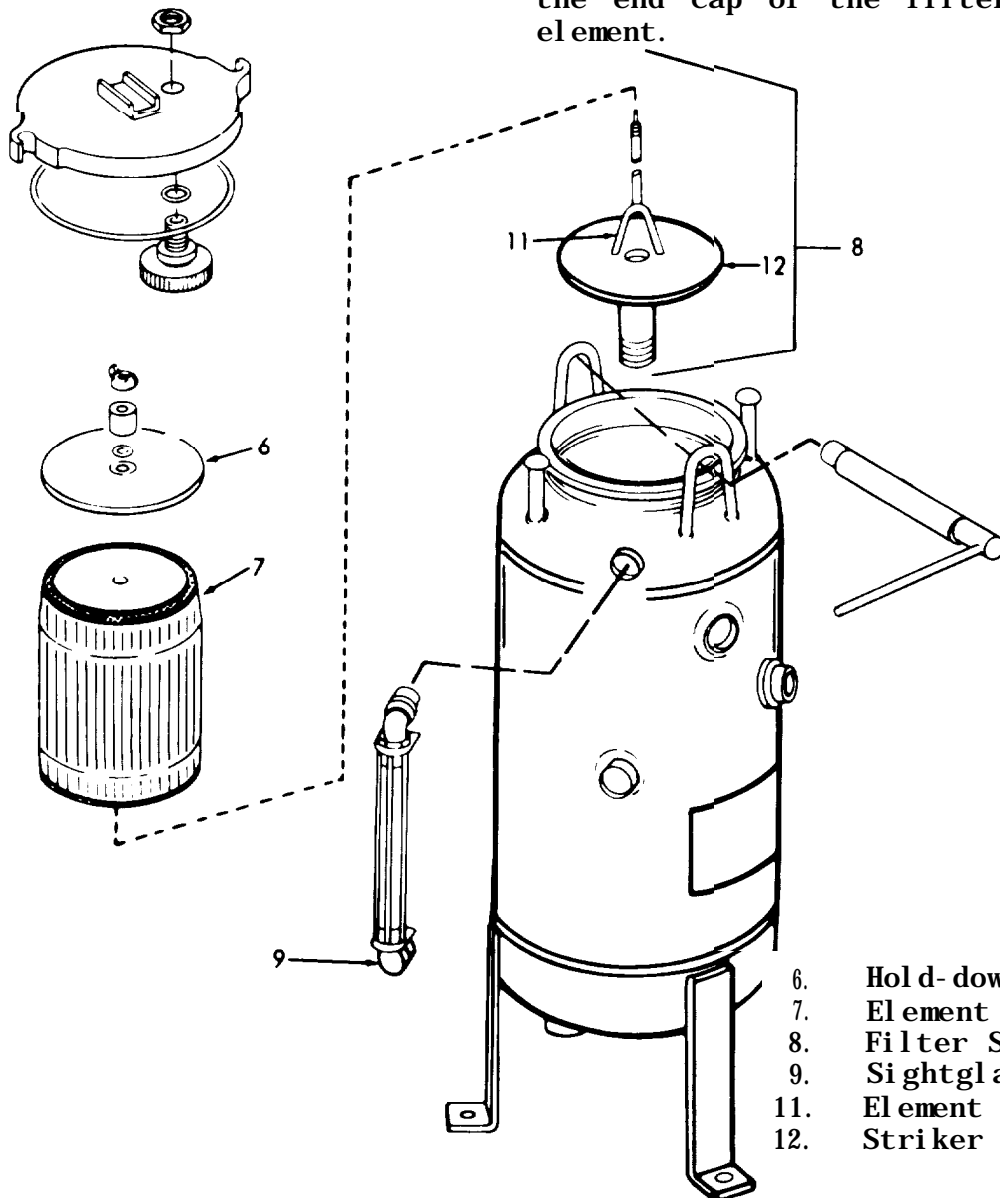
It is important that the filter element be handled properly. DO NOT touch or handle the sock area (side covering) of the elements. Contamination of this surface by skin oils may prevent the coalescer element from functioning properly and cause foaming of the effluent.



3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- b. Place a filter element (7), over the threaded element stand (8). Position the element so that it is centered over the element positioning guide (11) attached to the striker plate (12).
- c. Replace and center the hold-down plate (6) over the end cap of the filter element.



- 6. Hold-down Plate
- 7. Element
- 8. Filter Support
- 9. Sightglass
- 11. Element Positioning Guide
- 12. Striker Plate

3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- d. Place 0-ring (5), 0-ring retainer (4), and wing nut (3) on the element stand.

CAUTION

DO NOT use a wrench to tighten the wing nut, or the filter element may be damaged.

- e. Tighten the wing nut (3) as tightly as possible by hand.

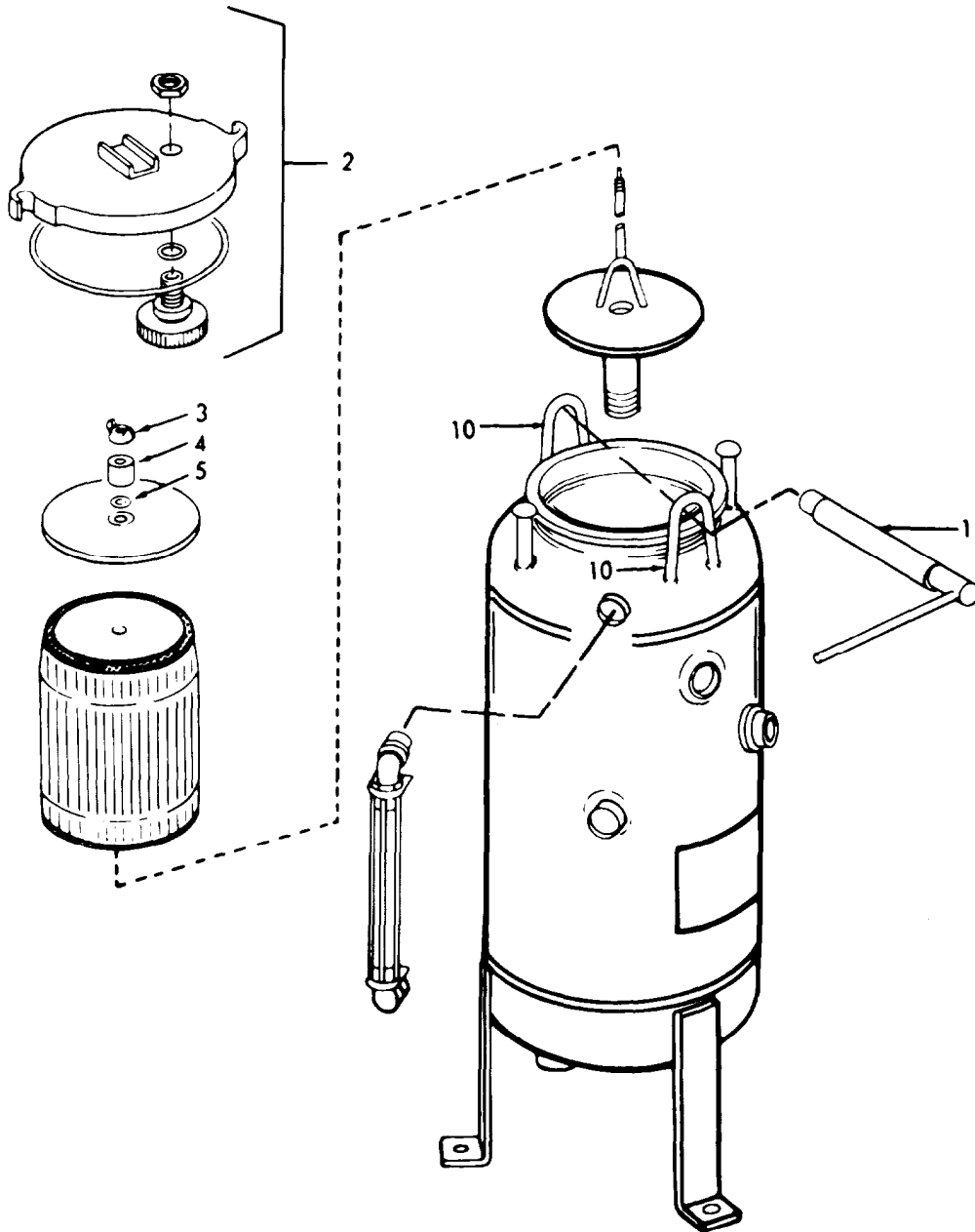
- | | | |
|-----|-------|--|
| 12. | Cover | <ul style="list-style-type: none"> a. Replace the cover (2) on the stage being serviced. b. Slide the cam bar (1) thru cam latches (10) to secure the cover. |
|-----|-------|--|

NOTE

Attach a suitable sling to the 3rd stage separator and using a suitable hoist, position the separator in place on the mounting frame.

3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

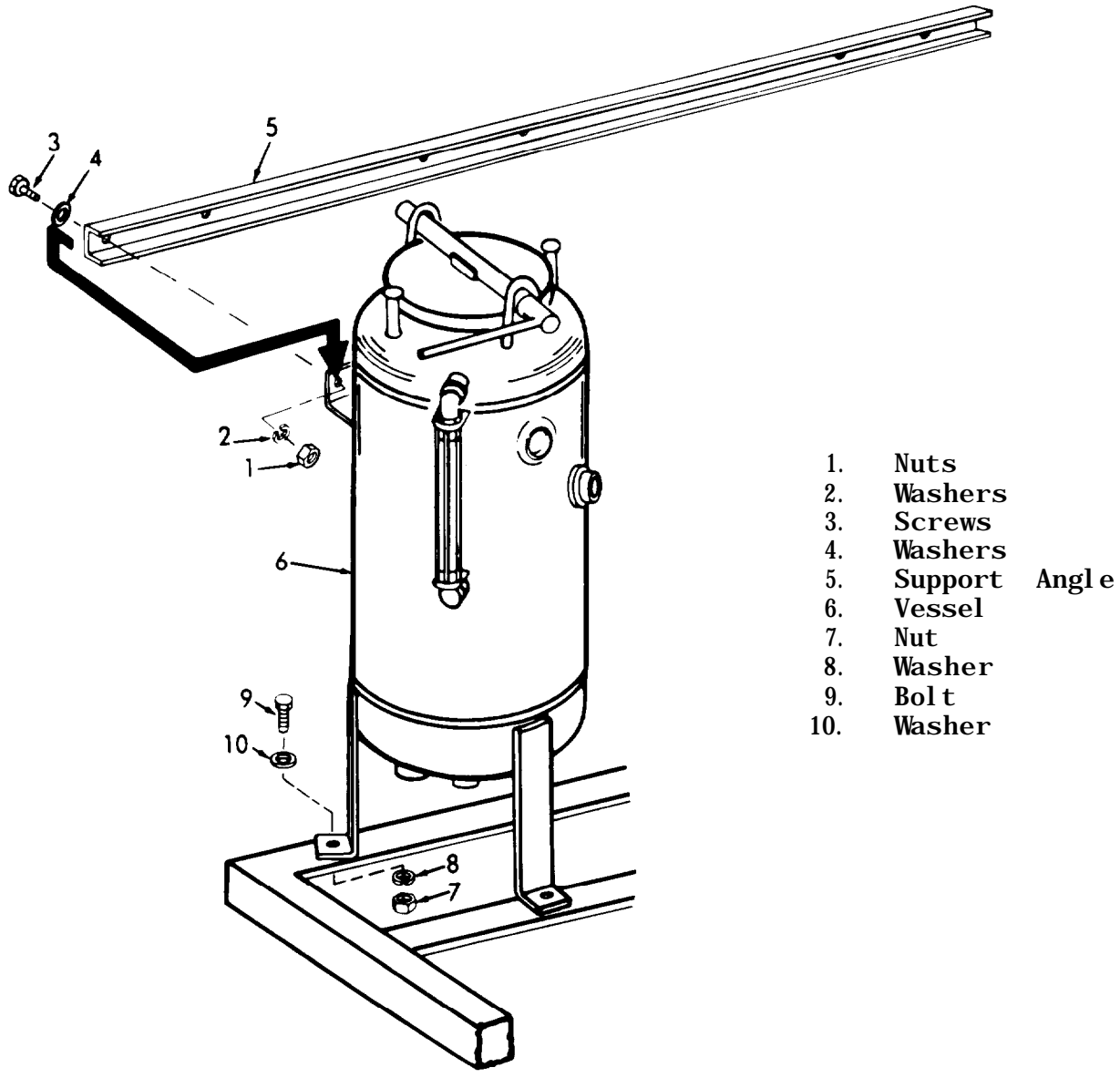
LOCATION	ITEM	ACTION	REMARKS
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- 1. Cam Bar
- 2. Cover
- 3. Wing Nut
- 4. "O" Ring Retainer
- 5. "O" Ring
- 10. Cam Latches

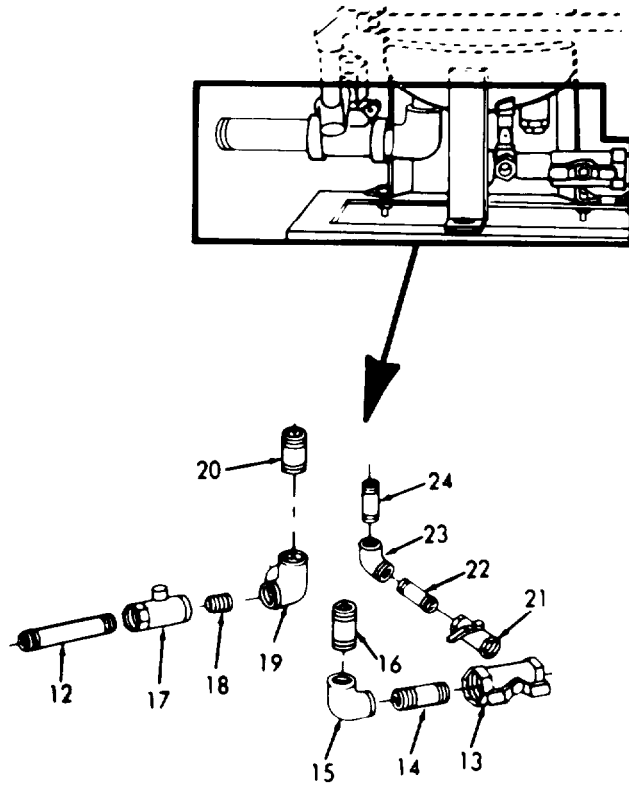
3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
13. Support angle and 3rd stage mounting hardware	a. Separator mounting hardware	Install flatwashers (10), screws (9), lockwashers (8) and nuts (7).	
	b. Support angle (5)	Secure to vessel (6) with flatwashers (4), screws (3), lockwashers (2) and nuts (1).	



3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
14.	Separator piping	<p>a. Install nipple (24), elbow (23), nipple (22) and valve (21).</p> <p>b. Install nipple (20), tee (19), nipple (18) and valve (17).</p> <p>c. Install nipple (16), elbow (15), nipple (14), valve (13) and water discharge line (12).</p>	

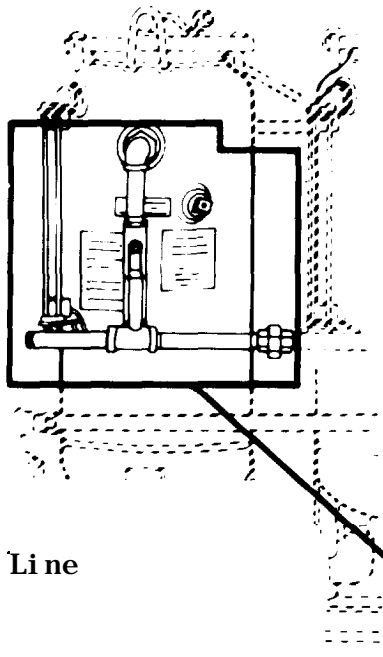


- | | | | |
|-----|----------------------|-----|--------|
| 12. | Water Discharge Line | 19. | Tee |
| 13. | Valve | 20. | Nipple |
| 14. | Nipple | 21. | Valve |
| 15. | Elbow | 22. | Nipple |
| 16. | Nipple | 23. | Elbow |
| 17. | Valve | 24. | Nipple |
| 18. | Nipple | | |

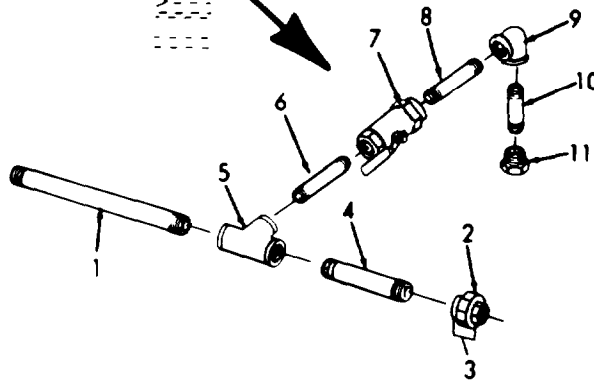
3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- d. Install bushing (11), nipple (10), elbow (9), nipple (8), valve (7), nipple (6), tee (5) and nipple (4).
- e. Secure to union (3) by tightening collar (2).
- f. Install oil discharge line (1).



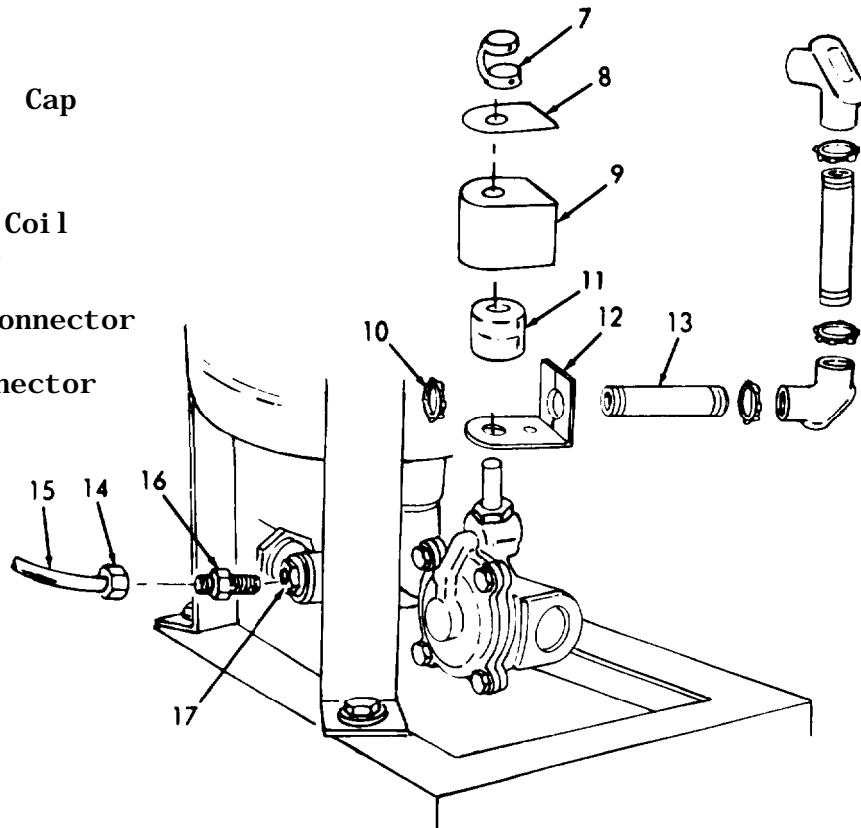
- 1. Oil Discharge Line
- 2. Collar
- 3. Union
- 4. Nipple
- 5. Tee
- 6. Nipple
- 7. Oil Discharge Valve
- 8. Nipple
- 9. Elbow
- 10. Nipple
- 11. Bushing



3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
15.	Air line and electrical connectors	<p>a. Install male connector (16), in bushing (17).</p> <p>b. Connect air line (15) by tightening female connector (14) to male connector (16).</p> <p>c. Position baseplate (12) in place on solenoid valve and install solenoid coil (11) on valve stem.</p> <p>d. Insert nipple (13) into baseplate (12) and secure with locknut (10).</p> <p>e. Install housing (9) and nameplate (8) over baseplate and secure with retaining cap (7).</p>	

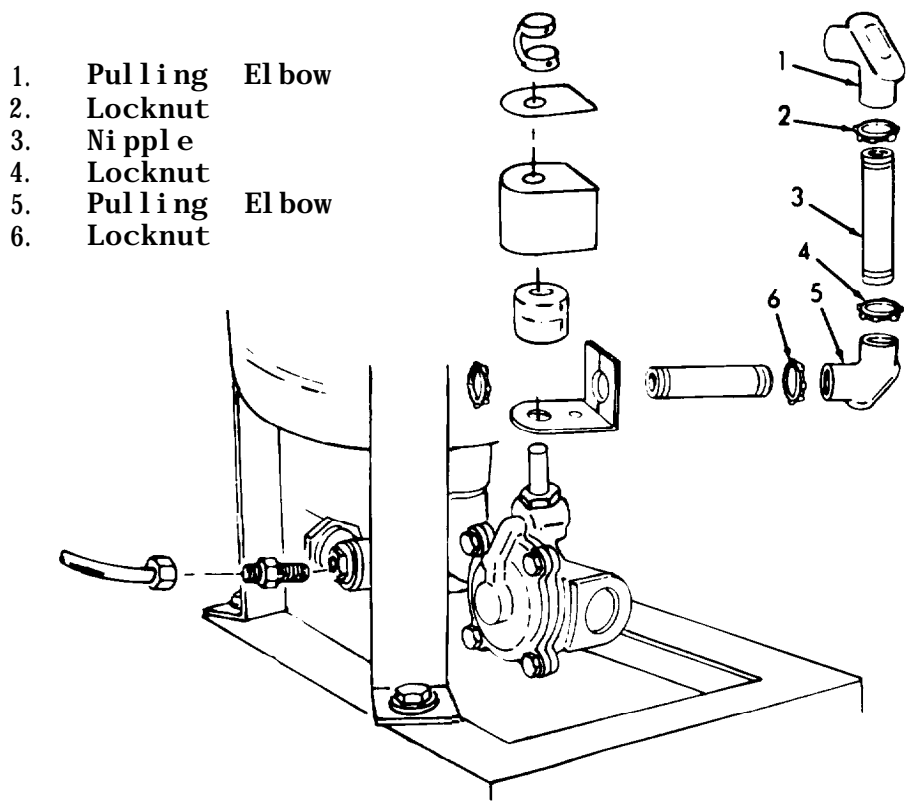
- 7. Retaining Cap
- 8. Nameplate
- 9. Housing
- 10. Locknut
- 11. Solenoid Coil
- 12. Baseplate
- 13. Nipple
- 14. Female Connector
- 15. Air Line
- 16. Male Connector
- 17. Bushing



3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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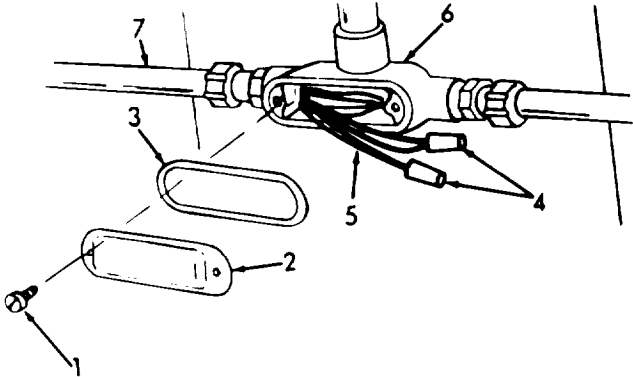
f. Install locknut (6), elbow (5), locknut (4), nipple (3), locknut (2) and elbow (1).



- g. Install conduit (7) to tee (6).
- h. Thread wiring from solenoid coil to tee and reconnect leads (5) using connectors (4).
- i. Position gasket (3) in place on tee (6) and install cover (2) using screws (1).

3-44. 3RD STAGE SEPARATOR, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
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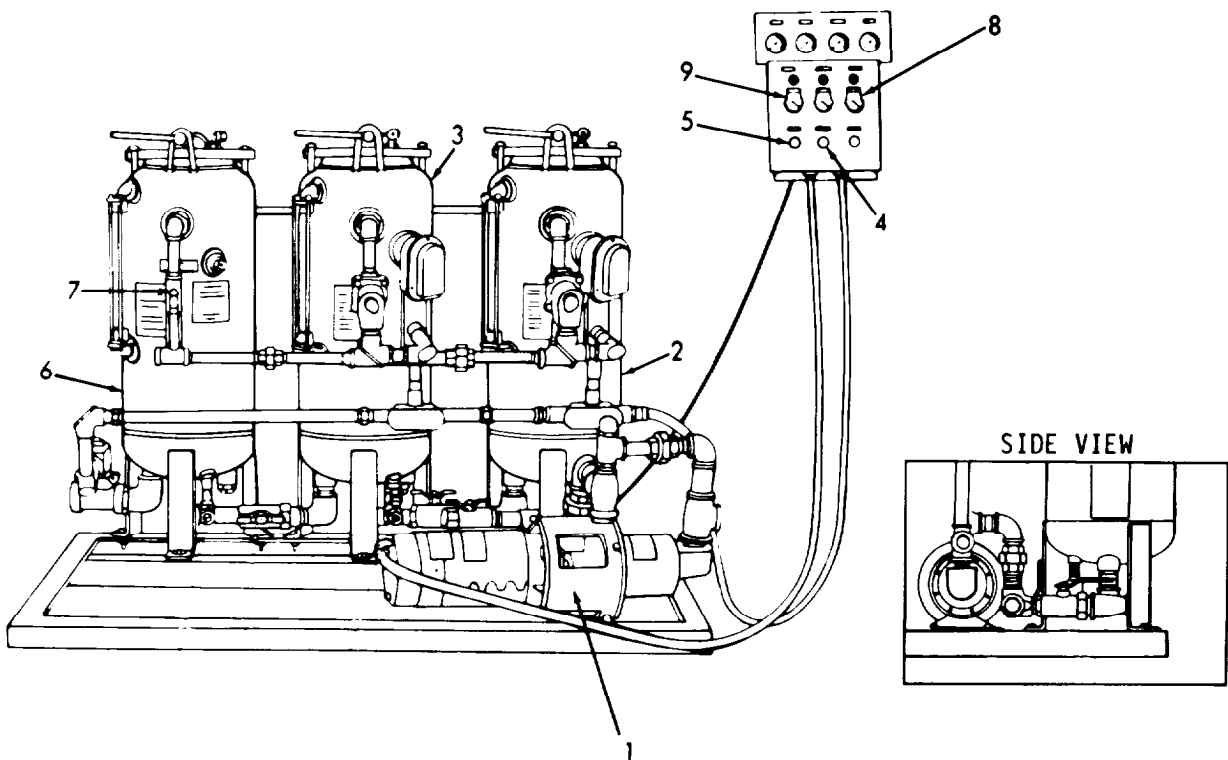
- 1. Screws
- 2. Tee Cover
- 3. Gasket
- 4. Connectors
- 5. Leads
- 6. Tee
- 7. Conduit

16. Restart system Refer to paragraph 2-4.

3-45. WATER SAMPLE/DRAIN VALVES, MANUAL, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
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- | | | | |
|--|--|---|--|
| | | b. Stop the supply pump (1) by turning the supply pump selector switch (8) OFF. | |
| | | c. Turn the auto controls selector switch (9) OFF. | |



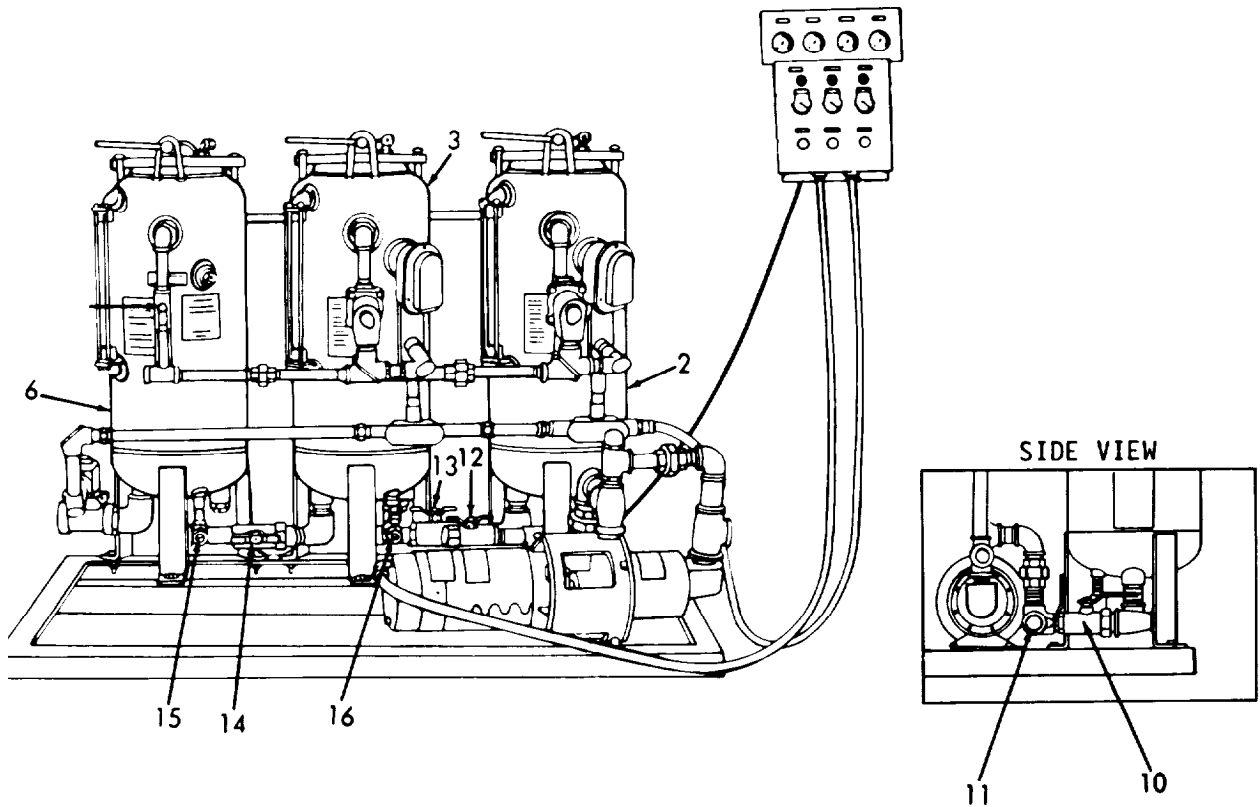
1. Pump
2. First (Prefilter) Stage
3. Second Stage
4. Oil Dump Light/Button
5. Oil Dump Light/Button
6. Third Stage
7. Manual Oil Discharge Valve
8. Supply Pump Selector Switch
9. Auto Controls Selector Switch

3-45. WATER SAMPLE/DRAIN VALVES, MANUAL, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
		d. To drain water from the first stage (prefilter) (2): (1) Close the two manual shut-off valves (10 and 11) located on the main flow line at the inlet of the first stage (prefilter) (2) and between the first (prefilter) and second stages. (2) Open the drain valve (12) at the base of the vessel.	
		e. To drain water from the second or third stages (3 or 6). (1) Close the two inter-vessel shutoff valves (13 and 14) on either side of the second stage (3) or the intervessel shutoff valve (14) for drainage of the third stage (6). (2) Open the drain valve (15 or 16) at the base of the vessel.	
2.	Drain valve 2nd and 3rd stage	a. Remove drain valve (16) from 2nd stage. b. Remove drain valve (15) from 3rd stage.	
3.	Drain valve 1st stage (pre-filter)	Remove drain valve (12).	

3-45. WATER SAMPLE/DRAIN VALVES, MANUAL, TYPE A AND B SEPARATORS
(Continued).

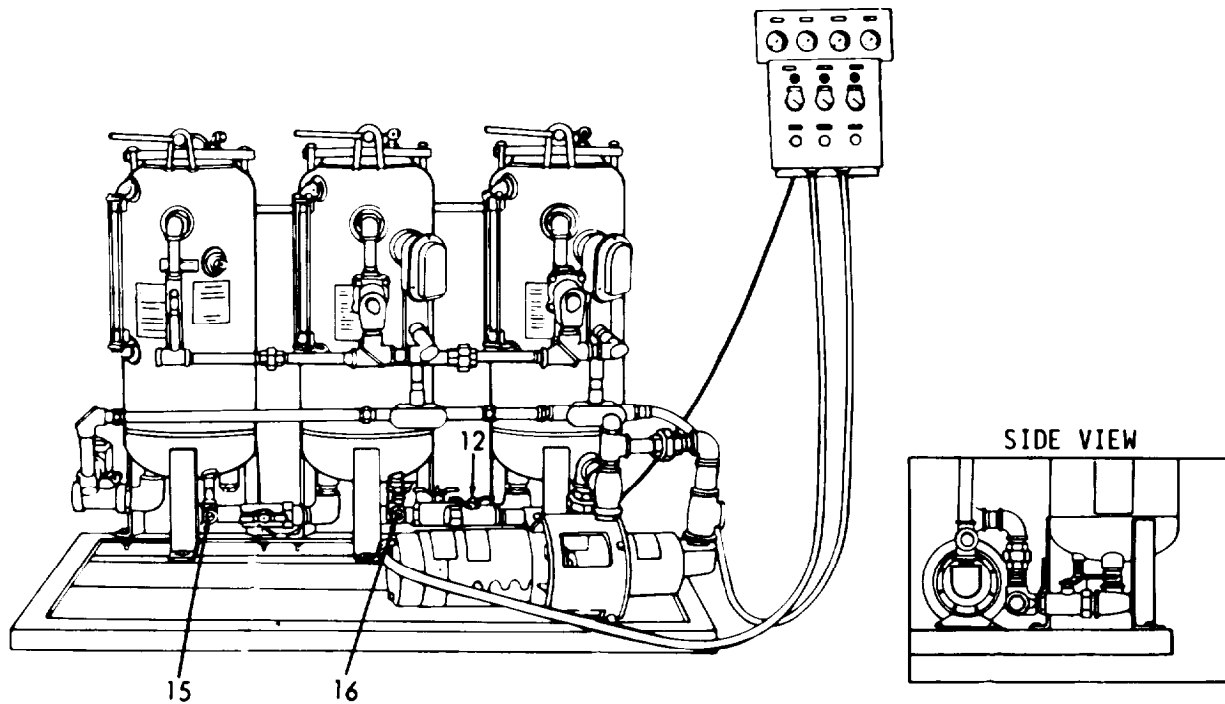
LOCATION ITEM ACTION REMARKS



- 2. First (Prefilter) Stage
- 3. Second Stage
- 6. Third Stage
- 10. Manual Shutoff Valve
- 11. Manual Shutoff Valve
- 12. Drain Valve
- 13. Intervessel Shutoff Valve
- 14. Intervessel Shutoff Valve
- 15. Drain Valve
- 16. Drain Valve

3-45. WATER SAMPLE/DRAIN VALVES, MANUAL, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
Replacement		Replace a defective water sample/drain valve with a serviceable-like item.	
Installation			
4.	1st stage (pre-filter) drain valve	Install valve (12).	
5.	2nd and 3rd stage drain valves	a. Install 2nd stage valve (16). b. Install 3rd stage valve (15).	
6.	Restart system	Refer to paragraph 2-4.	



- 12. Drain Valve
- 15. Drain Valve
- 16. Drain Valve

3-46. DISCHARGE VALVE, SOLENOID OPERATED, TYPE A AND B SEPARATORS.

This task covers:

- | | |
|----------------|-----------------|
| a. Removal | d. Replacement |
| b. Disassembly | e. Reassembly |
| c. Repair | f. Installation |

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics
Torque wrench

<u>Material/Parts</u>	<u>Equipment Condition</u>
Discharge valve, solenoid operated Parts kit, FV172-88 (04845)	

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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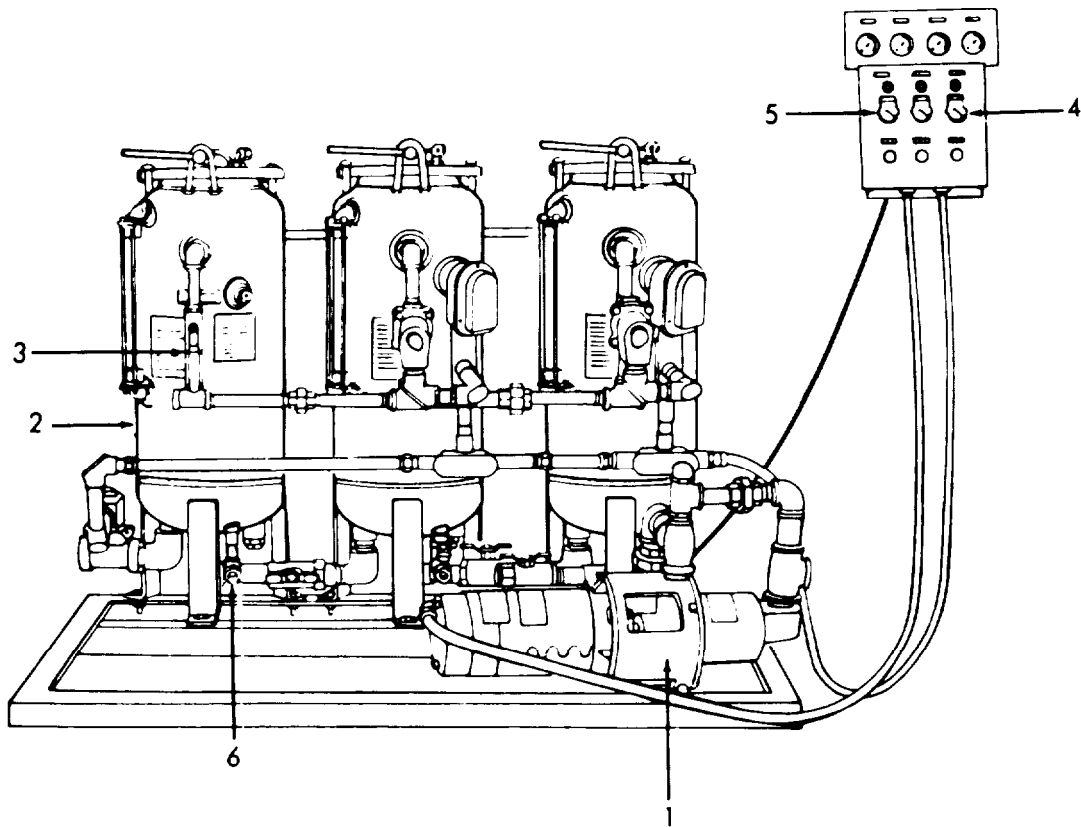
Removal

- | | | |
|----|-----------------|--|
| 1. | Draining system | <ul style="list-style-type: none"> a. With the pump (1), running and control power on, discharge as much oil as possible from the 3rd stage separator according to the following: <ul style="list-style-type: none"> b. To discharge oil from the third stage (2), open the manual oil discharge valve (3) until all oil has been discharged. c. Stop the supply pump (1) by turning the supply pump selector switch (4) to OFF. d. Turn the auto controls selector switch (5) OFF. |
|----|-----------------|--|

3-46. DISCHARGE VALVE, SOLENOID OPERATED, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
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e. To drain water from the third stage, open the drain valve (6) at base of separator.



- 1. Pump
- 2. Third Stage
- 3. Manual Oil Discharge Valve
- 4. Supply Pump Selector Switch
- 5. Auto Controls Selector Switch
- 6. Drain Valve

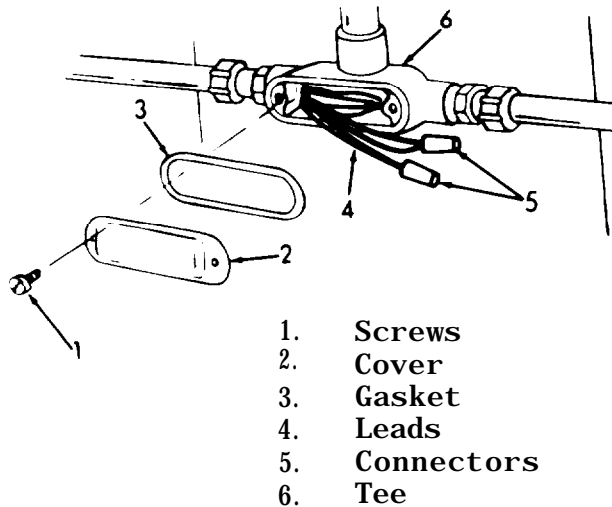
3-46. DISCHARGE VALVE, SOLENOID OPERATED, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
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WARNING

Electrical shock or serious injury may result if electrical power is not shut off before continuing maintenance on the 3rd stage separator.

- | | | |
|----|------------------------|---|
| 2. | Electrical connections | <ul style="list-style-type: none"> a. Remove screws (1), cover (2) and gasket (3) from tee (6). b. Tag and disconnect leads (4) by removing connectors (5). |
|----|------------------------|---|



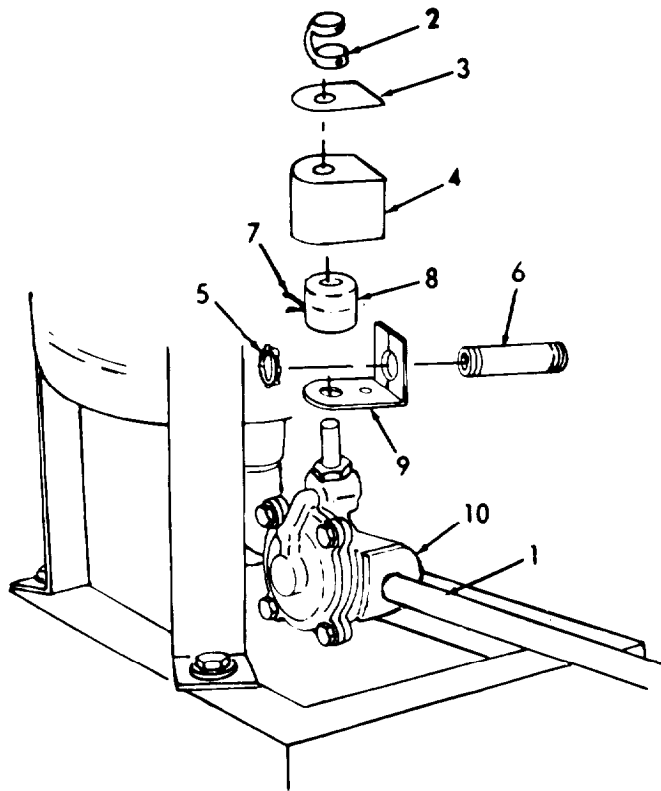
- | | | |
|----|-----------------------|---|
| 3. | Water discharge valve | <ul style="list-style-type: none"> a. Remove water discharge line (1). b. Remove retaining cap (2), nameplate (3) and housing (4). c. Remove locknut (5) and nipple (6). |
|----|-----------------------|---|

**3-46. DISCHARGE VALVE, SOLENOID OPERATED, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
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d. Pull coil leads (7) thru connectors and remove coil (8) and baseplate (9).

e. Remove valve (10).



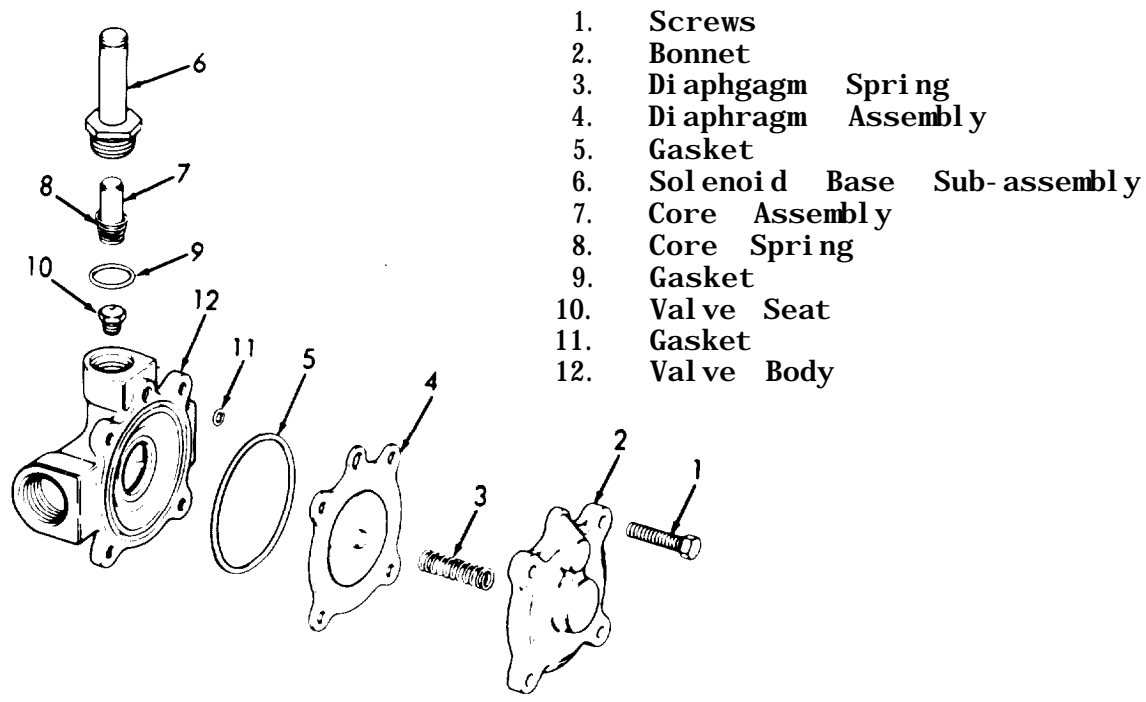
- 1. Water Discharge Line
- 2. Retaining Cap
- 3. Nameplate
- 4. Housing
- 5. Locknut
- 6. Nipple
- 7. Leads
- 8. Coil
- 9. Baseplate
- 10. Valve

3-46. DISCHARGE VALVE, SOLENOID OPERATED, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
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Disassembly

4. Water discharge valve solenoid
- a. Remove screws (1), bonnet (2), diaphragm spring (3), diaphragm assembly (4) and body gasket (5) from valve body (12).
 - b. Remove solenoid base sub-assembly (6).
 - c. Remove core assembly (7). Remove core spring (8) from core.
 - d. Remove bonnet gasket (9).
 - e. Remove valve seat (10).
 - f. Remove body passage gasket (11) from valve body.



- 1. Screws
- 2. Bonnet
- 3. Diaphragm Spring
- 4. Diaphragm Assembly
- 5. Gasket
- 6. Solenoid Base Sub-assembly
- 7. Core Assembly
- 8. Core Spring
- 9. Gasket
- 10. Valve Seat
- 11. Gasket
- 12. Valve Body

3-46. DISCHARGE VALVE, SOLENOID OPERATED, TYPE A AND B SEPARATOR
(Continued).

LOCATION	ITEM	ACTION	REMARKS
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Repair or Replacement

If repair cannot be accomplished with parts contained in parts kit FV 172-88 (04845), replace valve assembly with a serviceable-like item.

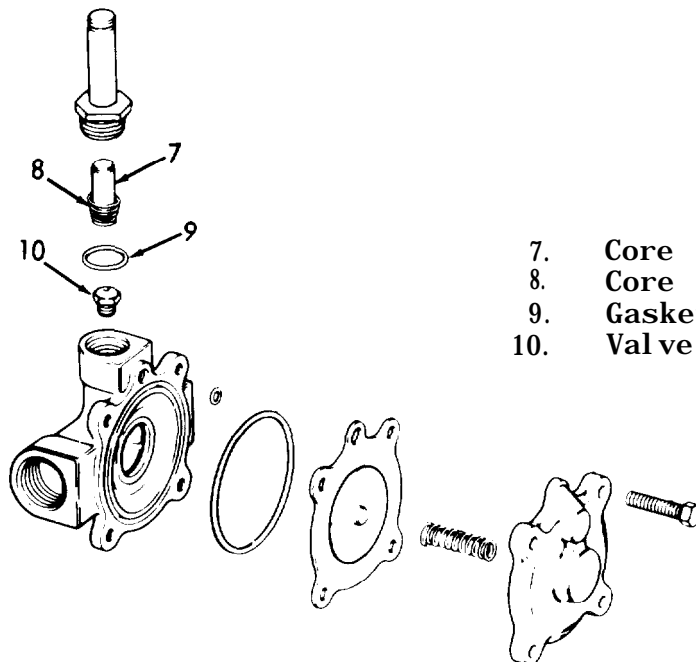
Reassembly

5. Water discharge valve solenoid

- a. Install valve seat (10) in body.
- b. Position bonnet gasket (9) in place on valve body.
- c. Install core spring (8) in core assembly (7), then install core assembly.

Torque valve seat to 65+10 inch pounds² (11609+1786 gm cm).²

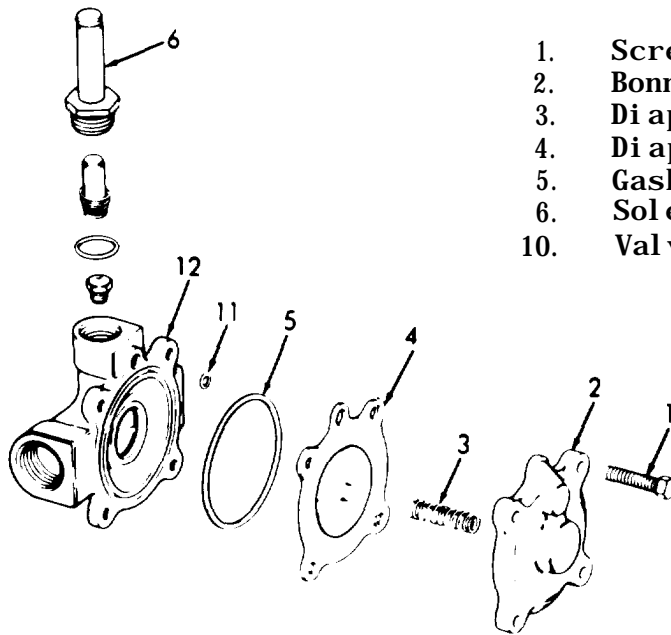
Be sure core spring is inserted into core assembly with wide end in first. Closed end protrudes from top of core assembly.



- 7. Core Assembly
- 8. Core Spring
- 9. Gasket
- 10. Valve Seat

3-46. DISCHARGE VALVE, SOLENOID OPERATED, TYPE A AND B SEPARATORS
(Continued).

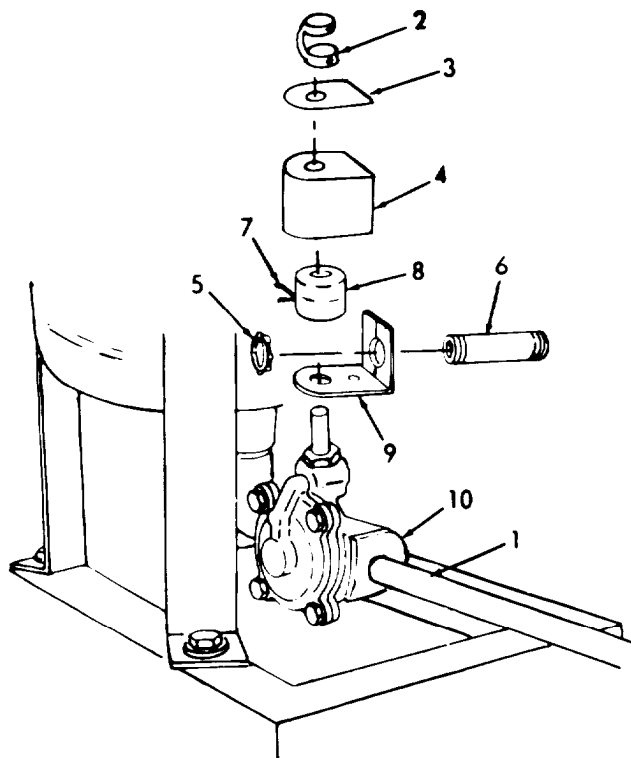
LOCATION	ITEM	ACTION	REMARKS
		d. Install solenoid base sub-assembly (6).	Torque to 175 ± 25 inch pounds- (31255 ± 4465 gm cm).
		e. Insert body passage gasket (11) into valve body (12).	
		f. Install body gasket (5), diaphragm (4) and spring (3).	Position bleed hole in diaphragm assembly approximately 45° from outlet.
		g. Install bonnet (2) using screws (1).	Torque bonnet screws to 144 ± 15 inch pounds (25718.4 ± 2679 gm cm) in a criss-cross manner.



- 1. Screws
- 2. Bonnet
- 3. Diaphragm Spring
- 4. Diaphragm Assembly
- 5. Gasket
- 6. Solenoid Base Sub-assembly
- 10. Valve Seat

3-46. DISCHARGE VALVE, SOLENOID OPERATED, TYPE A AND B SEPARATORS
(Continued).

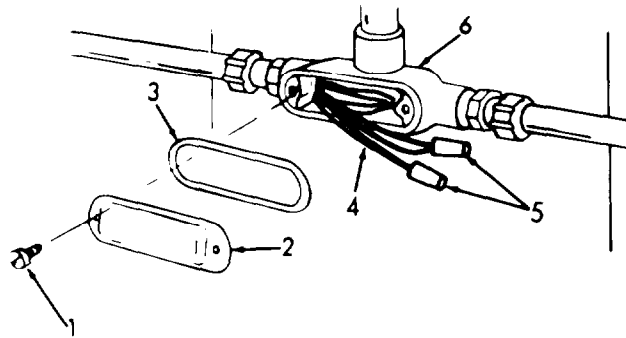
LOCATION	ITEM	ACTION	REMARKS
6.	Water discharge valve solenoid	<p>a. Install valve (10).</p> <p>b. Position baseplate (9) in place and thread coil leads (7) thru connectors.</p> <p>c. Insert coil (8) over valve subassembly.</p> <p>d. Insert nipple (6) into baseplate and install locknut (5).</p> <p>e. Install housing (4), nameplate (3) and retaining cap (2).</p> <p>f. Install discharge line (1).</p>	



1. Water Discharge Line
2. Retaining Cap
3. Nameplate
4. Housing
5. Locknut
6. Nipple
7. Leads
8. Coil
9. Baseplate
10. Valve

3-46. DISCHARGE VALVE, SOLENOID OPERATED, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
7.	Electrical connections	a. Reconnect leads (4) and secure with connectors (5). b. Position gasket (3) and cover (2) in place on tee (6). c. Secure with screws (1).	
8.	Restart system	Refer to paragraph 2-4.	



1. Screws
2. Cover
3. Gasket
4. Leads
5. Connectors
6. Tee

3-47. INLET VALVE, FLUID, MANUALLY OPERATED, TYPE A AND B SEPARATORS.

This task covers:

- a. Removal b. Replacement c. Installation

INITIAL SETUP

Test Equipment
None

Tools

Tool Kit, General Mechanics

Material/Parts

Inlet valve
Sealing compound
Appendix C. Item No. 6

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Removal

- | | | |
|----|------------------------------|--|
| 1. | Draining prefilter separator | <ul style="list-style-type: none"> a. With the pump (1) running and control power on, discharge as much oil as possible from the first stage (prefilter) separator according to the following: <ul style="list-style-type: none"> b. To discharge from the first stage (prefilter) (2) manually depress the oil dump light/button (3). c. Stop the supply pump (1) by turning the supply pump selector switch (4) OFF. d. Turn the auto controls selector switch (5) OFF. |
|----|------------------------------|--|

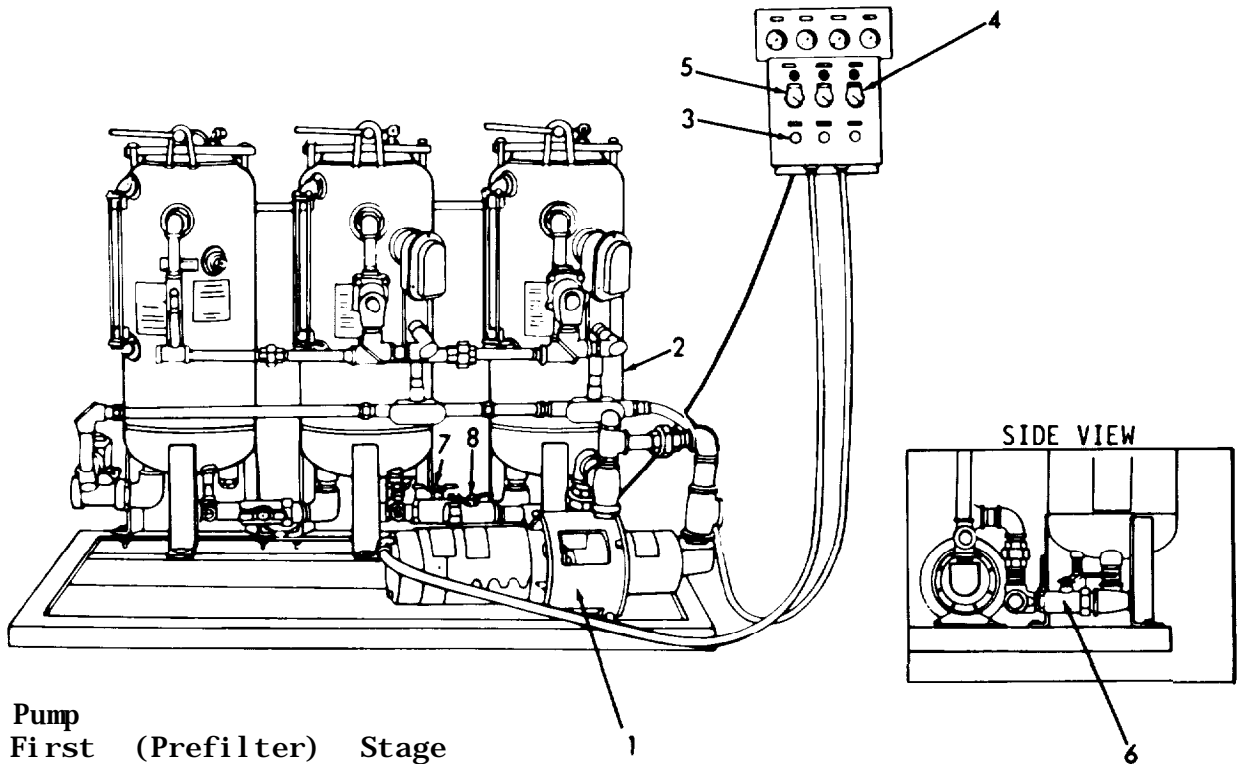
3-47. INLET VALVE, FLUID, MANUALLY OPERATED, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
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e. To drain water from the first stage (2):

(1) Close the two manual shutoff valves (6 and 7) located on the main flow line at the inlet to the first stage (prefilter) (2) and between the first (prefilter) and second stages.

(2) Open the drain valve (8) at the base of the vessel.

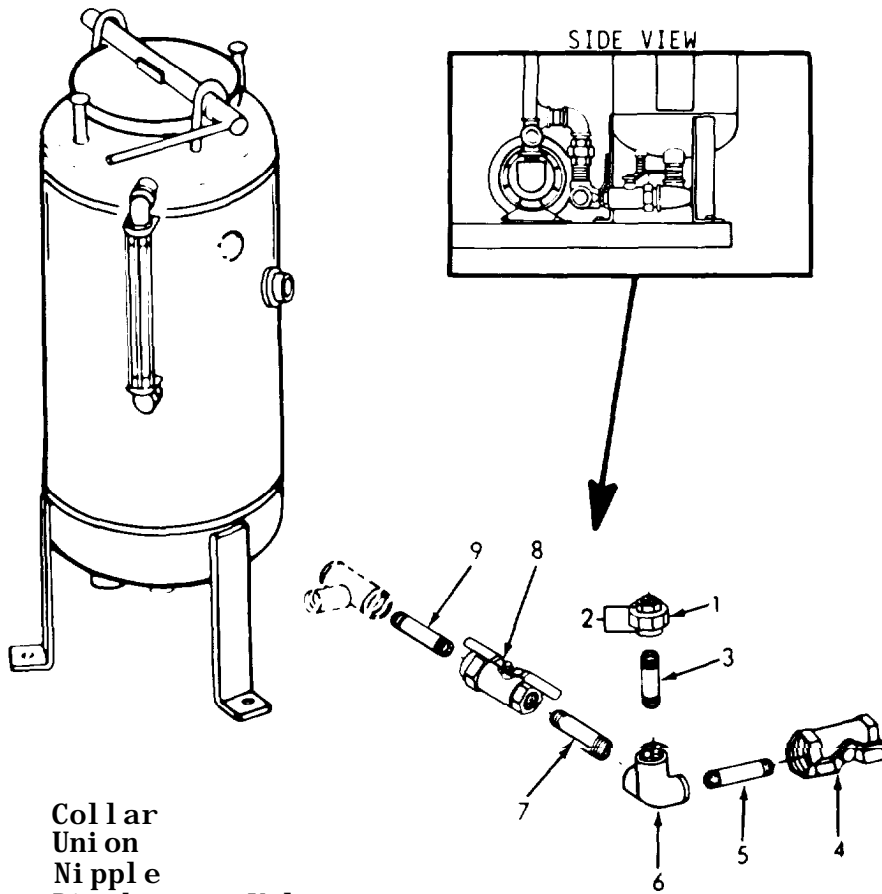


- 1. Pump
- 2. First (Prefilter) Stage
- 3. Oil Dump Light/Button
- 4. Supply Pump Selector Switch
- 5. Auto Controls Selector Switch
- 6. Manual Shutoff Valve
- 7. Manual Shutoff Valve
- 8. Drain Valve

3-47. INLET VALVE, FLUID, MANUALLY OPERATED, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
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- | | | | |
|----|------------------------|---|--|
| 2. | Piping and inlet valve | <ol style="list-style-type: none"> Unscrew collar (1) from union (2). Remove nipple (3). Remove pump discharge valve (4), nipple (5), tee (6) and nipple (7). Remove inlet valve (8) from nipple (9). | |
|----|------------------------|---|--|



- Collar
- Union
- Nipple
- Discharge Valve
- Nipple
- Tee
- Nipple
- Inlet Valve
- Nipple

3-47. INLET VALVE, FLUID, MANUALLY OPERATED, TYPE A AND B SEPARATORS
(Continued).

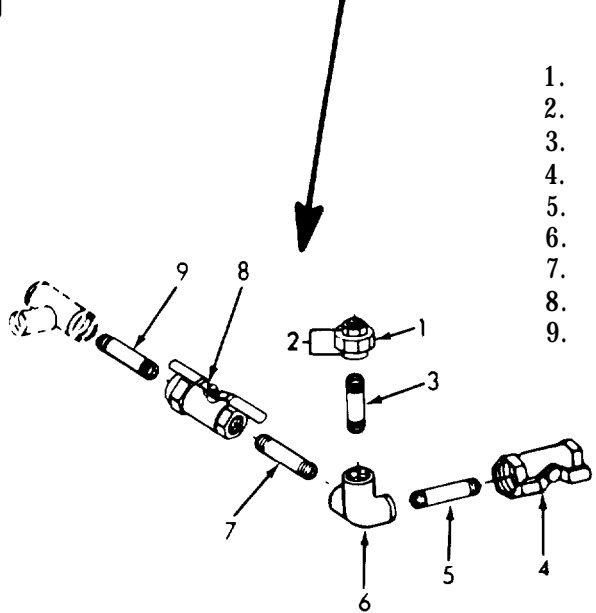
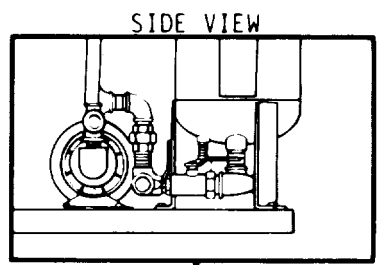
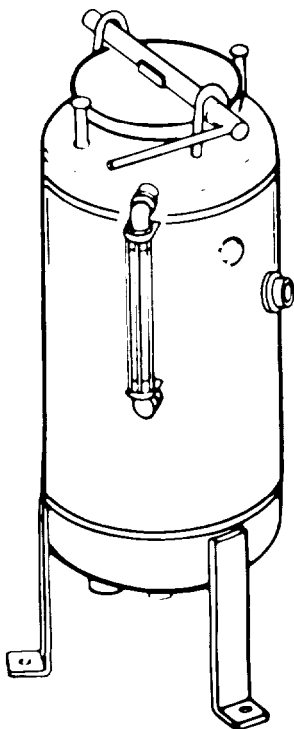
LOCATION	ITEM	ACTION	REMARKS
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Replacement

Replace a defective inlet valve with a serviceable-like item

Installation

- | | | |
|----|------------------------|---|
| 3. | Inlet valve and piping | <ul style="list-style-type: none"> a. Install inlet valve (8) onto nipple (9). b. Install nipple (7), tee (6), nipple (5), pump discharge valve (4) and nipple (3). c. Secure to union (2) by tightening collar (1). |
|----|------------------------|---|



- 1. Collar
- 2. Union
- 3. Nipple
- 4. Discharge Valve
- 5. Nipple
- 6. Tee
- 7. Nipple
- 8. Inlet Valve
- 9. Nipple

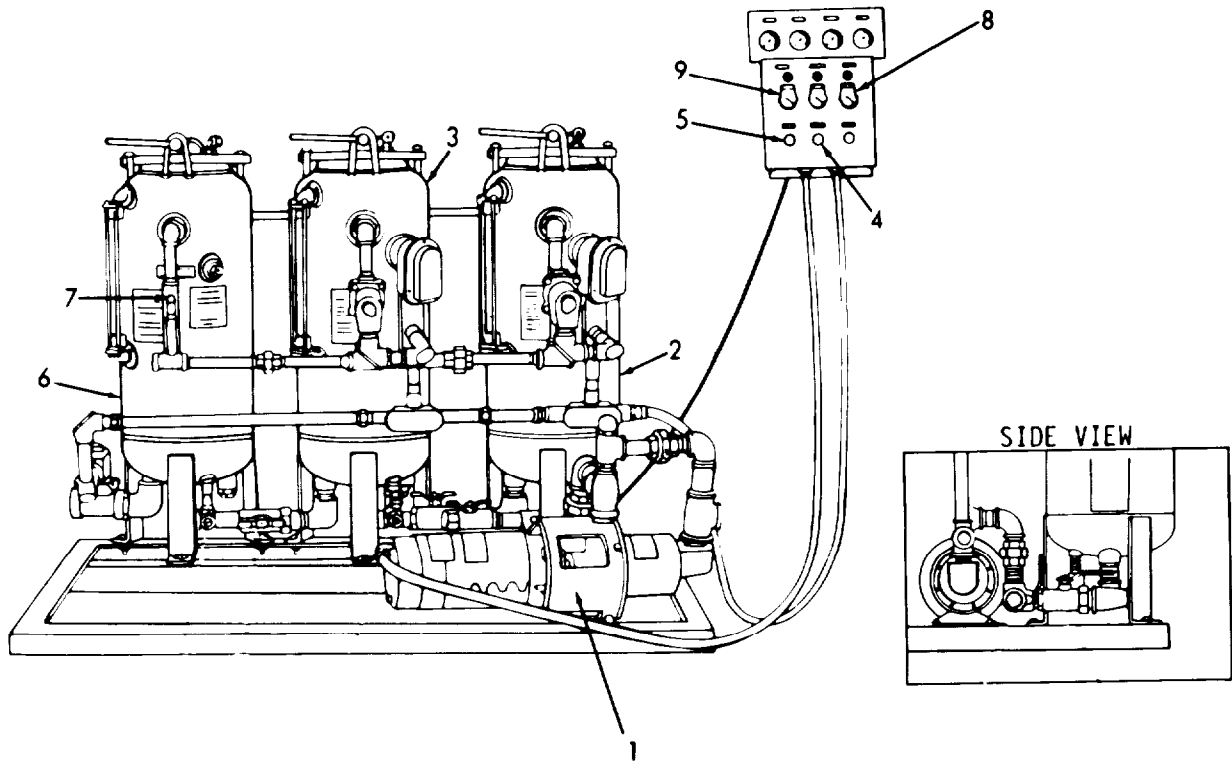
- | | | |
|----|----------------|-------------------------|
| 4. | Restart system | Refer to paragraph 2-4. |
|----|----------------|-------------------------|

3-48. INTERVESSEL SHUTOFF VALVES, MANUAL, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
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		b. Stop the supply pump (1) by turning the supply pump selector switch (8) OFF.	
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		c. Turn the auto controls selector switch (9) OFF.	
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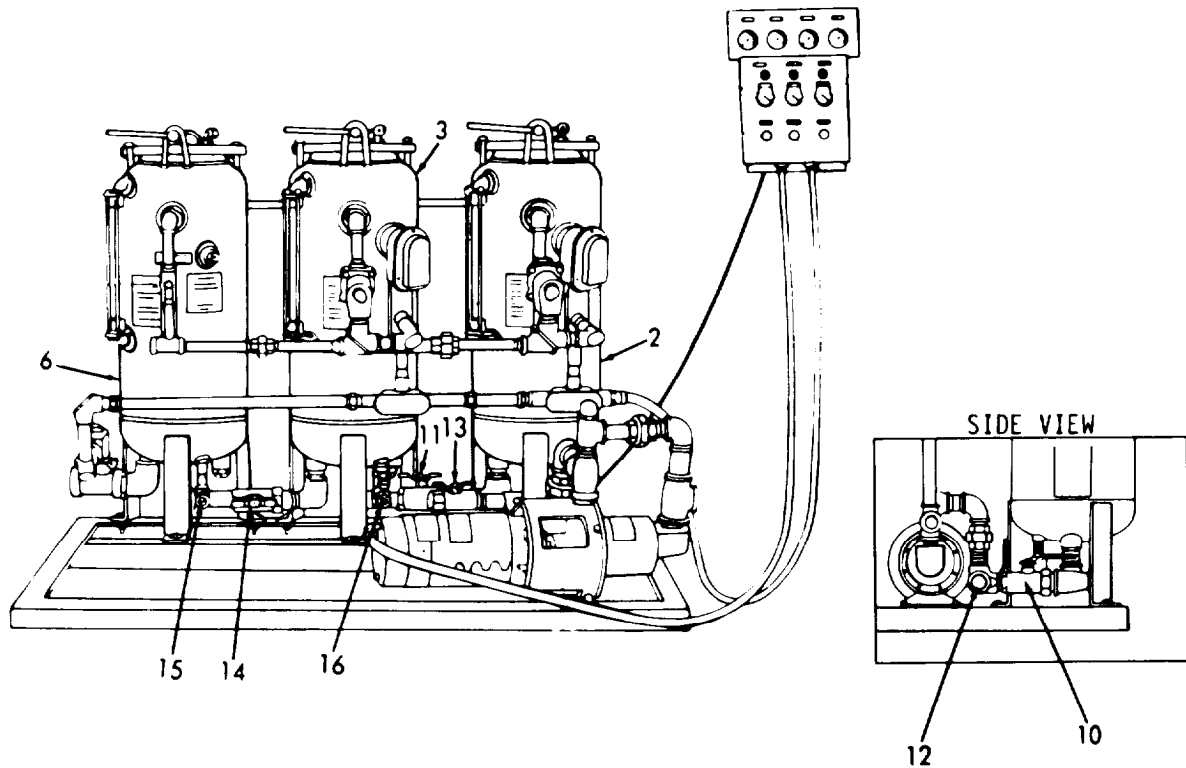
1. Pump
2. First (Prefilter) Stage
3. Second Stage
4. Oil Dump Light/Button
5. Oil Dump Light/Button
6. Third Stage
7. Oil Discharge Valve
8. Supply Pump Selector Switch
9. Auto Controls Selector Switch

<p>3-48. INTERVESSEL SHUTOFF VALVES, MANUAL, TYPE A AND B SEPARATORS (Continued).</p>

LOCATION	ITEM	ACTION	REMARKS
		<p>d. To drain water from the first stage (prefilter) (2):</p> <p>(1) Close the two manual shutoff valves (10 and 11) located on the main flow line at the inlet to the first stage (pre-filter) (2) and between the first (prefilter) and second stages.</p> <p>(2) Open the drain valve (12) at the base of the vessel.</p>	
		<p>e. To drain water from second or third stages (3 or 6):</p> <p>(1) Close the two inter-vessel shutoff valves (13 and 14) on either side of the second stage (3) or the intervessel shutoff valve (14) for drainage of the third stage (6).</p> <p>(2) Open the drain valve (15 or 16) at the base of the vessel.</p>	

3-48. INTERVESSEL SHUTOFF VALVES, MANUAL, TYPE A AND B SEPARATORS
(Continued).

LOCATION ITEM ACTION REMARKS



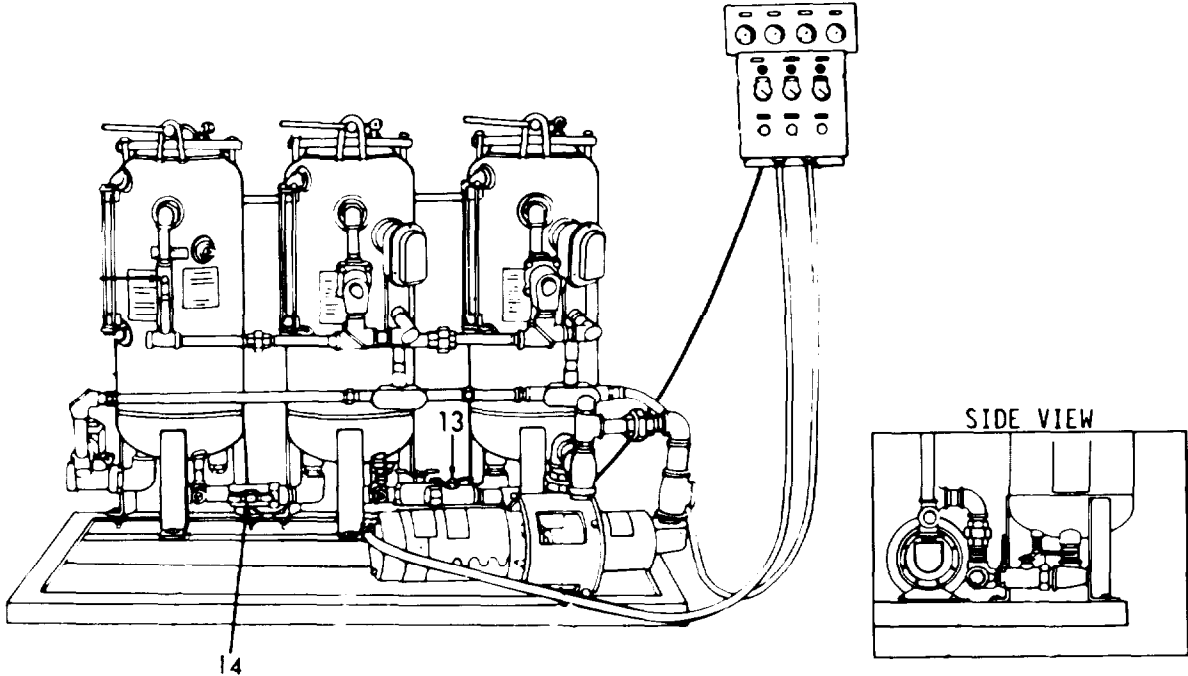
- 2. First (Prefilter) Stage
- 3. Second Stage
- 6. Third Stage
- 10. Manual Shutoff Valve
- 11. Manual Shutoff Valve
- 12. Drain Valve
- 13. Intervessel Shutoff Valve
- 14. Intervessel Shutoff Valve
- 15. Drain Valve
- 16. Drain Valve

**3-48. INTERVESSEL SHUTOFF VALVES, MANUAL, TYPE A AND B SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
2.	2nd stage inter- vessel shutoff valve (14)	Unscrew to remove.	
3.	1st stage (pre- filter) inter- vessel shutoff valve (13)	Unscrew to remove.	
Installation			
4.	1st stage (pre- filter) inter- vessel shutoff valve (13)	Install.	
5.	2nd stage inter- vessel shutoff valve (14)	Install.	

3-48. INTERVESSEL SHUTOFF VALVES, MANUAL, TYPE A AND B SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 13. Intervessel Shutoff Valve
- 14. Intervessel Shutoff Valve

6. Restart system Refer to paragraph 2-4.

3-49. MINI-PROBE, TYPE A AND B SEPARATORS.

This task covers:

- | | |
|------------|-----------------|
| a. Testing | c. Replacement |
| b. Removal | d. Installation |

INITIAL SETUP

Test Equipment
 Simpson 260 voltmeter
 or equivalent

Tools
 Adapter
 Tool Kit, General Mechanics
 Socket

Material/Parts
 Mini-probe

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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Electrical checks should be performed only by a qualified electrician. Check that all electrical components are dry and free of moisture before making electrical checks.

NOTE

Use a Simpson 260 meter or equivalent for electrical checks. The terminal contacts are located on terminal board TB1 on the inside of the control panel.

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION ITEM ACTION REMARKS

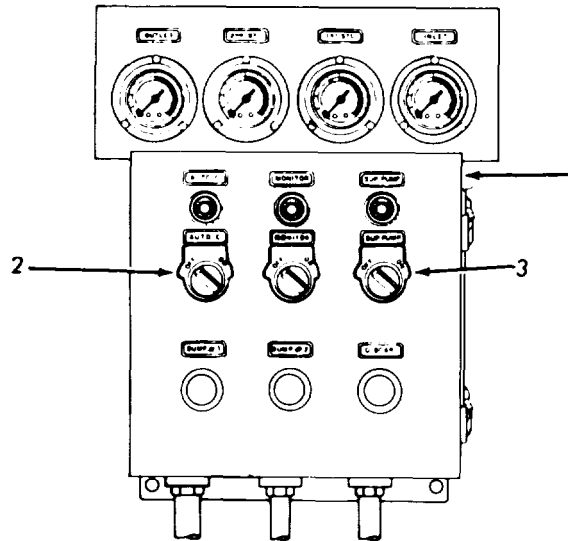
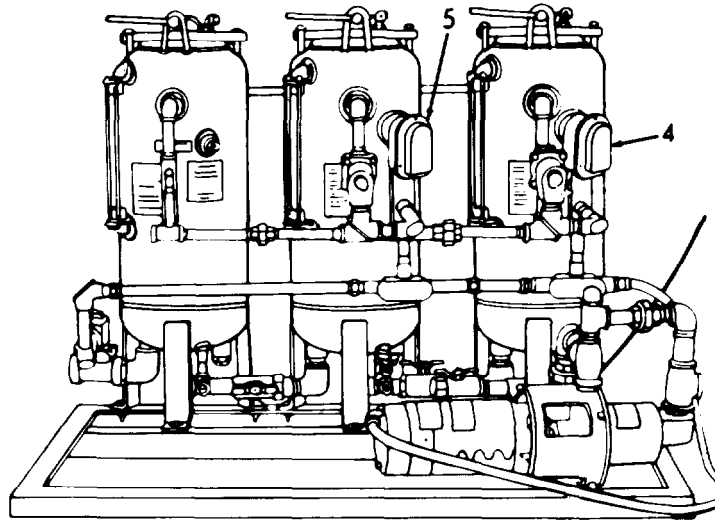
Testing

1. Type A mini-probe

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
1. To verify 24 VDC output of power supply: A. Unlock, open control panel (1) and, B. Connect a test meter across terminal contacts 8 and 9 on terminal board TB1	24	1. Auto controls switch (2) and facility power are on, supply pump switch (3) is off.	1. If there is no output power, check that facility power is on. Electrical input lines are connected properly. There should be no loose or broken wires. Check that the 1-amp fast blow fuse is not defective 230 VAC facility input power can be read across terminal contacts 14 and 17.
2. Verify the operation of first stage (prefilter) mini-probe (4) and the printed circuit board:		2. Facility power and auto controls switch (2) are on: pump switch off; both mini-probe (4 and 5) immersed in water.	2. The normal operation of the mini-probe is to transmit a 24 VDC signal to open the solenoid operated oil discharge valve and close the solenoid operated water discharge valve only when the mini-probe senses oil or air. The mini-probe should be

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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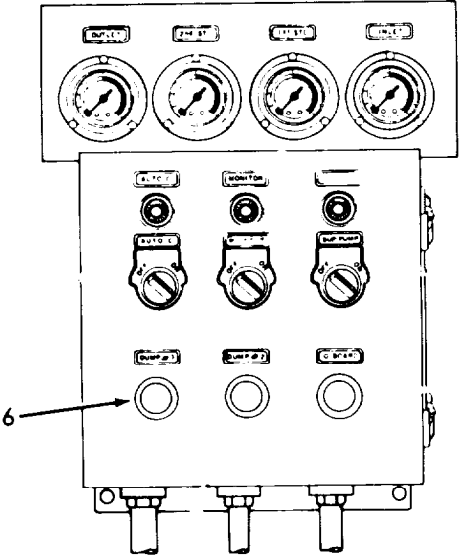
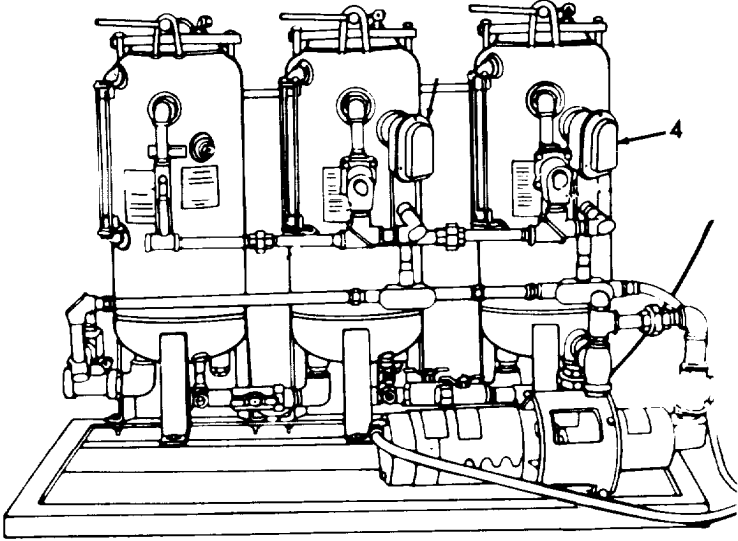
1. Control Panel
2. Auto Controls Switch
3. Supply Pump Switch
4. Mini - probe
5. Mini - probe

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
A. Connect the test meter leads to terminal contacts 1 and 8 on terminal board TB1	0		replaced if either a signal is generated while the mini-probe is in water or a signal is not transmitted when the first stage oil dump light/button (6) does not light when it is depressed. A malfunction in the printed circuit board is indicated when the mini-probe generated signal is not relayed to the solenoid valve.
B. Connect the test meter leads to terminal contacts 1 and 3, depress the first stage (prefilter) oil dump			A. Replace the mini-probe (4) if a zero reading is not obtained on the test meter.
			B. Depressing the oil dump light/button (6) will cause the mini-probe to generate a signal causing the first stage oil (prefilter) oil dump light/but-

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 4. Mini - probe
- 6. Oil Dump Light/Button

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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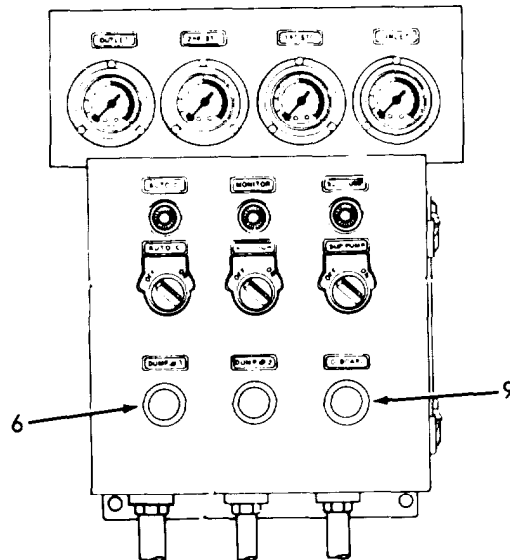
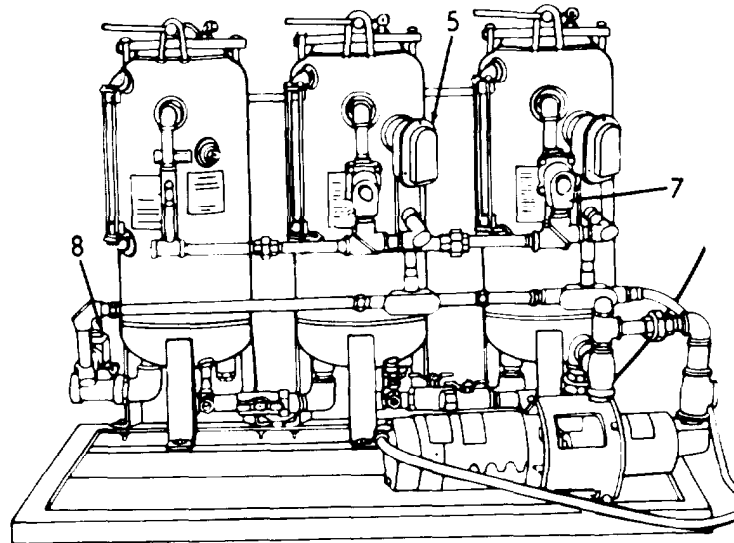
Test	Procedure	Meter Reading (VDC)	Test Conditions	Remarks
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	light/button (6) thereby grounding the mini-probe test terminal.	24		ton (6) to illuminate, the first (prefilter) stage solenoid operated oil discharge valve (7) to open, the solenoid operated water discharge valve (8) to close, and overboard discharge light (9) to go out. Replace the mini-probe (5) if a 24±5 VDC reading is not obtained.
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C.	Connect the test meter leads first to contacts 5 and 9, and depress the first stage (prefilter) oil dump light/button (6). Next, connect the test meter leads to contacts 7 and 9 and again depress the first stage	24		C. A 24 VDC read-out between contacts 5 and 9 indicates the first stage (prefilter oil discharge valve (7) and the first stage (prefilter) dump light/button (6) are receiving a signal from mini-probe (5) and that the printed circuit board is func-
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3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 5. Mini - probe
- 6. Oil Dump Light/Button
- 7. Oil Discharge Line
- 8. Water Discharge Line
- 9. Overboard Discharge Light

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Test	Procedure	Meter Reading (VDC)	Test Conditions	Remarks
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(prefilter) oil dump light/button (6).

0

tioning properly. A zero readout between contacts 7 and 9 indicates the water discharge valve (8) and circuit board are functioning properly. A built-in time delay of approximately 2-3 seconds will hold the first stage (prefilter) oil discharge valve (7) open after the mini-probe signal terminates.

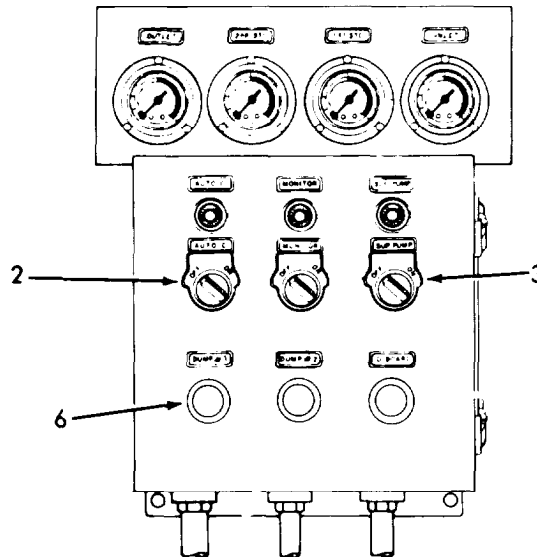
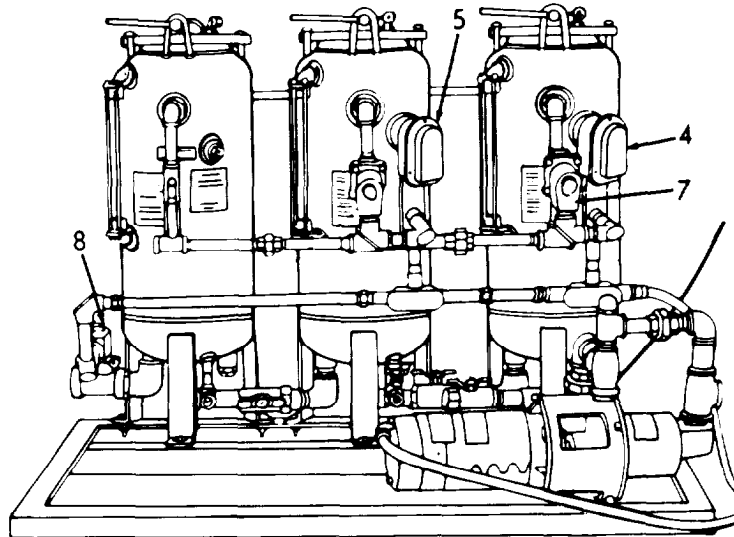
3. To verify the operation of the second stage mini-probe (5) and the printed circuit board:

3. Facility power and auto controls switch (2) are on; pump switch (3) is off. Second stage mini-probe (5) in water; first stage (prefilter) mini-probe (4) in water, oil or air.

3. Refer to remarks for test procedure 2. The second stage oil dump light/button (10) when depressed activates the second stage mini-probe (5).

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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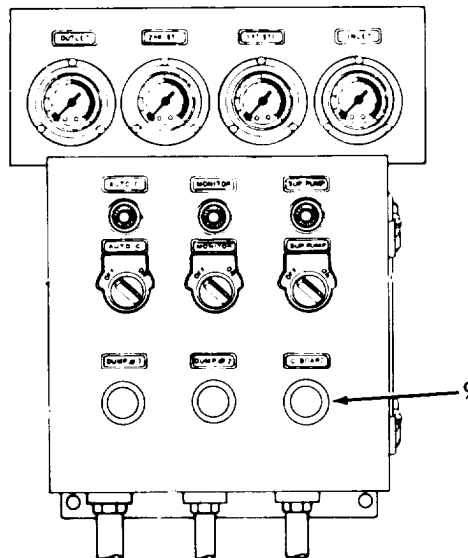
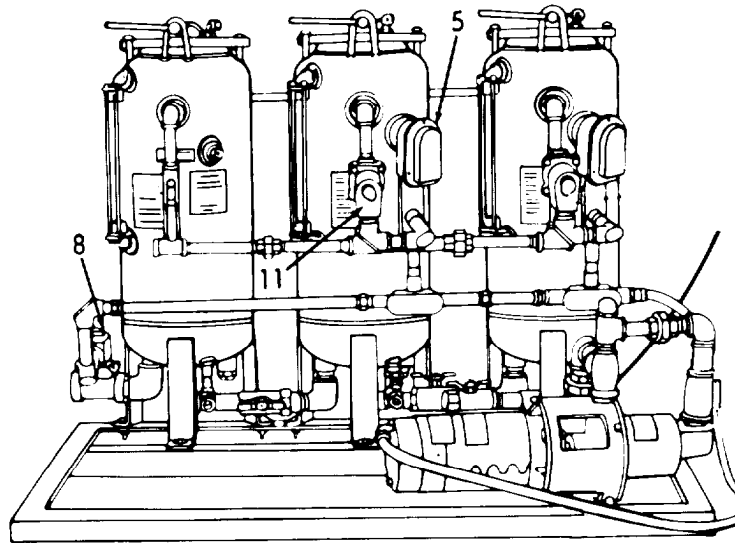
- 2. Auto Controls Switch
- 3. Supply Pump Switch
- 4. Mini-probe
- 5. Mini-probe
- 6. Oil Dump Light/Button
- 7. Oil Discharge Line
- 8. Water Discharge Line
- 10. Oil Dump Light/Button

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION		REMARKS
Test Procedure	Meter Reading (VDC)	Test	Conditions	Remarks
A. Connect the test meter leads to terminal contacts 3 and 8 on terminal board TB1	0			A. Replace mini-probe (5) if a zero voltage reading is not obtained on the test meter
B. With the test meter leads connected to terminal contacts 3 and 8, depress the second stage oil dump light/button (10). This grounds the mini-probe's test terminal.				B. Depressing the oil dump light/button (10) will cause the mini-probe to generate a signal causing the second stage oil dump light button (10) to illuminate. The second stage solenoid operated water discharge valve (11) will open. The solenoid operated water discharge valve (8) to close, and the overboard discharge light (9) to go out. Replace the mini-probe (5) if a 24 ± 5 VDC reading is not obtained.

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 5. Mini - probe
- 8. Water Discharge Line
- 9. Overboard Discharge Light
- 10. Oil Dump Light/Button
- 11. Water Discharge Valve

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Test	Procedure	Meter Reading (VDC)	Test Conditions	Remarks
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C. Connect the test meter leads first to contacts 6 and 9. Depress the second stage oil dump light/button (10). Next, connect the test meter leads to contacts 7 and 9 and again depress the second stage oil dump light/button (10).

Meter Reading (VDC)

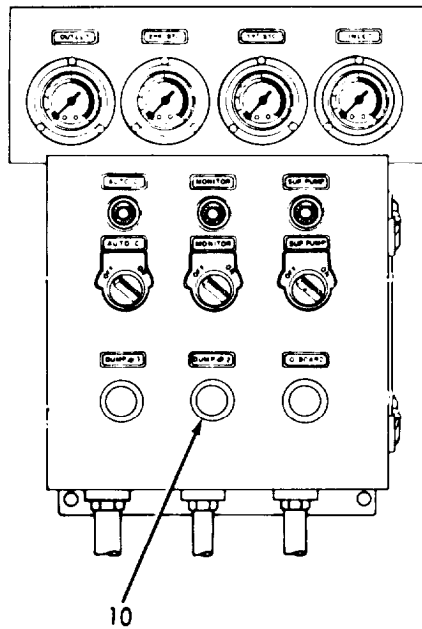
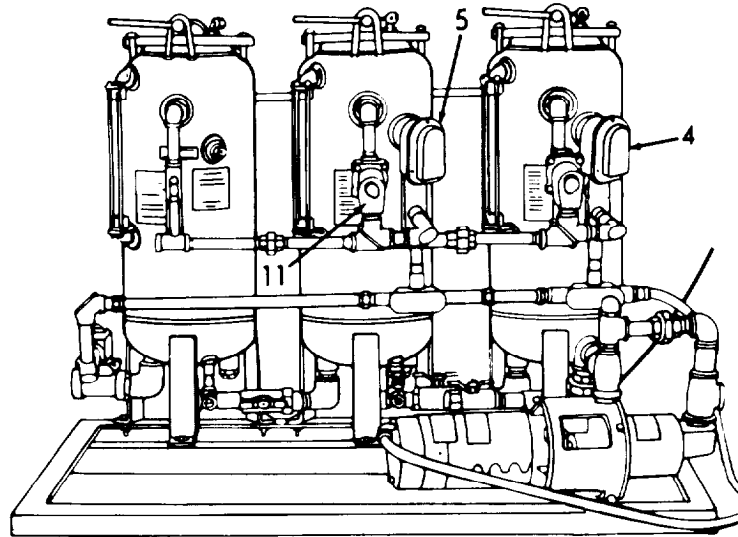
24

0

C. A 24 VDC read-out between contacts 6 and 9 indicates second stage oil discharge valve (11) and the second stage oil dump light/button (10) are receiving a signal from the mini-probe (5). The printed circuit board is functioning properly. A built-in time delay of approximately 2 seconds will hold the second stage oil discharge valve (11) open after the mini-probe signal terminates. A signal from the second stage mini-probe (5) will override a signal from the first (pre-filter) stage mini-probe (4).

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 4. Mini - probe
- 5. Mini - probe
- 10. Oil Dump Light/Button
- 11. Water Discharge Valve

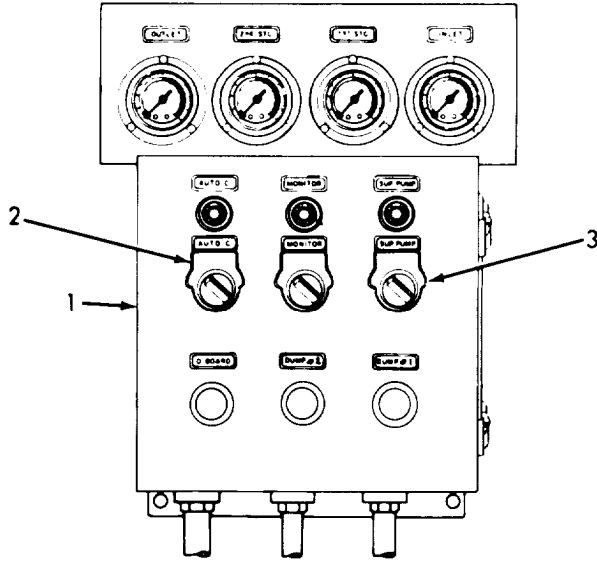
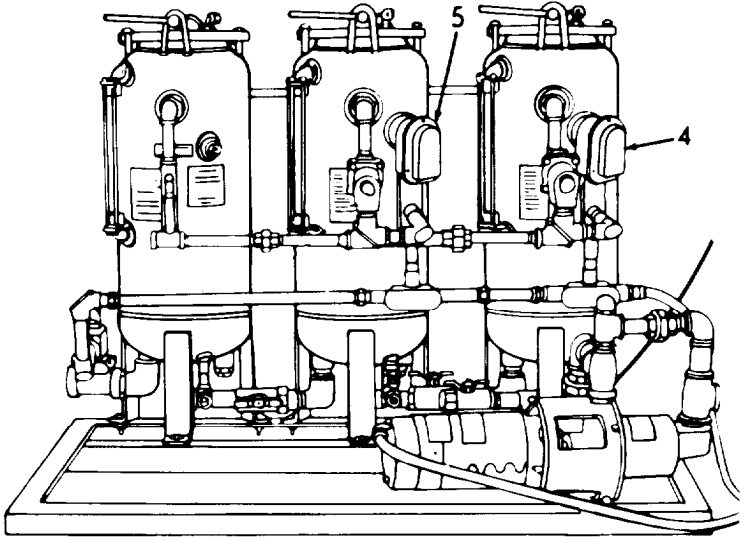
3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
2. Type B Mini-probe			

Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
<p>1. To verify 24 VDC output of power supply:</p> <p>A. Unlock, open control panel (1) and,</p> <p>B. Connect a test meter across terminals contacts 8 and 9 on terminal board TB1</p>	24	<p>1. Auto controls switch (2) and facility power are on, supply pump switch (3) is on.</p>	<p>1. If there is no output power, check that facility power is on. Electrical input lines must be connected properly. There should be no loose or broken wires. Check that the 1-amp fast blow fuse is not blown. 120 VDC facility input power can be read across terminal contacts 14 and 17.</p>
<p>2. Verify the operation of the first stage (pre-filter) mini-probe (4) and the printed circuit board:</p>		<p>2. Facility power and auto controls switch (2) are on: pump switch (3) on; both mini-probes (4 and 5) immersed in water.</p>	<p>2. The normal operation of the mini-probe is to transmit a 24 VDC signal to open the solenoid operated oil discharge valve and close the solenoid operated water discharge valve only when the mini-probe senses oil or air. The mini-probe should be replaced if either a signal is generated while the mini-probe is in water or a signal is not transmitted when the first stage (prefilter)</p>

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 1. Control Panel
- 2. Auto Controls Switch
- 3. Supply Pump Switch
- 4. Mini-probe
- 5. Mini-probe

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

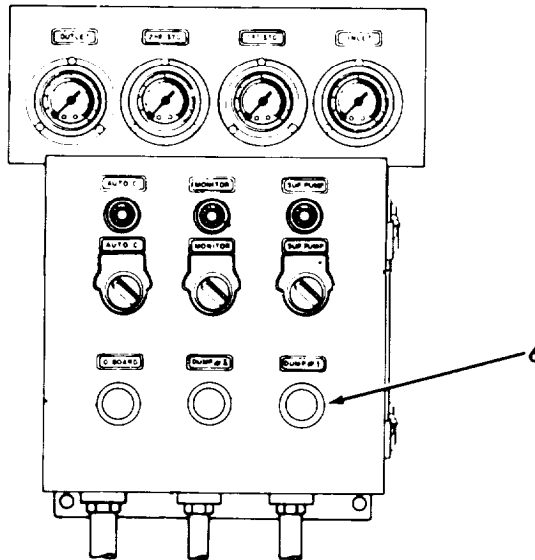
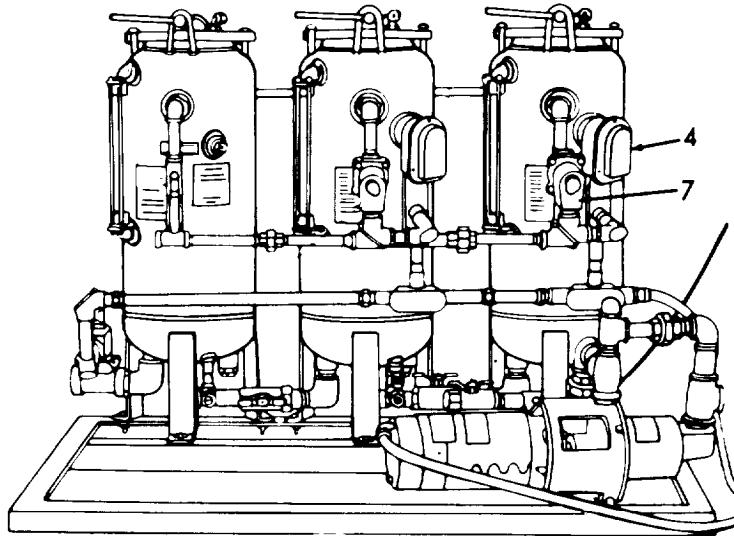
LOCATION	ITEM	ACTION	REMARKS
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Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
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<p>A. Connect the test meter leads to terminal contacts 1 and 8 on terminal board TB1</p>	<p>Meter Reading (VDC)</p>	<p>Test Conditions</p>	<p>oil dump light/button (6) does not light when it is depressed. A malfunction in the printed circuit board is indicated when the mini-probe generated signal is not relayed to the solenoid valve.</p>
<p>B. Connect the test meter leads to terminal contacts 1 and 8. Depress the first stage (prefilter) oil dump light/button (6). This grounds the mini-probe's test terminal.</p>	<p>24</p>		<p>A. Replace the mini-probe (4) if a zero reading is not obtained on the test meter.</p> <p>B. Depressing the oil dump light/button will cause the mini-probe to generate a signal causing the first stage (prefilter) oil dump light/button (6) to illuminate, the first stage (prefilter) solenoid operated oil discharge valve (7) to open, the solenoid</p>

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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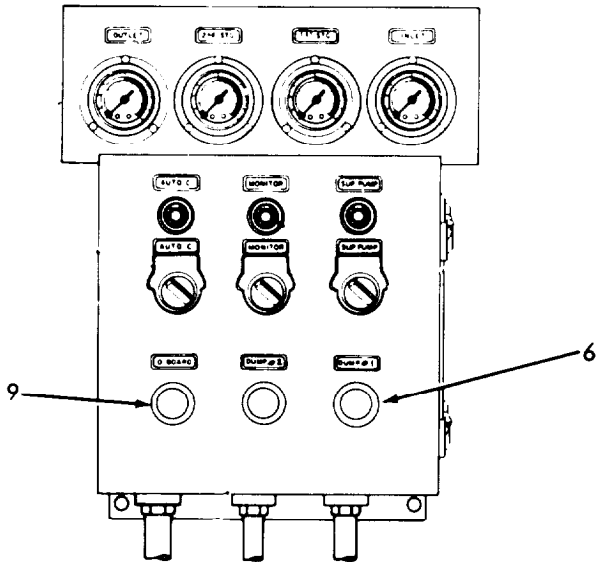
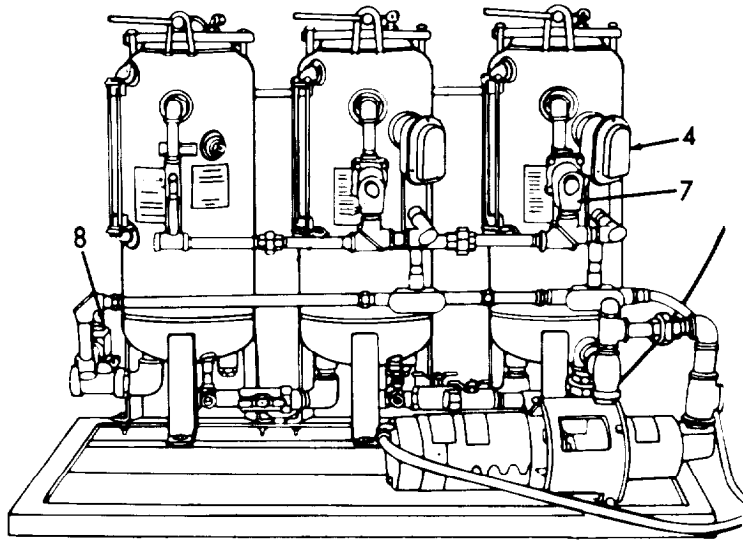
- 4. Mini - probe
- 6. Oil Dump Light/Button
- 7. Oil Discharge Line

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
C. Connect the test meter leads first to contacts 5 and 9, and depress the first stage (prefilter) oil dump light/button (6). Next, connect the test meter leads to contacts 7 and 9 and again depress the first stage (prefilter) oil dump light/button (6).	24		operated water discharge valve (8) to close, and the over-board discharge light (9) to go out. Replace the mini-probe (4) if a 24 ± 5 VDC reading is not obtained.
C. Connect the test meter leads first to contacts 5 and 9, and depress the first stage (prefilter) oil dump light/button (6). Next, connect the test meter leads to contacts 7 and 9 and again depress the first stage (prefilter) oil dump light/button (6).	0		C. A 24 VDC readout between contacts 5 and 9 indicates the first stage (prefilter) oil discharge valve (7) and the first stage (prefilter) oil dump light/button (6) are receiving a signal from mini-probe (4). The printed circuit board is functioning properly. A zero readout between contacts 7 and 9 indicates the water discharge valve (8) and circuit board are functioning properly. A built-in time delay of approx-

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 4. Mini - probe
- 6. Oil Dump Light/Button
- 7. Oil Discharge Line
- 8. Water Discharge Line
- 9. Overboard Discharge Light

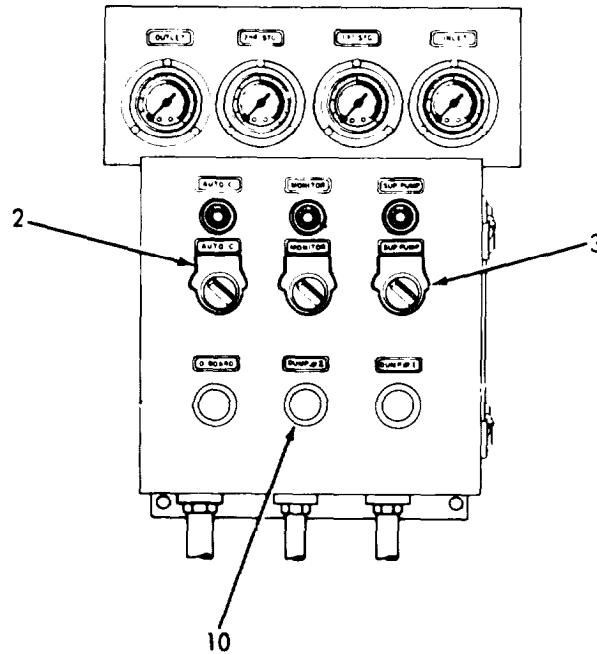
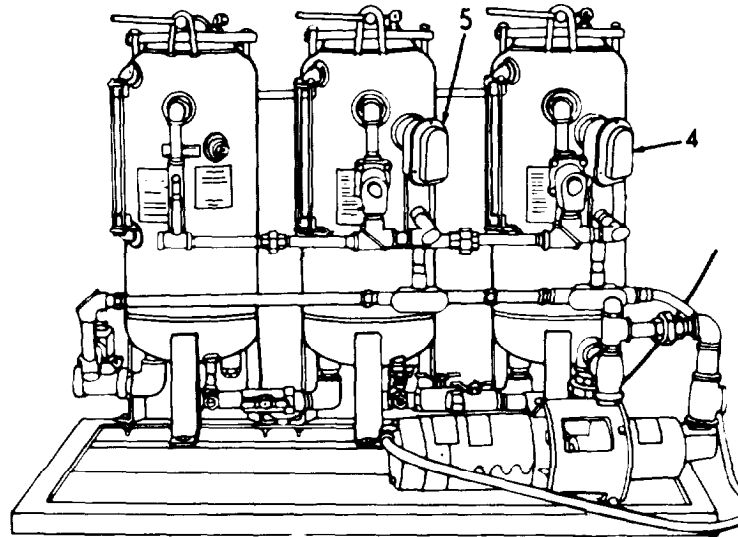
3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Test Procedure	Meter Reading (VDC)	Test Conditions	Remarks
<p>3. To verify the operation of the second stage mini-probe (5) and the printed circuit board:</p> <p>A. Connect the test meter leads to terminal contacts 3 and 8 on terminal board TB1.</p> <p>B. Connect the test meter leads to terminal contacts 3 and 8. Depress the second stage oil dump light/button (10). This</p>	0	<p>3. Facility power and auto controls switch (2) are on; pump switch (3) is on; second stage mini-probe (5) in water; first stage (prefilter) mini-probe (4) in water, oil or air.</p>	<p>imately 2-3 seconds will hold the first stage (prefilter) oil discharge valve (4) open after the mini-probe signal terminates.</p> <p>3. Refer to remarks for test procedure 2. The second stage oil dump light/button (10) when depressed activates the second stage mini-probe (5).</p> <p>A. Replace mini-probe (5) if a zero voltage reading is not obtained on the test meter.</p> <p>B. Depressing the oil dump light/button (10) will cause the mini-probe to generate a signal. The second stage oil dump light/button (10) will illuminate, the</p>

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

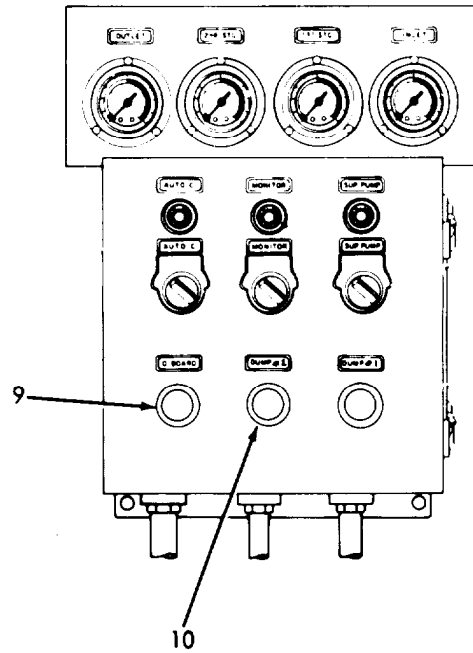
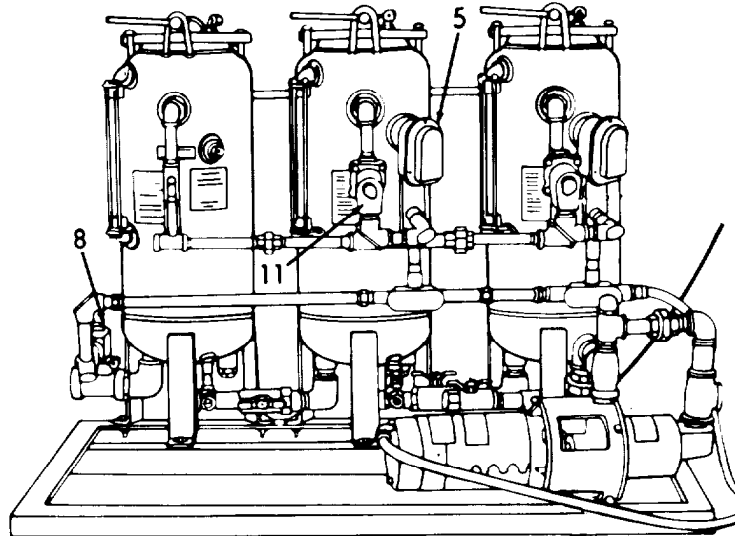
LOCATION	ITEM	ACTION	REMARKS
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- 2. Auto Controls Switch
- 3. Supply Pump Switch
- 4. Mini-probe
- 5. Mini-probe
- 10. Oil Dump Light/Button

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 5. Mini - probe
- 8. Water Discharge Line
- 9. Overboard Discharge Light
- 10. Oil Dump Light/Button
- 11. Oil Discharge Valve

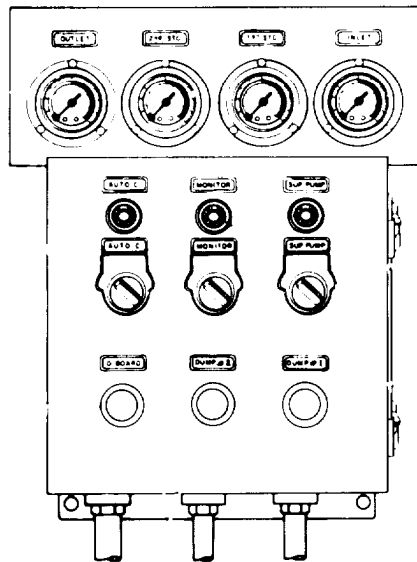
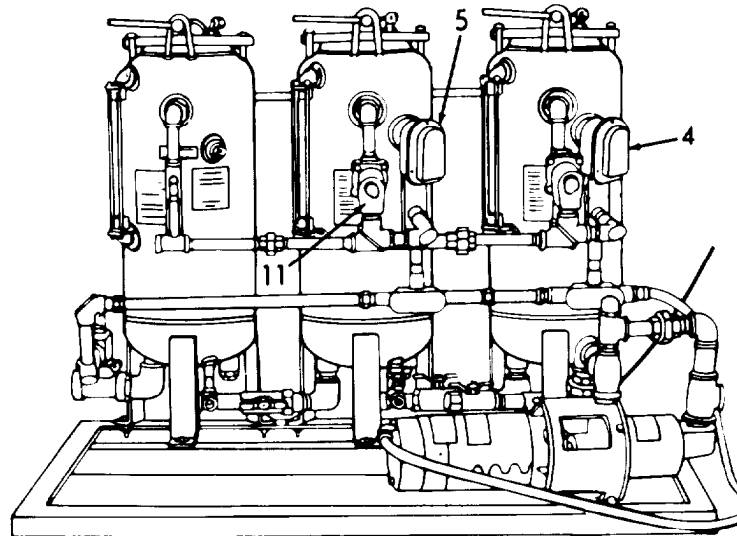
3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION		ITEM	ACTION		REMARKS
Test	Procedure	Meter Reading (VDC)	Test	Conditions	Remarks

circuit board are functioning properly. A built-in time delay of approximately 2 seconds will hold the second stage oil discharge valve (11) open after the mini-probe signal terminates. A signal from the second stage sensor (5) will over-ride a signal from the first (pre-filter) stage sensor (4).

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 4. Mini - probe
- 5. Mini - probe
- 11. Oil Discharge Valve

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Removal

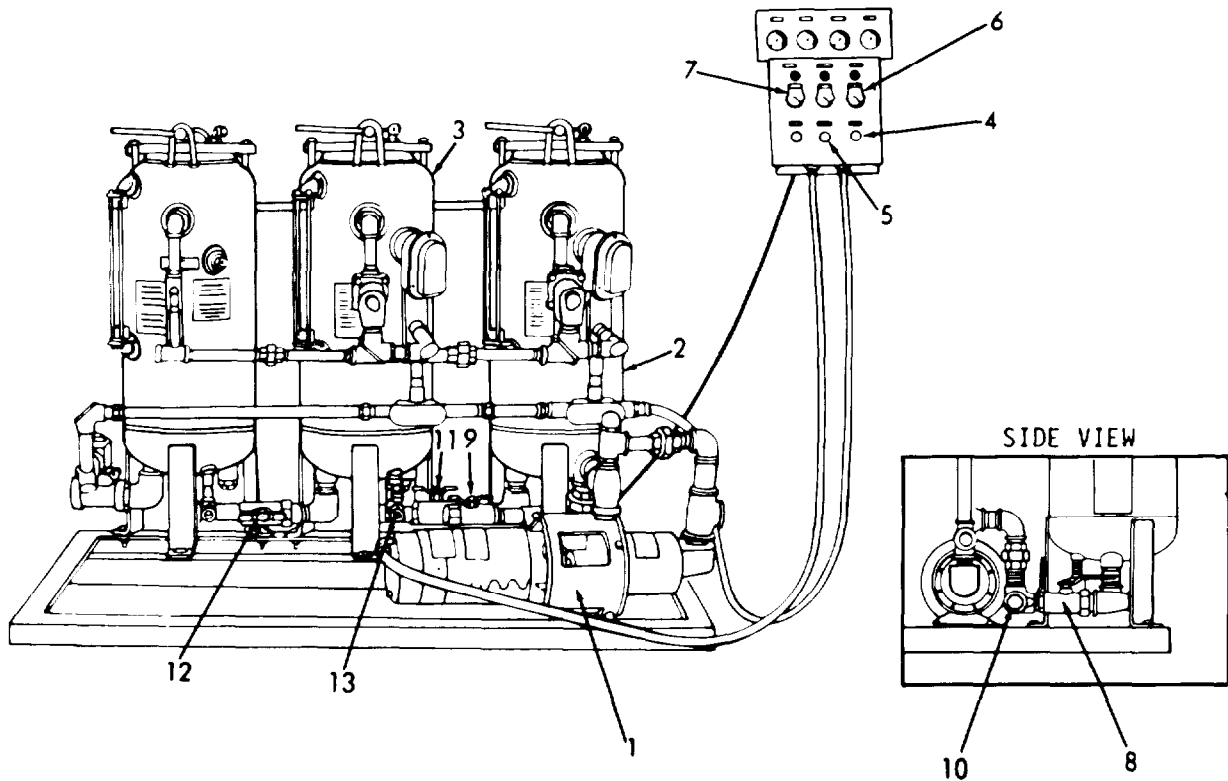
- | | | | |
|----|-----------------|--|--|
| 3. | Draining system | <ul style="list-style-type: none"> a. With the pump (1) running and control power on, discharge as much oil as possible from the separator stage in which the mini-probe is to be replaced according to the following: <ul style="list-style-type: none"> b. To discharge from the first (prefilter) or second stage (2 or 3) manually depress the oil dump light/button (4 or 5) for the respective stage. c. Stop the supply pump (1) by turning the supply pump selector switch (6) OFF. d. Turn the auto controls selector switch (7) OFF. e. To drain water from the first stage (prefilter) (2): <ul style="list-style-type: none"> (1) Close the two manual shutoff valves (8 and 9) located on the main flow line at the inlet to the first stage (prefilter) (2) and between the first (prefilter) and second stages. (2) Open the drain valve (10) at the base of the vessel. f. To drain water from the second stage (3): | |
|----|-----------------|--|--|

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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(1) Close the two inter-vessel shutoff valves (11 and 12) on either side of the second stage (3).

(2) Open the drain valve (13) at the base of the vessel.



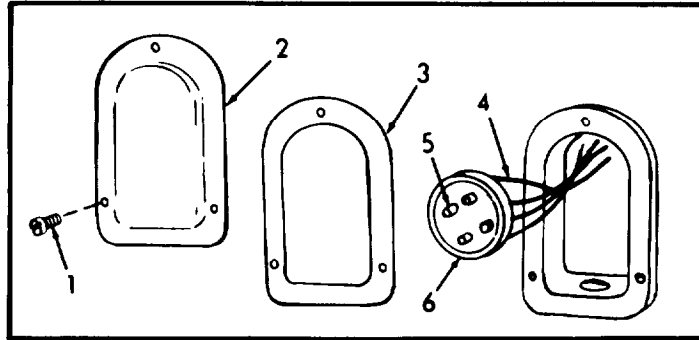
1. Pump
2. First (Prefilter) Stage
3. Second Stage
4. Oil Dump Light/Button
5. Oil Dump Light/Button
6. Supply Pump Selector Switch
7. Auto Controls Selector Switch
8. Manual Shutoff Valves
9. Manual Shutoff Valves
10. Drain Valve
11. Intervessel Shutoff Valve
12. Intervessel Shutoff Valve
13. Drain Valve

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
4.	Mini-probe	a. Remove screws (1), cover (2) and gasket (3). b. Tag and disconnect leads (4) from terminals (5). c. Unscrew mini-probe (6).	Use thin wall socket NSN 5120-00-277-1465 with 1/2 inch (1.27 cm) sq. drive ratchet.
	Replacement	Replace defective mini-probe with a serviceable-like item.	
	Installation		
5.	Mini-probe (6)	a. Screw into vessel. Do not overtighten. b. Reconnect leads (4) to terminals (5). c. Position gasket (3) in place on cover and install cover (2) using screws (1).	Use thin wall socket NSN 5120-00-277-1465 to install.
6.	Restart system	Refer to paragraph 2-4.	

3-49. MINI-PROBE, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 1. Screws
- 2. Cover
- 3. Gasket
- 4. Leads
- 5. Terminals
- 6. Mini-probe

3-50. WARNING, INSTRUCTION AND IDENTIFICATION PLATES, TYPE A AND B SEPARATORS.

This task covers:

- | | | |
|---------------|----------------|-----------------|
| a. Inspection | c. Cleaning | e. Installation |
| b. Removal | d. Replacement | |

INITIAL SETUP

Test Equipment
None

Material/Parts
Warning, instruction and identification plates
Cleaning solvent P-D-680
Appendix C. Item No. 2

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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Inspection

Inspect for missing, illegible or damaged plate.

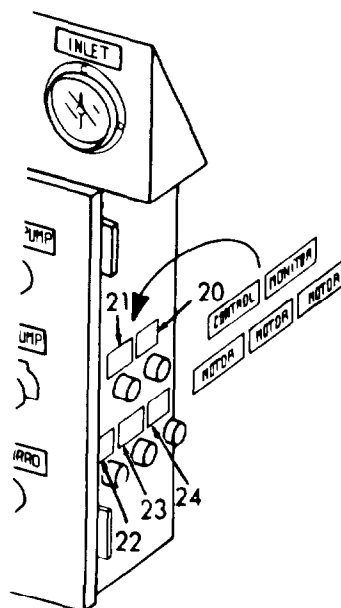
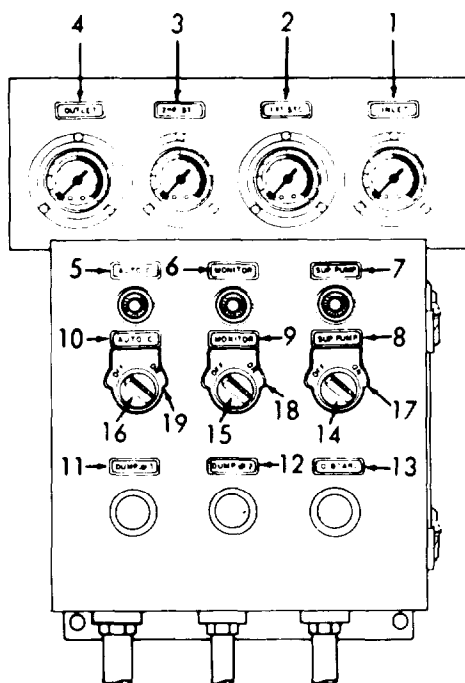
Removal

- | | | | | |
|------------------|----|--------------------------------|--|--|
| 1. Legend plates | a. | Control panel type A separator | <p>(1) Remove inlet (1), 1st stage (prefilter) (2), second stage (3) or outlet plate (4).</p> <p>(2) Remove auto control (5), monitor (6), supply pump (7 and 8), monitor (9), auto control (10), dump #1 (11), dump #2 (12) or 0 board plate (13).</p> <p>(3) Unscrew nut (14, 15 or 16) from switch to remove supply pump (17), monitor (18) or auto/control plate (19).</p> | Remove legend plates only if damaged or illegible. |
|------------------|----|--------------------------------|--|--|

3-50. WARNING, INSTRUCTION AND IDENTIFICATION PLATES, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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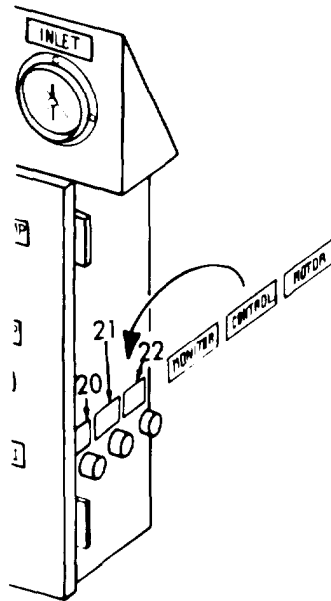
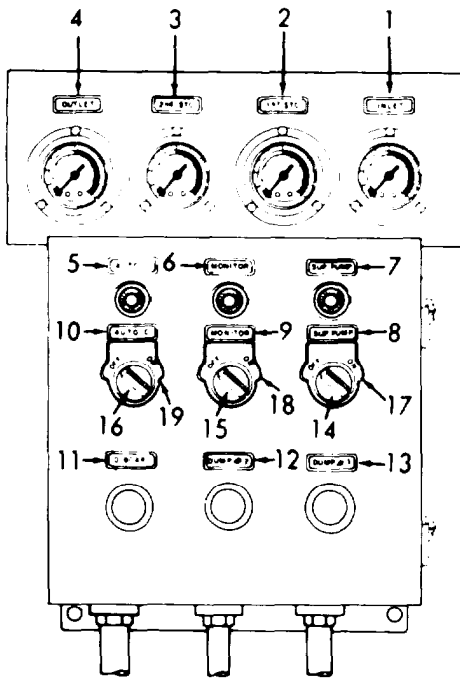
(4) Remove monitor (20), control (21) or motor legend plate (22, 23, 24).



- | | |
|--------------------------|------------------------|
| 1. Inlet | 13. 0 Board Plate |
| 2. 1st (Prefilter) Stage | 14. Nut |
| 3. Second Stage | 15. Nut |
| 4. Outlet Plate | 16. Nut |
| 5. Auto Control | 17. Supply Pump |
| 6. Monitor | 18. Monitor |
| 7. Supply Pump | 19. Auto/Control Plate |
| 8. Supply Pump | 20. Monitor |
| 9. Monitor | 21. Control |
| 10. Auto Control | 22. Motor Legend Plate |
| 11. Dump #1 | 23. Motor Legend Plate |
| 12. Dump #2 | 24. Motor Legend Plate |

3-50. WARNING, INSTRUCTION AND IDENTIFICATION PLATES, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
	b. Control panel type B Separator,	<p>(1) Remove inlet (1), 1st stage (prefilter) (2), 2nd stage (3) or outlet plate (4).</p> <p>(2) Remove auto control (5), monitor (6), supply pump (7 and 8), monitor (9), auto control (10), O board (11), dump #2 (12) or dump #1 plate (13).</p> <p>(3) Unscrew nut (14, 15 or 16) from switch to remove supply pump (17), monitor (18) or auto/control plate (19).</p> <p>(4) Remove monitor (20), control (21) or motor plate (22).</p>	Remove legend plates only if damaged or illegible.



- 1. Inlet
- 2. 1st (Prefilter) Stage
- 3. Second Stage
- 4. Outlet Plate
- 5. Auto control
- 6. Monitor
- 7. Supply Pump
- 8. Supply Pump
- 9. Monitor
- 10. Auto Control
- 11. O Board
- 12. Dump #2
- 13. Dump #1 Plate
- 14. Nut
- 15. Nut
- 16. Nut
- 17. Supply Pump
- 18. Monitor
- 19. Auto/Control Plate
- 20. Monitor
- 21. Control
- 22. Motor Plate

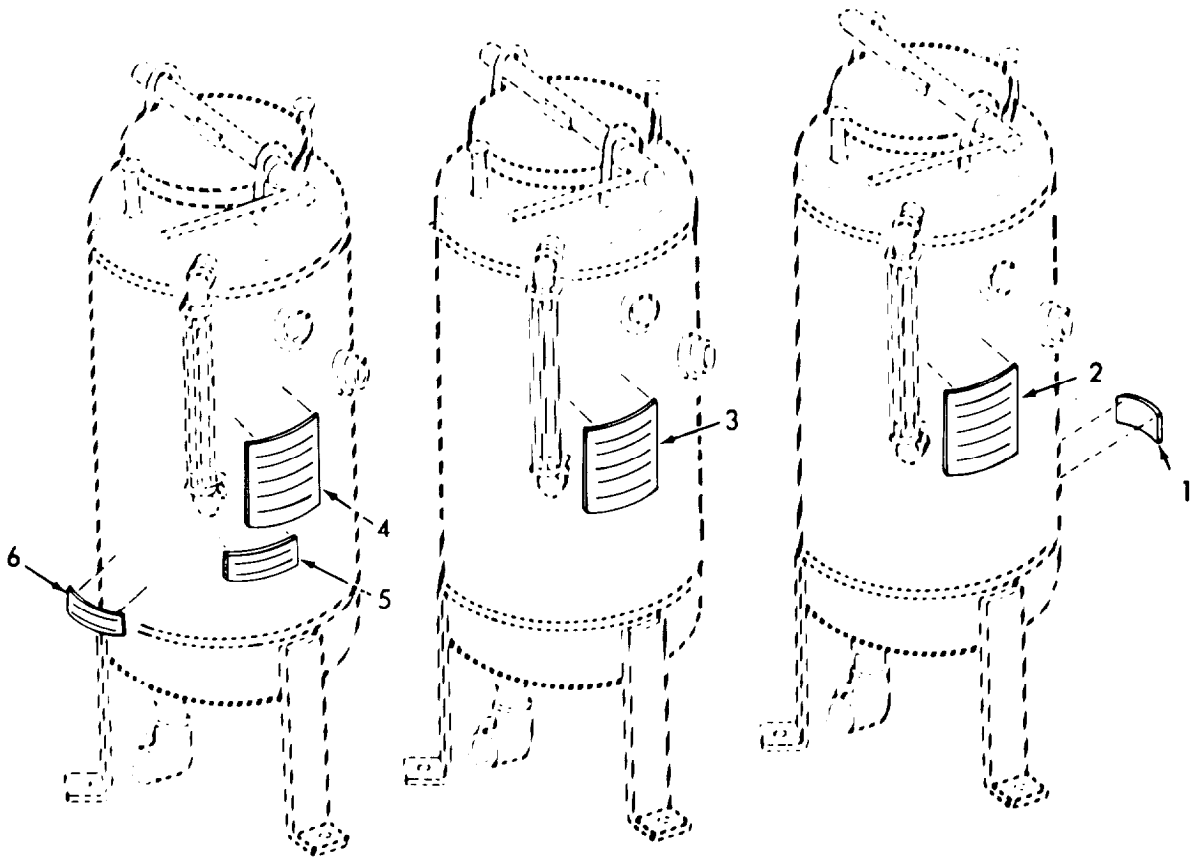
3-50. WARNING, INSTRUCTION AND IDENTIFICATION PLATES, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

c. Separator stages

Remove inlet plate (1), identification plate (2), warning plate (3), instruction plate (4 or 5) or outlet plate (6).

Remove only if damaged or illegible.



1. Inlet Plate
2. Identification Plate
3. Warning Plate
4. Instruction Plate
5. Instruction Plate
6. Outlet Plate

3-50. WARNING, INSTRUCTION AND IDENTIFICATION PLATES, TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Cleaning

WARNING

Cleaning solvent Fed. Spec. P-D-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated or prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°- 138°F (38°-59°C).

Using a clean cloth dampened with cleaning solvent, remove any adhesive adhering to the vessel. Dry thoroughly.

Repair

Replace any missing, damaged or illegible warning, instruction or legend plate with a serviceable-like item.

Installation

Peel backing from plate being replaced and press firmly in place on vessel.

CHAPTER 4

ORGANIZATIONAL

MAINTENANCE INSTRUCTIONS

TYPE C AND D SEPARATORS

	Page
● Overview	4-1
● Repair Parts and Special Tools	4-1
● Service Upon Receipt	4-2
● Preventive Maintenance Checks and Services	4-3
● Troubleshooting	4-4
● Maintenance Procedures	4-8

4-1. OVERVIEW.

This chapter contains maintenance and servicing procedures that are the responsibility of Organizational Maintenance. Operator maintenance tasks given in Chapter 3 are not repeated in this chapter.

SECTION I.

REPAIR PARTS AND SPECIAL TOOLS.

4-2. REPAIR PARTS.

See Appendix C for a listing of spare parts required for maintaining the oil-water separators.

4-3. SPECIAL TOOLS.

There are no special tools required.

SECTION II.

SERVICE UPON RECEIPT.

4-4. SERVICE UPON RECEIPT.

4-5. Service upon Receipt Check List. See table 4-1.

Table 4-1. Oil-Water Separator Service-Upon-Receipt-Checklist

LOCATION	ITEM	ACTION	REMARKS
(1) In crate with assembled separator	Contents of crate	Check crate for following contents: <ul style="list-style-type: none"> ● Control Panel ● Power Cable ● Flow Rate Indicator ● This technical manual 	Notify Supply Officer of any missing or damaged parts.
(2) Separator package and contents	Packing materials	Remove all blocks and packing.	
	Spare parts	Check parts received against packing list. Check all parts for damage.	Report deficiencies to Supply Officer. Report damage to Supply Officer.

SECTION III.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES
(PMCS)

4-6. ORGANIZATIONAL PMCS.

See Table 4-2.

TABLE 4-2. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

TYPE C AND D SEPARATORS

LEGEND

W - Weekly

M - Monthly

Q - Quarterly

Item No.	Interval			Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment will be reported not ready/ available if:
	W	M	Q			
1.	●			Pressure gauges and tubing	Inspect for damage. Replace if defective.	Obviously damaged or defective
2.		●		Control panel lights, switches and wiring	Inspect for wear and damage. Replace if defective or damaged.	Obviously damaged or defective
3.	●			Flow rate indicator	Inspect, service and replace as necessary.	Obviously damaged or leaking
4.			●	Control panel and supply pump motor power cable	Inspect for damage and replace as necessary.	Obviously damaged or defective
5.	●			Piping air lines and fittings	Inspect for damage and replace as necessary.	Leaking
6.	●			Supply pump assembly	Test and replace as necessary.	Obviously damaged or leaking
7.		●		Pump and motor	Inspect for damage, loose mounting bolts, leakage, proper operation. Replace as necessary.	Obviously damaged or defective

TABLE 4-2. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

TYPE C AND D SEPARATORS (Continued)

LEGEND

W - Weekly

M - Monthly

Q - Quarterly

Item No.	Interval			Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Equipment will be reported not ready/available if:
	W	M	Q			
8.	•			Air eliminator valve	Inspect tubing for cracks, breaks, loose connections, operable condition.	Obviously damaged
9.		•		Manually operated valves	Inspect for damage and proper operation. Replace as necessary.	Obviously defective or leaking

SECTION IV.

TROUBLESHOOTING

4-7. ORGANIZATIONAL MAINTENANCE TROUBLESHOOTING CHART.

See Table 4-3. This table does not repeat operator's maintenance procedures given in Table 3-1. Perform tests, inspections and corrective actions in the order listed.

Table 4-3. Organizational Maintenance Troubleshooting Chart, Type C and D Separators (Sheet 1 of 3).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Air eliminator valve leaks fluid	Step 1. Check for dirt or debris in air eliminator.	Clean air eliminator valve per paragraph 4-27.
	Step 2. Inspect for defective plunger 0-ring seal.	Replace per paragraph 4-27.
	Step 3. Inspect for bent float pins.	Straighten pins.
2. Pressure differential builds rapidly on second coalescer stage.	Step 1. Prefilter elements not sealing properly.	Realign elements on striker plate and retighten.
	Step 2. Check for ruptured prefilter element.	Replace element per paragraph 3-40.
3. Pump motor will not start.	Step 1. Check ON-OFF switch.	Place in ON position to check switch.
	Step 2. Check for loose wiring or connections.	Tighten.
	Step 3. Inspect for defective fuse.	Replace per paragraph 3-7.
	Step 4. If motor still will not start.	Report condition to General Support Maintenance.

Table 4-3. Organizational Maintenance Troubleshooting Chart, Type C and D Separators (Sheet 2 of 3).

MALFUNCTION

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

4. Motor runs and kicks out.

Step 1. Is system properly aligned?

Align system.

Step 2. Check for excessive discharge pressure. Is pre-filter element clogged? Is discharge line obstructed?

Replace element per paragraph 3-40.

Remove obstruction.

Step 3. Inspect for loose connections.

Tighten.

Step 4. Check for improper ventilation.

Increase ventilation.

5. Pump fails to pump or prime.

Step 1. Check for closed valve in suction line.

Open closed valve.

Step 2. Inspect for clogged strainer on inlet line.

Clean strainer per paragraph 3-29.

Step 3. Inspect for broken flexible joint.

Report condition to General Support Maintenance.

Step 4. Pump still fails to operate.

Report condition to General Support Maintenance.

Table 4-3. Organizational Maintenance Troubleshooting Chart,
Type C and D Separators (Continued)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. Pump overloads.	Step 1. Check for excessive discharge pressure caused by clogged filter in 1st (prefilter) stage.	Replace element per paragraph 3-40.
	Step 2. Check for obstruction in discharge line.	Remove obstruction.
7. Pump noisy.	Step 1. Check for loose mounting bolts.	Tighten.
	Step 2. Check for lack of suction.	Remove obstruction in strainer or suction line.
	Step 3. Check for worn flexible joint.	Report condition to General Support Maintenance.
	Step 4. Pump still noisy.	Report condition to General Support Maintenance.

SECTION V.

ORGANIZATIONAL MAINTENANCE PROCEDURES

4-8. SUMMARY AND DETAILED PROCEDURES.

SUMMARY PROCEDURES

Paragraph	Procedure
4-27	Air Eliminator Valve, Type C and D Separators
4-25	Cam Bar, Type C and D Separators
4-16	Conduit, Connectors and Wiring, Type C and D Separators
4-10	Control Box Indicator Lights, Type C and D Separators
4-12	Control Box Relay, Type C and D Separators
4-11	Control Box Switches, Type C and D Separators
4-13	Control Box Terminals, Type C and D Separators
4-14	Control Box, Type C and D Separators
4-28	Filter Support, Type C and D Separators
4-30	First Stage (Prefilter) Separator, Type C and D
4-15	Flow Rate Indicator, Type C and D Separators
4-34	Inlet Valve, Manual, Type C and D Separators
4-35	Intervessel Shutoff Valve, Manual, Type C and D Separators
4-38	Mounting Frame, Type A and B Separators
4-37	Mounting Frame, Type C and D Separators
4-18	Oil Discharge Valves, Manually Operated, Type C and D Separators
4-17	Piping and Fittings, Type C and D Separators
4-9	Pressure Gauges, Mounting Bracket, Identification and Legend Plates, Type C and D Separators

4-8. SUMMARY AND DETAILED PROCEDURES (Continued).
--

Paragraph	Procedure
4-19	Pressure Gauge and Vessel Tubing, Type C and D Separators
4-23	Relief Valve, Type C and D Separators
4-31	Second Stage Separator, Type C and D
4-29	Sightglass and Fittings, Type C and D Separators
4-20	Supply Pump Assembly, Type C and D Separators
4-22	Supply Pump Motor, Type C and D Separators
4-21	Supply Pump, Type C and D Separators
4-26	Vessel Cover, Type C and D Separators
4-24	Vessel Sub-Assembly, Type C and D Separators
4-36	Warning, Instruction and Identification Plates, Type C and D Separators
4-33	Water Discharge Valve, Manually Operated, Type C and D Separators
4-32	Water Sample/Drain Valve, Type C and D Separators

4-9. PRESSURE GAUGES, MOUNTING BRACKET, IDENTIFICATION AND LEGEND PLATES, TYPE C and D SEPARATORS.

This task covers:

- a. Removal
- b. Cleaning
- c. Repair/Replace
- d. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Cleaning Solvent P-D-680
Appendix C. Item No. 2
Pressure gauge(s)
Legend plates
Bucket
Clean Cloths
Detergent

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Removal

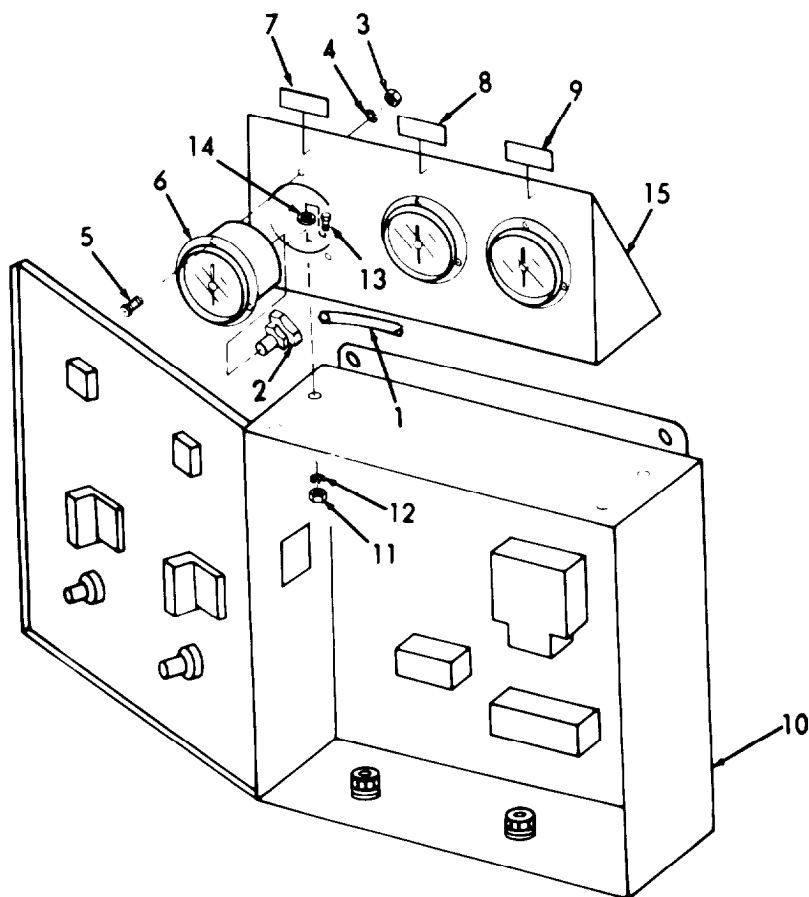
- | | | | |
|----|----------------|---|------------------------|
| 1. | Air line | Disconnect air line (1), by unscrewing connector (2). | |
| 2. | Pressure Gauge | <ul style="list-style-type: none"> a. Remove nuts (3), lock-washers (4) and screws (5). b. Remove pressure gauge (6). | Discard, if defective. |

NOTE

Remove other gauges in the same manner.

4-9. PRESSURE GAUGES, MOUNTING BRACKET, IDENTIFICATION AND LEGEND PLATES, TYPE C and D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
3.	Legend and identification plates	Peel legend and identification plates (7, 8 and 9) from bracket (15).	Remove and discard only if defaced or illegible.
4.	Mounting bracket	<p>a. Open control box door (10).</p> <p>b. Remove nuts (11), lockwashers (12).</p> <p>c. Remove bolts (13) flat washers (14) from mounting bracket.</p> <p>d. Remove mounting bracket (15) from control panel.</p>	



1. Air Line
2. Connector
3. Nuts
4. Lockwasher
5. Screw
6. Pressure Gauge
7. Plate
8. Plate
9. Plate
10. Control Box
11. Nut
12. Lockwasher
13. Bolt
14. Flatwasher
15. Bracket

4-9. PRESSURE GAUGES, MOUNTING BRACKET, IDENTIFICATION AND LEGEND PLATES, TYPE C and D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

WARNING

Cleaning solvent Fed. Spec. PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated or prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°-138°F (38°-59°C).

Cleaning

- a. Using a mild detergent, water and clean cloth, wipe gauges clean.
- b. Clean bracket with a clean cloth dampened in cleaning solvent PD-680 and dry thoroughly.

Repair

Replace defective part with
 a. Serviceable-like item.

Installation

- Mounting bracket
 - a. Position mounting bracket (15) on control panel (10).
 - b. Use flatwasher (14), bolt (13), lockwasher (12), and nut (11), to fasten bracket (15) to control panel (10).

6. Legend and identification plates (7, 8 and 9) Press in place if replaced. Self adhesive.

4-9. PRESSURE GAUGES, MOUNTING BRACKET, IDENTIFICATION AND LEGEND PLATES, TYPE C and D SEPARATOR (Continued).

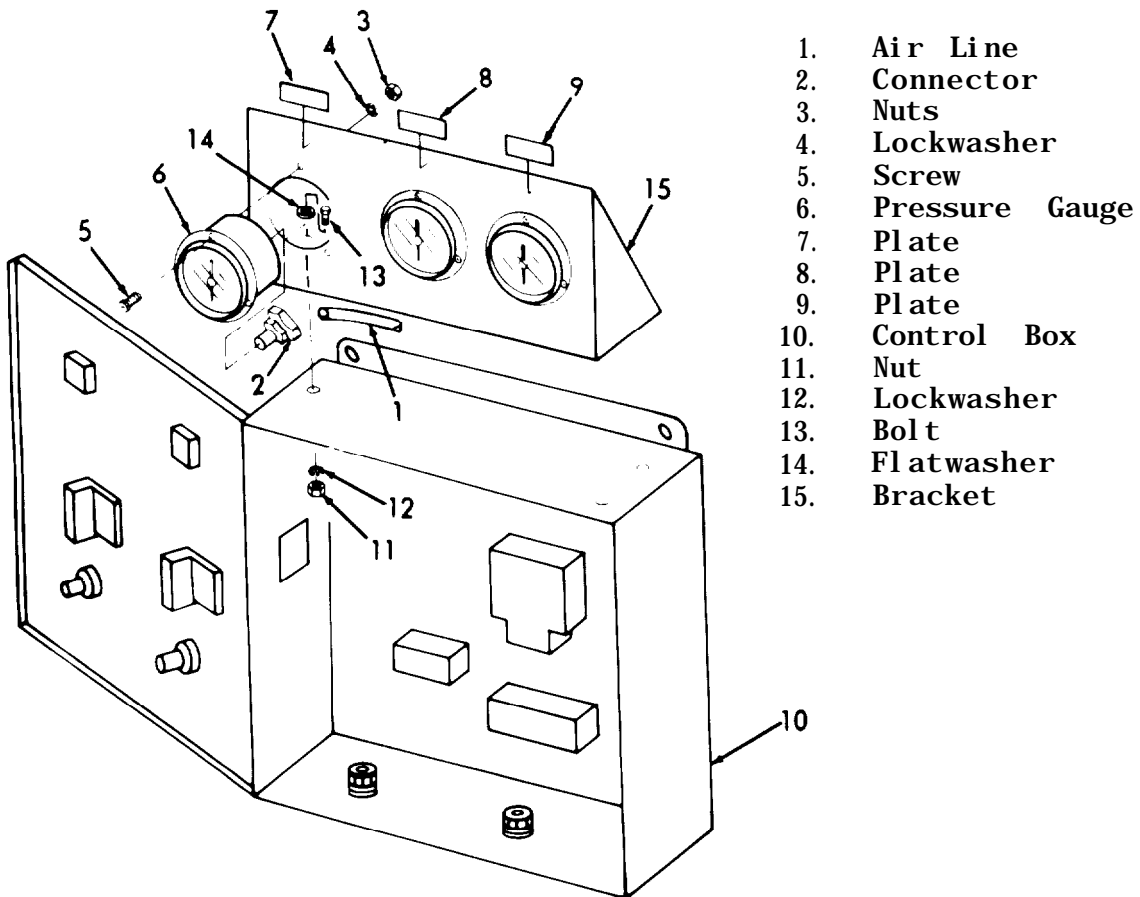
LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|----|----------------|--|--|
| 7. | Pressure gauge | <p>a. Insert pressure gauge (6) thru opening in mounting bracket (15).</p> <p>b. Secure with screws (5), lockwashers (4) and nuts (3).</p> | |
|----|----------------|--|--|

NOTE

Install other gauges in the same manner.

- | | | | |
|----|----------|---|--|
| 8. | Air line | Secure air line (1) to back of gauge by tightening connector (2). | |
|----|----------|---|--|



4-10. CONTROL BOX INDICATOR LIGHTS, TYPE C AND D SEPARATORS.

This task covers:

- a. Removal b. Repair/Replace c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Indicator lights

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



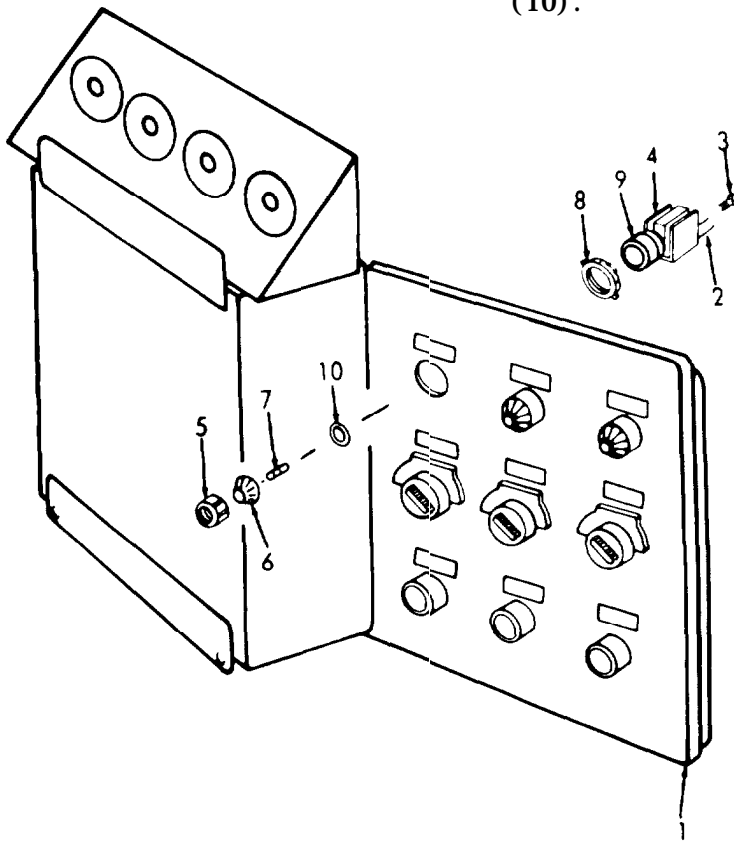
Electrical shock or serious injury may result if internal power is not turned off prior to servicing this assembly.

Remove

- | | | |
|----|----------------------------------|---|
| 1. | Electric power | Turn OFF. |
| 2. | Monitor or supply pump indicator | <ul style="list-style-type: none"> a. Open control panel door (1). b. Tag and disconnect leads (2). c. Remove screw (3) from back of light body (4). |

4-10. CONTROL BOX INDICATOR LIGHTS, TYPE C AND D SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
		d. Move light body (4) slightly to right toward front of control panel door (1).	Lamp body is recessed in notch in lamp housing.
		Disengage light body (4) from lamp housing (9).	
		f. Unscrew lens cap (5) from lamp housing (9).	
		g. Remove lens (6) from cap (5).	
		h. Remove lamp (7).	Discard defective lamp.
		i. Remove nut (8), lamp housing (9) and gasket (10).	



- 1. Door
- 2. Leads
- 3. Screw
- 4. Light Body
- 5. Lens Cap
- 6. Lens
- 7. Lamp
- 8. Nut
- 9. Lamp Housing
- 10. Gasket

**4-10. CONTROL BOX INDICATOR LIGHTS, TYPE C AND D SEPARATORS
(Continued).**

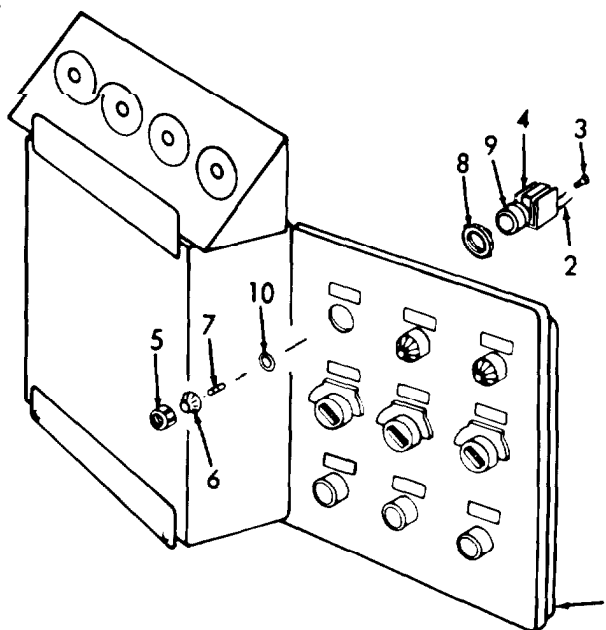
LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Installation

- | | | | |
|----|--|---|---|
| 3. | Monitor or supply pump indicator light | <ul style="list-style-type: none"> a. Install gasket (10) on lamp housing (9). b. Insert lamp housing (9) in control panel and secure with nut (8). c. Install lamp (7). d. Install lens (6) in cap (5). Screw cap (5) onto lamp housing (9). e. Place lamp body (4) on housing (9) turn slightly to right toward front of panel to engage in notch in housing. f. Install screw (3) to secure. g. Reconnect leads (2) and close door (1). | <p>Lamp body has to be engaged in notch in housing to secure.</p> |
|----|--|---|---|

- | | | |
|----|----------------|----------|
| 4. | Electric power | Turn ON. |
|----|----------------|----------|

- 1. Door
- 2. Leads
- 3. Screw
- 4. Light Body
- 5. Lens Cap
- 6. Lens
- 7. Lamp
- a. Nut
- 9. Lamp Housing
- 10. Gasket



4-11. CONTROL BOX SWITCHES, TYPE C AND D SEPARATORS

This task covers:

- a. Removal b. Repair c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts Equipment Condition
Switch(s)

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

WARNING

Electrical shock or serious injury may result if internal power is not turned off prior to servicing this assembly.

Removal

1. Electric power Turn OFF.

2. Monitor or supply pump switch Open control panel door
 - a. (1).
 - b. Disconnect leads (2) from switch.
 - c. Unscrew nut (3) and remove legend plate (4).

4-11. CONTROL BOX SWITCHES, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

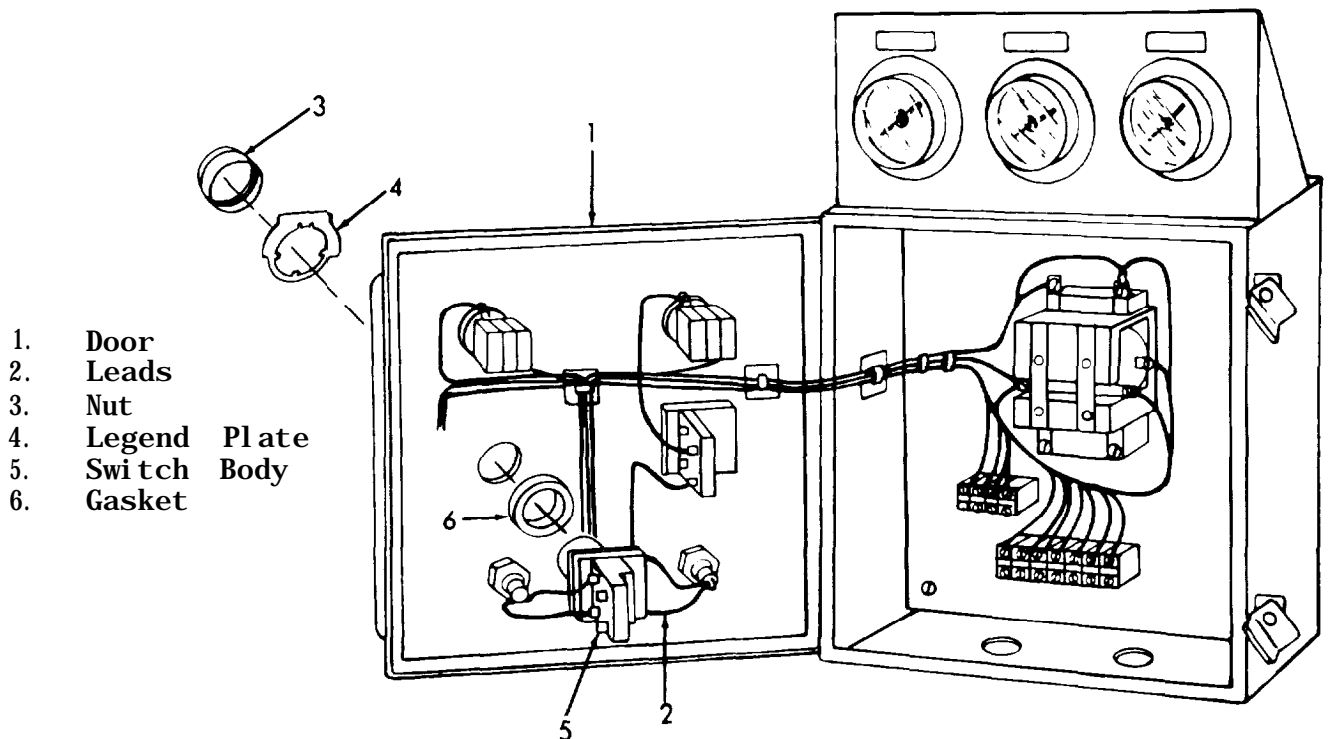
		d. Remove switch body (5) and gasket (6) from rear of panel.	Discard defective switch.
--	--	--	---------------------------

Repair

Replace defective switch with a serviceable-like item.

Installation

3.
 - a. Place gasket (6) in position on control panel.
 - b. Insert switch body (5) into panel from rear.
 - c. Position legend plate (4) in place and install nut (3) to secure. Tighten nut.
 - d. Reconnect leads (2) and close door (1).



4-12. CONTROL BOX RELAY. TYPE C AND D SEPARATORS.

This task covers:

- a. Removal b. Repair/Replace c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Relay

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



Electrical shock or serious injury may result if internal power is not turned off prior to servicing this assembly.

Removal

1. Electric power Turn OFF.
2. Control panel door (1) Open.
- Wiring (2) Tag and disconnect.

4-12. CONTROL BOX RELAY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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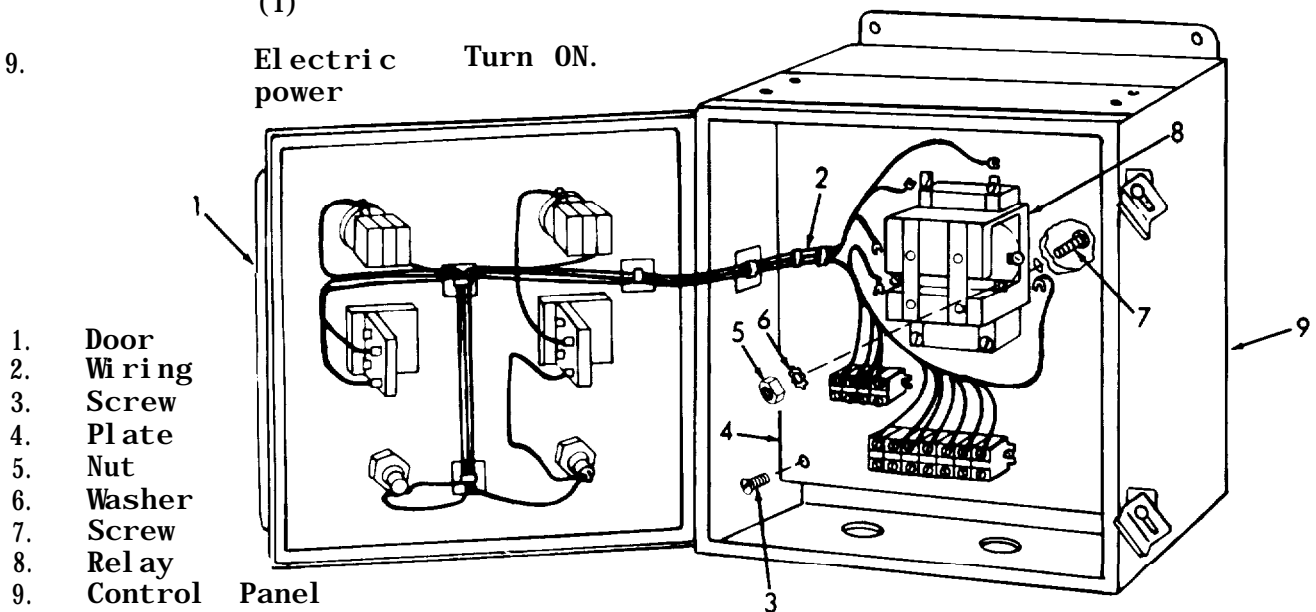
- | | | | |
|----|--------------|--|-----------------------|
| 3. | Plate
(4) | Remove four screws (3) and remove plate (4). | |
| 4. | Relay
(8) | Remove nuts (5), washers (6) screws (7). Remove relay (8). | Discard if defective. |

Repair

Replace relay with a serviceable-like item

Installation

- | | | |
|----|----------------|--|
| 5. | Relay
(8) | Secure relay (8) to plate (4) with screws (7), washers (6) and nuts (5). |
| 6. | Plate
(4) | Secure to back of control panel (9) with four screws (3). |
| 7. | Wiring
(2) | Reconnect. |
| 8. | Door
(1) | Close and lock. |
| 9. | Electric power | Turn ON. |



4-13. CONTROL BOX TERMINALS, TYPE C AND D SEPARATORS.

This task covers:

- a. Removal b. Repair/Replace c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Terminal sections

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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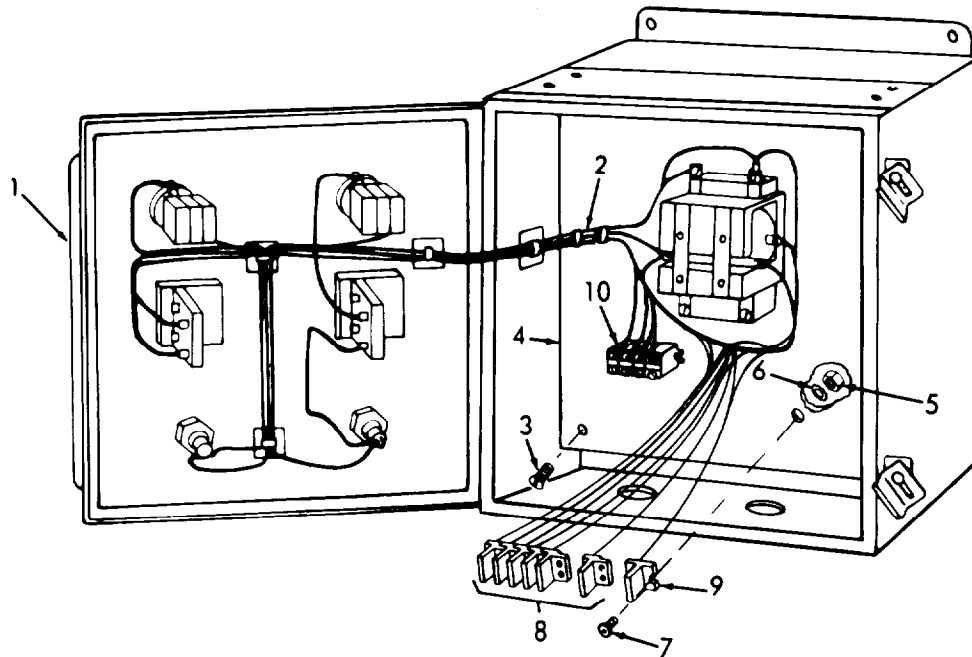
Electrical shock or serious injury may result if internal power is not turned off prior to servicing this assembly.

Removal

- | | | |
|----|------------------------|---------------------|
| 1. | Electric power | Turn OFF. |
| 2. | Control Panel Door (1) | Open. |
| | Wiring (2) | Tag and disconnect. |

4-13. CONTROL BOX TERMINALS, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
3.	Plate (4)	Remove four screws (3) and remove plate (4).	
4.	Terminal (8)	a. Remove nuts (5), washers (6) and screws (7). b. Separate sections (9). c. Remove other terminal (10) in the same manner.	Terminal sections are interlocking. Discard defective sections.

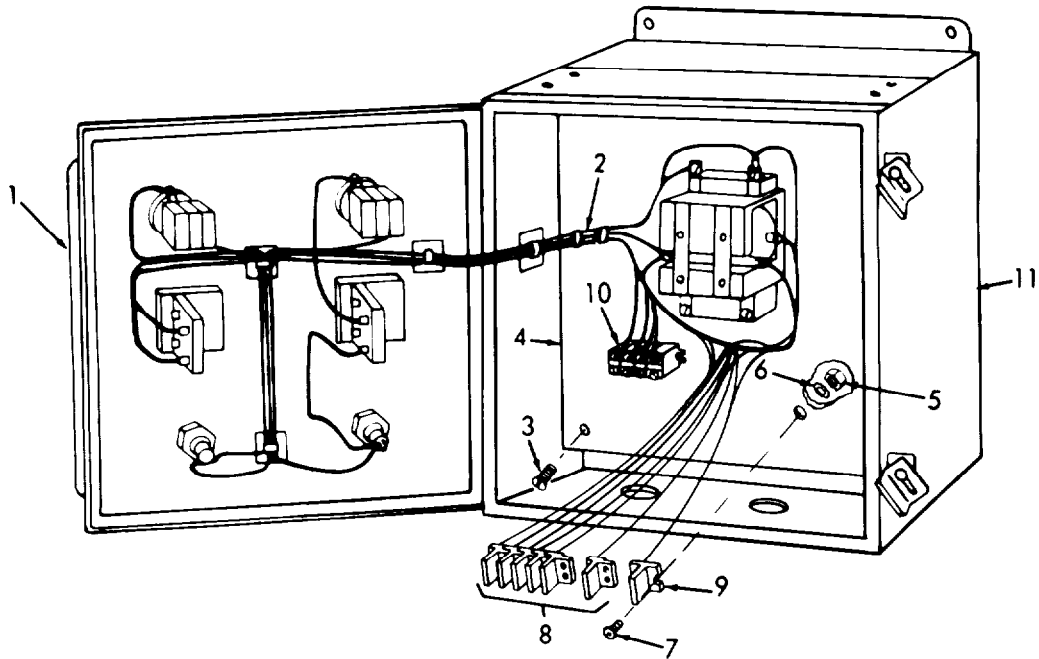


- 1. Panel Door
- 2. Wiring
- 3. Screws
- 4. Plate
- 5. Nuts
- 6. Washer
- 7. Screws
- 8. Terminal
- 9. Section
- 10. Terminal

4-13. CONTROL BOX TERMINALS, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
	Repair	Replace defective terminal sections with a serviceable-like item.	
	Installation		
5.	Terminal (8)	a. Interlock sections (9). b. Secure to plate (4) with screws (7), washers (6) and nuts (5).	
NOTE			
Install other terminal (10) in the same manner.			
6.	Plate (4)	Secure to back of control panel (11) with screws (3).	
7.	Wiring (2)	Reconnect.	
8.	Control panel door (1)	Close and lock.	
9.	Electric power	Turn ON.	

4-13. CONTROL BOX TERMINALS, TYPE C AND D SEPARATORS (Continued).



- 1. Panel Door
- 2. Wiring
- 3. Screws
- 4. Plate
- 5. Nuts
- 6. Washers
- 7. Screws
- 8. Terminal
- 9. Section
- 10. Terminal
- 11. Control Panel

4-14. CONTROL BOX, TYPE C AND D SEPARATORS.

This task covers:

- a. Removal b. Repair/Replace c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Arc welder
Tool Kit, General Mechanics

Material/Parts
Paint ML-P-23236 Type II Class 3
Appendix C. Item No, 4
Door seal
Control Box

Equipment Condition
Relays and terminals
installed

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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Electrical shock or serious injury may result if internal power is not turned off prior to servicing this assembly.

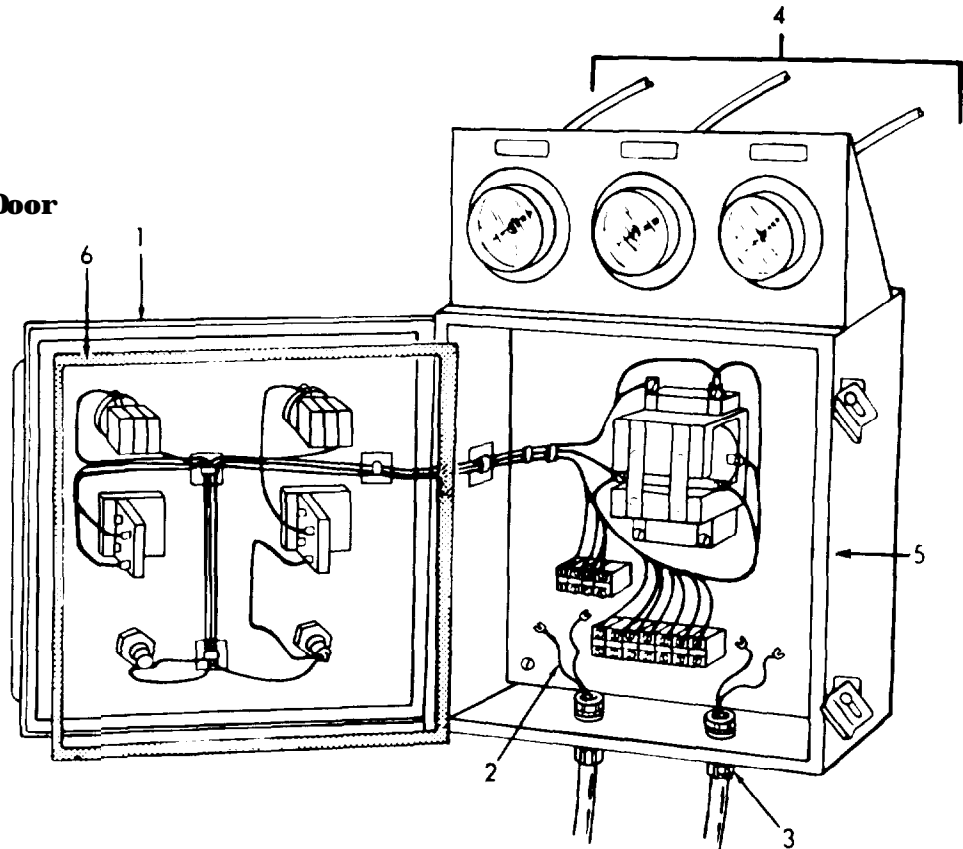
Removal

- | | | |
|----|-------------------------|---|
| 1. | Electric power | Turn OFF. |
| 2. | Control box door
(1) | Open. |
| 3. | Wiring
(2) | Tag and disconnect internal power supply. |

4-14. CONTROL BOX, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
4.	Connector (3)	a. Unscrew. b. Withdraw wiring from control box.	
5.	Air lines (4)	Disconnect from pressure gauges.	
6.	Relay	Refer to paragraph 4-12 and remove relay.	
7.	Terminals	Refer to paragraph 4-13 and remove terminals.	
8.	Control box (5)	Remove from mounting and lay on suitable work bench.	
9.	Door seal (6)	Remove, if defective.	

- 1. Control Box Door
- 2. Wiring
- 3. Connector
- 4. Air Lines
- 5. Control Box
- 6. Door Seal

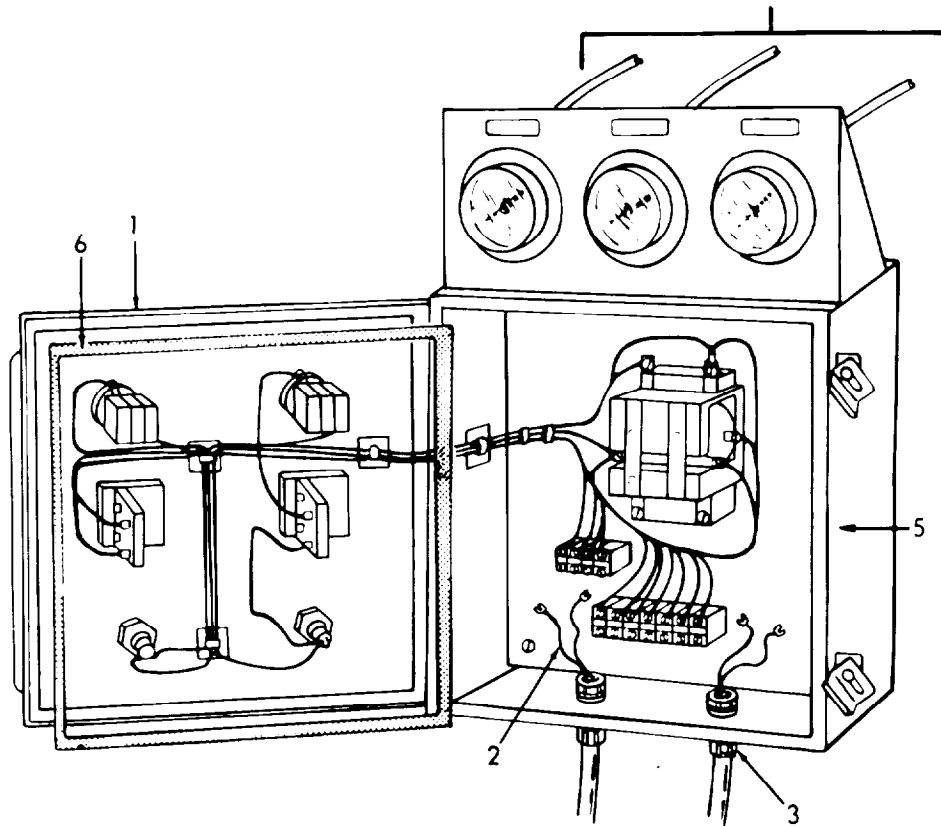


4-14. CONTROL BOX, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
Repair		Weld small cracks. Straighten small dents by hammering out. Spot-paint disturbed areas.	
Installation			
10.	Door seal (6)	Install if removed.	
11.	Control box (5)	Mount in place.	
12.	Terminals	Refer to paragraph 4-13 and install terminals.	
13.	Relays	Refer to paragraph 4-12 and install relay.	
14.	Wiring (2)	a. Insert into control box. Tighten con- nector (3). b. Reconnect to terminals.	
15.	Control box door (1)	Close and lock.	
16.	Air lines (4)	Reconnect to pressure gauges.	
17.	Electric power	Turn ON.	

4-14. CONTROL BOX, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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1. Control Box Door
2. Wiring
3. Connector
4. Air Lines
5. Control Box
6. Door Seal

4-15. FLOW RATE INDICATOR, TYPE C AND D SEPARATORS.

This task covers:

- | | | |
|---------------|-------------------|-----------------|
| a. Inspection | c. Removal | e. Installation |
| b. Service | d. Repair/Replace | |

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Detergent
Indicator, Gasket,
"O"-rings
Clean Cloths

Equipment Condition
Power OFF

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Inspection

- | | | | |
|----|----------------------|---------------------------------|--|
| 1. | Indicator glass | a. Inspect for poor visibility. | |
| | Indicator and piping | b. Evidence of leaking. | |

Service

CAUTION

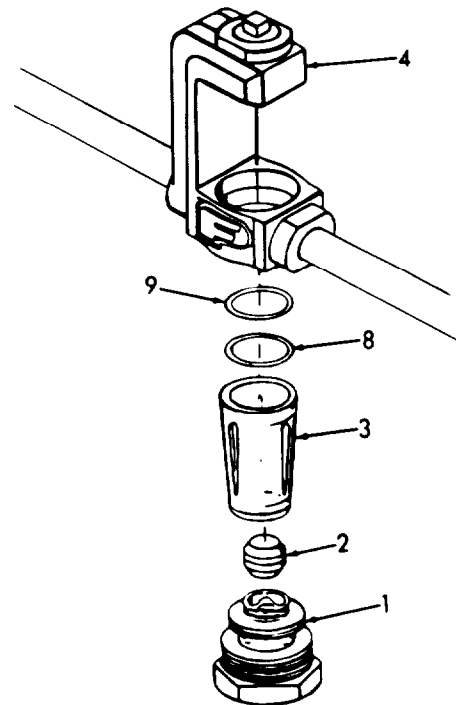
Exercise care when removing the inlet fitting (1), as the float (2) and tube (3) are free to fall out of the meter body (4).

- | | | | |
|----|-------------------|--------------------------------|--|
| 2. | Inlet fitting (1) | a. Remove. | |
| | | b. Remove "O" rings (8 and 9). | |

4-15. FLOW RATE INDICATOR, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
3.	Tube and float (3)	<ul style="list-style-type: none"> a. Remove b. Clean float and tube using a clean cloth, detergent and water. c. Insert tube (3) into body (4). d. Insert float (2) into tube (3). e. Install "O" rings (8 and 9) into inlet fitting. f. Install inlet fitting (1). 	

- 1. Inlet Fitting
- 2. Tube
- 3. Float
- 4. Body
- 8. "O" Ring
- 9. "O" Ring



4-15. FLOW RATE INDICATOR, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Removal

- | | | | |
|----|----------------------|---|--|
| 4. | Piping and indicator | Remove inlet (5) and outlet piping (6) as necessary, freeing the indicator (7). | |
|----|----------------------|---|--|

Replacement

Replace "O" rings and defective flow rate indicator with a serviceable-like item

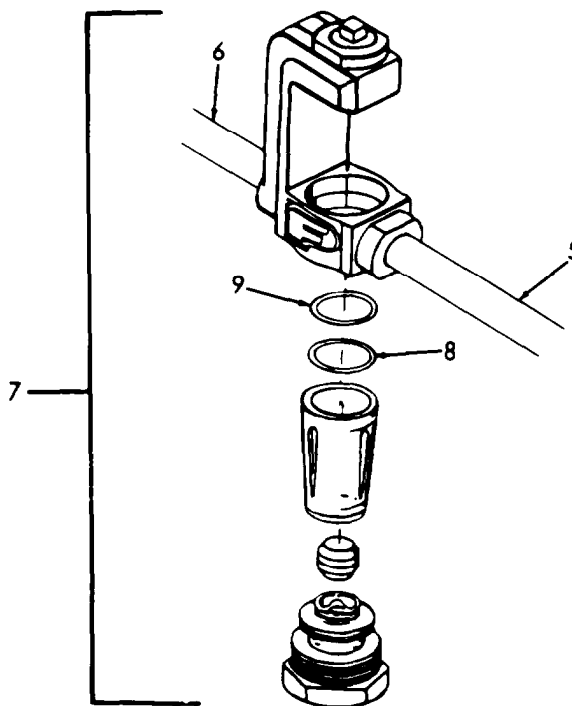
Installation

- | | | | |
|----|--------|--|--|
| 5. | Piping | a. Position flow rate indicator (7) into place. | |
| | | b. Install "O" rings (8 and 9). | |
| | | c. Install outlet (6) and inlet piping (5) to indicator. | |

NOTE

The flow rate indicator should be as free as possible from piping strains.

- 5. Inlet Piping
- 6. Outlet Piping
- 7. Flow Rate Indicator
- 8. "O" Ring
- 9. "O" Ring



4-16. CONDUIT, CONNECTORS AND WIRING, TYPE C AND D SEPARATORS.

This task covers:

- | | |
|---------------|-------------------|
| a. Removal | c. Repair/Replace |
| b. Inspection | d. Installation |

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Conduit, Connectors,
Wire
Appendix C. Item No. 8
Electricians tape
Appendix C. Item No. 5

Equipment Condition

Personnel Required
1

LOCATION	ITEM	ACTION	REMARKS
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Electric shock or serious injury may result if electric power is not turned off prior to performing maintenance.

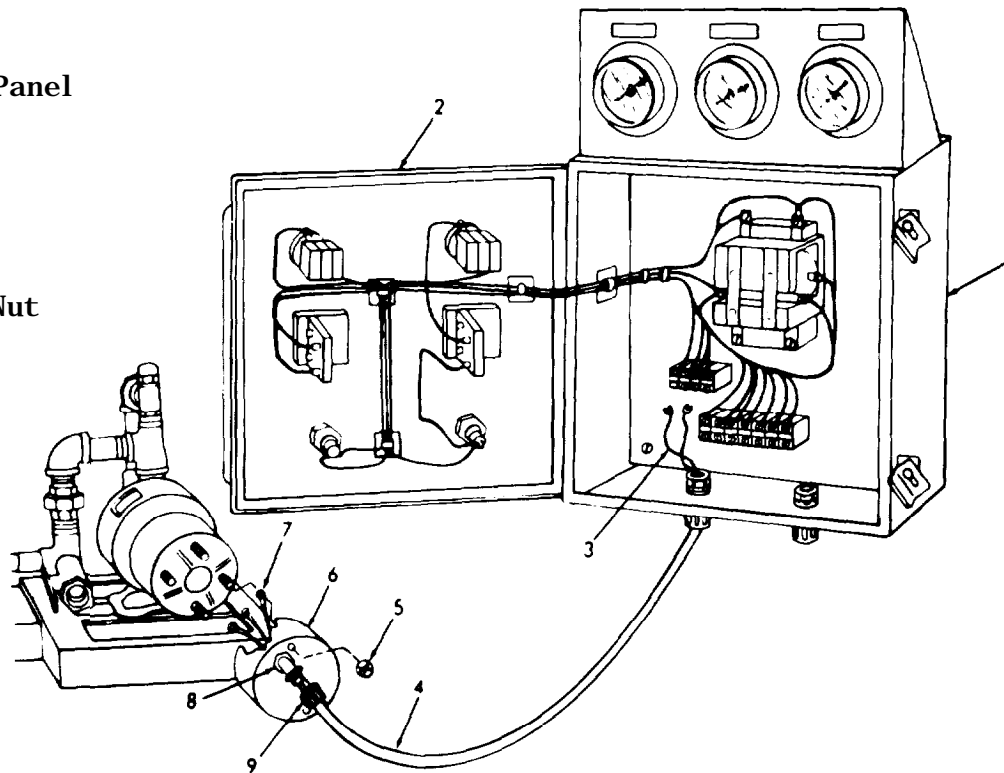
Removal

- | | | |
|----|----------------------|--|
| 1. | Control Panel
(1) | Open door (2). |
| 2. | Leads (3) | Tag and disconnect. |
| 3. | Conduit
(4) | Withdraw thru bottom of control panel. |

4-16. CONDUIT, CONNECTORS AND WIRING, TYPE C AND D SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
4.	Motor leads, end cover and connector	<p>a. Remove nuts (5) from end cover (6).</p> <p>b. Cover (6) will separate from motor far enough to disconnect leads (7).</p> <p>c. Remove cover (6).</p> <p>d. Remove conduit (4) from cover (6).</p> <p>e. Remove locking nut (8) from inside cover (6).</p> <p>f. Remove connector (9).</p> <p>g. Remove lead wires (3) from conduit (4).</p>	

1. Control Panel
2. Door
3. Leads
4. Conduit
5. Nuts
6. Cover
7. Leads
8. Locking Nut
9. Connector



**4-16. CONDUIT, CONNECTORS AND WIRING, TYPE C AND D SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Inspection

	Connector	Inspect for damaged threads.	
	Leads	Inspect for damaged insulation or broken wires.	

Repair

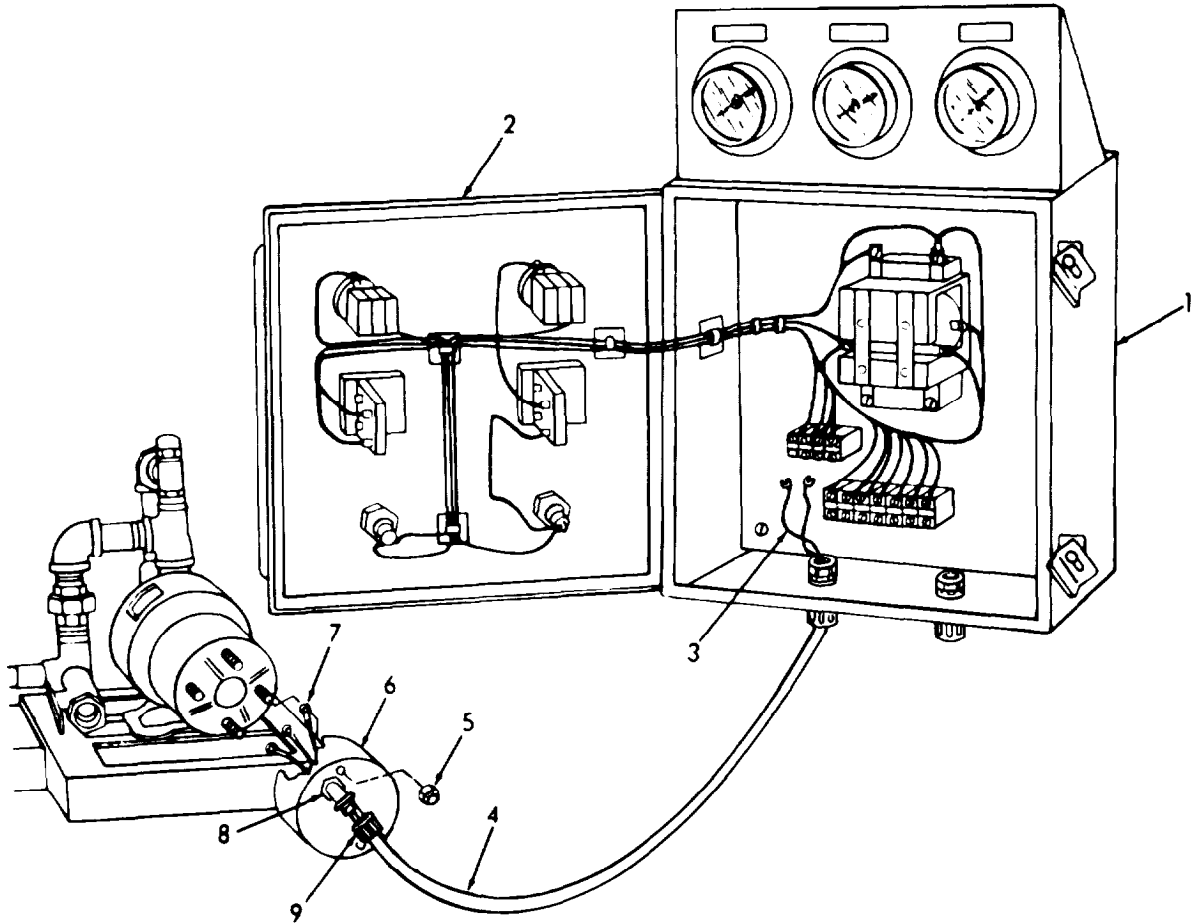
		Replace damaged or defective connector with a serviceable-like item.	
		Wrap damaged insulation with electricians' tape.	
		Replace defective wire lead using the same size wire.	

Installation

5.	Motor and control panel leads (3)	Thread leads (3) into conduit (4).	
6.	Connector (9)	Install in cover (6) using locking nut (8).	
7.	Conduit (4)	a. Thread thru connector and cover. b. Connect motor leads (7) to terminals.	
8.	Cover (6)	Install on motor with nuts (5).	
9.	Control panel leads (3)	a. Connect to proper terminal in control box (1). b. Close door (2). c. Turn electric power ON.	

4-16. CONDUIT, CONNECTORS AND WIRING, TYPE C AND D SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



1. Control Panel
2. Door
3. Leads
4. Conduit
5. Nuts
6. Cover
7. Leads
8. Nut
9. Connector

4-17. PIPING AND FITTINGS, TYPE C AND D SEPARATORS.

This task covers:

- | | |
|---------------|-------------------|
| a. Removal | c. Repair/Replace |
| b. Inspection | d. Installation |

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Sealing compound
Appendix C. Item No. 6
Fittings
Valves

Equipment Condition
System Drained

Personnel Required

1

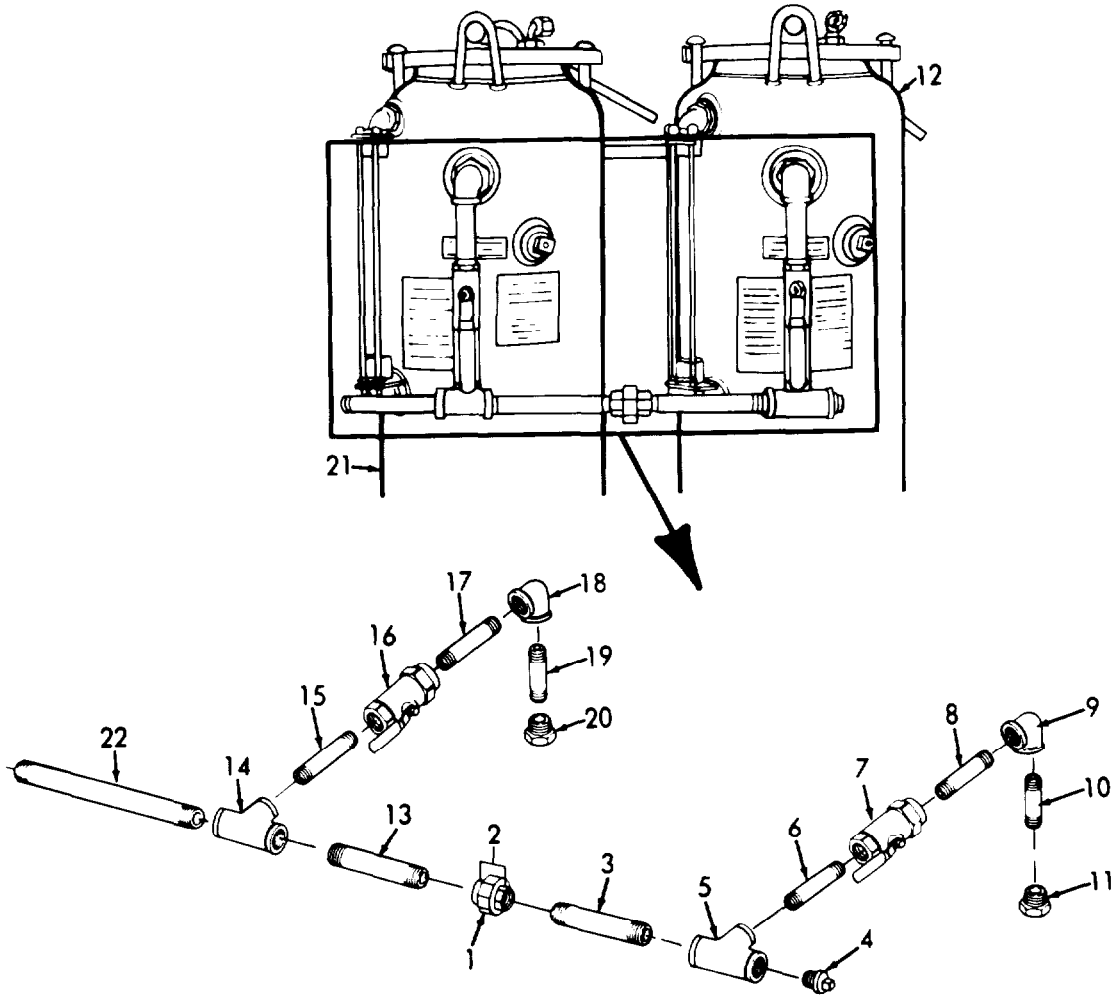
LOCATION	ITEM	ACTION	REMARKS
-----------------	-------------	---------------	----------------

Removal

- | | | | |
|----|--|--|--|
| 1. | Oil discharge line (22) | Remove. | |
| 2. | 1st Stage (prefilter) (12) piping and fittings | a. Unscrew collar (1).
b. Remove union halves (2).
c. Remove nipple (3), pipe plug (4), tee (5), nipple (6), valve (7), nipple (8), elbow (9), nipple (10) and reducer (11). | |
| 3. | Second stage separator piping and fittings | Remove nipple (13), tee (14), nipple (15), valve (16), nipple (17), elbow (18), nipple (19) and reducer (20). | |

4-17. PIPING AND FITTINGS, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- | | |
|-------------------|---------------------------|
| 1. Collar | 12. 1st Stage (Prefilter) |
| 2. Uni on Hal ves | 13. Ni pple |
| 3. Ni pple | 14. Tee |
| 4. Plug | 15. Ni pple |
| 5. Tee | 16. Val ve |
| 6. Ni pple | 17. Ni pple |
| 7. Val ve | 18. El bow |
| 8. Ni pple | 19. Ni pple |
| 9. El bow | 20. Reducer |
| 10. Ni pple | 21. 2nd Stage |
| 11. Reducer | 22. Oil Discharge Line |

4-17. PIPING AND FITTINGS, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Inspection

Inspect valves for proper operation and piping and fittings for damaged threads.

Repair

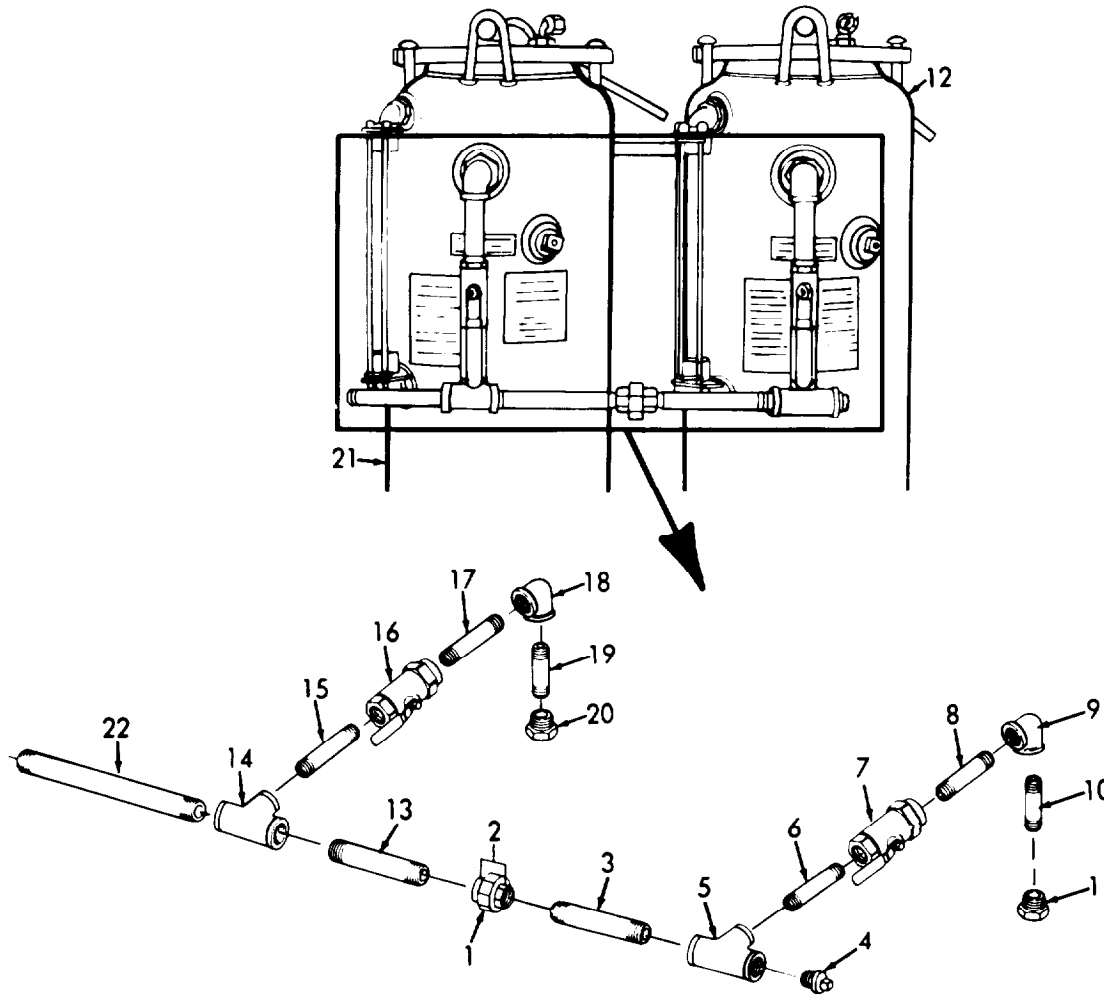
Replace defective valve, piping or fittings with serviceable-like item.

Installation

- | | | | |
|----|--|---|--|
| 4. | Second stage separator piping and fittings | Install reducer (20), nipple (19), elbow (18), nipple (17), valve (16), nipple (15), tee (14) and nipple (13). | |
| 5. | 1st Stage (prefilter) (12) piping and fittings | <p>a. Install reducer (11), nipple (10), elbow (9), nipple (8), valve (7), nipple (6), tee (5), pipe plug (4), nipple (3) and union halves (2).</p> <p>b. Secure by tightening collar (1).</p> <p>c. Install oil discharge line (22).</p> | |

4-17. PIPING AND FITTINGS, TYPE C AND D SEPARATORS (Continued).

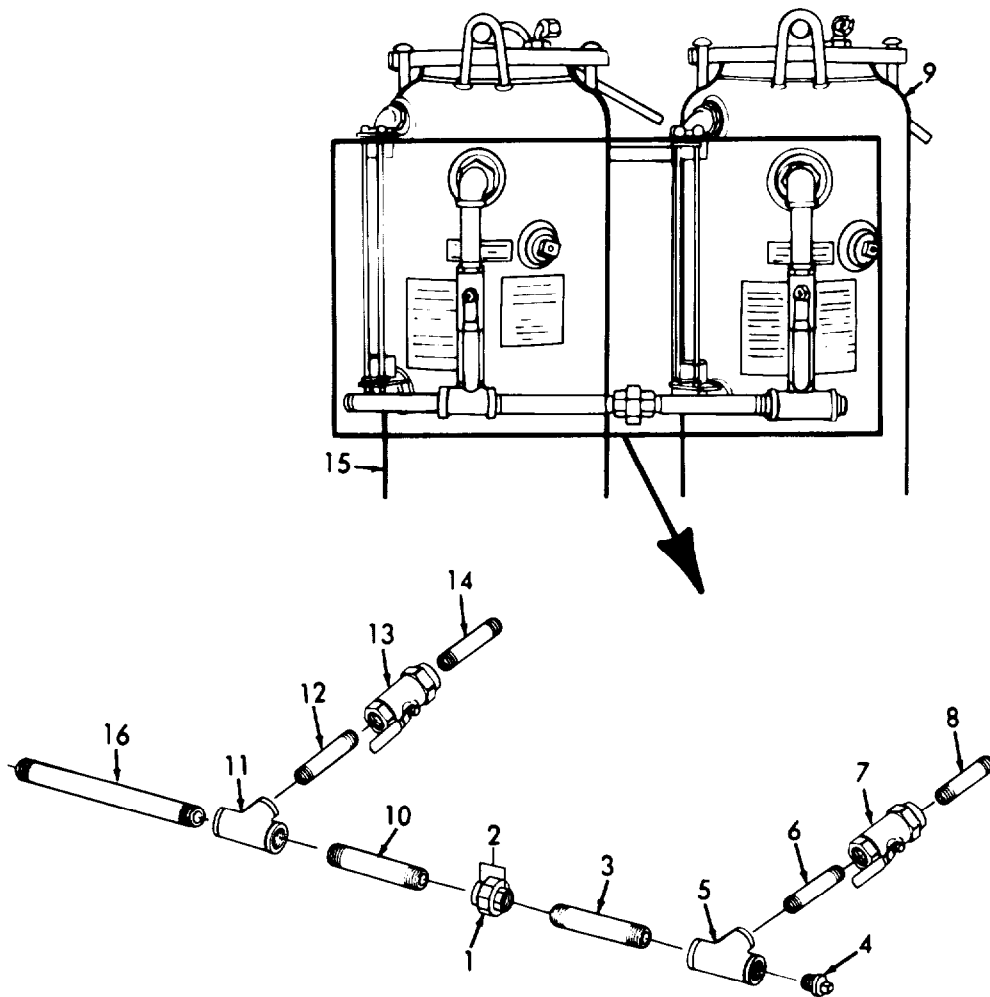
LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- | | | | |
|-----|--------------|-----|-----------------------|
| 1. | Collar | 12. | 1st Stage (Prefilter) |
| 2. | Union Halves | 13. | Nipple |
| 3. | Nipple | 14. | Tee |
| 4. | Plug | 15. | Nipple |
| 5. | Tee | 16. | Valve |
| 6. | Nipple | 17. | Nipple |
| 7. | Valve | 18. | Elbow |
| 8. | Nipple | 19. | Nipple |
| 9. | Elbow | 20. | Reducer |
| 10. | Nipple | 21. | 2nd Stage |
| 11. | Reducer | 22. | Oil Discharge Line |

4-18. OIL DISCHARGE VALVES (MANUALLY OPERATED), TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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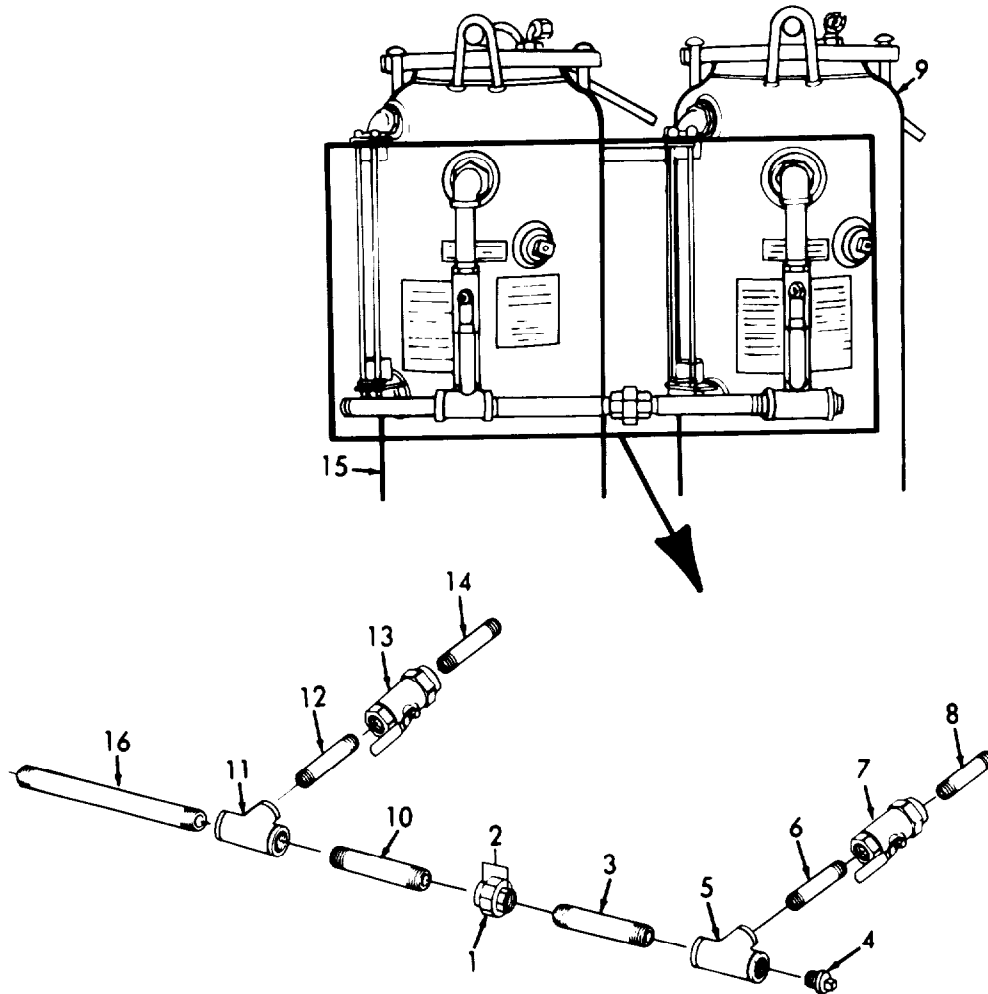
- | | |
|--------------|--------------------------|
| 1. Collar | 9. 1st Stage (Prefilter) |
| 2. Union | 10. Nipple |
| 3. Nipple | 11. Tee |
| 4. Pipe Plug | 12. Nipple |
| 5. Tee | 13. Valve |
| 6. Nipple | 14. Nipple |
| 7. Valve | 15. 2nd Stage Separator |
| 8. Nipple | 16. Oil Discharge Line |

4-18. OIL DISCHARGE VALVES (MANUALLY OPERATED), TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
Replacement		Replace defective valve with a serviceable-like item.	
	Installation		
7.	Second stage separator (15) piping and valve	a. Install valve (13) onto nipple (14). b. Install nipple (12), tee (11) and nipple (10).	
8.	1st Stage (Prefilter) separator (9) piping and valve	a. Install valve (7) onto nipple (8). b. Install nipple (6), tee (5) and nipple (3). c. Secure to union (2) by tightening collar (1). d. Install oil discharge line (16).	Install pipe plug (4) in tee (5) if removed.

4-18. OIL DISCHARGE VALVES (MANUALLY OPERATED), TYPE C AND D SEPARATORS (Continued).

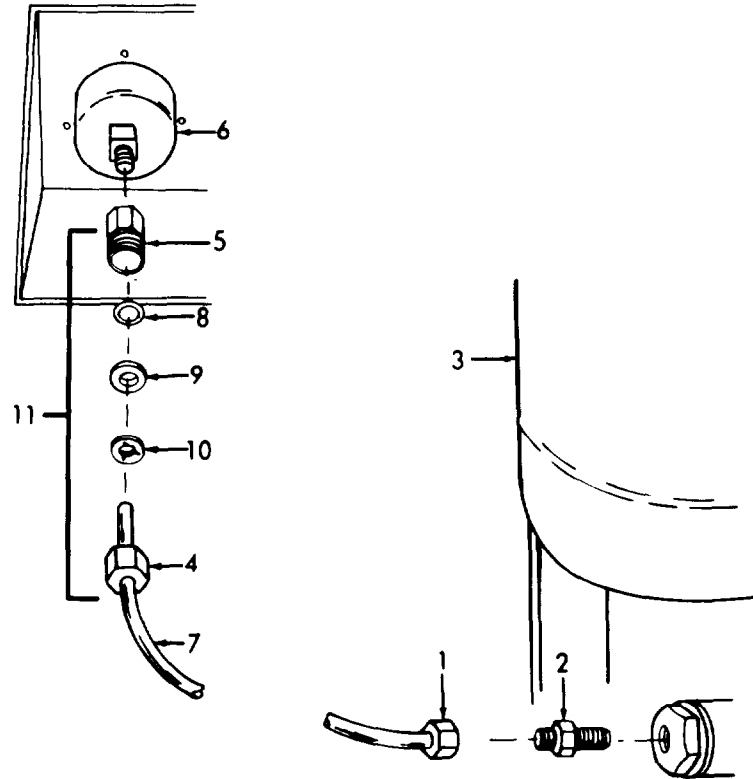
LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- | | | | |
|----|-----------|-----|-----------------------|
| 1. | Collar | 9. | 1st Stage (Prefilter) |
| 2. | Union | 10. | Nipple |
| 3. | Nipple | 11. | Tee |
| 4. | Pipe Plug | 12. | Nipple |
| 5. | Tee | 13. | Valve |
| 6. | Nipple | 14. | Nipple |
| 7. | Valve | 15. | 2nd Stage Separator |
| 8. | Nipple | 16. | Oil Discharge Line |

4-19. PRESSURE GAUGE AND VESSEL TUBING, TYPE C AND D SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
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1. Female Connector
2. Male Connector
3. Vessel
4. Female Connector
5. Male Connector
6. Pressure Gauge
7. Tubing
8. "O" Ring
9. Seal
10. Locknut
11. Male Connector Assembly

4-19. PRESSURE GAUGE AND VESSEL TUBING, TYPE C AND D SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
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NOTE

Remove other tubes and connectors in the same manner.

Repair/Replace

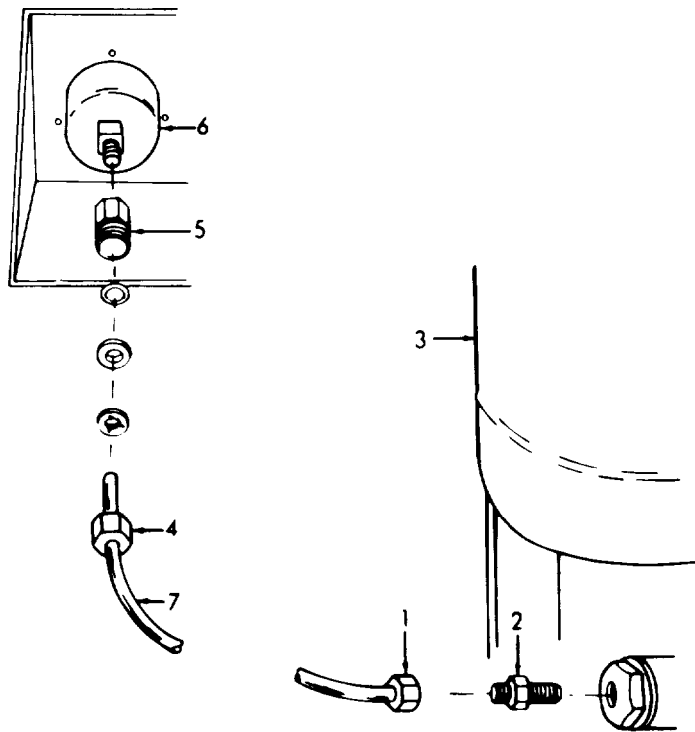
Replace defective male connector assembly or tube as necessary with serviceable-like item.

Installation

- | | | |
|----|----------------------|--|
| 3. | Control panel tubing | <ul style="list-style-type: none"> a. Install male connector (5) to back of pressure gauge (6). b. Install female connector over tubing (7). c. Place female connector (4) on male connector (5) and tighten. |
| 4. | Vessel tubing | <ul style="list-style-type: none"> a. Install male connector (2) on vessel (3). b. Install female connector (1) on tubing (7). c. Place female connector (1) on male connector (2) and tighten. |

4-19. PRESSURE GAUGE AND VESSEL TUBING, TYPE C AND D SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
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1. Female Connector
2. Male Connector
3. Vessel
4. Female Connector
5. Male Connector
6. Pressure Gauge Tubing
7. Tubing

4-20. SUPPLY PUMP ASSEMBLY, TYPE C AND D SEPARATORS.

This task covers:

- a. Test
- b. Removal
- c. Repair/Replace
- d. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Sealing compound
Appendix C. Item No. 6
Supply pump assembly
Piping parts

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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WARNING

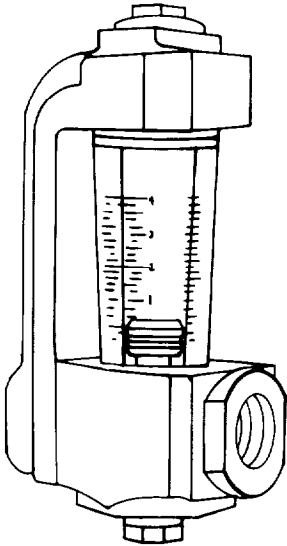
Electrical shock or serious injury may result if electric power is not turned off prior to performing maintenance on the supply pump assembly.

Test

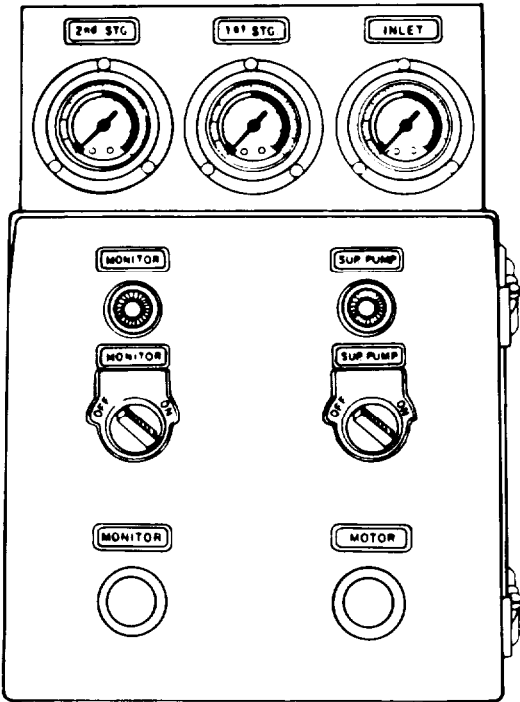
1.
 - a. Check flow rate indicator for rate of flow. Reading on gauge should be between 2 and 5 gpm
 - b. Check pressure gauges for loss of pressure.

4-20. SUPPLY PUMP ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Flow Rate Indicator



Pressure Gauges

4-20. SUPPLY PUMP ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
Removal			
2.	Electric power	Turn OFF.	
3.	Intake line (1)	Remove.	
4.	Motor end cover (2)	Remove nuts (3).	Cover can be separated from motor body far enough to disconnect leads (4).
5.	Leads (4)	a. Remove nuts (5). b. Remove cover (2) and leads (4). c. Remove locking nut (6) from inside cover (2) freeing connector (7).	Tag leads to insure proper pump rotation when reconnected. Reinstall cover.
6.	Supply pump piping	Loosen collar (8) from union (9).	
7.	Mounting hardware	a. Remove nuts (10), washers (11), bolts (12) and washers (13). b. Lift supply pump assembly (14) from mounting frame (15).	
8.	Piping and valve	a. Remove nipple (16), elbow (17) and nipple (18). b. Loosen collar (19) from union (20).	

4-20. SUPPLY PUMP ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS	
Repair		Replace defective supply pump assembly or piping parts with serviceable-like item.		
	Installation			
9.		Supply pump assembly	a. Install foot (33) on supply pump assembly (14) with washers (32) and nuts (31). b. Position supply pump assembly (14) on mounting frame (15). c. Secure with washers (13), bolts (12), washers (11), and nuts (10).	
10.		Piping and pressure relief valve	a. Install nipple (30), tee (29), nipple (28), elbow (27) and nipple (26). b. Install nipple (25), tee (24), nipple (23), relief valve (22) and nipple (21). c. Secure to union (20) by tightening collar (19). d. Install nipple (18), elbow (17) nipple (16). e. Secure to union (9) by tightening collar (8). f. Install inlet line (1).	
11.	Motor end cover (2) and leads (4)	a. Remove nuts (3) and cover (2). b. Install connector (7) on cover (2) with locking nut (6).		

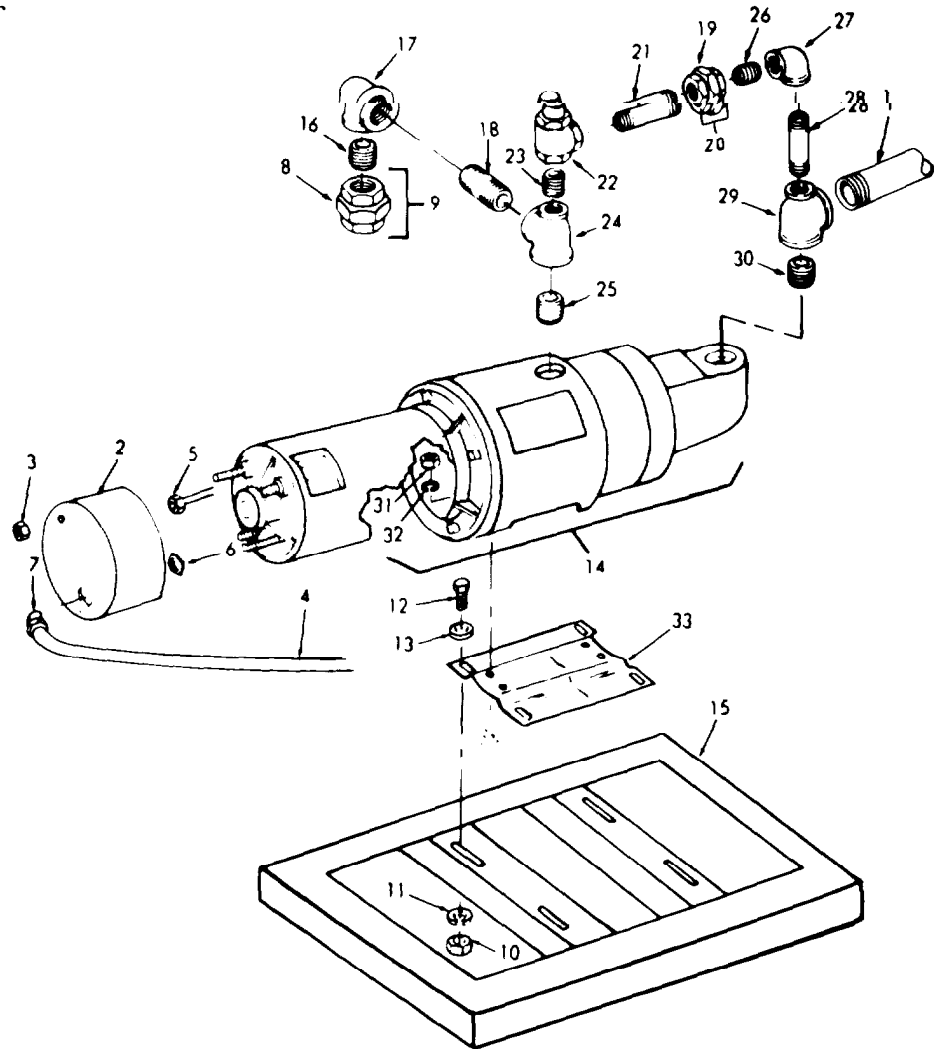
4-20. SUPPLY PUMP ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- c. Thread leads (4) thru connector.
- d. Connect leads (4) to motor terminals with nuts (5).
- e. Install cover (2) secure with nuts (3).

12. Electric power Turn ON.
power

- 1. Inlet Line
- 2. Motor End Cover
- 3. Nut
- 4. Lead
- 5. Nut
- 6. Locking Nut
- 7. Connector
- 8. Collar
- 9. Union
- 10. Nut
- 11. Washer
- 12. Bolt
- 13. Washer
- 14. Supply Pump Assembly
- 15. Mounting Frame
- 16. Ni pple
- 17. El bow
- 18. Ni pple
- 19. Collar
- 20. Uni on
- 21. Ni pple
- 22. Relief Valve
- 23. Ni pple
- 24. Tee
- 25. Ni pple
- 26. Ni pple
- 27. El bow
- 28. Ni pple
- 29. Tee
- 30. Ni pple
- 31. Nut
- 32. Washer
- 33. Foot



4-21. SUPPLY PUMP, TYPE C AND D SEPARATORS.

This task covers:

- a. Inspection
- b. Removal
- c. Repair/Replace
- d. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Sealing compound
Appendix C. Item No. 6
Supply pump

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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Disconnect power supply prior to performing maintenance on the supply pump.

Inspection

- 1.
 - a. Inspect pump for evidence of leaking seal assembly.
 - b. Loose flexible joint.

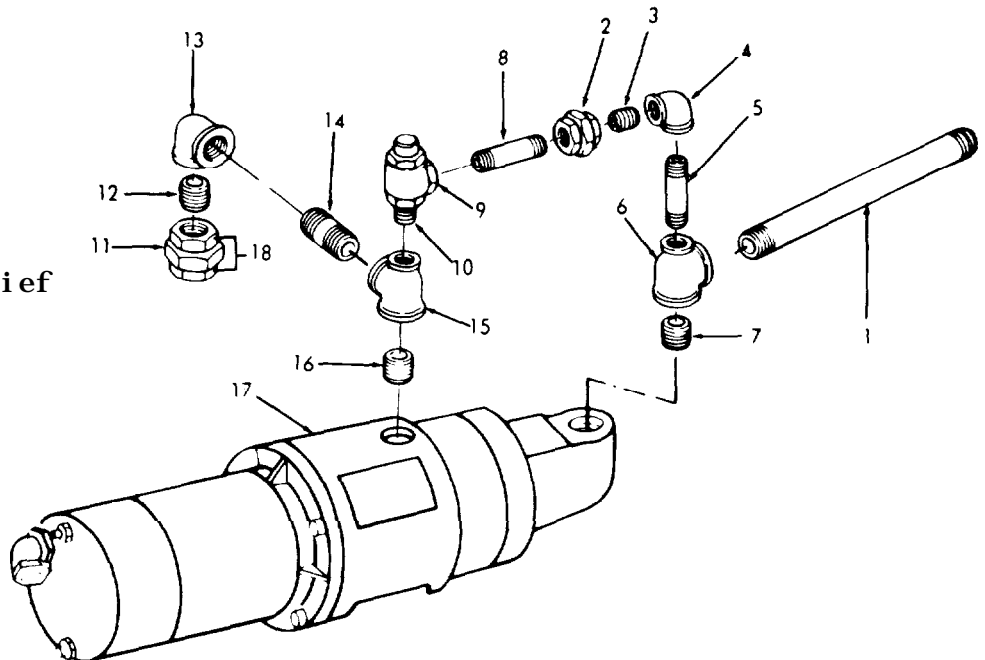
4-21. SUPPLY PUMP, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Removal

- | | | | |
|----|----------------|---|--|
| 2. | Inlet Line (1) | Remove. | |
| 3. | Piping | <p>a. Unscrew collar (2) from union.</p> <p>b. Remove nipple (3), elbow (4), nipple (5), reducing tee (6) and nipple (7).</p> <p>c. Remove nipple (8), pressure relief valve (9), and nipple (10).</p> <p>d. Unscrew collar (11) from union (18).</p> <p>e. Remove nipple (12), elbow (13), nipple (14), reducing tee (15) and nipple (16) from housing (17).</p> | |

1. Inlet Line
2. Collar
3. Nipple
4. Elbow
5. Nipple
6. Reducing Tee
7. Nipple
8. Nipple
9. Pressure Relief Valve
10. Nipple
11. Collar
12. Nipple
13. Elbow
14. Nipple
15. Reducing Tee
16. Nipple
17. Housing
18. Union



4-21. SUPPLY PUMP, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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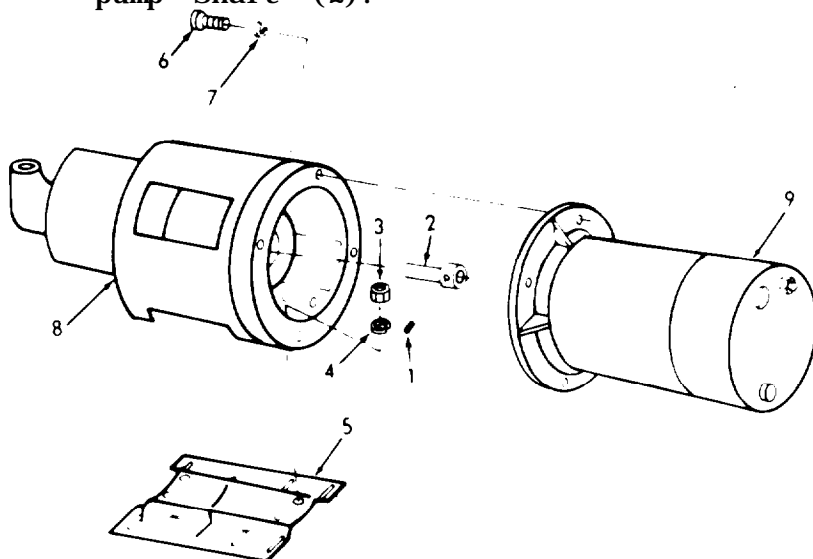
- | | | | |
|----|-------------|--|--|
| 4. | Supply pump | <ul style="list-style-type: none"> a. Remove setscrews (1) from flexible pump shaft (2). b. Remove nuts (3) and lockwashers (4) securing pump to foot (5). c. Remove screws (6) and lockwashers (7). d. Remove pump assembly (8) from motor (9). | |
|----|-------------|--|--|

Repair

Replace defective pump with a serviceable-like item.

Installation

- | | | | |
|----|-------------|--|--|
| 5. | Supply pump | <ul style="list-style-type: none"> a. Place pump assembly (8) on motor (9). b. Secure with lockwashers (7) and screws (6). c. Secure pump assembly to foot (5) using washers (4) and nuts (3). d. Install setscrews (1) in pump shaft (2). | |
|----|-------------|--|--|



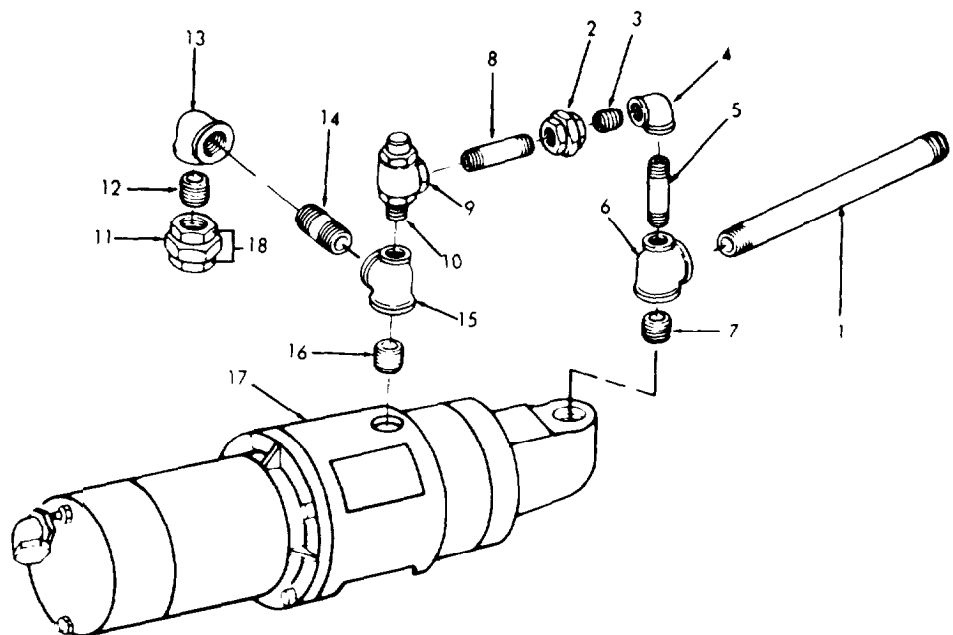
- 1. Setscrew
- 2. Flexible Pump Shaft
- 3. Nut
- 4. Lockwasher
- 5. Foot
- 6. Screw
- 7. Lockwasher
- 8. Pump Assembly
- 9. Motor

4-21. SUPPLY PUMP, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
6.	Piping	<p>a. Install nipple (16) in pump housing (17).</p> <p>b. Install reducing tee (15), nipple (14), elbow (13) and nipple (12).</p> <p>c. Tighten collar (11) to union (18).</p> <p>d. Install nipple (10) in tee (15).</p> <p>e. Install pressure relief valve (9), nipple (8), nipple (7), reducing tee (6), nipple (5), elbow (4) and nipple (3).</p> <p>f. Tighten collar (2) and install inlet line (1).</p>	

7. Power supply Turn ON.

- 1. Inlet Line
- 2. Collar
- 3. Nipple
- 4. Elbow
- 5. Nipple
- 6. Reducing Tee
- 7. Nipple
- 8. Nipple
- 9. Pressure Relief Valve
- 10. Nipple
- 11. Collar
- 12. Nipple
- 13. Elbow
- 14. Nipple
- 15. Reducing Tee
- 16. Nipple
- 17. Housing
- 18. Union



4-22. SUPPLY PUMP MOTOR, TYPE C AND D SEPARATORS.

This task covers:

- | | |
|---------------|-------------------|
| a. Inspection | c. Repair/Replace |
| b. Removal | d. Installation |

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Motor

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

WARNING

Electrical shock or serious injury may result if electrical power is not shut off prior to performing maintenance on supply pump motor.

Inspection

Inspect for evidence of overheating or other visible damage.

Removal

- | | | |
|----|-------------------|--|
| 1. | Electric power | Turn OFF. |
| 2. | Motor connections | Remove nuts (1) from cover
a. (2).

b. Cover (2) will separate from motor housing (1) far enough to tag and disconnect leads (3). |

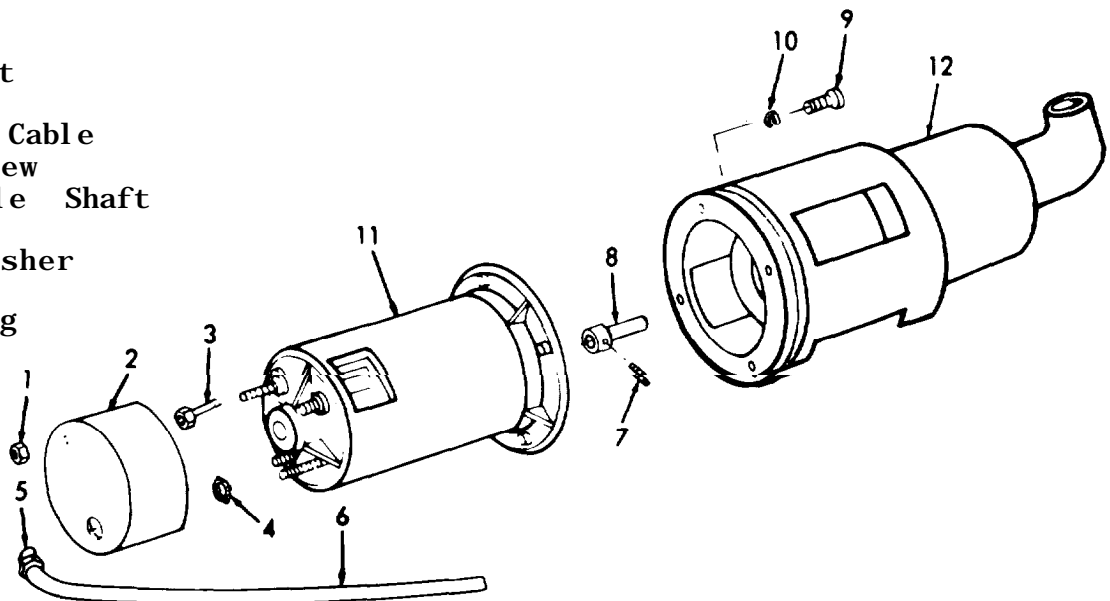
4-22. SUPPLY PUMP MOTOR, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
		c. Remove locknut (4) from elbow (5) to remove power cable (6).	
3.	Motor	a. Remove setscrew (7) from flexible shaft (8). b. Remove screws (9) and lockwashers (10). c. Remove motor (11) from pump housing (12).	

Repair

Replace defective motor with a serviceable-like item.

1. Nut
2. Cover
3. Lead
4. Locknut
5. Elbow
6. Power Cable
7. Setscrew
8. Flexible Shaft
9. Screw
10. Lockwasher
11. Motor
12. Housing



4-22. SUPPLY PUMP MOTOR, TYPE C AND D SEPARATORS (Continued).

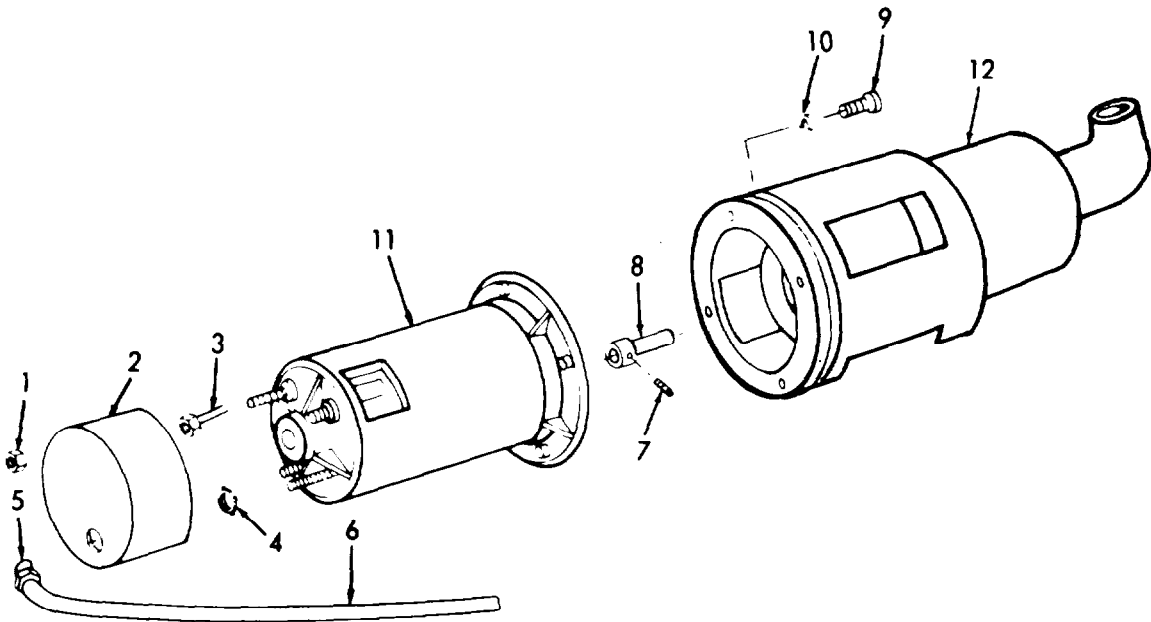
LOCATION	ITEM	ACTION	REMARKS
-----------------	-------------	---------------	----------------

Installation

- | | | | |
|----|-------------------|---|--|
| 4. | Motor | <ul style="list-style-type: none"> a. Slide motor (11) over pump shaft to housing (12). b. Install using lock-washers (10) and screws (9). c. Install setscrews (7) in flexible shaft (8). | |
| 5. | Motor connections | <ul style="list-style-type: none"> a. Insert power cable (6) and elbow (5) in cover (2). b. Secure with locknut (4). c. Reconnect leads (3). d. Install cover (2) to motor housing (11) using nuts (1). | |
| 6. | Electric power | Turn ON. | |

4-22. SUPPLY PUMP MOTOR, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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1. Nut
2. Cover
3. Lead
4. Locknut
5. El bow
6. Power Cable
7. Setscrew
8. Flexible Shaft
9. Screw
10. Lockwasher
11. Motor
12. Housing

4-23. RELIEF VALVE, TYPE C AND D SEPARATORS.

This task covers:

- | | |
|---------------|-------------------|
| a. Adjustment | c. Repair/Replace |
| b. Removal | d. Installation |

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

<u>Material/Parts</u>	<u>Equipment Condition</u>
Gasket	
Relief Valve	
Sealing compound	
Appendix C. Item No. 6	

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
-----------------	-------------	---------------	----------------

Adjustment

- | | |
|----|--------------|
| 1. | Relief valve |
|----|--------------|

NOTE

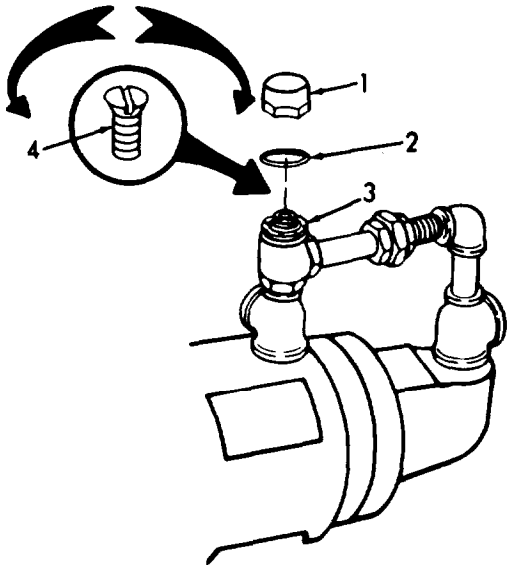
The pressure relief valve is pre-set at 45 psig (3163.8 gm sq cm) and should not require adjustment. However, the following procedure is used to readjust the relief valve pressure setting if necessary.

- a. Remove cap (1) and gasket (2).
- b. Loosen locknut (3).
- c. To increase pressure setting, turn adjustment screw (4) clockwise.

4-23. RELIEF VALVE, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- d. To decrease pressure setting turn counter-clockwise.
- e. Tighten locknut (3) and install gasket (2) and cap (1).



- 1. Cap
- 2. Gasket
- 3. Locknut
- 4. Adjustment Screw

NOTE

To verify pressure setting proceed as follows:

- 1. Water discharge valve Turn to OPEN.
- 2. Supply Pump selector switch Turn ON.

4-23. RELIEF VALVE, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|--|--------------------------------|--|--|
| | 3. Water discharge valve | Slowly close until pressure relief valve activates. The relief valve can be heard as it relieves pressure at the preset level, and the pressure readings as observed on the pressure gauges will begin to stabilize. | |
| | 4. Supply pump selector switch | Turn OFF. | |

Removal

- | | | | |
|----|------------------|--|--|
| 2. | Relief valve (3) | <ol style="list-style-type: none"> a. Loosen and slide collar (1) from union (4). b. Remove nipple (2). c. Remove relief valve (3). | |
|----|------------------|--|--|

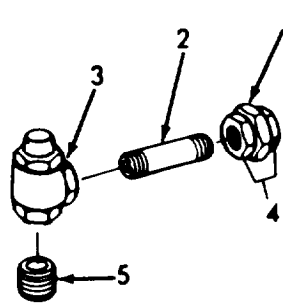
Repair

Replace defective valve with a serviceable-like item.

Installation

- | | | | |
|----|--|---|--|
| 3. | | <ol style="list-style-type: none"> a. Install valve (3) onto nipple (5). b. Install nipple (2). c. Secure collar (1) to union (4). Tighten collar (1). | |
|----|--|---|--|

1. Collar
2. Nipple
3. Relief Valve
4. Union
5. Nipple



4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS.

This task covers:

- | | |
|---------------|-----------------|
| a. Removal | c. Repair |
| b. Inspection | d. Installation |

INITIAL SETUP

Test Equipment
None

Tools
Arc welder
Tool Kit, General Mechanics

Material/Parts
Sealing compound
Appendix C. Item No. 6
Vessel subassembly

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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Removal

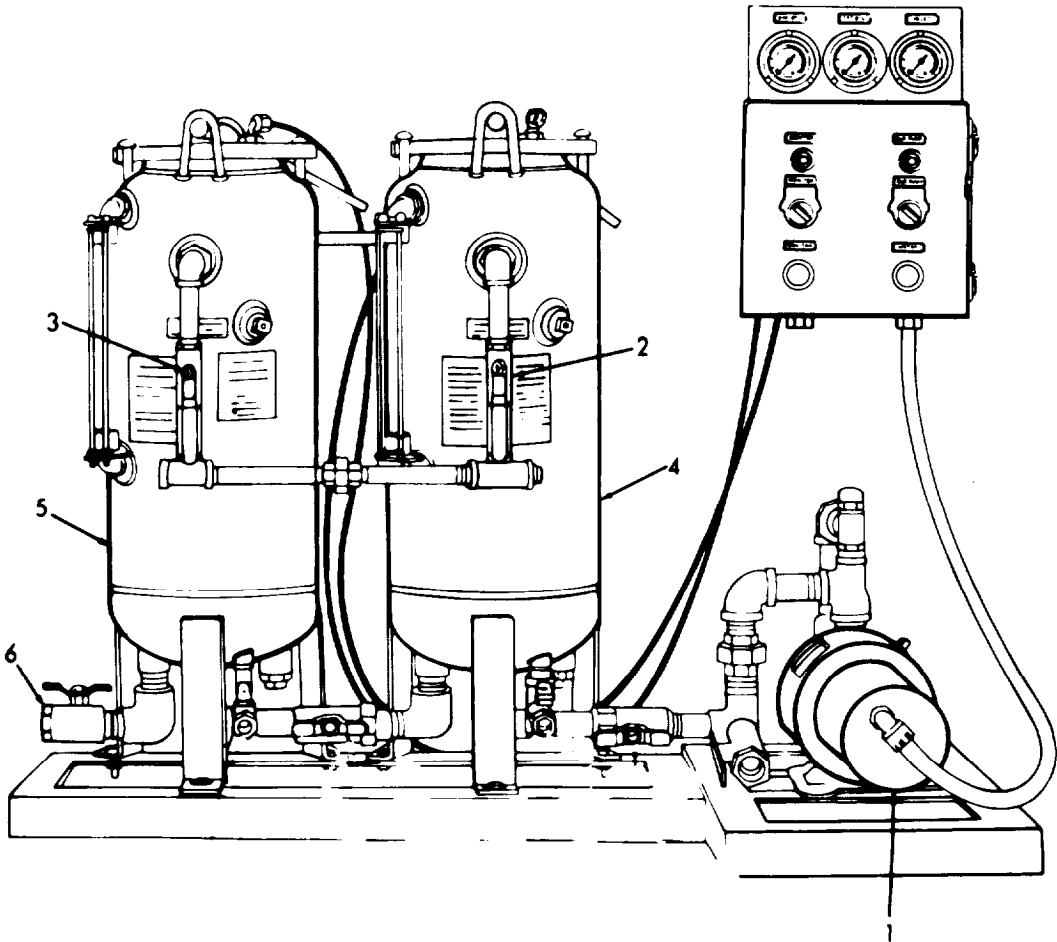
- | | | | |
|----|-----------------|--|--|
| 1. | Draining system | <p>a. With the pump (1) running, discharge as much oil as possible from the separator stage which is to be replaced according to the following:</p> <p>(1) Open the oil discharge valve (2 or 3) on either the first (prefilter) or second stage (4 or 5).</p> <p>(2) Close the water discharge valve (6):</p> | |
|----|-----------------|--|--|

NOTE

Allow the oil to discharge for approximately one to two seconds after the oil disappears from the sight-glass before closing the oil discharge valve.

4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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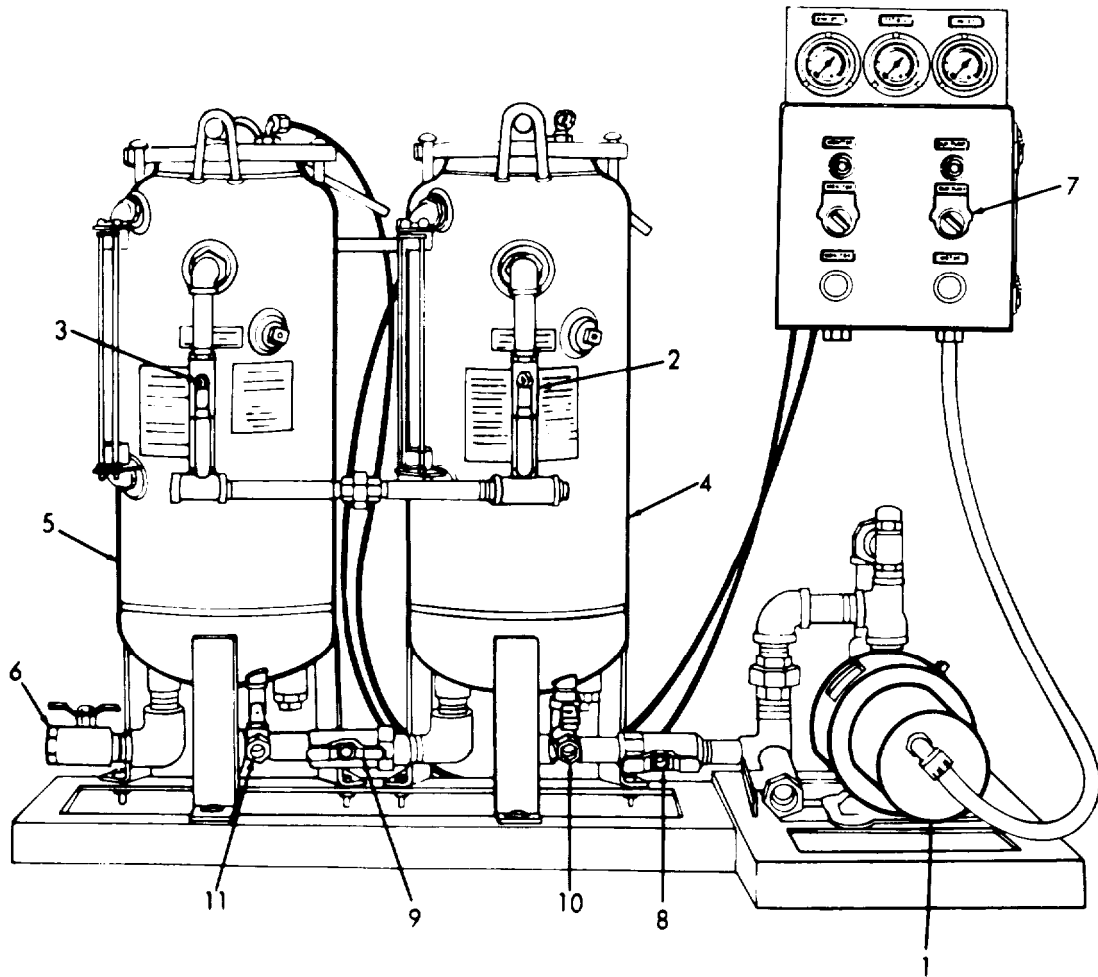
- 1. Supply Pump
- 2. Discharge Valve
- 3. Discharge Valve
- 4. 1st Stage (Prefilter)
- 5. 2nd Stage
- 6. Discharge Valve

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|--|--|--|--|
| | | <p>(3) Open the water discharge valve (6) and close the oil discharge valve (2 or 3) after the oil has drained from the stage.</p> <p>b. Stop the supply pump (1) by turning the supply pump selector switch (7) OFF.</p> <p>c. Close the water discharge valve (6).</p> <p>d. To drain water from the first (prefilter) stage (4):</p> <p>(1) Close the inlet valve (8) located at the inlet to the first (prefilter) stage (4) and the inter-vessel shutoff valve (9) between the first (prefilter) and second stages.</p> <p>(2) Open the drain valve (10) at the base of the vessel.</p> <p>e. To drain water from the second stage (5):</p> <p>(1) Close the intervessel shutoff valve (9) located between the first (prefilter) and second stages.</p> <p>(2) Open the drain valve (11) at the base of the vessel.</p> | |
|--|--|--|--|

4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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1. Supply Pump
2. Discharge Valve
3. Discharge Valve
4. 1st Stage (Prefilter)
5. 2nd Stage
6. Discharge Valve
7. Selector Switch
8. Inlet Valve
9. Intervessel Shutoff Valve
10. Drain Valve
11. Drain Valve

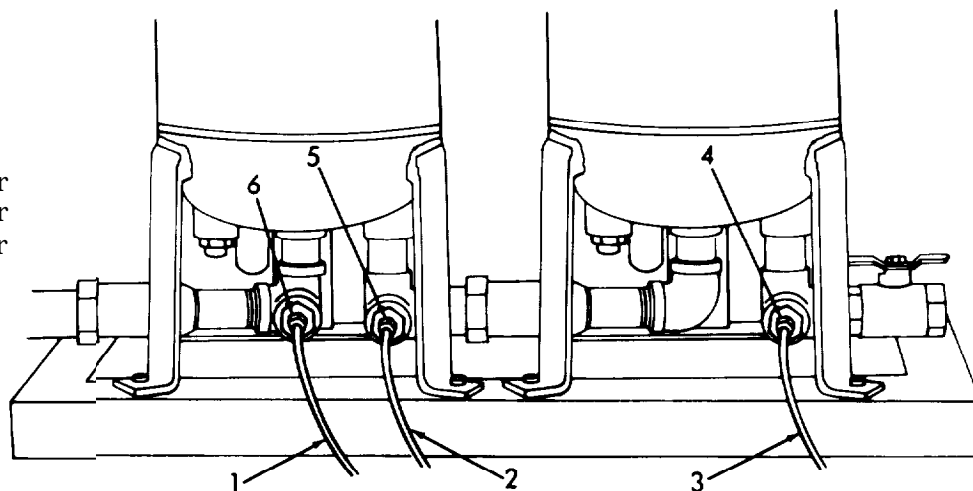
4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Electric shock or serious injury may result if electric power is not turned off prior to performing maintenance on the separators.

- | | | |
|----|----------------|---|
| 2. | Electric power | Turn OFF. |
| 3. | Air lines | Disconnect air lines (1, 2 and 3) by unscrewing female connectors (4, 5 and 6). |

- 1. Air Line
- 2. Air Line
- 3. Air Line
- 4. Female Connector
- 5. Female Connector
- 6. Female Connector

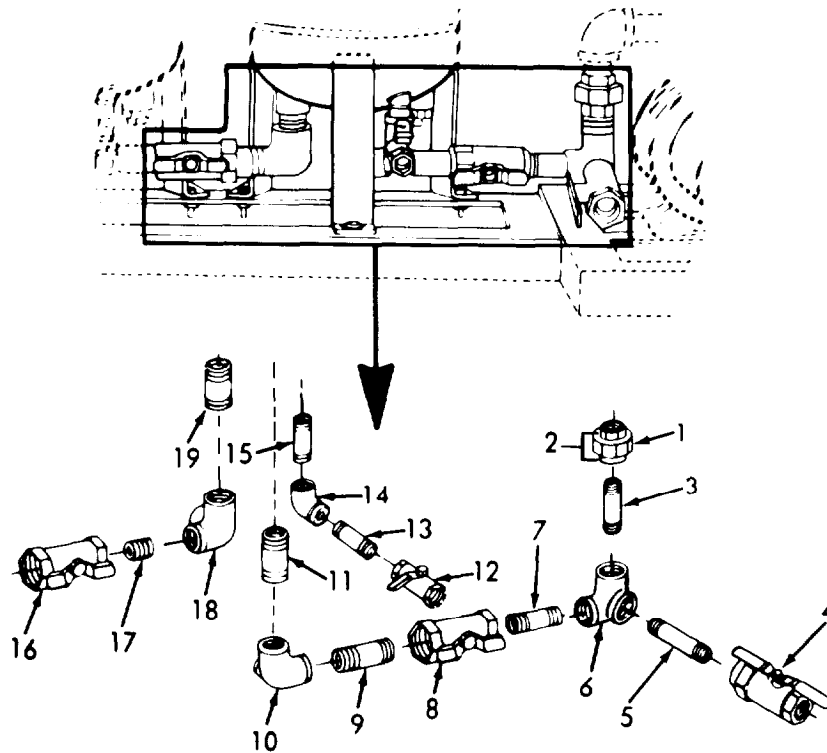


- | | | |
|----|---------------------------------|--|
| 4. | Prefilter piping, lower section | <ul style="list-style-type: none"> a. Unscrew collar (1) from union (2). b. Remove nipple (3), bypass valve (4), nipple (5), tee (6) and nipple (7). c. Remove inlet valve (8), nipple (9), tee (10) and nipple (11). |
|----|---------------------------------|--|

4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- d. Remove water sample/drain valve (12), nipple (13), elbow (14) and nipple (15).
- e. Remove intervessel shutoff valve (16), nipple (17), tee (18) and nipple (19).

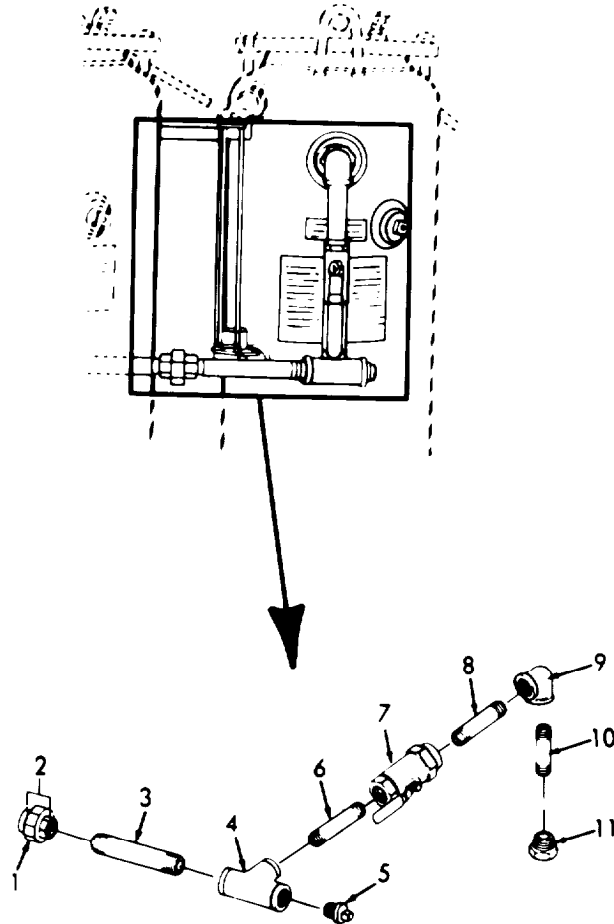


1.	Collar	8.	Inlet Valve	14.	Elbow
2.	Union	9.	Nipple	15.	Nipple
3.	Nipple	10.	Tee	16.	Intervessel Shutoff Valve
4.	By-pass Valve	11.	Nipple	17.	Nipple
5.	Nipple	12.	Sample/Drain Valve	18.	Tee
6.	Tee	13.	Nipple	19.	Nipple
7.	Nipple				

4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
5.	1st stage (pre-filter) piping, upper section	a. Unscrew collar (1) from union (2). b. Remove nipple (3) and tee (4). c. Remove nipple (6), oil discharge valve (7), nipple (8), elbow (9), nipple (10) and reducer bushing (11).	Remove pipe plug (5) if necessary.

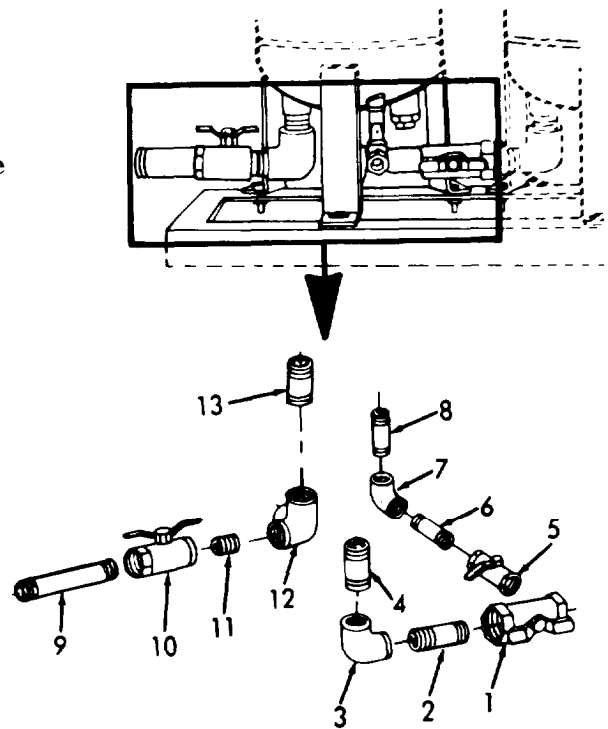
- 1. Collar
- 2. Union
- 3. Nipple
- 4. Tee
- 5. Pipe Plug
- 6. Nipple
- 7. Oil Discharge Valve
- 8. Nipple
- 9. Elbow
- 10. Nipple
- 11. Reducer Bushing



4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
6.	2nd stage piping, lower section	<p>a. Remove intervessel shut-off valve (1) nipple (2), elbow (3) and nipple (4).</p> <p>b. Remove water sample/drain valve (5), nipple (6), elbow (7) and nipple (8).</p> <p>c. Remove oil discharge line (9), water discharge valve (10), nipple (11), tee (12) and nipple (13).</p>	

- 1. Intervessel Shutoff Valve
- 2. Nipple
- 3. Elbow
- 4. Nipple
- 5. Water Sample/Drain Valve
- 6. Nipple
- 7. Elbow
- 8. Nipple
- 9. Oil Discharge Line
- 10. Water Discharge Valve
- 11. Nipple
- 12. Tee
- 13. Nipple

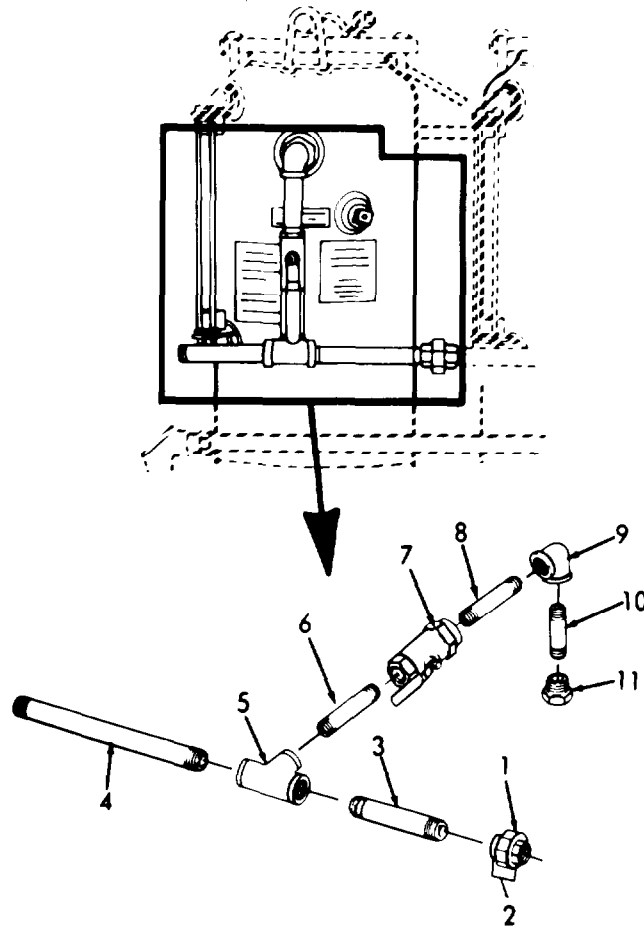


4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- | | | | |
|----|---------------------------------|--|--|
| 7. | 2nd stage piping, upper section | <p>a. Unscrew collar (1) from union (2).</p> <p>b. Remove nipple (3) and oil discharge line (4).</p> <p>c. Remove tee (5), nipple (6), oil discharge valve (7), nipple (8), elbow (9), nipple (10) and reducer bushing (11).</p> | |
|----|---------------------------------|--|--|

1. Collar
2. Union
3. Nipple
4. Oil Discharge Line
5. Tee
6. Nipple
7. Oil Discharge Valve
8. Nipple
9. Elbow
10. Nipple
11. Reducer Bushing

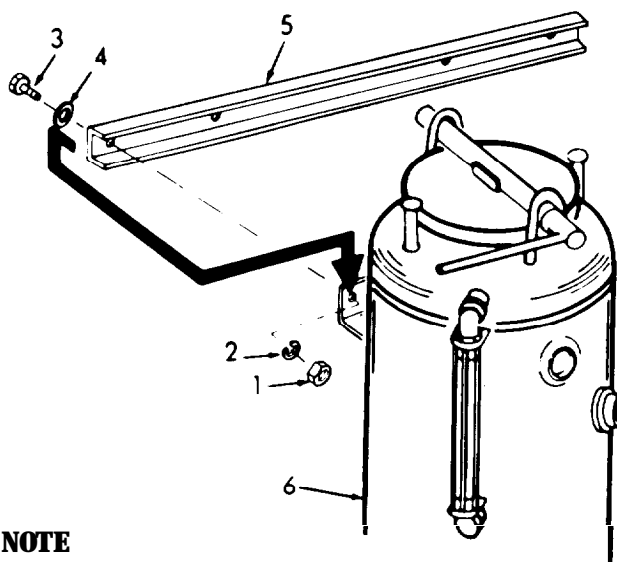


4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- | | | | |
|----|-------------------|--|--|
| 8. | Support angle (5) | <p>a. Remove nuts (1), washers (2), bolts (3) and washers (4).</p> <p>b. Remove support angle (5) from vessel (6).</p> | |
|----|-------------------|--|--|

- | | |
|----|---------------|
| 1. | Nut |
| 2. | Washer |
| 3. | Bolt |
| 4. | Washer |
| 5. | Support Angle |
| 6. | Vessel |

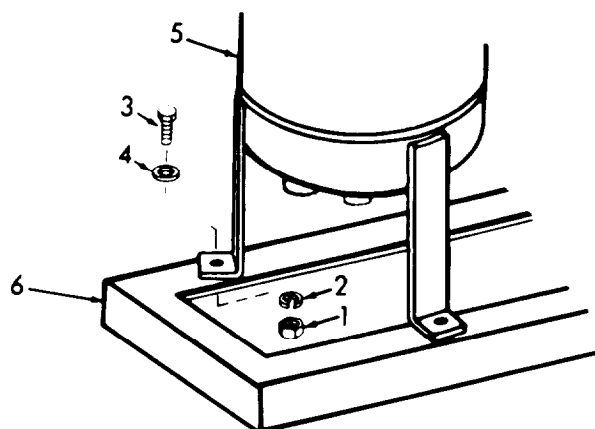


NOTE

Attach a sling to the vessel being removed. Using a suitable hoist, take up enough slack on the sling to make it taut before removing mounting hardware.

- | | | | |
|----|----------------------------|--|--|
| 9. | Mounting hardware (vessel) | <p>a. Remove nuts (1), washers (2), screws (3) and washers (4).</p> <p>b. Remove vessel (5) from mounting frame (6).</p> | |
|----|----------------------------|--|--|

- | | |
|----|---------------|
| 1. | Nut |
| 2. | Washer |
| 3. | Bolt |
| 4. | Washer |
| 5. | Support Angle |
| 6. | Vessel |



4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

NOTE

Set vessel on a flat surface and block sufficiently to prevent it from overturning. Detach sling.

- | | | |
|-----------------|----------------|---|
| 10. Disassembly | a. Cam Bar (1) | Turn handle upward until loose. Slide cam bar (1) from cover (2). |
| | b. Cover (2) | Remove. |



Turn cover over so that float faces upward.

- | | |
|-------------------------|---------|
| c. Wing nut (3) | Remove. |
| d. O-ring retainer (4) | Remove. |
| e. O-ring (5) | Remove. |
| f. Hold-down plate (6). | Remove. |

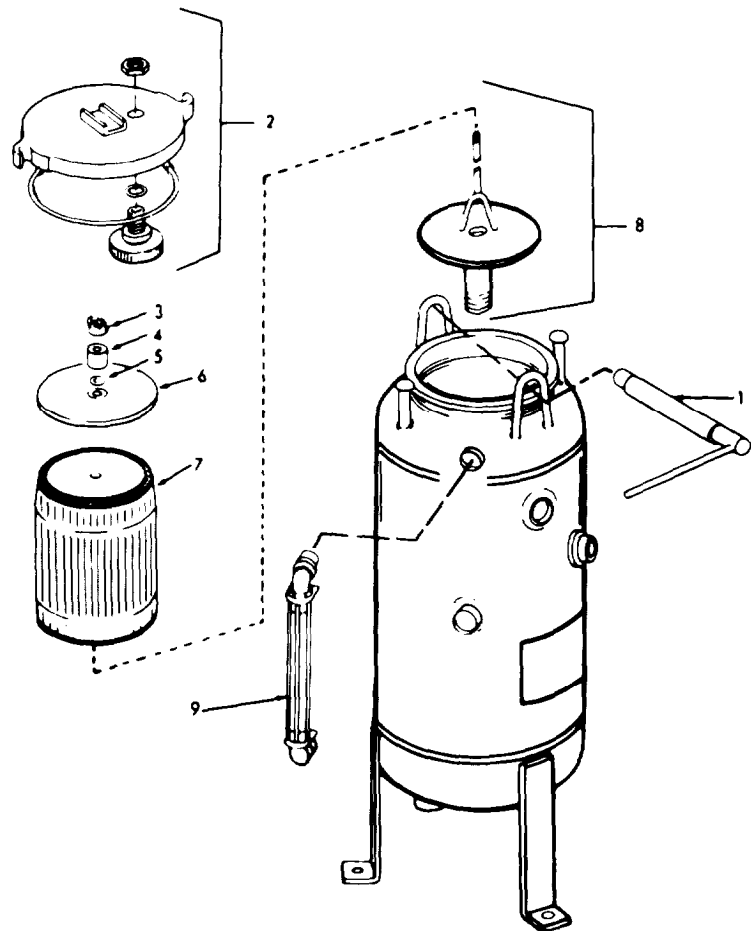
4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Filter elements are subject to contamination by human hand. Place in plastic bag and mark for petroleum waste disposal.

- g. Element Remove.
(7)
- h. Filter Support Remove.
support
(8)
- i. Sight glass assembly Remove.
glass
assembly
(9)

- 1. Cam Bar
- 2. Cover
- 3. Wingnut
- 4. "O" Ring Retainer
- 5. "O" Ring
- 6. Hold-down Plate
- 7. Element
- 8. Filter Support
- 9. Sight Glass Assembly



4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Inspection

Inspect threaded parts for thread damage and vessel support legs for cracked or broken welds.

Repair

- a. Weld cracked or broken welds. Chase damaged threads.
- b. Replace subassembly with a serviceable-like item if damaged beyond repair.

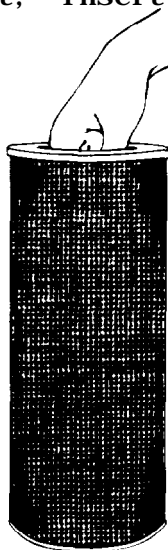
Installation

- | | | |
|-----|-----------------------------------|--|
| 11. | Separator sub-assembly reassembly | a. Install sight glass (9) and filter support (8). |
|-----|-----------------------------------|--|

NOTE

Be sure that the correct element is selected for each stage. Use only 614-501 prefilter elements (MIL-F-52847, Type II) in the first stage (prefilter) and 611-100 coalescer elements (MIL-F-52847, Type III) in the second stage. The prefilter element is longer than the coalescer element.

Handle the filter elements only by the end caps. When installing an element, insert hand through the opening in the end cap.



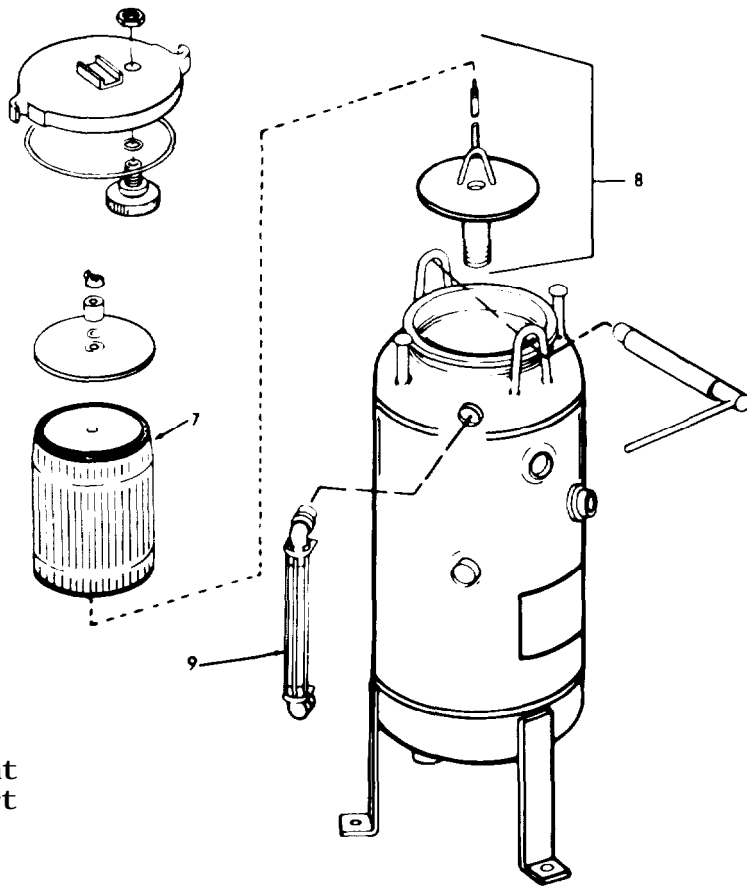
4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (continued).

LOCATION	ITEM	ACTION	REMARKS
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CAUTION

It is important that the filter element be handled properly. DO NOT touch or handle the sock area (side covering) of the elements. Contamination of this surface by skin oils may prevent the coalescer element from functioning properly and cause foaming of the effluent.

- b. Install filter element (7).



- 7. Filter Element
- 8. Filter Support
- 9. Sight Glass

4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

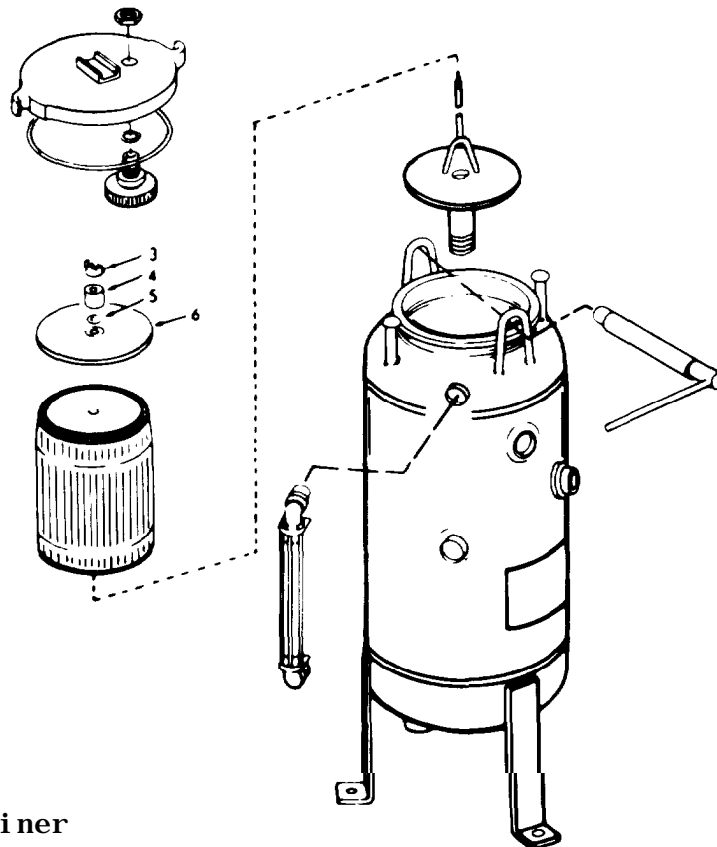
LOCATION	ITEM	ACTION	REMARKS
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- c. Install hold-down plate (6).

NOTE

Center the hold-down plate over the end cap of the filter element.

- d. Install 0-ring (5), 0-ring retainer (4) and wing nut (3). Tighten wing nut by hand.



- 3. Wing Nut
- 4. "O" Ring Retainer
- 5. "O" Ring
- 6. Hold-down Plate

4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

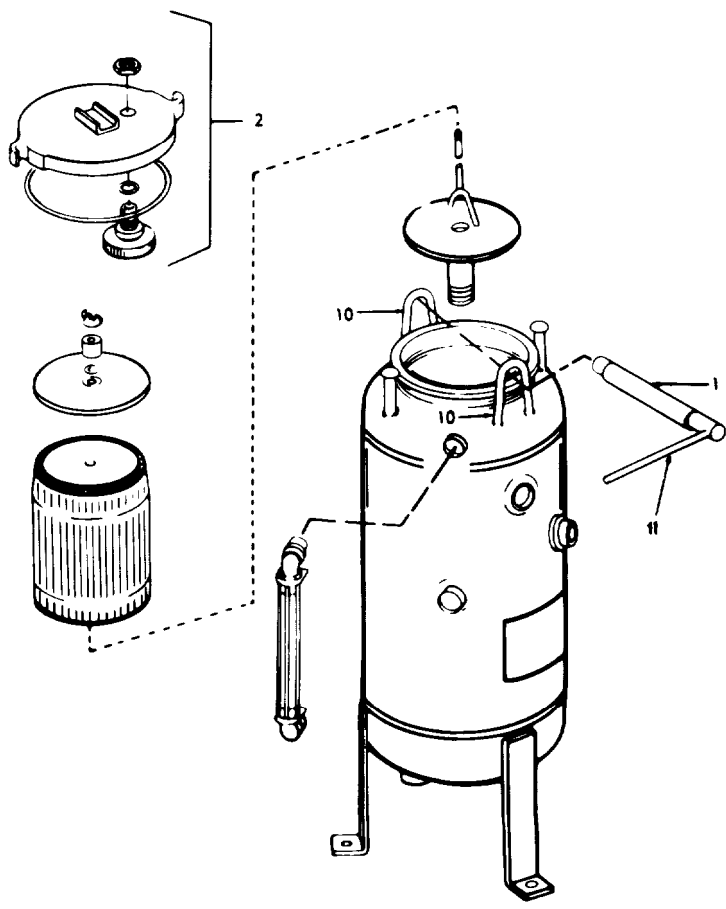
LOCATION	ITEM	ACTION	REMARKS
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CAUTION

DO NOT use a wrench to tighten the wing nut, or the filter element may be damaged.

- e. Position cover (2) on vessel.
- f. Hold handle on cam bar (1) upright and slide thru cam latches (10). Turn handle (11) downward to lock into place.

- 1. Cam Bar
- 2. Cover
- 10. Cam Latches
- 11. Handle



LOCATION	ITEM	ACTION	REMARKS
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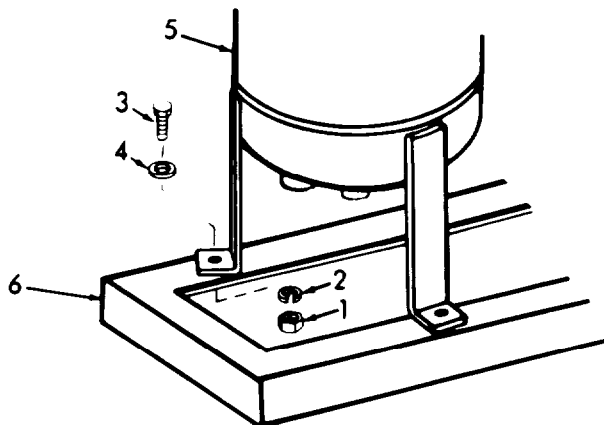
12. Vessel

NOTE

Attach a sling to the vessel and using a suitable hoist, place the vessel into position on the mounting frame for installation.

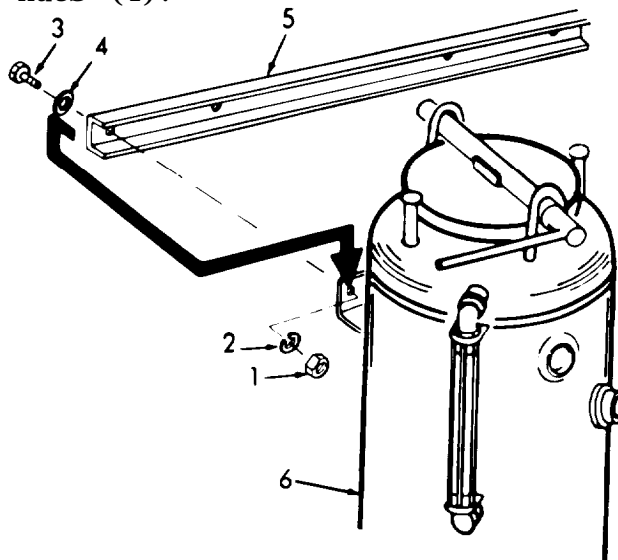
- a. Vessel mounting hardware Install flatwashers (4), screws (3), washers (2) and nuts (1) onto vessel (5), and install onto mounting frame (6).

- 1. Nut
- 2. Washer
- 3. Screw
- 4. Flatwasher
- 5. Vessel
- 6. Mounting Frame



- b. Support angle (5) Install to vessel (6) using washers (4), bolts (3), washers (2) and nuts (1).

- 1. Nut
- 2. Washer
- 3. Bolt
- 4. Washer
- 5. Support Angle
- 6. Vessel

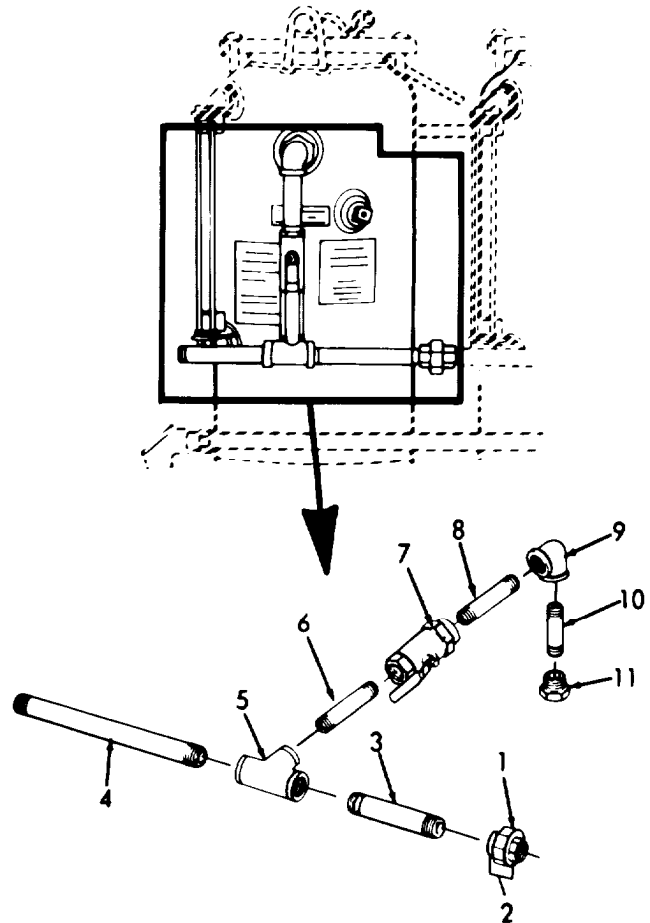


4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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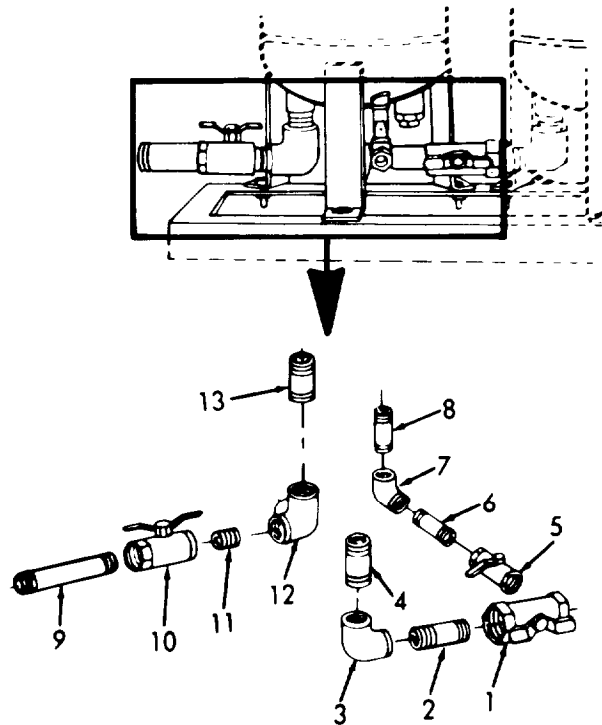
- | | | | |
|-----|-------------------------|------------------|--|
| 13. | 2nd stage vessel piping | a. Upper section | <p>(1) Install reducer bushing (11), nipple (10), elbow (9), nipple (8), oil discharge valve (7), nipple (6) and tee (5).</p> <p>(2) Install oil discharge line (4), and nipple (3).</p> <p>(3) Secure union (2) by tightening collar (1).</p> |
|-----|-------------------------|------------------|--|

1. Collar
2. Union
3. Nipple
4. Oil Discharge Line
5. Tee
6. Nipple
7. Oil Discharge Valve
8. Nipple
9. Elbow
10. Nipple
11. Reducer Bushing



4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
	b. Lower section	<p>(1) Install nipple (13), tee (12), nipple (11), water discharge valve (10) and oil discharge line (9).</p> <p>(2) Install nipple (8), elbow (7), nipple (6) and water sample/drain valve (5).</p> <p>(3) Install nipple (4), elbow (3), nipple (2) and inter-vessel shutoff valve (1).</p>	

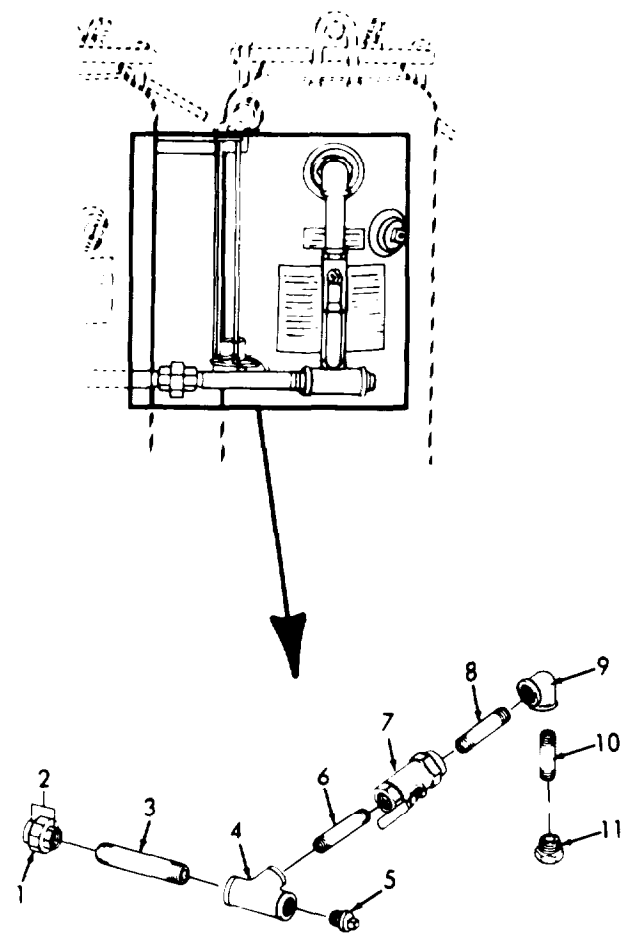


- | | |
|------------------------------|---------------------------|
| 1. Intervessel Shutoff Valve | 8. Nipple |
| 2. Nipple | 9. Oil Discharge Line |
| 3. Elbow | 10. Water Discharge Valve |
| 4. Nipple | 11. Nipple |
| 5. Water Sample/Drain Valve | 12. Tee |
| 6. Nipple | 13. Nipple |
| 7. Elbow | |

4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
14.	a. 1st stage (pre-filter) piping upper section	<p>(1) Install reducer bushing (11), nipple (10), elbow (9), nipple (8), oil discharge valve (7) and nipple (6).</p> <p>(2) Install pipe plug (5) in tee (4) if removed.</p> <p>(3) Install tee (4) and nipple (3).</p> <p>(4) Secure collar (1) to union (2) by tightening collar.</p>	

- 1. Collar
- 2. Union
- 3. Nipple
- 4. Tee
- 5. Pipe Plug
- 6. Nipple
- 7. Oil Discharge Valve
- 8. Nipple
- 9. Elbow
- 10. Nipple
- 11. Reducer Bushing

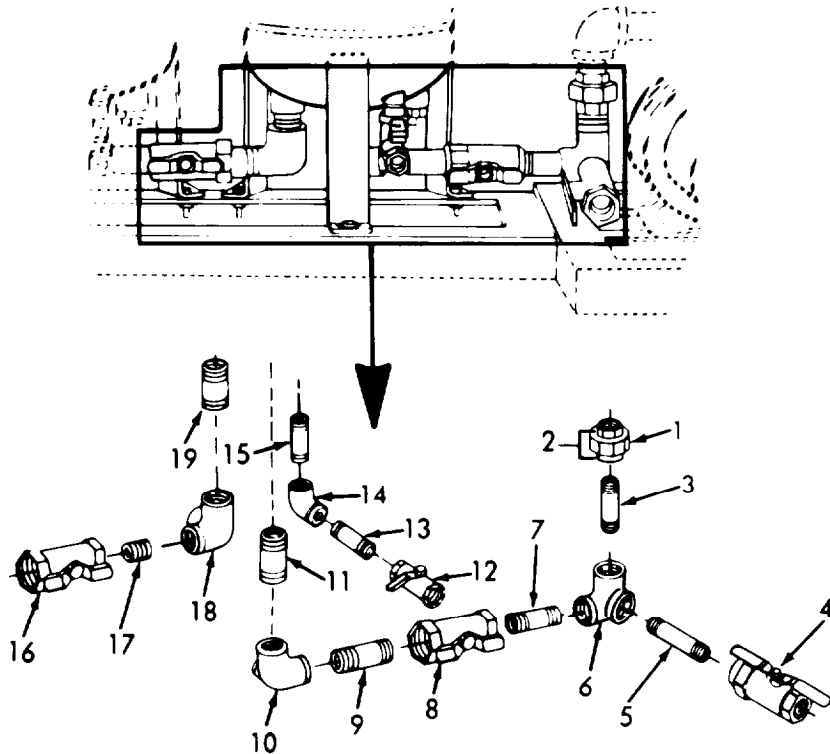


4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- | | | | |
|--|-----|---|--|
| b. 1st stage (pre-filter) piping lower section | (1) | Install nipple (19), tee nipple (17) and intervessel shutoff valve (16). | |
| | (2) | Install nipple (15), elbow nipple (13) and water sample/drain valve (12). | |
| | (3) | Install nipple (11), tee nipple (9) and inlet valve (8). | |
| | (4) | Install nipple (7), tee (6), | |

- 1. Collar
- 2. Union
- 3. Nipple
- 4. By-pass Valve
- 5. Nipple
- 6. Tee
- 7. Nipple
- 8. Inlet Valve
- 9. Nipple
- 10. Tee
- 11. Nipple
- 12. Water Sample/Drain Valve
- 13. Nipple
- 14. Elbow
- 15. Nipple
- 16. Intervessel Shutoff Valve
- 17. Nipple
- 18. Tee
- 19. Nipple

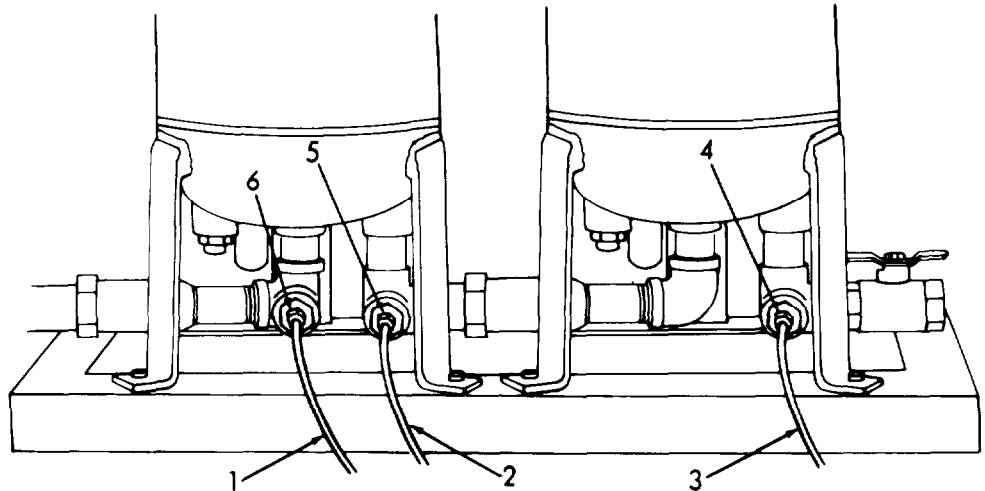


4-24. VESSEL SUB-ASSEMBLY, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

15.	Air line (1, 2 and 3)	Reconnect to vessel by tightening connectors (4, 5 and 6).	
-----	-----------------------------	--	--

- 1. Air Line
- 2. Air Line
- 3. Air Line
- 4. Connector
- 5. Connector
- 6. Connector



16.	Restart system	Refer to paragraph 2-4.	
17.	Electric power	Turn ON.	

4-25. CAM BAR - TYPE C AND D SEPARATORS.

This task covers:

- a. Removal b. Replacement c. Installation

INITIAL SETUP

Test Equipment
None

Material/Parts
Cam Bar

Equipment Condition

Personnel Required
1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Removal

- | | | | |
|----|----------------|--|--|
| 1. | Cam bar
(2) | a. Turn handle (1) upward until loose.

b. Slide cam bar (2) from cover (3). | |
|----|----------------|--|--|

Replacement

Replace defective cam bar with a serviceable-like item.

NOTE

Remove other cam bars from vessels in same manner.

Installation

- | | | | |
|----|--|---|--|
| 2. | | a. Hold handle (1) upright and slide cam bar (2) thru cam latches (4) on cover (3). | |
|----|--|---|--|

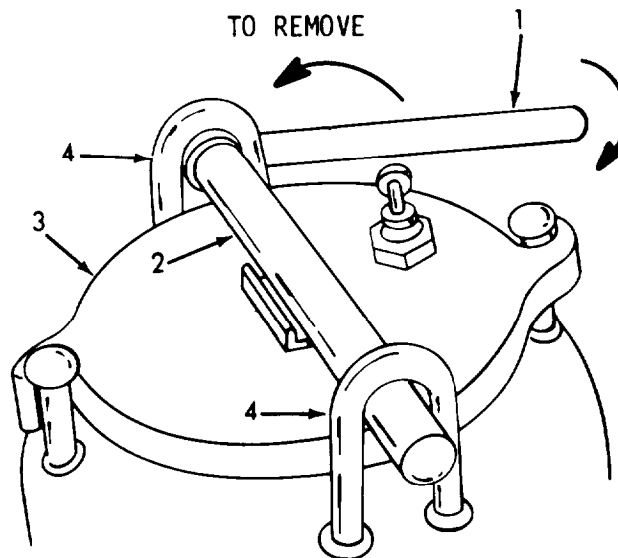
4-25. CAM BAR - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- b. Turn handle (1) downward to lock in place.

NOTE

Install other cam bars on vessels in same manner.

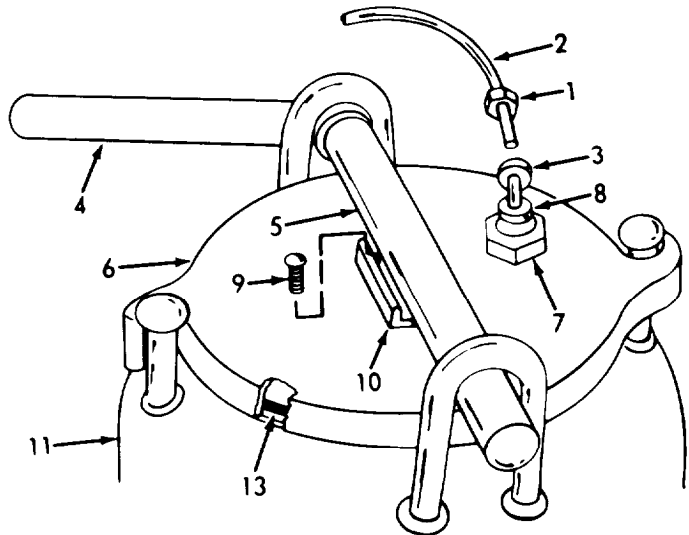


1. Handle
2. Cam Bar
3. Cover
4. Cam Latches

4-26. VESSEL COVER - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
4.	Air eliminator valve	a. Remove hex nut (7) from valve. b. Remove valve (8) from cover (6).	
5.	Locator (10)	a. Remove screws (9) from cam bar locator (10). b. Remove cam bar locator (10).	

- 1. Nut
- 2. Air Line
- 3. Female Connector
- 4. Handle
- 5. Cam Bar
- 6. Cover
- 7. Hex Nut
- 8. Valve
- 9. Screw
- 10. Cam Bar Locator
- 11. Vessel
- 13. "O" Ring



NOTE

Remove other cover in the same manner.

Repair

Replace damaged cover with a serviceable-like item.

4-26. VESSEL COVERS - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Installation

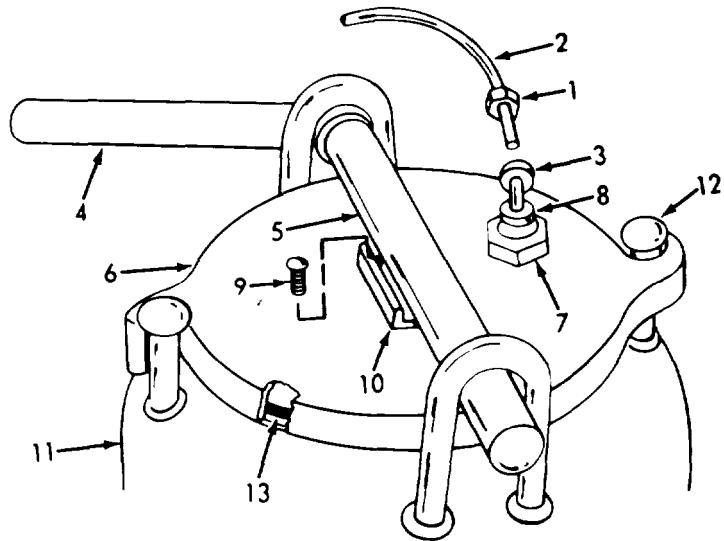
- | | | | |
|----|--------------------------------|--|--|
| 6. | Cam bar locator (10) | Install on cover (6) with screws (9). | |
| 7. | Air eliminator valve (8) | Install on cover using hex nut (7). | |
| 8. | Cover and cam bar | a. Install "O" Ring (13) in cover (6).
b. Position cover (6) in place on vessel (11) and turn counter-clockwise to latch on rivets (12).
c. Hold handle (4) upright and slide cam bar (5) into place. Turn handle (4) downward to lock in place. | |
| 9. | Air line (2) and connector (3) | a. Install female connector (3) on cover.
b. Secure air line (2) by tightening nut (1) on connector (3). | |

NOTE

Install other covers in the same manner.

4-26. VESSEL COVERS - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 1. Nut
- 2. Air Line
- 3. Female Connector
- 4. Handle
- 5. Cam Bar
- 6. Cover
- 7. Hex Nut
- 8. Valve
- 9. Screw
- 10. Cam Bar Locator
- 11. Vessel
- 12. Rivets
- 13. "0" Ring

4-27. AIR ELIMINATOR VALVE - TYPE C AND D SEPARATORS.

This task covers:

- | | | |
|----------------|-------------------|-----------------|
| a. Removal | d. Service | g. Installation |
| b. Disassembly | e. Repair/Replace | |
| c. Inspection | f. Assembly | |

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Cleaning solvent P-D-680
Item 2, -Appendix E
Lint free cloths
"O"-ring
Air eliminator valve

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
-----------------	-------------	---------------	----------------

WARNING

Turn the supply pump and auto controls selector switches to the OFF position prior to performing maintenance on the separators.

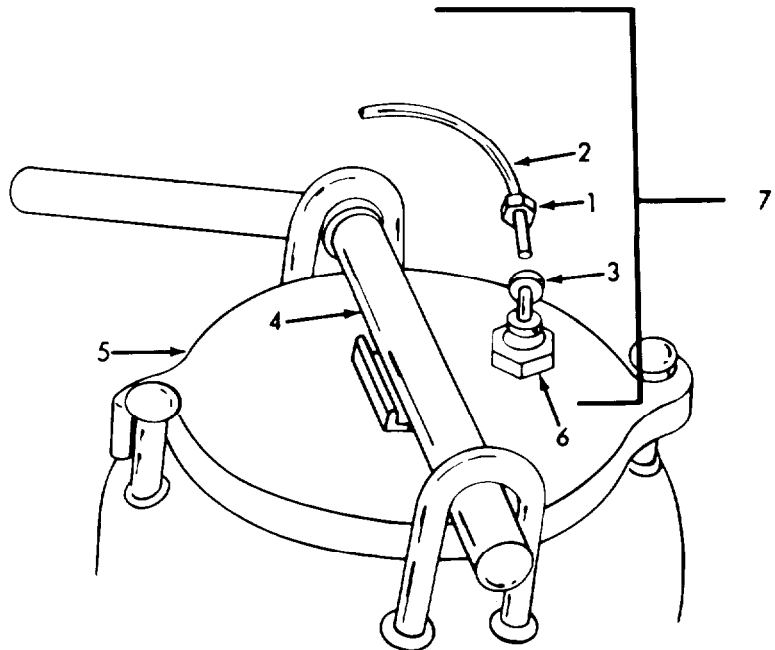
Removal

- | | | |
|----|-----------------|---|
| 1. | Air line
(2) | a. Loosen hex nut (1).
b. Remove air line (2).
c. Remove female connector (3) from cover. |
|----|-----------------|---|

4-27. AIR ELIMINATOR VALVE - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
2.	Cam bar (4)	a. Turn handle upward until loose. b. Slide cam bar (4) from cover.	
<div style="border: 1px dashed black; padding: 5px; width: fit-content; margin: 0 auto;"> CAUTION </div> <p>When removing the cover, be careful not to damage the air eliminator valve.</p>			
3.	Cover (5)	Turn cover (5) clockwise to remove from vessel.	
4.	Air eliminator valve assembly (7)	a. Remove hex nut (6) from valve. b. Remove valve assembly (7).	

- 1. Hex Nut
- 2. Air Line
- 3. Female Connector
- 4. Cam Bar
- 5. Cover
- 6. Hex Nut
- 7. Valve Assembly



4-27. AIR ELIMINATOR VALVE - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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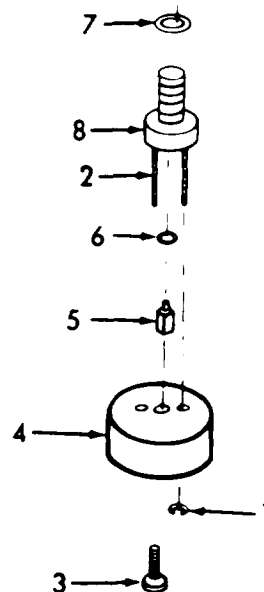
NOTE

Remove air eliminator valve from other vessels in same manner.

Disassembly

- 5. Air eliminator valve
 - a. Remove snap rings (1) from float guide pins (2).
 - b. Remove cap screw (3) from needle valve (5).
 - c. Remove float (4) and needle valve (5).
 - d. Remove "O" ring (6) from needle valve (5).
 - e. Remove "O" ring (7) from valve body (8).

- 1. Snap Ring
- 2. Float Guide Pin
- 3. Capscrew
- 4. Float
- 5. Needle Valve
- 6. "O" Ring
- 7. "O" Ring
- 8. Valve Body



4-27. AIR ELIMINATOR VALVE - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Inspection

- | | | | |
|--|--|--|--------------------------|
| | | a. Inspect "O" rings for wear or damage. | |
| | | b. Inspect guide pins for distortion | Straighten if distorted. |
| | | c. Inspect valve body for damaged threads. | |

Service

WARNING

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

- | | | | |
|--|--|---|--|
| | | a. Clean valve housing and needle valve using cleaning solvent PD-680 and dry thoroughly. | |
| | | b. Clean float using a clean lint free cloth. | |

Repair

Replace damaged or defective parts with serviceable-like item

4-27. AIR ELIMINATOR VALVE - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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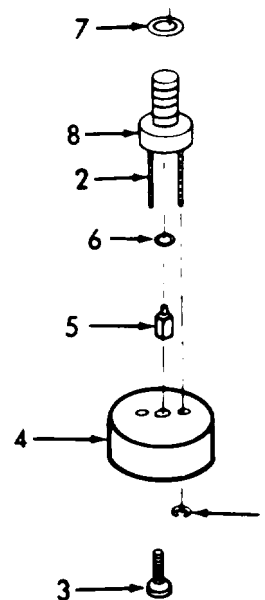
Assembly

- | | | |
|----|----------------------|--|
| 6. | Air eliminator valve | <ul style="list-style-type: none"> a. Install "O" ring (7) on valve body (8). b. Install "O" ring (6) on needle valve (5). c. Secure needle valve (5) to float (4) with cap-screw (3). d. Slide float (4) over guide pins (2). e. Install snap rings (1) on guide pins to secure float. |
|----|----------------------|--|

NOTE

Assemble air eliminator valve from another vessel in the same manner.

- 1. Snap Ring
- 2. Guide Pin
- 3. Capscrew
- 4. Float
- 5. Needle Valve
- 6. "O" Ring
- 7. "O" Ring
- 8. Valve Body



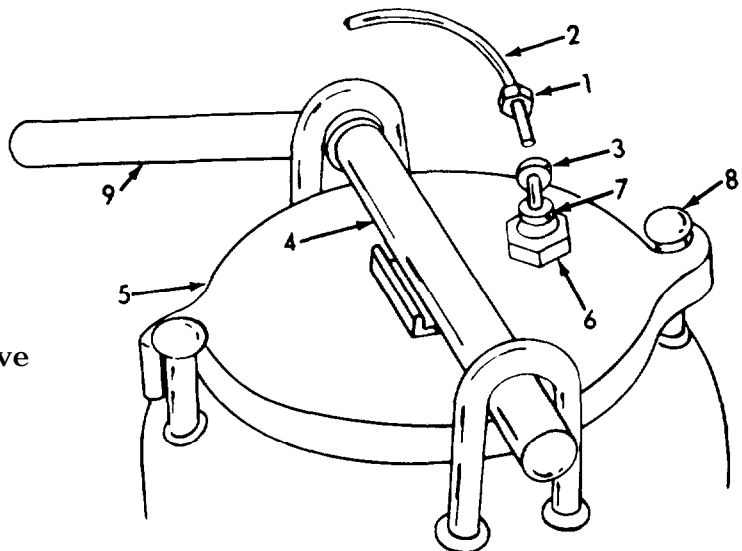
4-27. AIR ELIMINATOR VALVE - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Installation

- | | | | |
|-----|---------------------------|--|--|
| 7. | Air eliminator valve (7) | Install on cover (5) using hex nut (6). | |
| 8. | Cover (5) and cam bar (4) | <p>a. Position in place on vessel and turn counter-clockwise to secure to rivets (8).</p> <p>b. Hold cam bar handle (9) upright and slide cam bar (4) into place.</p> <p>c. Turn handle (9) downward to lock in place.</p> | |
| 9. | Air Line (2) | <p>a. Install female connector (3) to cover.</p> <p>b. Secure air line (2) by tightening nut (1) onto female connector.</p> | |
| 10. | | Turn ON power. | |

1. Nut
2. Air Line
3. Female Connector
4. Cam Bar
5. Cover
6. Hex Nut
7. Air Eliminator Valve
8. Rivet
9. Handle



4-28. FILTER SUPPORT, TYPE C AND D SEPARATORS.

This task covers:

- a. Removal b. Replacement c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Filter support

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
-----------------	-------------	---------------	----------------

Removal

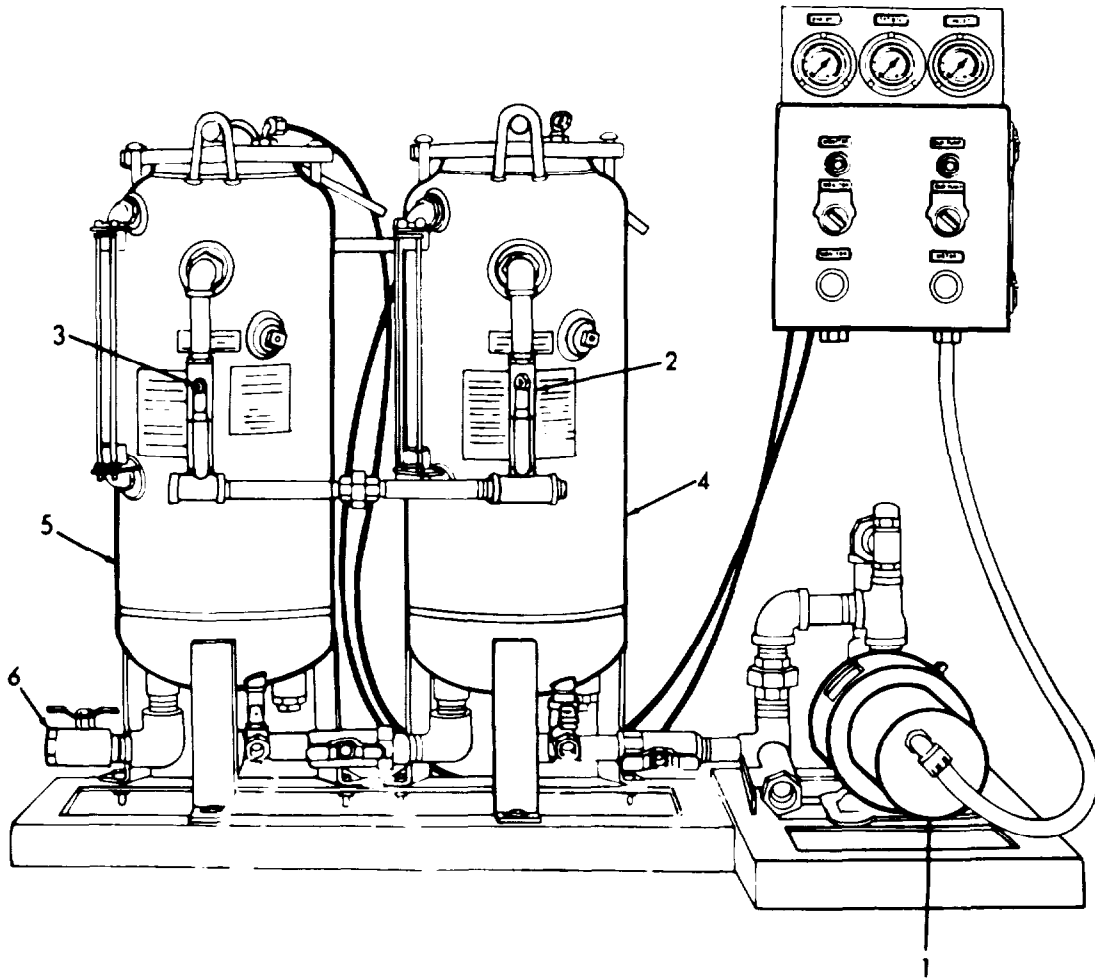
- | | | | |
|----|-----------------|--|--|
| 1. | Draining system | a. With the pump (1) running, discharge as much oil as possible from the separator stage in which the filter support is to be replaced according to the following: <ul style="list-style-type: none"> (1) Open the oil discharge valve (2 or 3) on either the first (prefilter) or second stage (4 or 5). (2) Close the water discharge valve (6). | |
|----|-----------------|--|--|

NOTE

Allow the oil to discharge for approximately one to two seconds after the oil disappears from the sight glass before closing the oil discharge valve.

4-28. FILTER SUPPORT - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 1. Pump
- 2. Oil Discharge Valve
- 3. Oil Discharge Valve
- 4. First Stage (Prefilter)
- 5. Second Stage
- 6. Water Discharge Valve

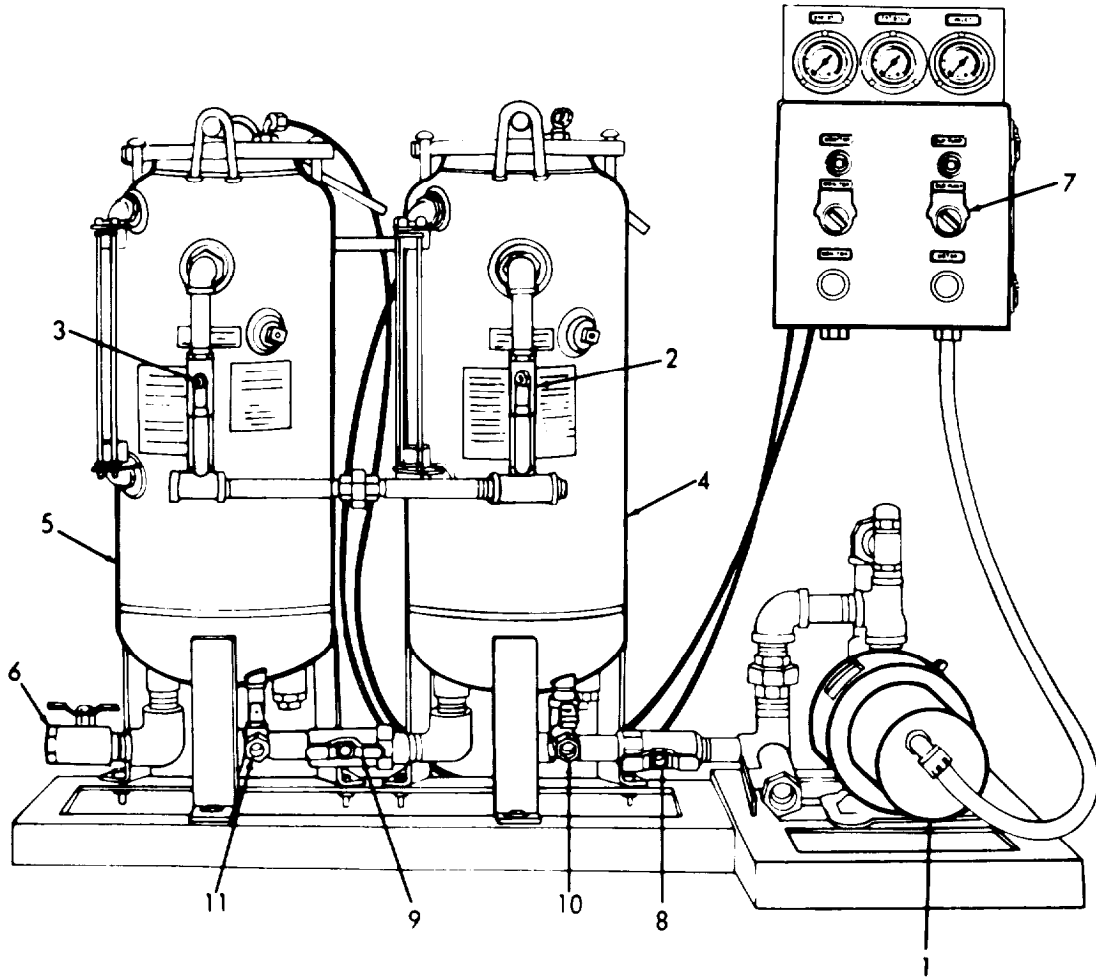
4-28. FILTER SUPPORT, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- (3) Open the water discharge valve (6) and close the oil discharge valve (2 or 3) after the oil has drained from the stage.
- b. Stop the supply pump (1) by turning the supply pump selector switch (7) OFF.
- c. Close the water discharge valve (6).
- d. To drain water from the first (prefilter) stage (4):
 - (1) Close the inlet valve (8) located at the inlet to the first (prefilter) stage (4) and the intervessel shutoff (9) valve between the first (prefilter) and second stages.
 - (2) Open the drain valve (10) at the base of the vessel.
- e. To drain water from the second stage (5):
 - (1) Close the intervessel shutoff valve (9) located between the first (prefilter) and second stage.
 - (2) Open the drain valve (11) at the base of the vessel.

4-28. FILTER SUPPORT - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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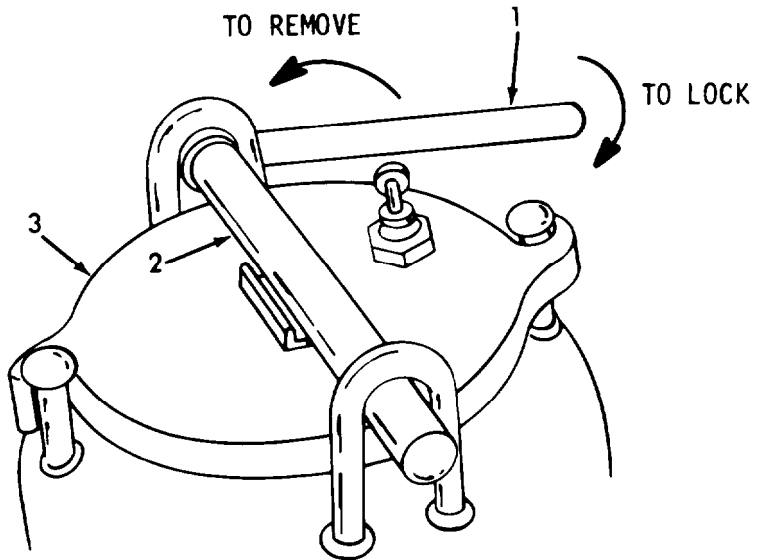


1. Pump
2. Oil Discharge Valve
3. Oil Discharge Valve
4. 1st Stage (Prefilter)
5. 2nd Stage
6. Water Discharge Valve
7. Selector Switch
8. Inlet Valve
9. Intervessel Shutoff Valve
10. Drain Valve
11. Drain Valve

4-28. FILTER SUPPORT - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
2.	Cover	a. Turn handle (1) upright until loose. b. Slide cam bar (2) from cover. c. Remove cover (3) by turning clockwise.	When placing cover on a surface, turn cover over so that float faces upward.

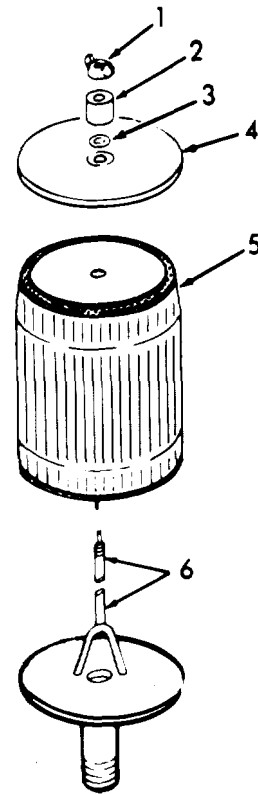
- 1. Handle
- 2. Cam Bar
- 3. Cover



4-28. FILTER SUPPORT = TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
3.	Filter element and support removal	<p>a. Loosen wing nut (1) and remove.</p> <p>b. Remove 0-ring retainer (2), 0-ring (3) and hold-down plate (4).</p> <p>c. Remove filter element (5) and filter support (6).</p>	

- 1. Wing Nut
- 2. "O" Ring Retainer
- 3. "O" Ring
- 4. Hold-down Plate
- 5. Filter Element
- 6. Filter Support



Repair

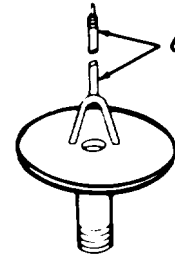
Replace a defective filter support with a serviceable-like item.

4-28. FILTER SUPPORT - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Installation

- | | | | |
|----|--------------------|----------|--|
| 4. | Filter support (6) | Install. | |
|----|--------------------|----------|--|



6. Filter Support

NOTE

Be sure that the correct element is selected for each stage. Use only prefilter element 614-501, (MIL-F-52847, Type II) in the first (prefilter) stage and coalescer element 611-100, (MIL-F-52847, Type III) in the second stage. The prefilter element is longer than the coalescer element.

- | | | | |
|----|-------------|---|--|
| 5. | Element (5) | a. Handle the filter elements only by the end caps. When installing an element, insert hand through the opening in the end cap. | |
|----|-------------|---|--|



5. Element

4-28. FILTER SUPPORT - TYPE C AND D SEPARATORS (Continued).

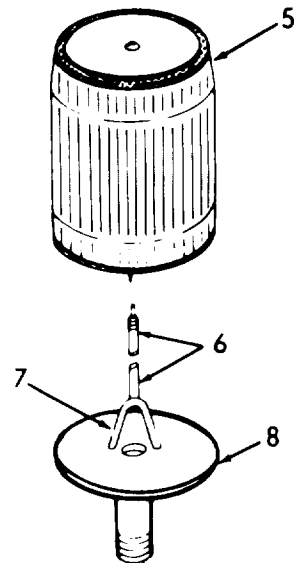
LOCATION	ITEM	ACTION	REMARKS
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WARNING

It is important that the filter elements be handled properly. DO NOT touch or handle the sock area (side covering) of the elements. Contamination of this surface by skin oils may prevent the coalescer element from functioning properly and cause foaming of the effluent.

- b. Place filter element (5) over the threaded element support (6). Position the element so that it is centered over the element positioning guide (7) attached to the striker plate (8).

- 5. Filter Element
- 6. Element Support
- 7. Element Positioning Guide
- 8. Striker Plate



4-28. FILTER SUPPORT - TYPE C AND D SEPARATORS (Continued).

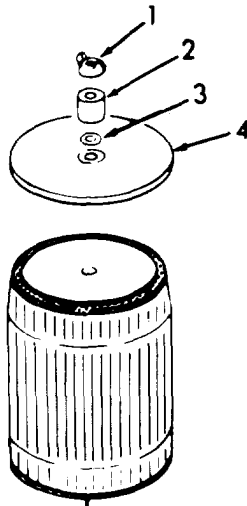
LOCATION	ITEM	ACTION	REMARKS
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- c. Replace and center the hold-down plate (4) over the end cap of the filter element.
- d. Place O-ring (3), O-ring retainer (2), and wingnut (1) on the element support.

WARNING

DO NOT use a wrench to tighten the wing nut, or the filter element may be damaged.

- e. Tighten the wing nut (1) as tightly as possible by hand.

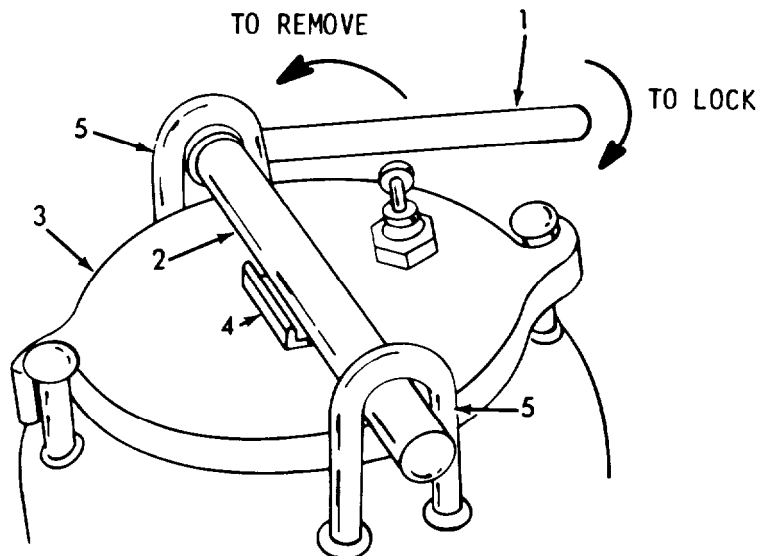


- 1. Wingnut
- 2. "O" Ring Retainer
- 3. "O" Ring
- 4. Hold-down Plate

4-28. FILTER SUPPORT - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|----|-------------|--|--|
| 6. | Cover (3) | <p>a. Position in place on vessel.</p> <p>b. Turn counter-clockwise to close.</p> | |
| 7. | Cam bar (2) | <p>a. Hold handle (1) upright and slide thru locator (4) and cam latches (5).</p> <p>b. Turn handle (1) downward to lock in place.</p> | |



1. Handle
2. Cam Bar
3. Cover
4. Locator
5. Cam Latches

- | | | | |
|----|----------------|-------------------------|--|
| 8. | Restart system | Refer to paragraph 2-4. | |
|----|----------------|-------------------------|--|

4-29. SIGHTGLASS AND FITTINGS - TYPE C AND D SEPARATORS.

This task covers:

- a. Removal b. Repair/Replace c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Fittings
"O"-Rings
Sightglass

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
-----------------	-------------	---------------	----------------

Removal

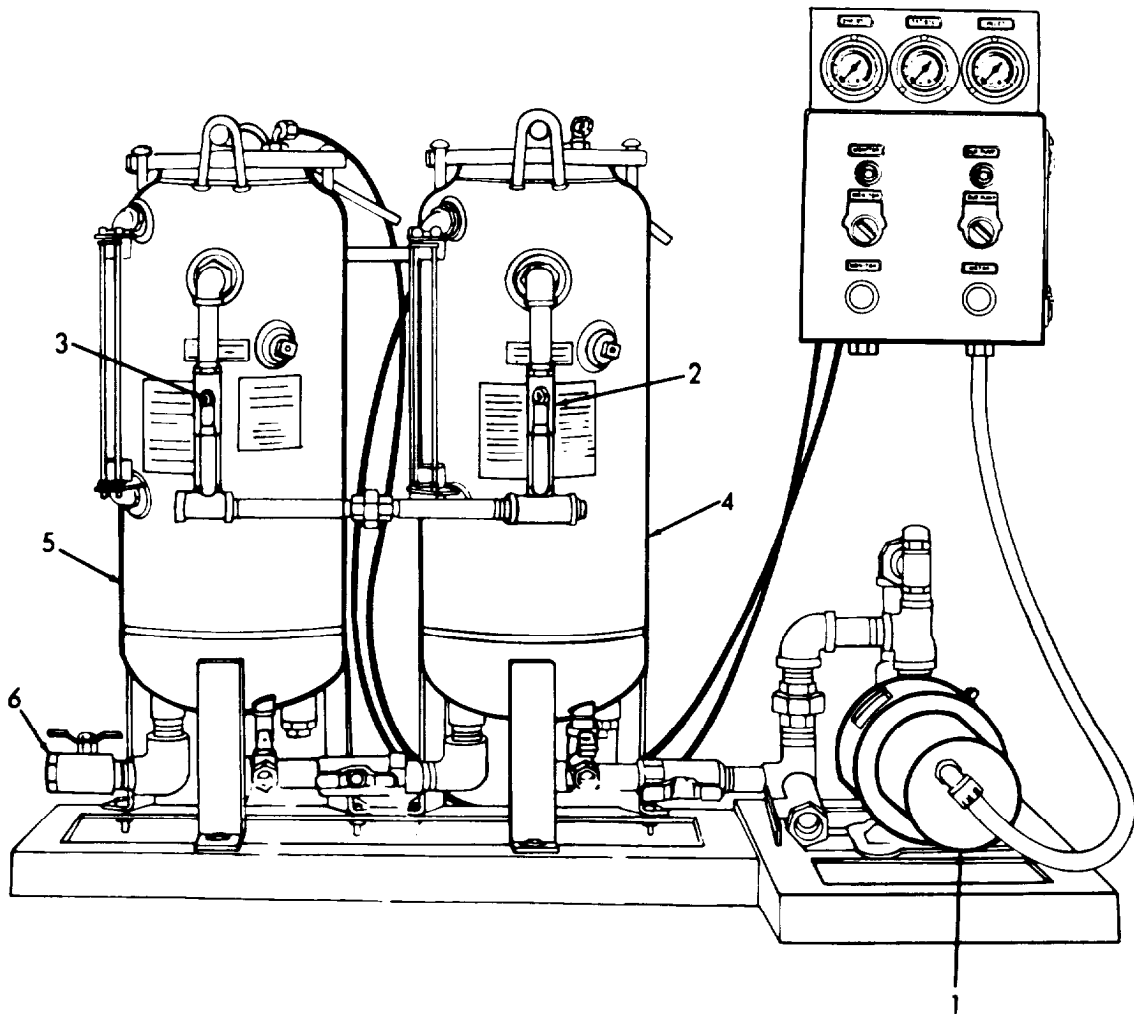
- | | | | |
|----|-----------------|---|--|
| 1. | Draining system | <p>a. With the pump (1) running, discharge as much oil as possible from the separator stage in which the sight-glass is to be replaced, according to the following:</p> <p>(1) Open the oil discharge valve (2 or 3) on either the first (pre-filter) or second stage (4 or 5).</p> <p>(2) Close the water discharge valve (6):</p> | |
|----|-----------------|---|--|

4-29. SIGHTGLASS AND FITTINGS - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

NOTE

Allow the oil to discharge for approximately one to two seconds after the oil disappears from the sight glass before closing the oil discharge valve.



1. Supply Pump
2. Oil Discharge Valve
3. Oil Discharge Valve
4. 1st Stage (Prefilter)
5. 2nd Stage
6. Water Discharge Valve

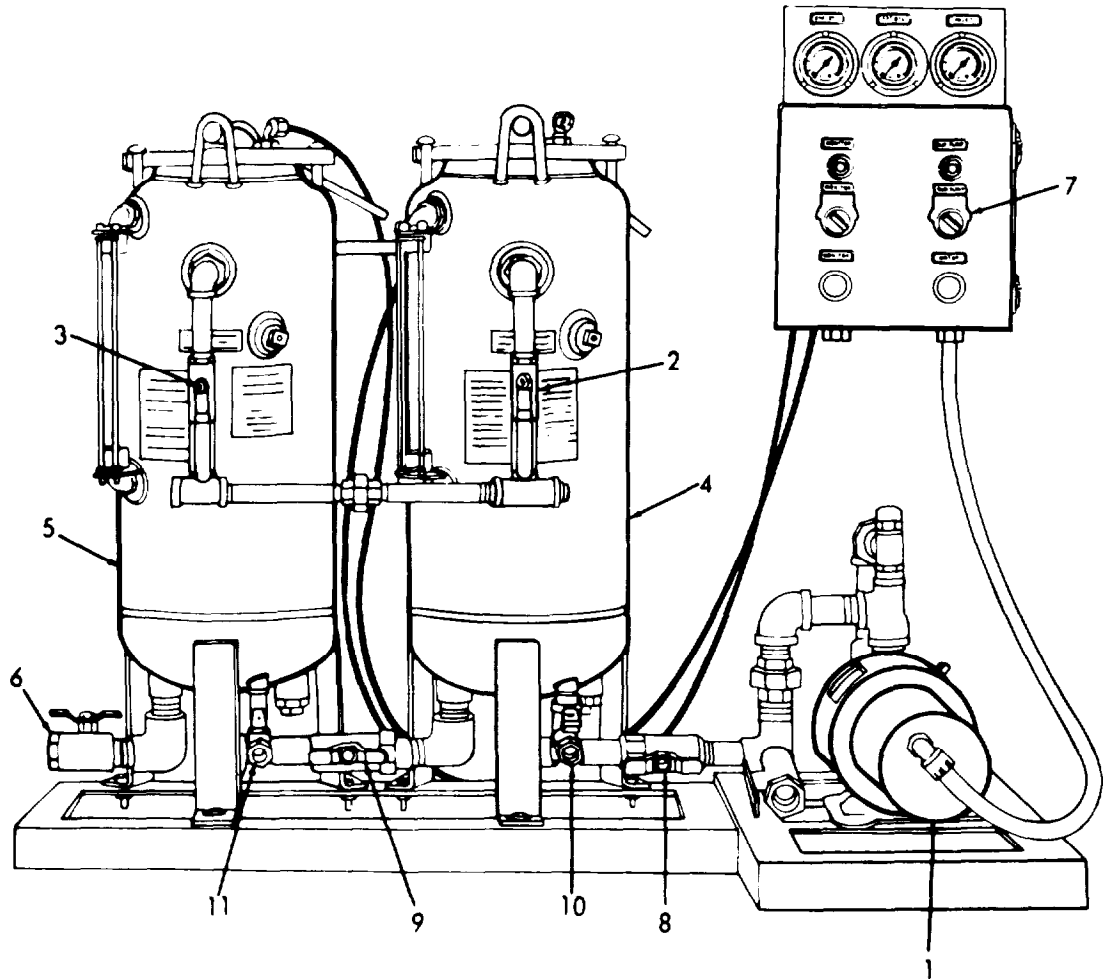
LOCATION	ITEM	ACTION	REMARKS
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- (3) Open the water discharge valve (6) and close the oil discharge valve (2 or 3) after the oil has drained from the stage.
- b. Stop the supply pump (1) by turning the supply pump selector switch (7) OFF.
- c. Close the water discharge valve (6).
- d. To drain water from the first stage (prefilter) (4):
 - (1) Close the inlet valve (8) located at the inlet to the first stage (prefilter) (4) and the intervessel shutoff valve (9) between the first (prefilter) and second stages.
 - (2) Open the drain valve (10) at the base of the vessel.
- e. To drain water from the second stage (5):
 - (1) Close the intervessel shutoff valve (9) located between the first (prefilter) and second stages.
 - (2) Open the drain valve (11) at the base of the vessel.

Use extreme care when handling sightglass.

4-29. SIGHTGLASS AND FITTINGS - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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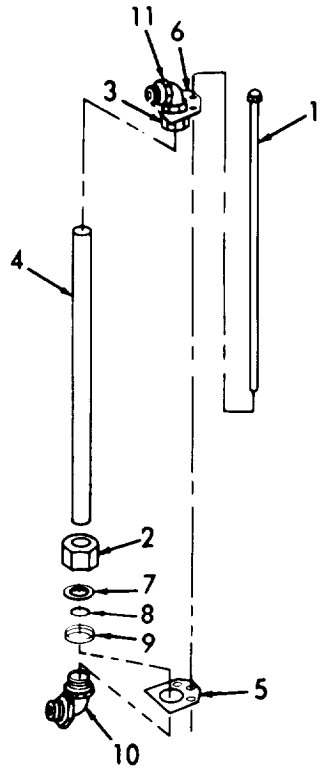


1. Supply Pump
2. Oil Discharge Valve
3. Oil Discharge Valve
4. First Stage (Prefilter)
5. Second Stage
6. Water Discharge Valve
7. Selector Switch
8. Inlet Valve
9. Intervessel Shutoff Valve
10. Drain Valve
11. Drain Valve

4-29. SIGHTGLASS AND FITTINGS - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
2.	Sight-glass and fittings	<p>a. Remove rods (1).</p> <p>b. Unscrew collars (2 and 3) from elbows.</p> <p>c. Remove sightglass (4), slide sightglass (4) upward, turn lower elbow (10) 1/4 turn counter-clockwise, slide sightglass down and out. Remove guard brackets (5 and 6).</p> <p>d. Remove O-ring (7) and washers (8 and 9).</p> <p>e. Remove elbows (10 and 11) from vessel.</p>	Discard if defective or damaged.

- 1. Rod
- 2. Collar
- 3. Collar
- 4. Sightglass
- 5. Guard Bracket
- 6. Guard Bracket
- 7. "O" Ring
- 8. Washer
- 9. Washer
- 10. Elbow
- 11. Elbow



4-29. SIGHTGLASS AND FITTINGS - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Repair

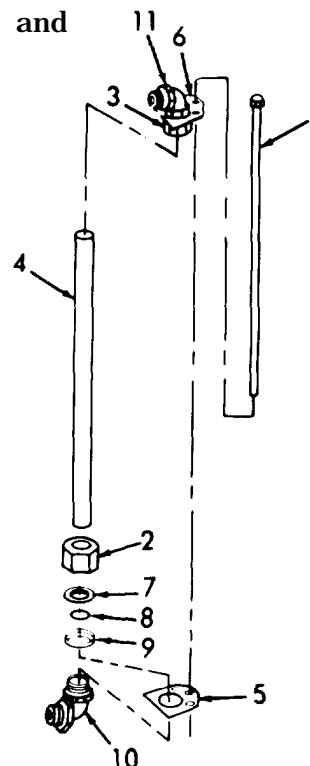
Replace damaged or defective parts with a serviceable-like item.

Installation

- | | | |
|----|--------------------------|---|
| 3. | Sight-glass and fittings | <ul style="list-style-type: none"> a. Install elbows (10 and 11) in vessel. b. Install washers (8 and 9) and 0-ring (7) collar (2 and 3) on sightglass. c. Place guard brackets (5 and 6) over the sightglass (4), install sightglass. d. Secure to elbows (10 and 11) by tightening collars (2 and 3). e. Install rods (1). |
|----|--------------------------|---|

- | | | |
|----|----------------|---|
| 4. | System startup | Refer to paragraph 2-4 and restart system |
|----|----------------|---|

- 1. Rod
- 2. Collar
- 3. Collar
- 4. Sightglass
- 5. Bracket
- 6. Bracket
- 7. "O" Ring
- 8. Washer
- 9. Washer
- 10. El bow
- 11. El bow



4-30. FIRST STAGE (PREFILTER) SEPARATOR - TYPE C AND D.

This task covers:

- | | |
|------------|-----------------|
| a. Removal | c. Replacement |
| b. Service | d. Installation |

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Sealing compound
Appendix C. Item No. 6
Separator
Lint free cloth
Detergent
Bucket

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
-----------------	-------------	---------------	----------------

Removal

- | | | | |
|----|-----------------|---|--|
| 1. | Draining system | a. With the pump (1) running, discharge as much oil as possible from the prefilter separator stage as follows: <ul style="list-style-type: none"> (1) Open the oil discharge valve (2) on the first (prefilter) stage (3). (2) Close the water discharge valve (4): | |
|----|-----------------|---|--|

NOTE

Allow the oil to discharge for approximately one to two seconds after the oil disappears from the sight-glass before closing the oil discharge valve.

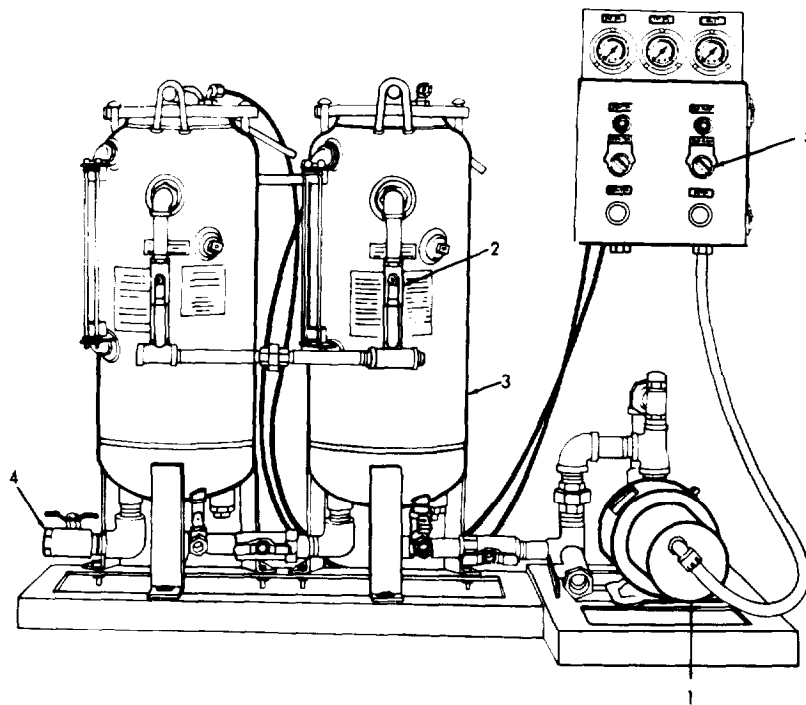
4-30. FIRST STAGE (PREFILTER) SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
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(3) Open the water discharge valve (4) and close the oil discharge valve (2) after the oil has drained from the stage.

b. Stop the supply pump (1) by turning the supply pump selector switch (5) OFF.

c. Close the water discharge valve (4).



- 1. Pump
- 2. Oil Discharge Valve
- 3. First Stage (Prefilter)
- 4. Water Discharge Valve
- 5. Selector Switch

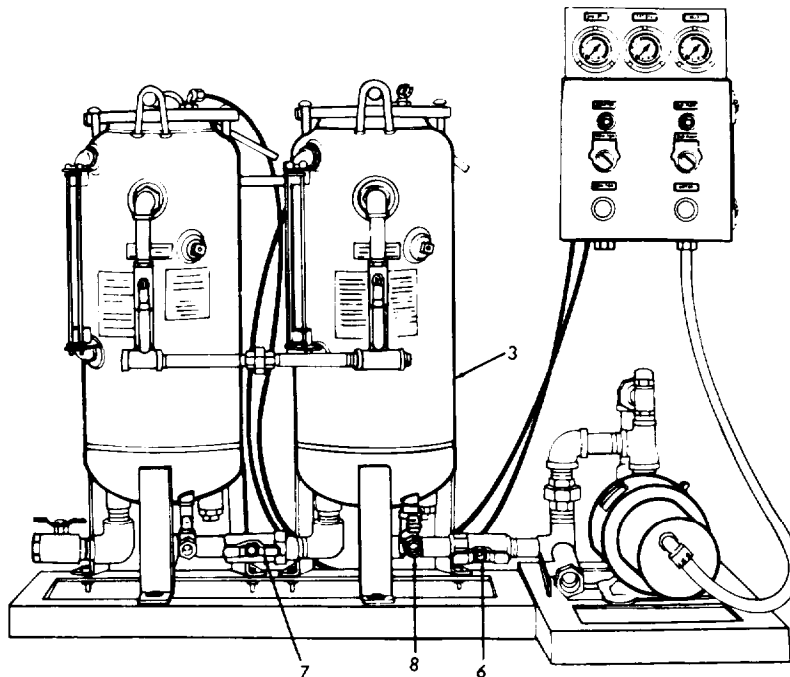
LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

d. To drain water from the first stage (prefilter)

(3):

(1) Close the inlet valve (6) located at the inlet to the first stage (prefilter) (3) and the intervessel shutoff valve (7) between the first (prefilter) and second stages.

(2) Open the drain valve (8) at the base of the vessel.

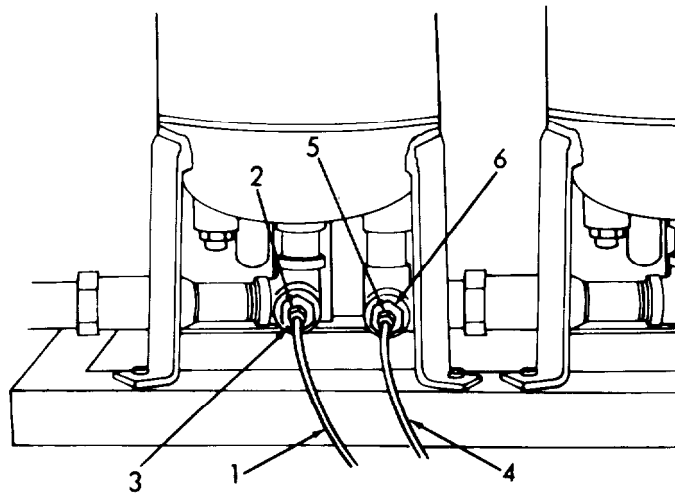


- 3. First Stage (Prefilter)
- 6. Inlet Valve
- 7. Intervessel Shutoff Valve
- 8. Drain Valve

4-30. FIRST STAGE (PREFILTER) SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|----|-----------|---|--|
| 2. | Air Lines | <p>a. Disconnect air lines (1 and 4) by unscrewing female connectors (2 and 5).</p> <p>b. Remove male connectors (3 and 6) from vessel.</p> | |
|----|-----------|---|--|



- 1. Air Line
- 2. Female Connector
- 3. Male Connector
- 4. Air Line
- 5. Female Connector
- 6. Male Connector

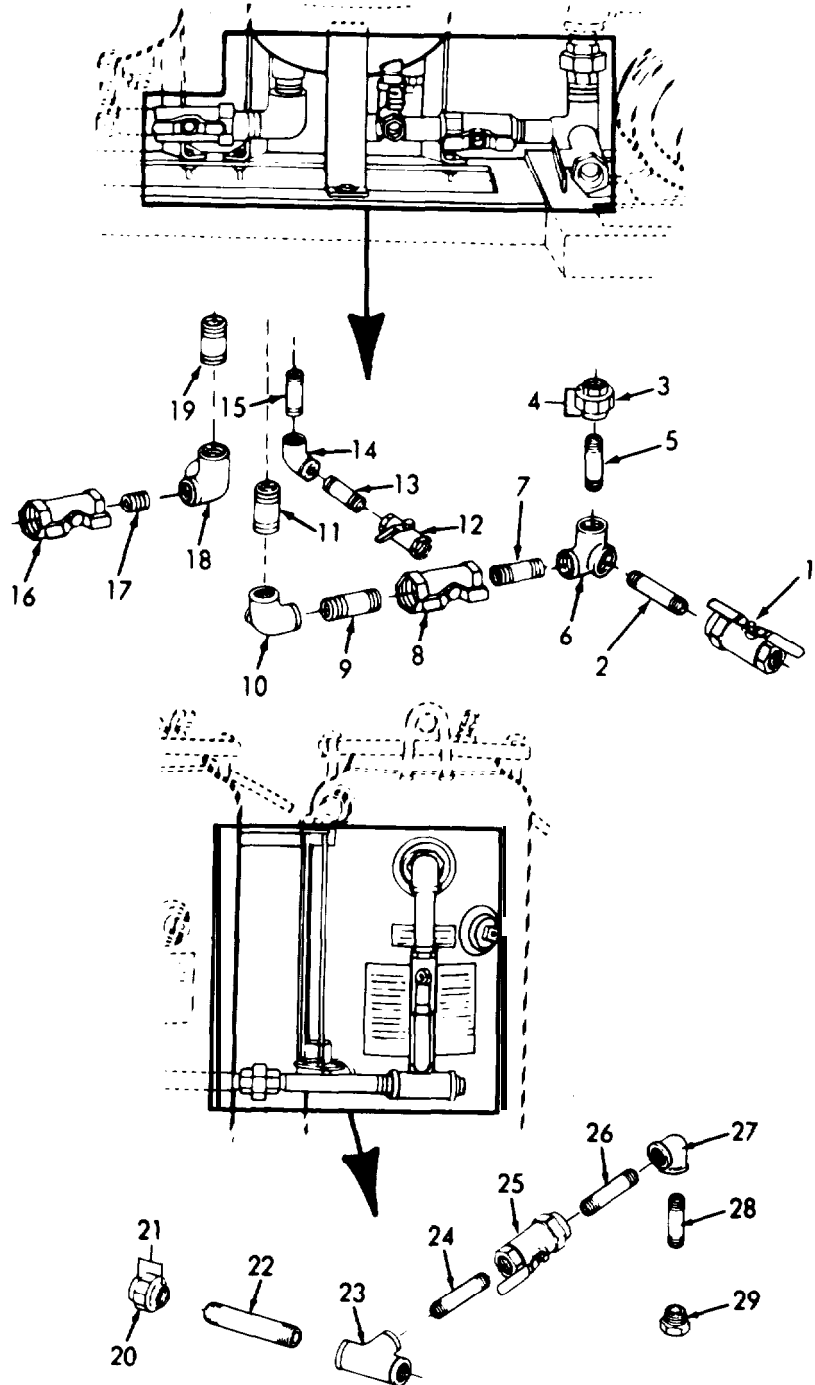
4-30. FIRST STAGE (PREFILTER) SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
3.	Piping	<ul style="list-style-type: none"> a. Remove bypass valve (1) and nipple (2). b. Unscrew collar (3) from union (4) and remove nipple (5), tee (6), nipple (7), inlet valve (8), nipple (9), tee (10) and nipple (11). c. Remove water sample/drain valve (12), nipple (13), elbow (14) and nipple (15). d. Remove intervessel valve (16), nipple (17), tee (18), and nipple (19). e. Unscrew collar (20) from union (21) and remove nipple (22), tee (23), nipple (24), oil discharge valve (25), nipple (26), elbow (27), nipple (28) and reducer bushing (29). 	

4-28 FILTER SUPPORT - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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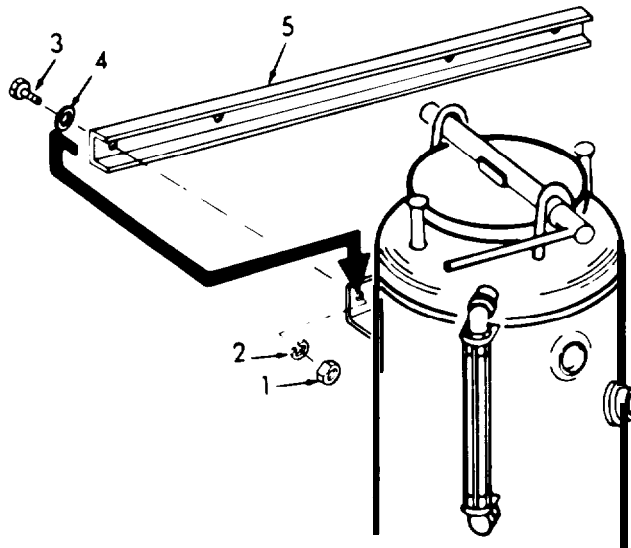
1. Bypass Valve
2. Nipple
3. Collar
4. Union
5. Nipple
6. Tee
7. Nipple
8. Inlet Valve
9. Nipple
10. Tee
11. Nipple
12. Water Sample/
Drain Valve
13. Nipple
14. Elbow
15. Nipple
16. Intervessel
Valve
17. Nipple
18. Tee
19. Nipple
20. Collar
21. Union
22. Nipple
23. Tee
24. Nipple
25. Oil Discharge
Valve
26. Nipple
27. Elbow
28. Nipple
29. Reducer Bushing



4-30. FIRST STAGE (PREFILTER) SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
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4.	Support angle	Remove nuts (1), washers (2), bolts (3) and washers (4) from support angle (5).	
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- 1. Nut
- 2. Washer
- 3. Bolt
- 4. Washer
- 5. Support Angle

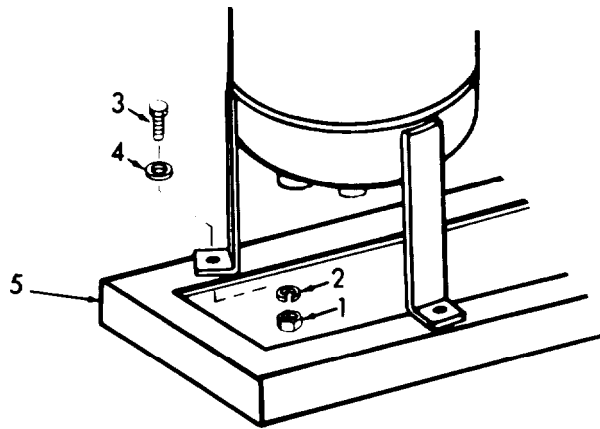
4-30. FIRST STAGE (PREFILTER) SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
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NOTE

Attach a sling to the separator. Using a suitable hoist take up enough slack from the sling to make it taut before removing vessel mounting hardware.

5.	Separator mounting hardware	Remove nuts (1), washers (2), bolts (3) and washers (4) securing separator to mounting frame (5).	Lift separator from mounting frame using hoist and set on a flat surface. Block sufficiently to prevent tipping over. Detach hoist
----	-----------------------------	---	--



- 1. Nut
- 2. Washer
- 3. Bolt
- 4. Washer
- 5. Mounting Frame

4-30. FIRST STAGE (PREFILTER) SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
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6. Separator sub-assembly disassembly	a. Cam bar (1)	Turn handle upward until loose to relieve tension. Slide cam bar from cover (2).	
---------------------------------------	----------------	--	--

CAUTION

Turn cover over so that float faces upward.

	b. Cover (2)	Remove.	
	c. Wing nut (3)	Remove.	
	d. " 0 " ring retainer (4)	Remove.	
	e. " 0 " ring (5)	Remove.	
	f. Hold-down plate (6)	Remove.	

WARNING

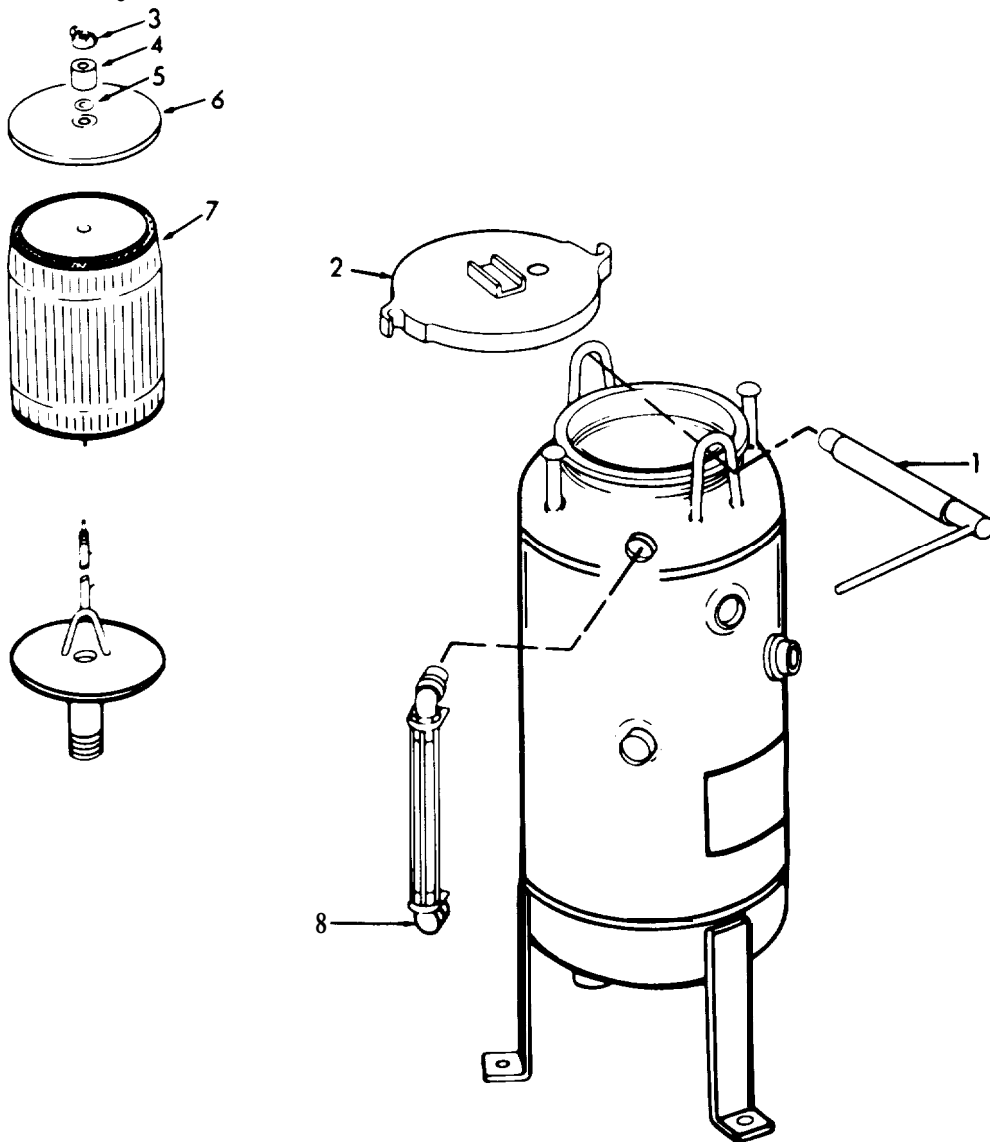
Filter elements are subject to contamination by human hands. Place in plastic bag and mark for petroleum waste disposal.

	g. Element (7)	Remove.	
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4-30. FIRST STAGE (PREFILTER) SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
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h. Sight-glass assembly (8) Remove.



- 1. Cam Bar
- 2. Cover
- 3. Wingnut
- 4. "O" Ring Retainer

- 5. "O" Ring
- 6. Hold-down Plate
- 7. Element
- 8. Sight Glass Assembly

4-30. FIRST STAGE (PREFILTER) SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Service

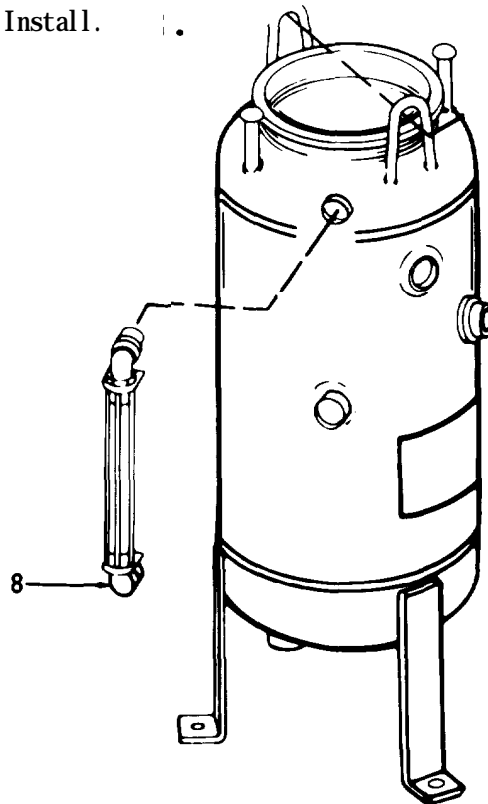
- | | | | |
|----|----------------------|---|--|
| 7. | Sight-glass | Clean using a lint free cloth, detergent and warm water. Dry thoroughly. | |
| 8. | Separator interior | Flush thoroughly with clean water. | |
| 9. | Air eliminator valve | Clean using a lint free cloth and a mild detergent and water. Dry thoroughly. | |

Repair

Replace a damaged or defective separator with a serviceable-like item.

Installation

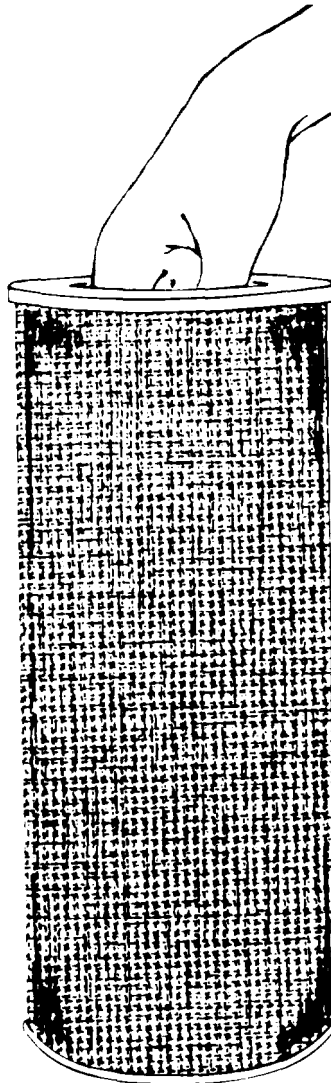
- | | | | |
|-----|----------------|----------|--|
| 10. | Sightglass (8) | Install. | |
|-----|----------------|----------|--|



8. Sightglass

4-30. FIRST STAGE (PREFILTER) SEPARATOR-TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
11.	Filter element	a. Handle the filter elements only by the end caps. When installing an element, insert hand through the opening in the end cap.	



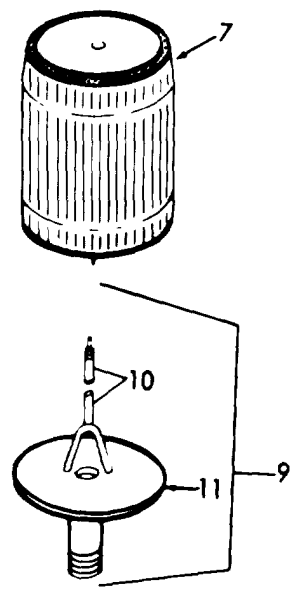
4-30 FIRST STAGE (PREFILTER) SEPARATOR- TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
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WARNING

It is important that the filter element be handled properly. DO NOT touch or handle the sock area (side covering) of the element. Contamination of this surface by skin oils may prevent the coaleser element from functioning properly and cause foaming of the effluent.

- b. Place filter element (7) over the threaded element stand (9). Position the element so that it is centered over the element positioning guide (10) attached to the striker plate (11).



- 7. Filter Element
- 9. Threaded Element Stand
- 10. Element Positioning Guide
- 11. Striker Plate

4-30. FIRST STAGE (PREFILTER) SEPARATOR - TYPE C AND D (Continued).

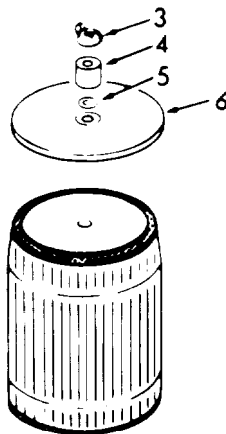
LOCATION	ITEM	ACTION	REMARKS
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- c. Replace and center hold-down plate (6) over the end cap of the filter element.
- d. Place 0-ring (5), 0-ring retainer(4), and wing nut (3) on the element stand.

CAUTION

DO NOT use a wrench to tighten the wing nut, or the filter element may be damaged.

- e. Tighten the wing nut (3) as tight as possible by hand.

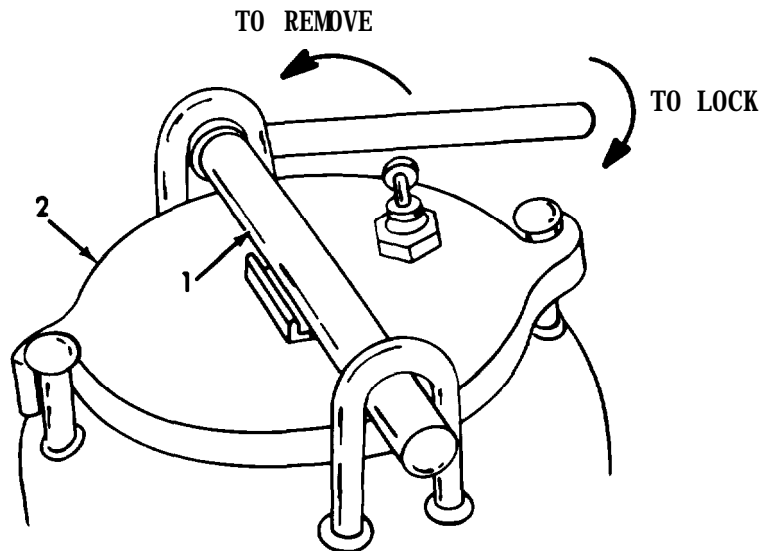


- 3. Wingnut
- 4. "O" Ring Retainer
- 5. "O" Ring
- 6. Hold-down Plate

4-30. FIRST STAGE (PREFILTER) SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
12.	Cover	a. Replace the cover (2) on the stage being serviced. b. Secure the cam bar (1) to the cover.	

- 1. Cam Bar
- 2. Cover



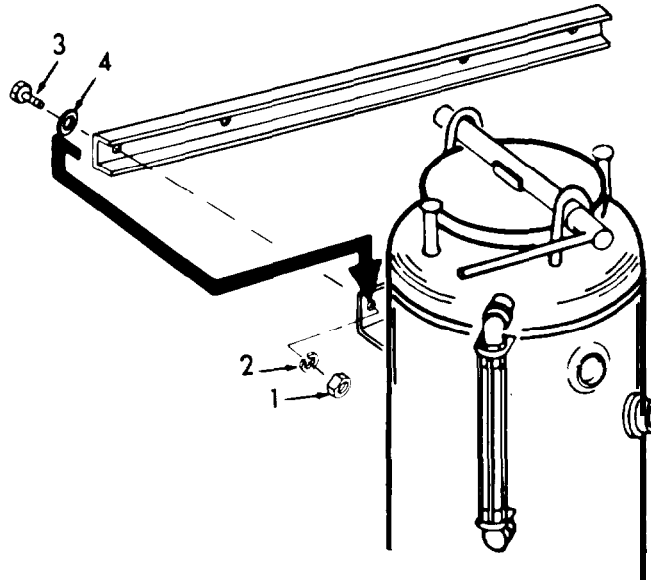
NOTE

Attach a suitable sling to the 1st stage (prefilter) separator and using a suitable hoist, position the separator in place on the mounting frame.

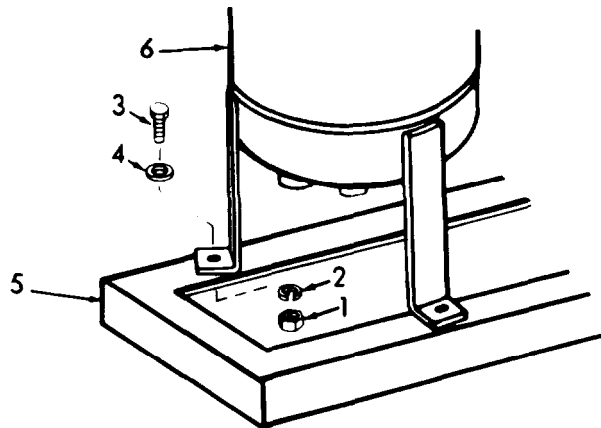
13. Support angle and pre-filter mounting hardware	a. Mounting hardware	Install flatwashers (4), screws (3), lockwashers (2) and nuts (1).
	b. Support angle (5)	Secure to vessel (6) with flatwashers (4), screws (3), lockwashers (2) and nuts (1).

4-30. FIRST STAGE (PREFILTER) SEPARATOR- TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
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1. Nut
2. Lockwasher
3. Screw
4. Flatwasher



1. Nut
2. Lockwasher
3. Screw
4. Flatwasher
5. Support Angle
6. Vessel

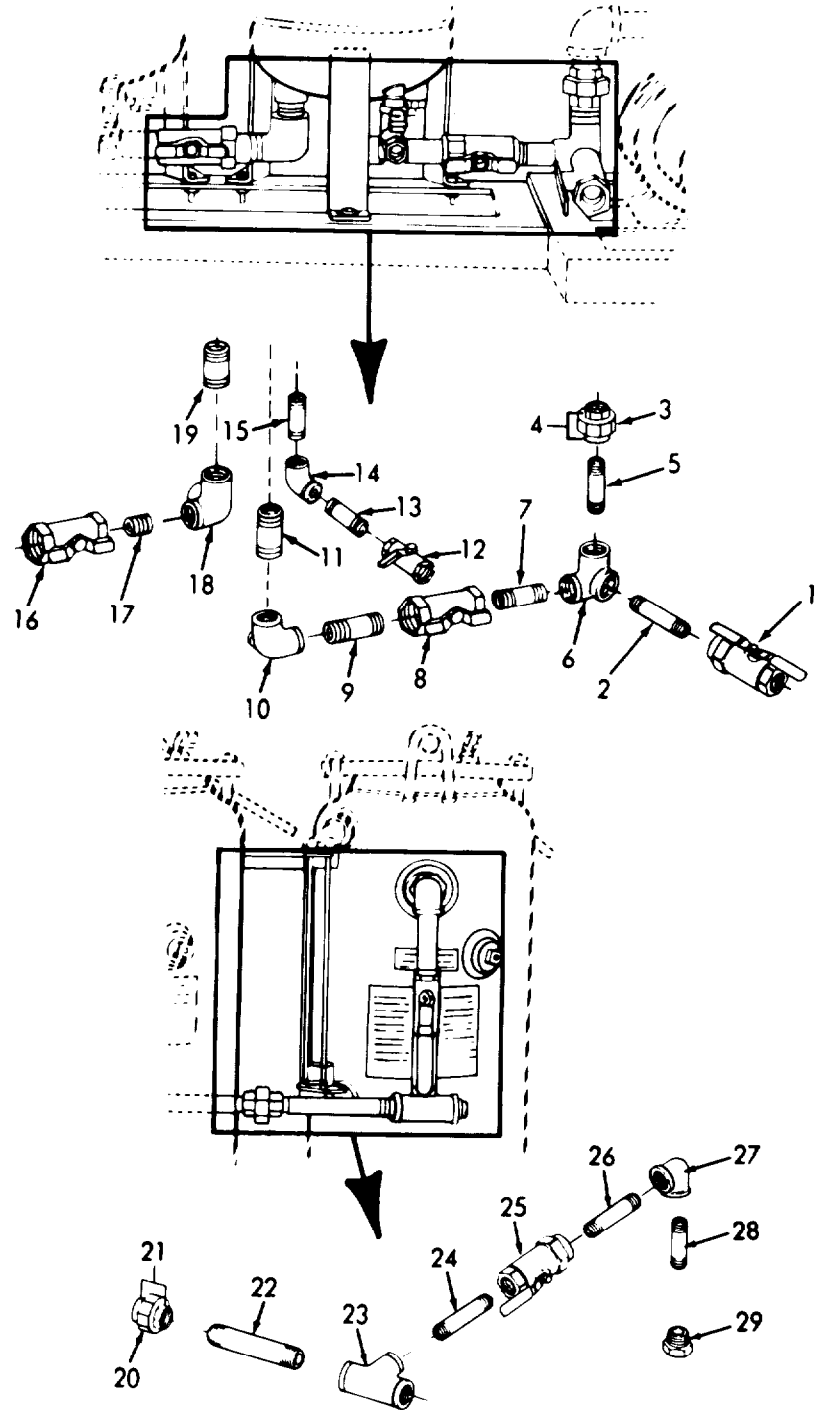
4-30. FIRST STAGE (PREFILTER) SEPARATOR- TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
14.	Piping	<ul style="list-style-type: none"> a. Install reducer bushing (29), nipple (28), elbow (27), nipple (26), oil discharge valve (25), nipple (24), tee (23) and nipple (22). b. Secure to union (21) by tightening collar (20). c. Install nipple (19), tee (18), nipple (17) and intervessel valve (16). d. Install nipple (15), elbow (14), nipple (13) and water sample/drain valve (12). e. Install nipple (11), tee (10), nipple (9), inlet valve (8), nipple (7) tee (6) and nipple (5). f. Secure to union (4) by tightening collar (3). g. Install nipple (2) and by-pass valve (1). 	

4-30. FIRST STAGE (PREFILTER) SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
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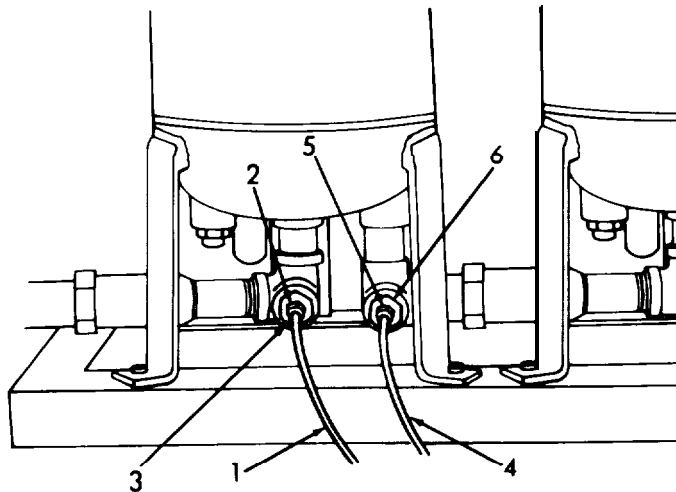
1. Bypass Valve
2. Nipple
3. Collar
4. Union
5. Nipple
6. Tee
7. Nipple
8. Inlet Valve
9. Nipple
10. Tee
11. Nipple
12. Water Sample/ Drain Valve
13. Nipple
14. Elbow
15. Nipple
16. Intervessel Valve
17. Nipple
18. Tee
19. Nipple
20. Collar
21. Union
22. Nipple
23. Tee
24. Nipple
25. Oil Discharge Valve
26. Nipple
27. Elbow
28. Nipple
29. Reducer Bushing



FIRST STAGE (PREFILTER) SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|-----|-----------|--|--|
| 15. | Air lines | <p>a. Install male connectors (3 and 6) into tees.</p> <p>b. Reconnect air lines (1 and 4) by tightening female connectors (2 and 5) to male connectors (3 and 6).</p> | |
|-----|-----------|--|--|



- 1. Air Line
- 2. Female Connector
- 3. Male Connector
- 4. Air Line
- 5. Female Connector
- 6. Male Connector

- | | | | |
|-----|----------------|-------------------------|--|
| 16. | Restart system | Refer to paragraph 2-4. | |
|-----|----------------|-------------------------|--|

4-31. SECOND STAGE SEPARATOR - TYPE C AND D.

This task covers:

- | | |
|------------|-----------------|
| a. Removal | c. Replacement |
| b. Service | d. Installation |

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Sealing compound
Appendix C. Item No. 6
Separator
Lint free cloths
Detergent
Bucket

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Removal

- | | | |
|----|-----------------|--|
| 1. | Draining system | a. With the pump (1) running discharge as much oil as possible from the 2nd stage separator according to the following:

(1) Open the oil discharge valve (2) on the second stage (3).

(2) Close the water discharge valve (4): |
|----|-----------------|--|

NOTE

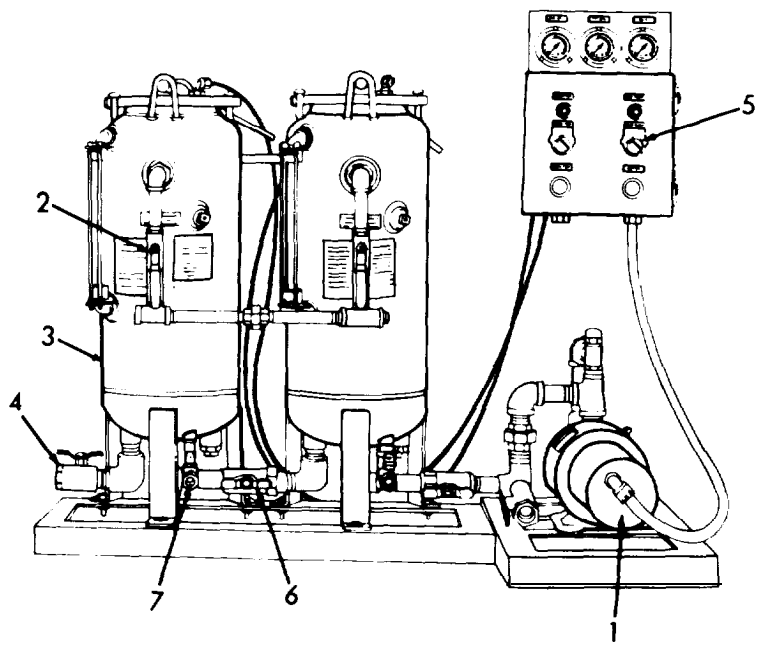
Allow the oil to discharge for approximately one to two seconds after the oil disappears from the sight-glass before closing the oil discharge valve.

4-31. SECOND STAGE SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- (3) Open the water discharge valve (4) and close the oil discharge valve (2) after the oil has drained from the stage.
- b. Stop the supply pump (1) by turning the supply pump selector switch (5) OFF.
- c. Close the water discharge valve (4).
- d. To drain water from the second stage (3):
 - (1) Close the intervessel shutoff valve (6) located between the first (prefilter) and second stages.
 - (2) Open the drain valve (7) at the base of the vessel.

- 1. Pump
- 2. Oil Discharge Valve
- 3. Second Stage
- 4. Water Discharge Valve
- 5. Selector Switch
- 6. Intervessel Shutoff Valve
- 7. Drain Valve



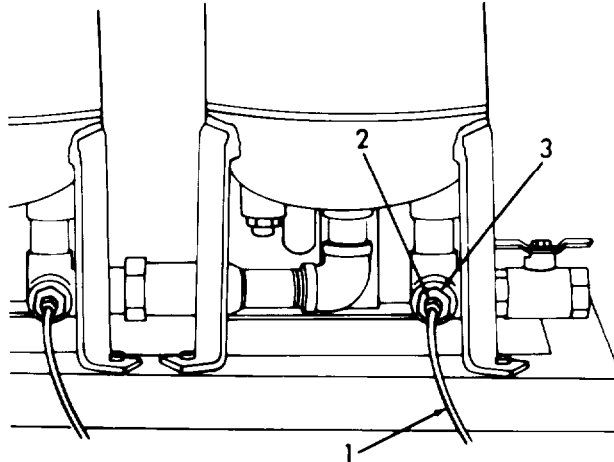
4-31. SECOND STAGE SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|----|------------------|--|--|
| 2. | Air lines
(1) | a. Disconnect by unscrewing female connector (2).

b. Remove male connector (3). | |
|----|------------------|--|--|

- 1. Air Line
- 2. Female Connector
- 3. Male Connector



- | | | | |
|----|--------|--|--|
| 3. | Piping | a. Remove water sample/drain valve (1), nipple (2), elbow (3) and nipple (4).

b. Remove intervessel shutoff valve (5), nipple (6), elbow (7) and nipple (8).

c. Remove water discharge line (9), discharge valve (10), nipple (11), tee (12) and nipple (13).

d. Remove oil discharge line (14).

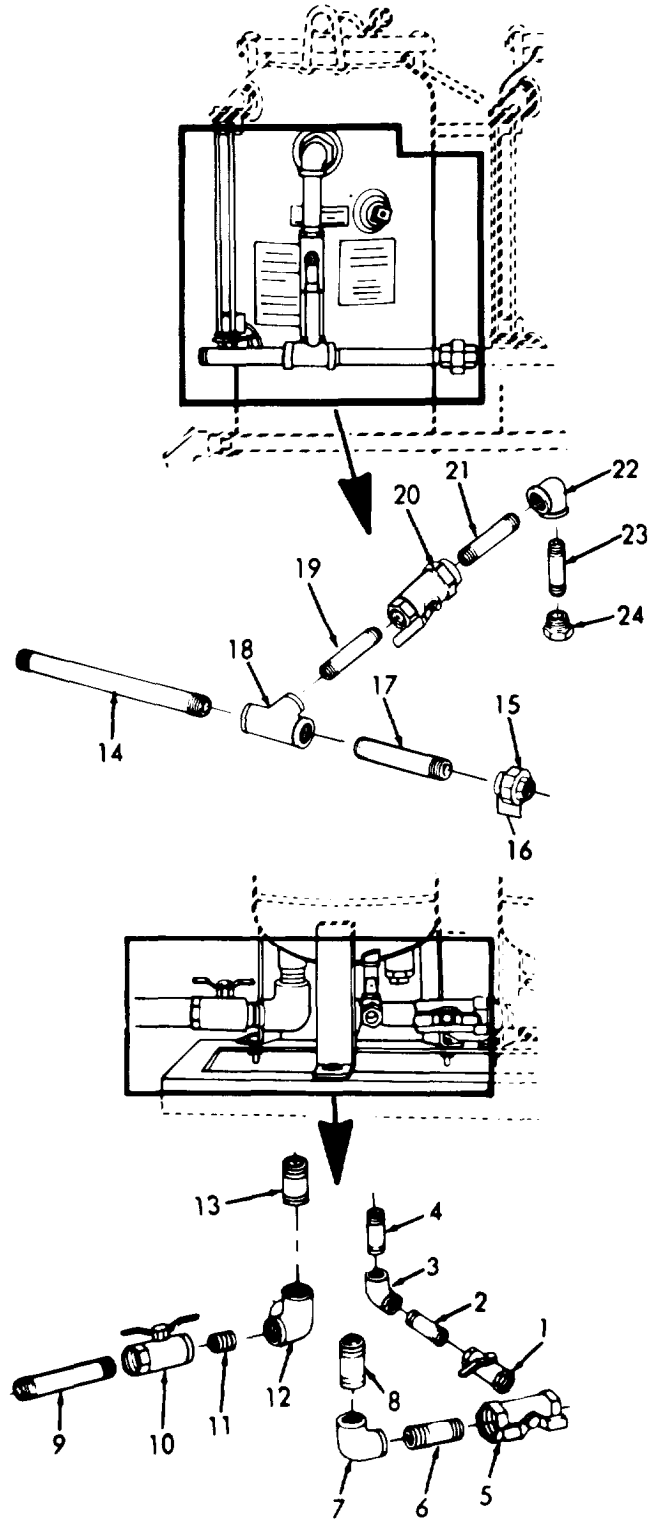
e. Unscrew collar (15) from union (16) and remove nipple (17).

f. Remove tee (18), nipple (19), oil discharge valve (20), nipple (21), elbow (22), nipple (23) and reducer bushing (24). | |
|----|--------|--|--|

4-31. SECOND STAGE SEPARATOR- TYPE C AND D (Continued).

LOCATI ON	I TEM	ACTI ON	REMARKS
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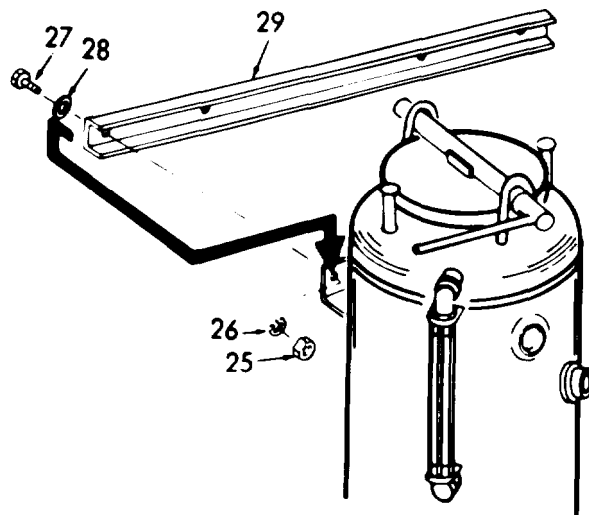
1. Water Sample/Drain Valve
2. Ni pple
3. El bow
4. Ni pple
5. Intervessel Shutoff Valve
6. Ni pple
7. El bow
8. Ni pple
9. Water Discharge Line
10. Discharge Valve
11. Ni pple
12. Tee
13. Ni pple
14. Oil Discharge Line
15. Coll ar
16. Uni on
17. Ni pple
18. Tee
19. Ni pple
20. Oil Discharge Valve
21. Ni pple
22. El bow
23. Ni pple
24. Reducer Bushi ng



4-31. SECOND STAGE SEPARATOR, TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
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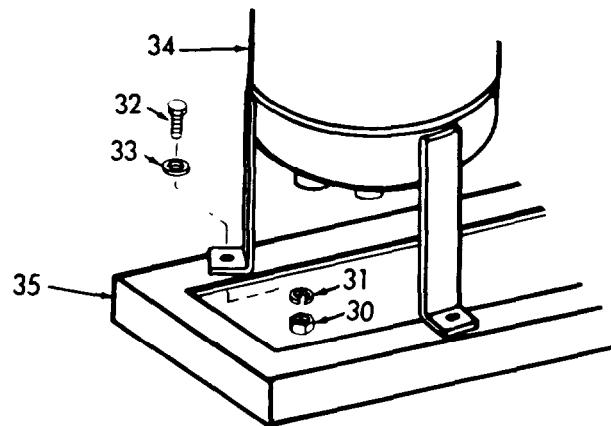
4.	Support Angle (29)	Remove nuts (25), washers (26), screws (27), and washers (28) from support angle (29).	
----	--------------------------	--	--



- 25. Nut
- 26. Washer
- 27. Screw
- 28. Washer
- 29. Support Angle

4-31. SECOND STAGE SEPARATOR, TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
5.	Separator mounting hardware	Remove nuts (30), washers (31), bolts (32) and washers (33) securing separator (34) to mounting frame (35).	Lift separator from mounting frame using hoist and set on a flat surface. Block sufficiently to prevent tipping over. Detach hoist and sling.



- 30. Nut
- 31. Washer
- 32. Bolt
- 33. Washer
- 34. Separator
- 35. Mounting Hardware

4-31. SECOND STAGE SEPARATOR, TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- | | | | |
|----|-------------------------------------|----------------|--|
| 6. | Separator sub-assembly dis-assembly | a. Cam bar (1) | Turn handle upwards until loose. Slide cam bar from cover (2). |
| | b. Cover (2) | Remove. | |



Turn cover over so that float faces upwards.

- | | | |
|----|-------------------------|---------|
| c. | Wing nut (3) | Remove. |
| d. | " 0 " ring retainer (4) | Remove. |
| e. | " 0 " ring (5) | Remove. |
| f. | Hold-down plate (6) | Remove. |

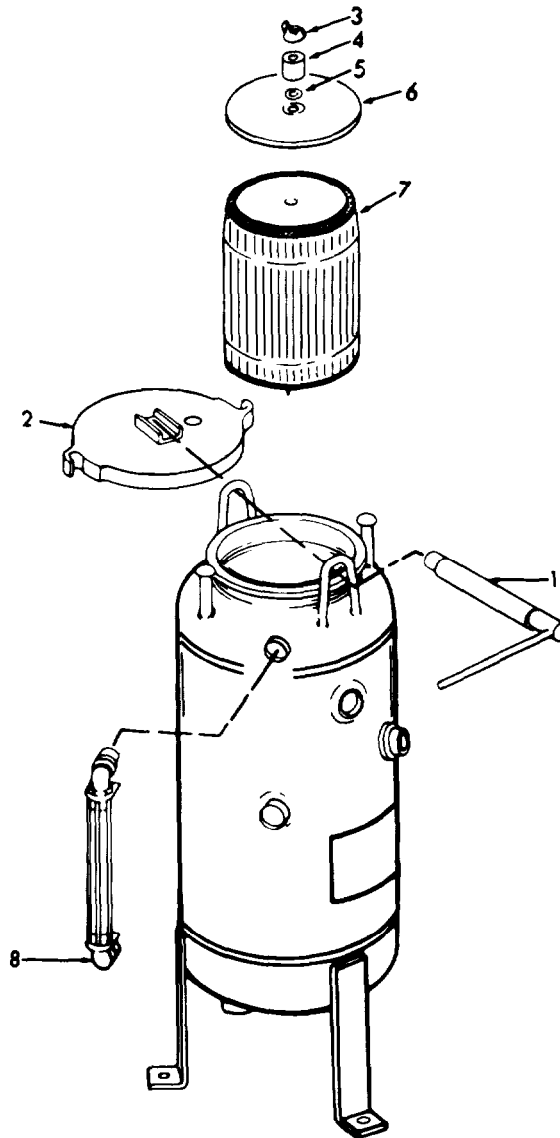


Filter elements are subject to contamination by human hands. Place in plastic bag and mark for petroleum waste disposal.

- | | | |
|----|--------------------------|---------|
| g. | Element (7) | Remove. |
| h. | Sight-glass assembly (8) | Remove. |

4-31. SECOND STAGE SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 1. Cam Bar
- 2. Cover
- 3. Wingnut
- 4. "O" Ring Retainer
- 5. "O" Ring
- 6. Hold-down Plate
- 7. Element
- 8. Sightglass Assembly

4-31. SECOND STAGE SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Service

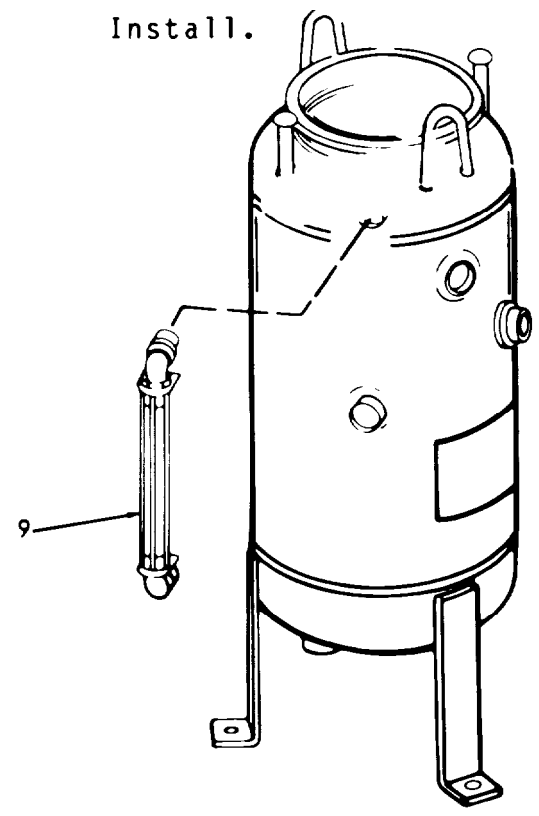
7.	Sight-glass	Clean using a lint free cloth, detergent and warm water. Dry thoroughly.	
8.	Separator interior	Flush thoroughly with clean water.	
9.	Air eliminator valve	Clean using a lint free cloth and a mild detergent and water. Dry thoroughly.	

Repair

Replace a damaged or defective separator with a serviceable-like item

Installation

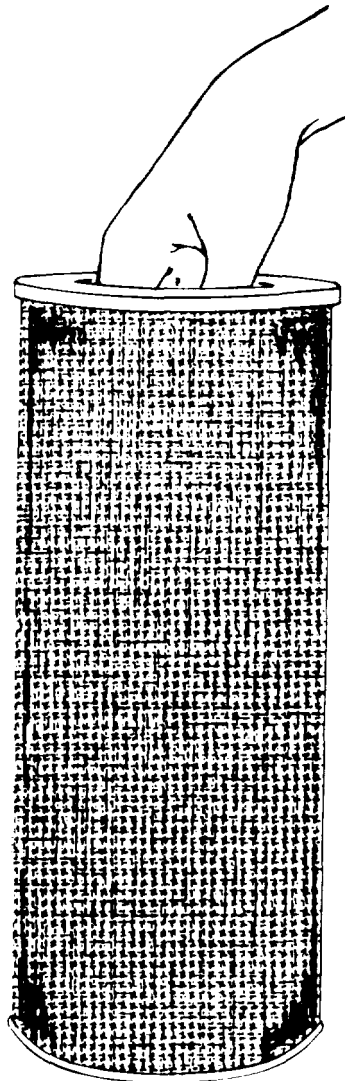
10.	Sight-glass (9)	Install.	
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9. Sightglass

4-31. SECOND STAGE SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
11.	Filter element	a. Handle the filter element only by the end caps. When installing an element, insert hand through the opening in the end cap.	



4-31. SECOND STAGE SEPARATOR - TYPE C AND D (Continued)

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

WARNING

It is important that the filter element be handled properly. DO NOT touch or handle the sock area (side covering) of the element. Contamination of this surface by skin oils may prevent the coalescer element from functioning properly and cause foaming of the effluent.

- b. Place filter element (7) over the threaded element stand (9). Position the element so that it is centered over the element positioning guide (10) attached to the striker plate (11).
- c. Replace and center the hold-down plate (6) over the end cap of the filter element.
- d. Place O-ring (5), O-ring retainer(4), and wing nut (3) on the element stand.

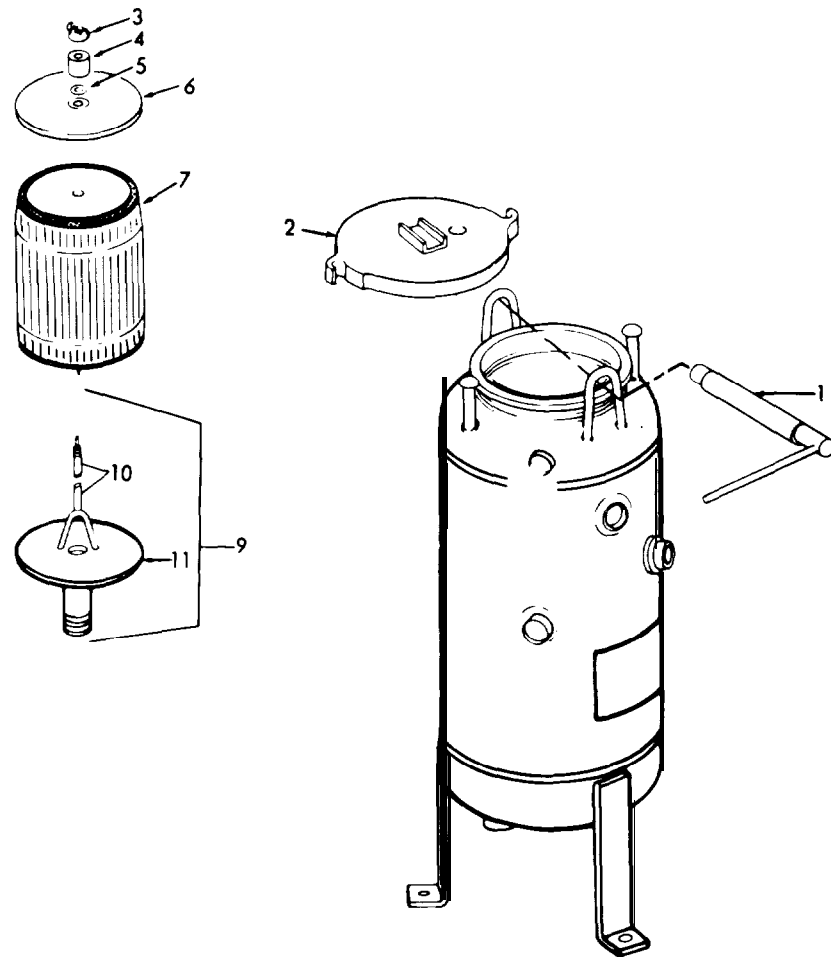
WARNING

DO NOT use a wrench to tighten the wing nut, or the filter element may be damaged.

- e. Tighten the wing nut (3) as tight as possible by hand.
12. Cover
- a. Install the cover (2).
 - b. Secure the cam bar (1) to the cover by turning downward to lock in place.

4-31. SECOND STAGE SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 1. Cam Bar
- 2. Cover
- 3. Wingnut
- 4. "O" Ring Retainer
- 5. "O" Ring
- 6. Hold-down Plate
- 7. Filter Element
- 9. Threaded Element Stand
- 10. Element Positioning Guide
- 11. Striker Plate

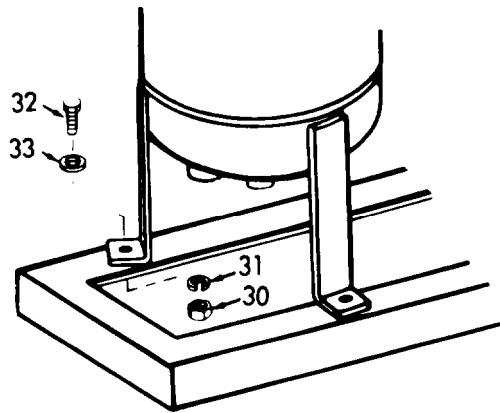
4-31. SECOND STAGE SEPARATOR, TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

NOTE

Attach a suitable sling to the 2nd stage separator and using a suitable hoist, position the separator in place on the mounting frame.

- | | | |
|--|----------------------|--|
| 13. Support angle and pre-filter mounting hardware | a. Mounting hardware | Install flatwashers (33), screws (32), lockwashers (31) and nuts (30). |
|--|----------------------|--|

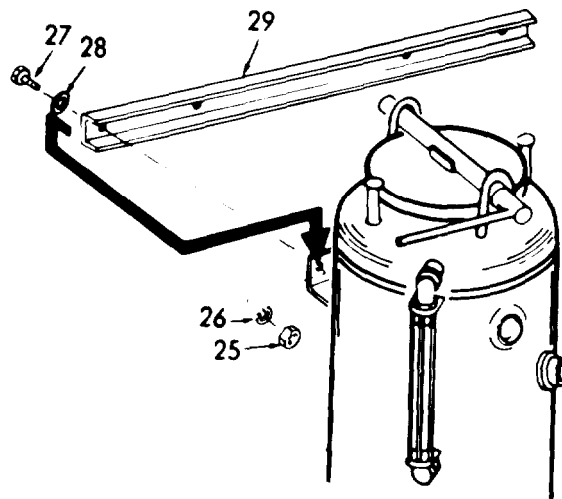


- 30. Nut
- 31. Lockwasher
- 32. Screw
- 33. Flatwasher

4-31. SECOND STAGE SEPARATOR, TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

b. Support Secure to vessel with flat-angle washers (28), screws (27), lockwashers (26) and nuts (25) .



- 25. Nut
- 26. Washer
- 27. Screw
- 28. Washer
- 29. Support Angle

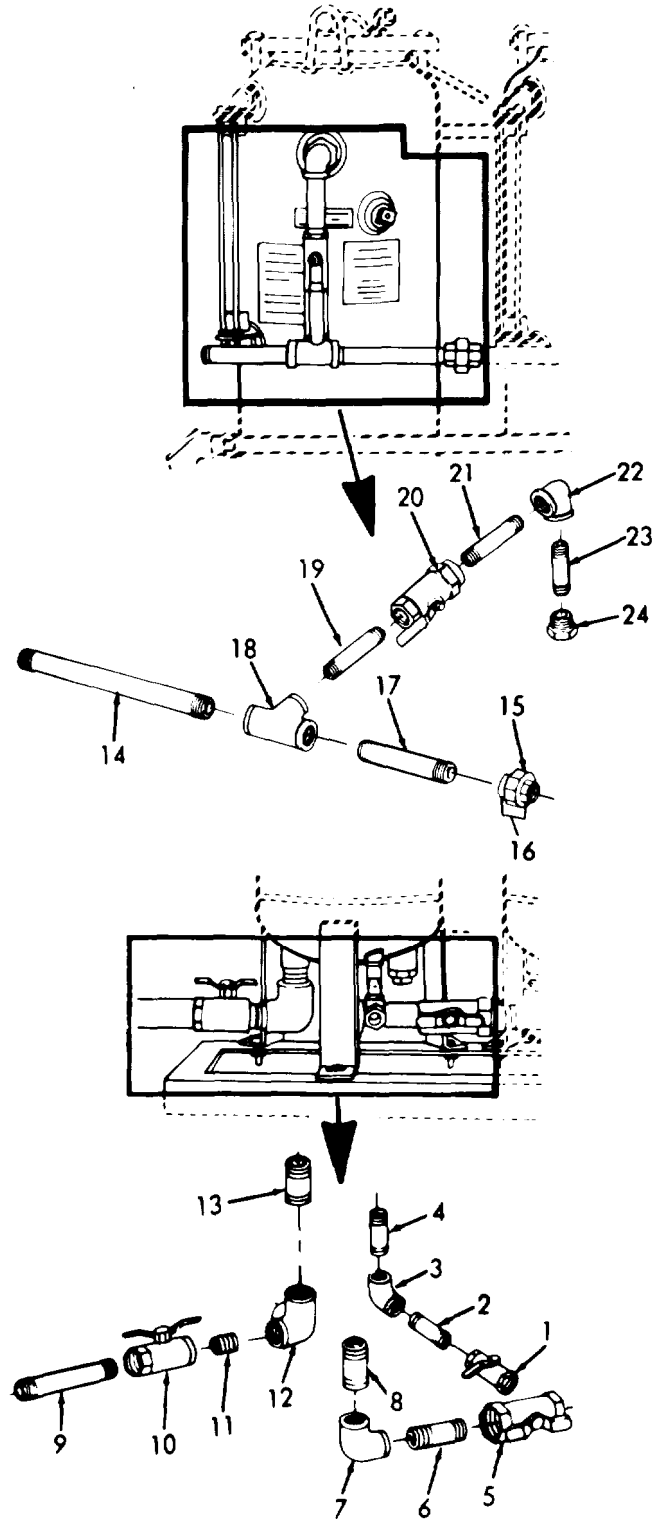
4-31. SECOND STAGE SEPARATOR, TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
14.	Piping	<ul style="list-style-type: none"> a. Install reducer bushing (24), nipple (23), elbow (22), nipple (21), oil discharge valve (20), nipple (19), tee (18). b. Install nipple (17) and secure to union (16) by tightening collar (15). Install oil discharge line (14). c. Install nipple (13), tee (12), nipple (11), water discharge valve (10) and water discharge line (9). d. Install nipple (8), elbow (7), nipple (6) and inter-vessel shutoff valve (5). e. Install nipple (4), elbow (3), nipple (2) and water sample/drain valve (1). 	

4-31. SECOND STAGE SEPARATOR, TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
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1. Water Sample/Drain Valve
2. Nipple
3. Elbow
4. Nipple
5. Intervessel Shutoff Valve
6. Nipple
7. Elbow
8. Nipple
9. Water Discharge Line
10. Discharge Valve
11. Nipple
12. Tee
13. Nipple
14. Oil Discharge Line
15. Collar
16. Union
17. Nipple
18. Tee
19. Nipple
20. Oil Discharge Valve
21. Nipple
22. Elbow
23. Nipple
24. Reducer Bushing

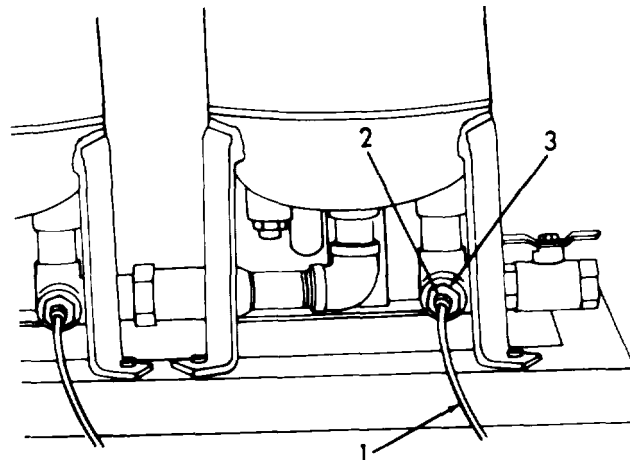


4-31. SECOND STAGE SEPARATOR - TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- | | | | |
|-----|-----------|--|--|
| 15. | Air lines | a. Install male connector (3) in tee.

b. Reconnect air line (1) by tightening female connector (2) to male connector. | |
|-----|-----------|--|--|



- 1. Air Line
- 2. Female Connector
- 3. Male Connector

- | | | | |
|-----|----------------|-------------------------|--|
| 16. | Restart system | Refer to paragraph 2-4. | |
|-----|----------------|-------------------------|--|

4-32. WATER SAMPLE/DRAIN VALVE - TYPE C AND D SEPARATORS.

This task covers:

- a. Removal b. Replacement c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Drain valve(s)
Sealing compound
Appendix C. Item No. 6

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Removal

- | | | | |
|----|-----------------|---|--|
| 1. | Draining system | <p>a. With the pump (1) running discharge as much oil as possible from the separator stage in which the water sample/drain valve is to be replaced according to the following:</p> <p>(1) Open the oil discharge valve (2 or 3) on either the first (prefilter) or second stage (4 or 5).</p> <p>(2) Close the water discharge valve (6):</p> | |
|----|-----------------|---|--|

4-32. WATER SAMPLE/DRAIN VALVE - TYPE C AND D SEPARATORS (Continued).

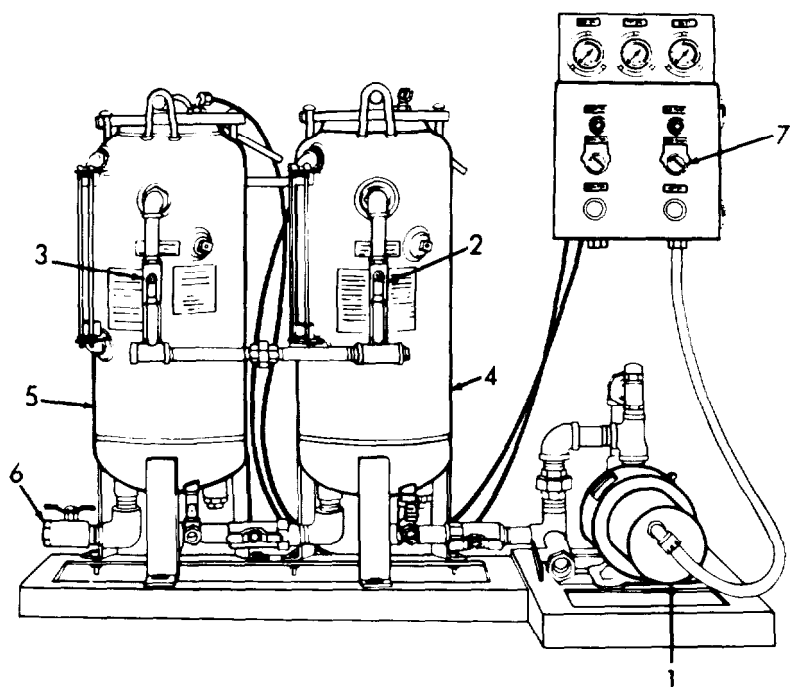
LOCATION	ITEM	ACTION	REMARKS
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NOTE

Allow the oil to discharge for approximately one to two seconds after the oil disappears from the sight glass before closing the oil discharge valve.

- (3) Open the water discharge valve (6) and close the discharge valve (2 or 3) after the oil has drained from the stage.
- b. Stop the supply pump (1) by turning the supply pump selector switch (7) OFF.
- c. Close the water discharge valve (6).

- 1. Pump
- 2. Oil Discharge Valve
- 3. Oil Discharge Valve
- 4. First Stage (Prefilter)
- 5. Second Stage
- 6. Water Discharge Valve
- 7. Selector Switch

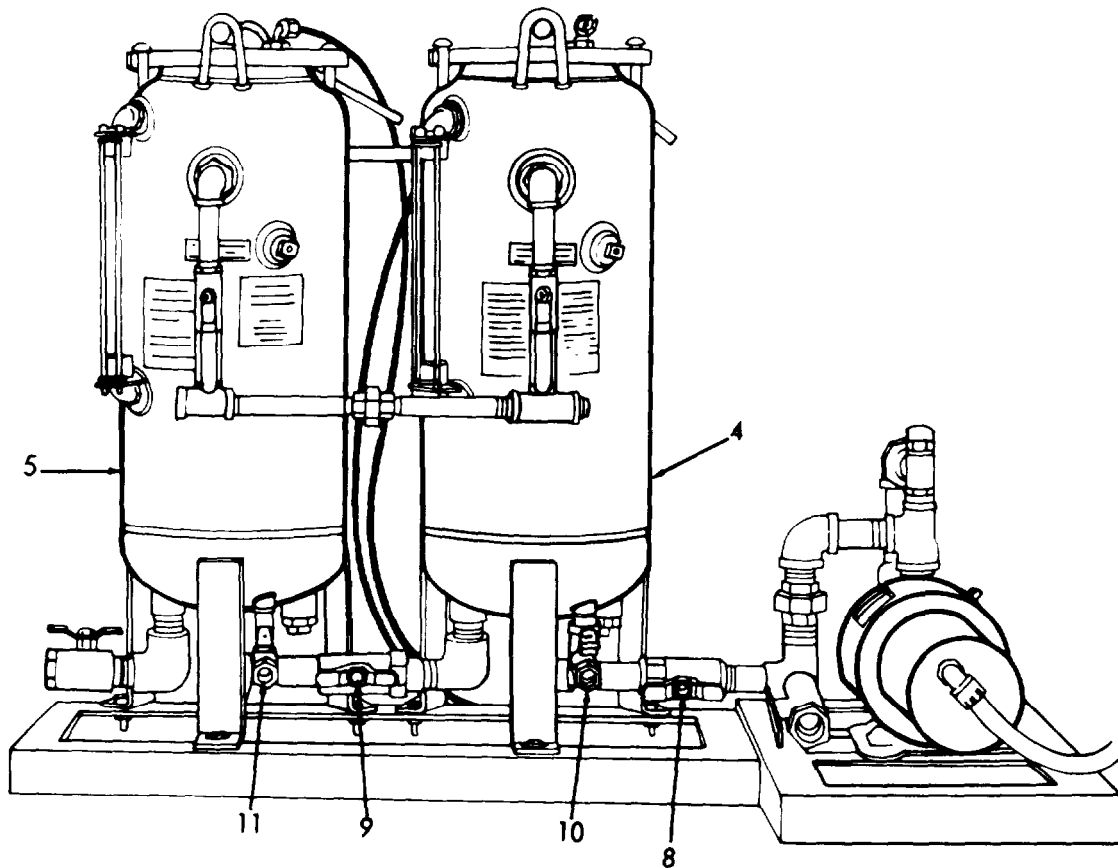


4-32. WATER SAMPLE/DRAIN VALVE, TYPE C AND D SEPARATORS (Continued).
--

LOCATION	ITEM	ACTION	REMARKS
		<p>d. To drain water from the first (prefilter) stage (2):</p> <p>(1) Close the inlet valve (8) located at the inlet to the first (prefilter) stage (4) and the intervessel shutoff valve (9) between the first (prefilter) and second stages.</p> <p>(2) Open the drain valve (10) at the base of the vessel.</p>	
		<p>e. To drain water from the second stage (5).</p> <p>(1) Close the intervessel shutoff valve (9) located between the first (prefilter) and second stages.</p> <p>(2) Open the drain valve (11) at the base of the vessel.</p>	

4-32. WATER SAMPLE/DRAIN VALVE - TYPE C AND D SEPARATORS (Continued).

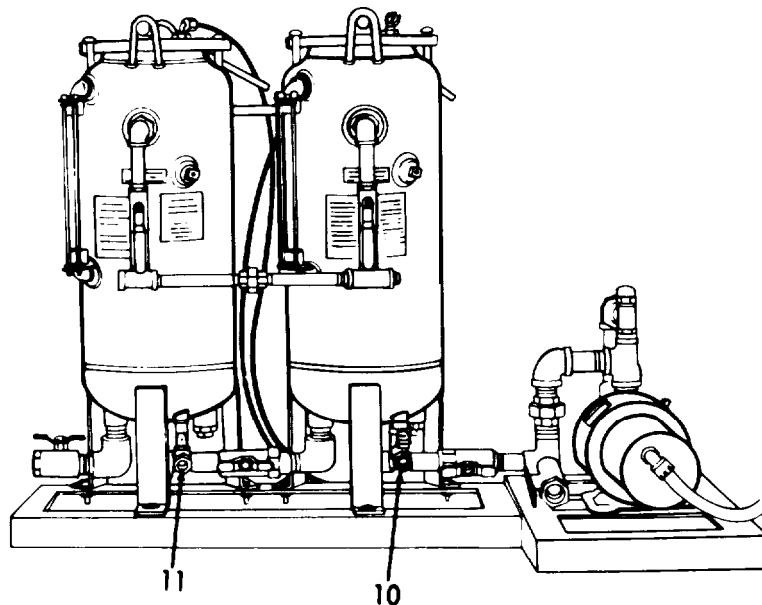
LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 4. First (Prefilter) Stage
- 5. Second Stage
- 8. Inlet Valve
- 9. Intervessel Shutoff Valve
- 10. Drain Valve
- 11. Drain Valve

4-32. WATER SAMPLE/DRAIN VALVE, TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
2.	Drain valve (10), prefilter	Unscrew to remove.	
3.	Drain valve (11), 2nd stage	Unscrew to remove.	



- 10. Drain Valve - First Stage (Prefilter)
- 11. Drain Valve - Second Stage

Replacement

Replace a defective water sample/drain valve with a serviceable-like item.

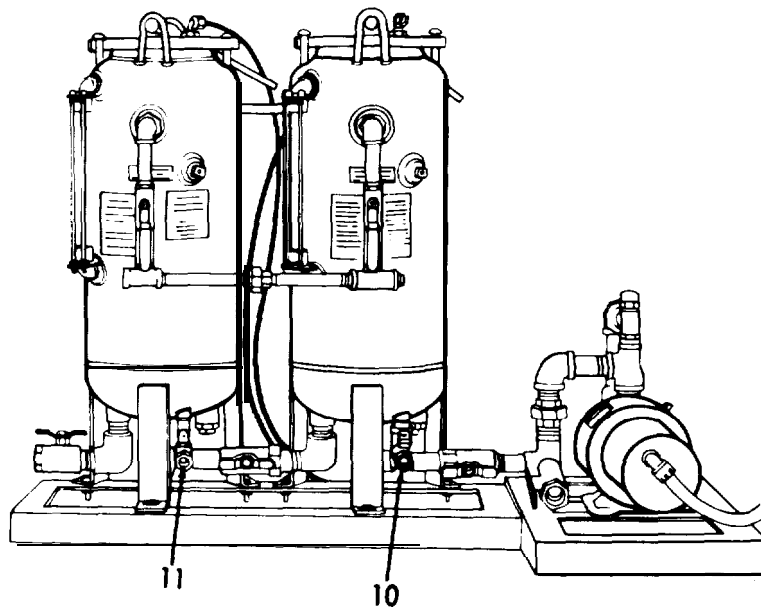
4-32. WATER SAMPLE/DRAIN VALVE - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Installation

4.	Drain valve (11) 2nd stage	Install.	
----	----------------------------	----------	--

5.	Drain valve (10) prefilter	Install.	
----	----------------------------	----------	--



10. Drain Valve - Second Stage
 11. Drain Valve - First Stage (Prefilter)

6.	Restart system	Refer to paragraph 2-4.	
----	----------------	-------------------------	--

4-33. DISCHARGE VALVE - MANUALLY OPERATED, TYPE C AND D SEPARATORS.

This task covers:

- a. Removal b. Replacement c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Discharge valve
Sealing compound
Appendix C. Item No. 6

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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Removal

1. Draining system a. With the pump (1) running discharge as much oil as possible from the 2nd stage separator according to the following:
- (1) Open the oil discharge valve (2) on second stage (3).
 - (2) Close the water discharge valve (4):

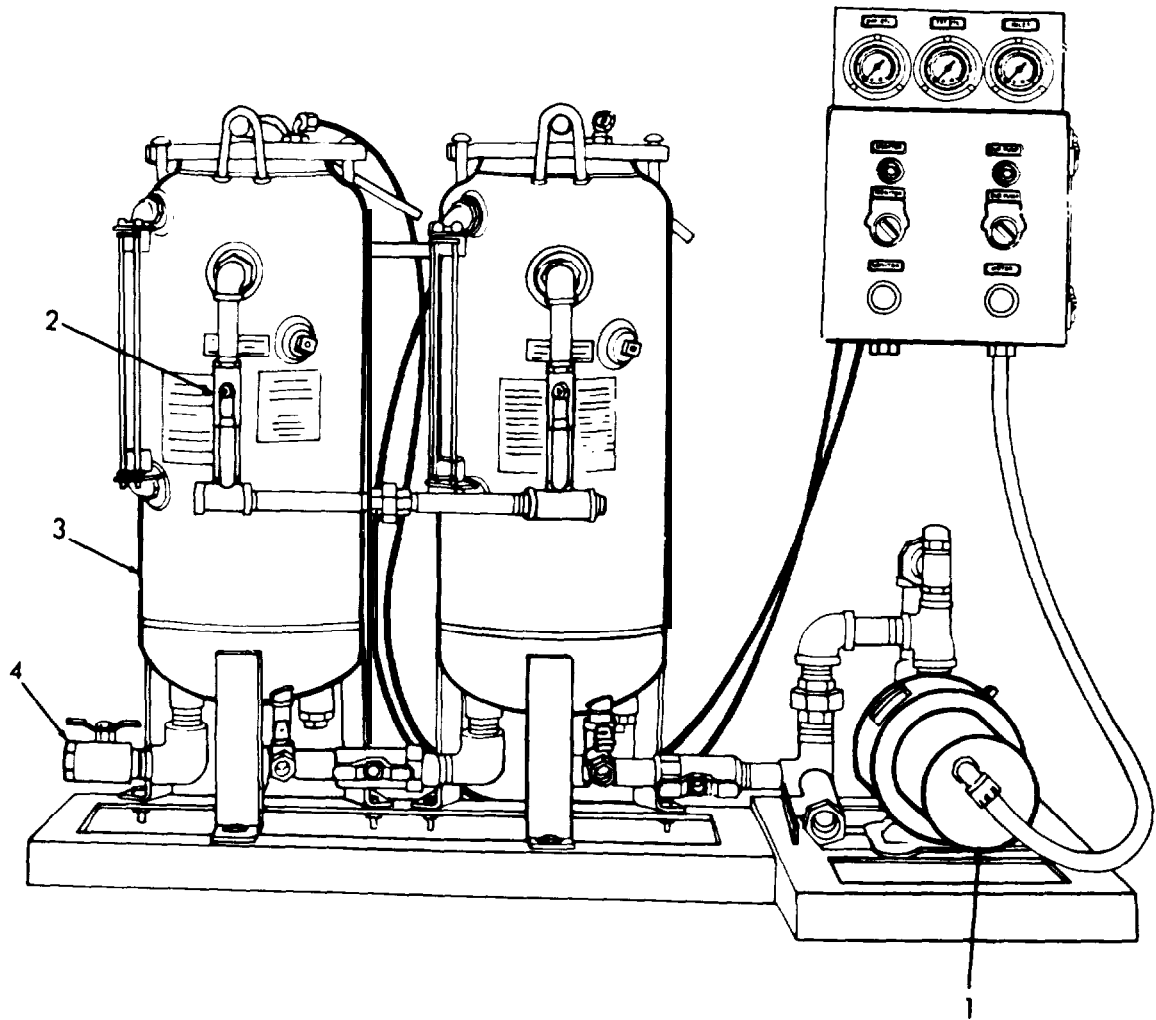
NOTE

Allow the oil to discharge for approximately one to two seconds after the oil disappears from the sight glass before closing the oil discharge valve.

**4-33. DISCHARGE VALVE - MANUALLY OPERATED, TYPE C AND D SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
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		(3) Open the water discharge valve (4) and close the oil discharge valve (2) after the oil has drained from the stage.	
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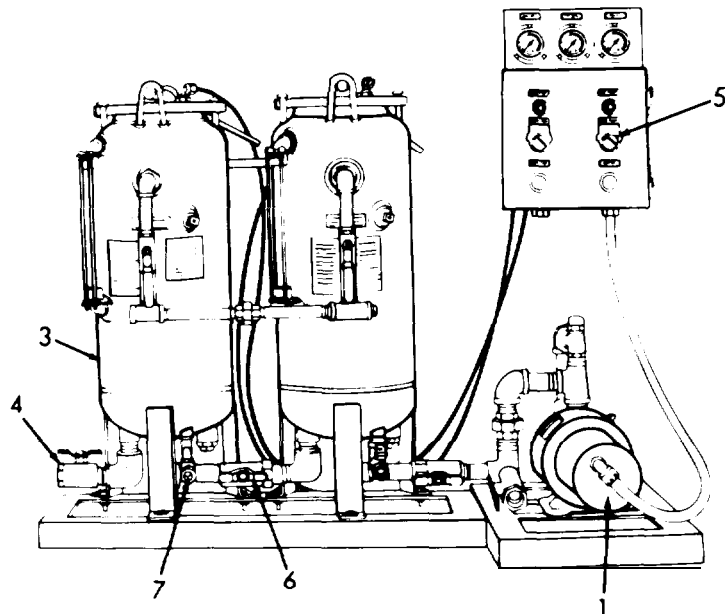
1. Pump
2. Oil Discharge valve
3. Second Stage
4. Water Discharge Valve

**4-33. DISCHARGE VALVE - MANUALLY OPERATED, TYPE C AND D SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- b. Stop the supply pump (1) by turning the supply pump selector switch (5) OFF.
- c. Close the water discharge valve (4).
- d. To drain water from the second stage (3):
 - (1) Close the intervessel shutoff valve (6) located between the first (prefilter) and second stages.
 - (2) Open the drain valve (7) at the base of the vessel.

- 1. Pump
- 3. Second Stage
- 4. Water Discharge Valve
- 5. Selector Switch
- 6. Intervessel Shutoff Switch
- 7. Drain Valve



**4-33. DISCHARGE VALVE - MANUALLY OPERATED, TYPE C AND D SEPARATORS
(Continued).**

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|----|---------------------------|--------------------|--|
| 2. | Oil discharge line (8) | Remove. | |
| 3. | Water discharge valve (4) | Unscrew to remove. | |

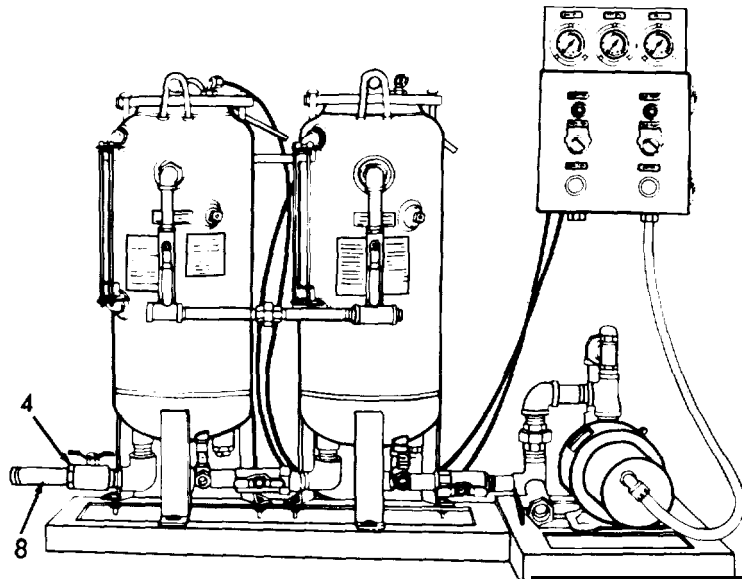
Replacement

Replace a defective water discharge valve with a serviceable-like item.

Installation

- | | | | |
|----|---------------------------|----------|--|
| 4. | Water discharge valve (4) | Install. | |
| 5. | Oil discharge line (8) | Install. | |

- | | |
|----|-----------------------|
| 4. | Water Discharge Valve |
| 8. | Oil Discharge Line |



- | | | | |
|----|----------------|-------------------------|--|
| 6. | Restart system | Refer to paragraph 2-4. | |
|----|----------------|-------------------------|--|

4-34. INLET VALVE - MANUAL - TYPE AND D SEPARATORS.

This task covers:

- a. Removal b. Replacement c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

<u>Material/Parts</u>	<u>Equipment Condition</u>
Inlet valve	
Sealing compound	
Appendix C. Item No. 6	

Personnel Required
1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Removal

- | | | |
|----|-----------------|---|
| 1. | Draining system | <p>a. With the pump (1) running, discharge as much oil as possible from the prefilter separator stage according to the following:</p> <p style="margin-left: 40px;">(1) Open the oil discharge valve (2) on the first (prefilter) stage (3).</p> <p style="margin-left: 40px;">(2) Close the water discharge valve (4):</p> |
|----|-----------------|---|

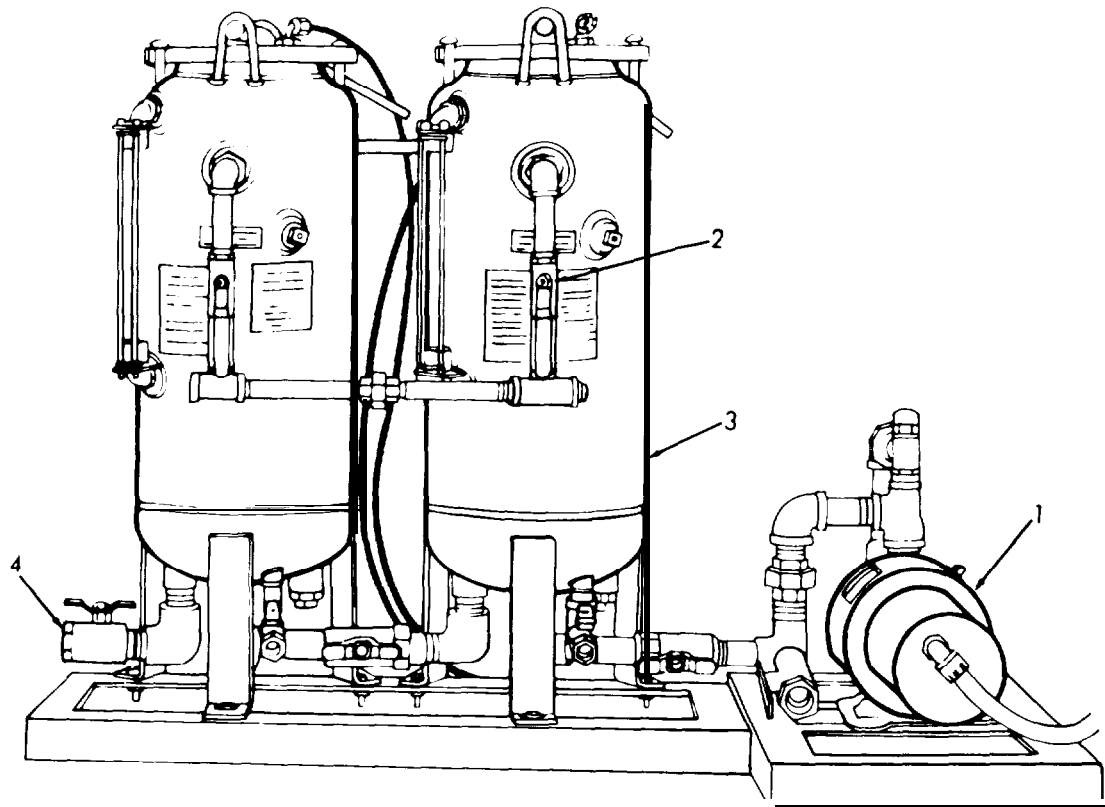
NOTE

Allow the oil to discharge for approximately one to two seconds after the oil disappears from the sight-glass before closing the oil discharge valve.

4-34. INLET VALVE - MANUAL - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

		(3) Open the water discharge valve (4) and close the oil discharge valve (2) after the oil has drained from the stage.	
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1. Pump
2. Oil Discharge Valve
3. First (Prefilter) Stage
4. Water Discharge Valve

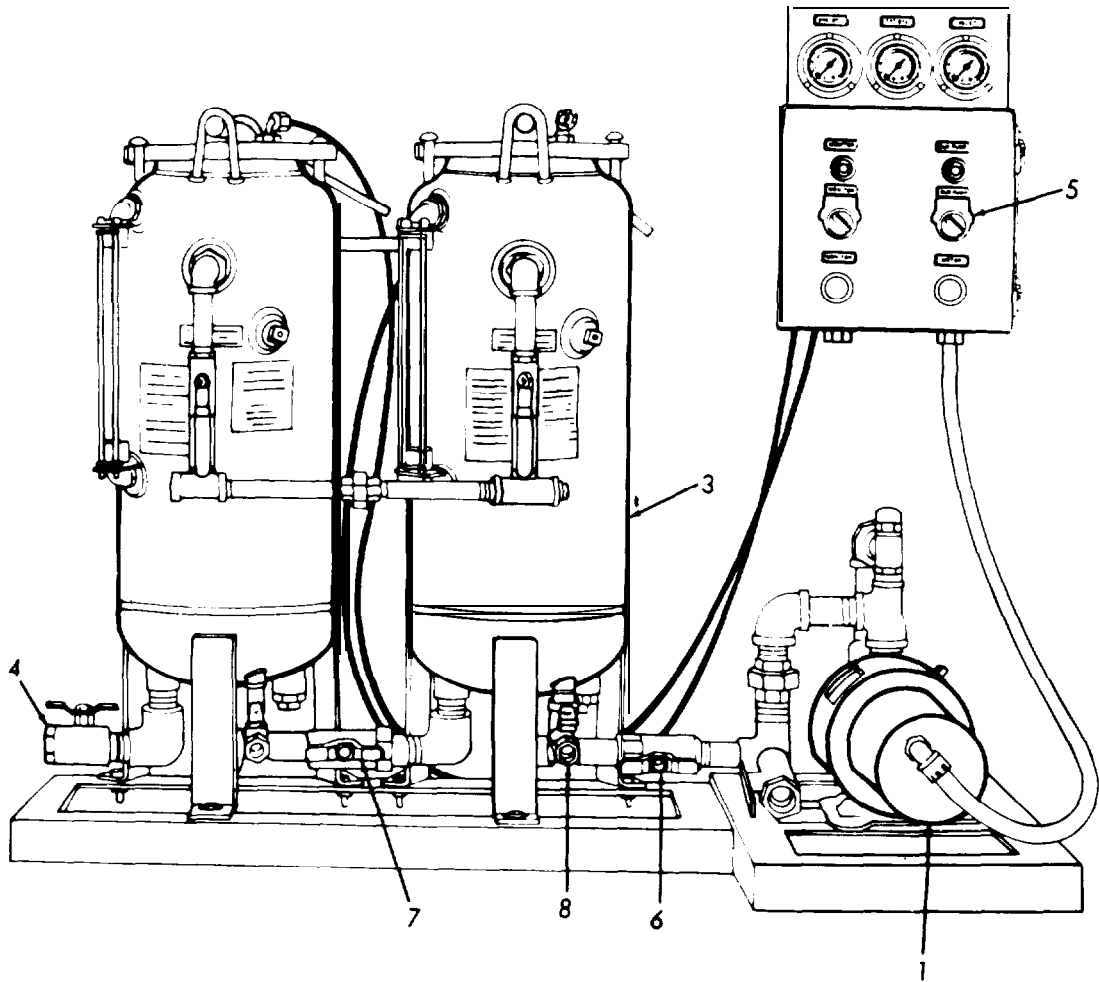
4-34. INLET VALVE - MANUAL - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- b. Stop the supply pump (1) by turning the supply pump selector switch (5) OFF.
- c. Close the water discharge valve (4).
- d. To drain water from the first (prefilter) stage (3):
 - (1) Close the inlet valve (6) located at the inlet to the first (prefilter) stage (3) and the intervessel shutoff (7) valve between the first (pre-filter) and second stages.
 - (2) Open the drain valve (8) at the base of the vessel.

4-34. INLET VALVE - MANUAL - TYPE C AND D SEPARATORS (Continued).

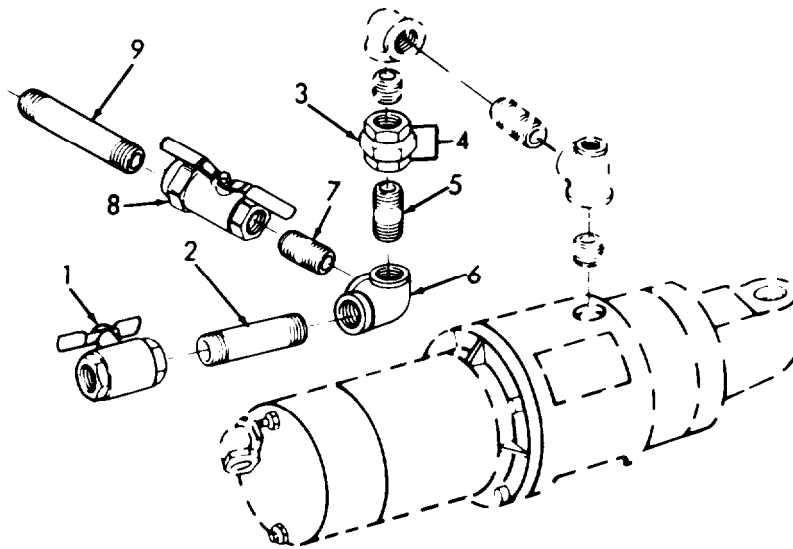
LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 1. Supply Pump
- 3. First (Prefilter) Stage
- 4. Water Discharge Valve
- 5. Selector Switch
- 6. Inlet Valve
- 7. Intervessel Shutoff Valve
- 8. Drain Valve

4-34. INLET VALVE - MANUAL - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
2.	Inlet valve (8)	<p>a. Remove bypass valve (1) and nipple (2).</p> <p>b. Unscrew collar (3) from union (4) and remove nipple (5), tee (6) and nipple (7).</p> <p>c. Remove inlet valve (8) from nipple (9).</p>	

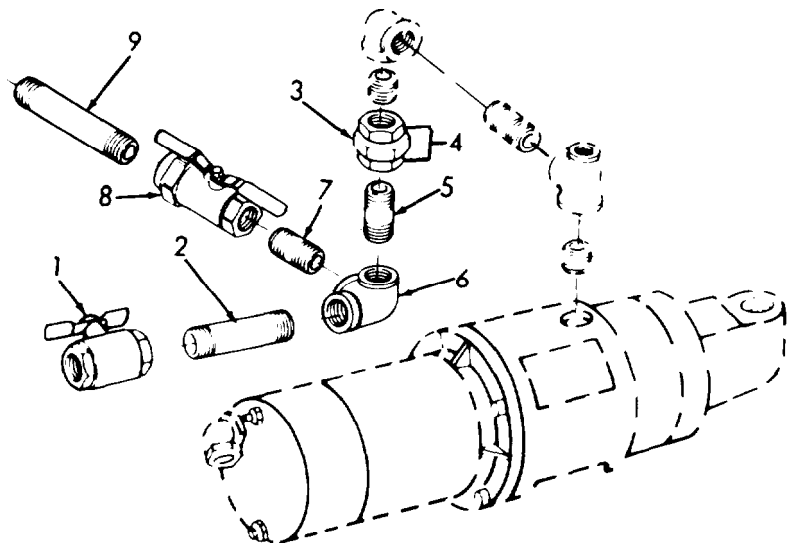


- 1. Bypass Valve
- 2. Nipple
- 3. Collar
- 4. Union
- 5. Nipple
- 6. Tee
- 7. Nipple
- 8. Inlet Valve
- 9. Nipple

4-34. INLET VALVE - MANUAL - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
Replacement		Replace a defective inlet valve with a serviceable-like item.	
Installation			
3.	Inlet valve (8)	<ol style="list-style-type: none"> Install on nipple (9). Install nipple (7), tee (6) and nipple (5). Secure union (4) by tightening collar (3). Install nipple (2) and bypass valve (1). 	

- 2. Bypass Valve Nipple
- 3. Collar
- 4. Union
- 5. Nipple Tee
- 7. Nipple
- 8. Inlet Valve
- 9. Nipple



4.	Restart system	Refer to paragraph 2-4.	
----	----------------	-------------------------	--

4-35. INTERVESSEL SHUTOFF VALVE - MANUAL - TYPE C AND D SEPARATORS.

This task covers:

- a. Removal b. Replacement c. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Material/Parts
Sealing compound
Appendix C. Item No. 6
Shutoff valve

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Removal

- | | | | |
|----|-----------------|---|--|
| 1. | Draining system | <p>a. With the pump (1) running, discharge as much oil as possible from the separator stages according to the following:</p> <p>(1) Open the oil discharge valve (2 or 3) on either the first (prefilter) or second stage (4 or 5).</p> <p>(2) Close the water discharge valve (6):</p> | |
|----|-----------------|---|--|

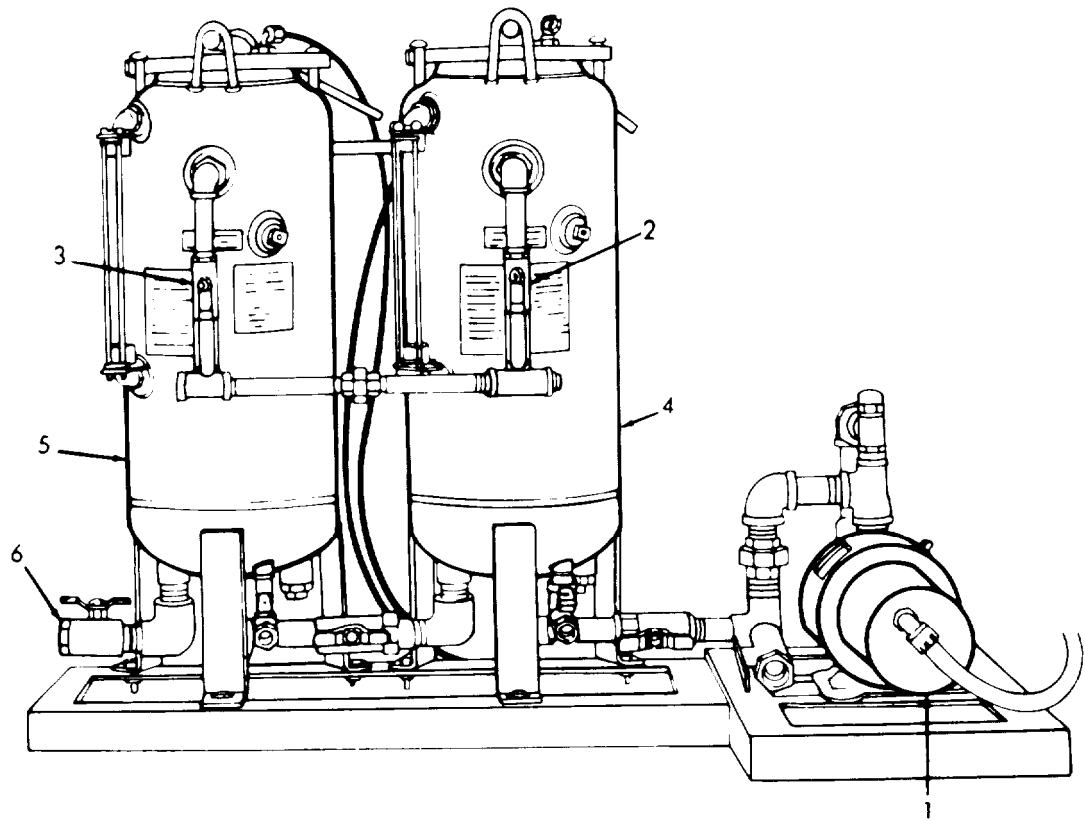
NOTE

Allow the oil to discharge for approximately one to two seconds after the oil disappears from the sight-glass before closing the oil discharge valve.

4-35. INTERVESSEL SHUTOFF VALVE - MANUAL - TYPE C AND D SEPARATORS.

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

		(3) Open the water discharge valve (6) and close the oil discharge valve (2 or 3) after the oil has drained from the stage.	
--	--	---	--



1. Pump
2. Oil Discharge Valve
3. Oil Discharge Valve
4. First (Prefilter) Stage
5. Second Stage
6. Water Discharge Valve

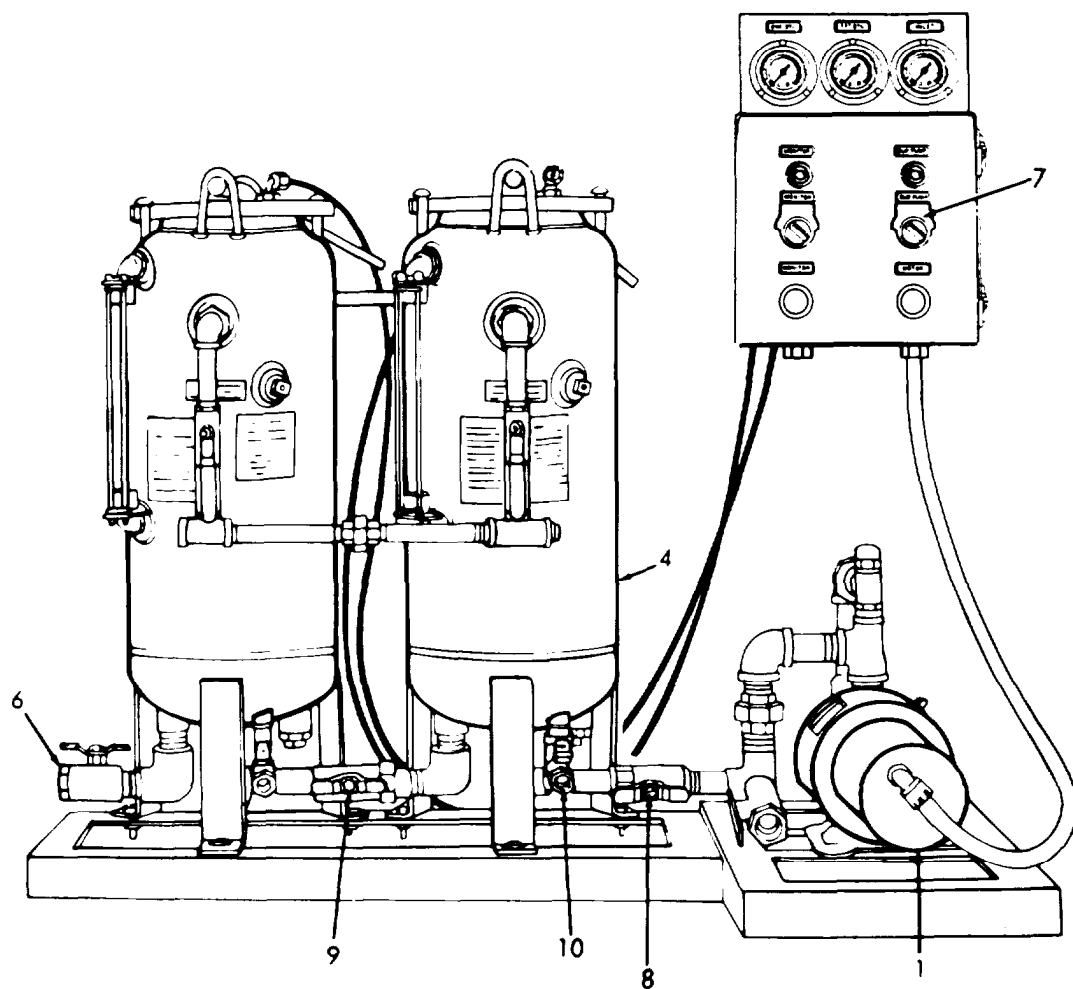
4-35. INTERVESSEL SHUTOFF VALVE - MANUAL - TYPE C AND D SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|--|--|---|--|
| | | <ul style="list-style-type: none"> b. Stop the supply pump (1) by turning the supply pump selector switch (7) OFF. c. Close the water discharge valve (6). d. To drain water from the first (PREFILTER) stage (4): <ul style="list-style-type: none"> (1) Close the inlet valve (8) located at the inlet to the first (prefilter) stage (4) and the interves- sel shutoff valve (9) be- tween the first (prefilter) and second stages. (2) Open the drain valve (10) at the base of the vessel. | |
|--|--|---|--|

4-35. INTERVESSEL SHUTOFF VALVE - MANUAL - TYPE C AND D SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



1. Pump
4. First (Prefilter) Stage
6. Water Discharge Valve
7. Selector Switch
8. Inlet Valve
9. Intervessel Shutoff Valve
10. Drain Valve

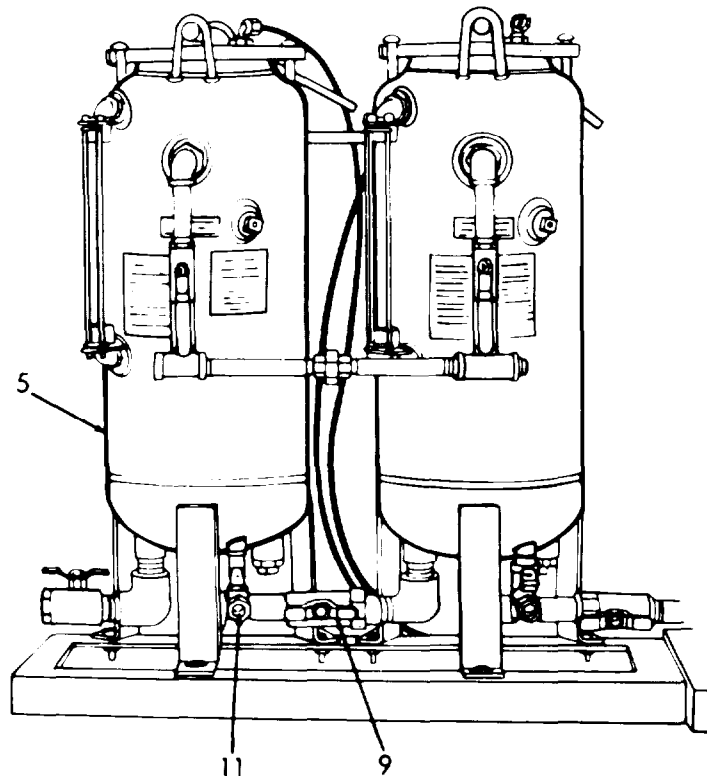
4-35. INTERVESSEL SHUTOFF VALVE - MANUAL - TYPE C AND D SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

e. To drain water from the second stage (5):

(1) Close the intervessel shutoff valve (9) located between the first (pre-filter) and second stages.

(2) Open the drain valve (11) at the base of the vessel.



- 5. Second Stage
- 9. Intervessel Shutoff Valve
- 11. Drain Valve

4-35. INTERVESSEL SHUTOFF VALVE - MANUAL - TYPE C AND D SEPARATORS
(Continued).

LOCATION	ITEM	ACTION	REMARKS
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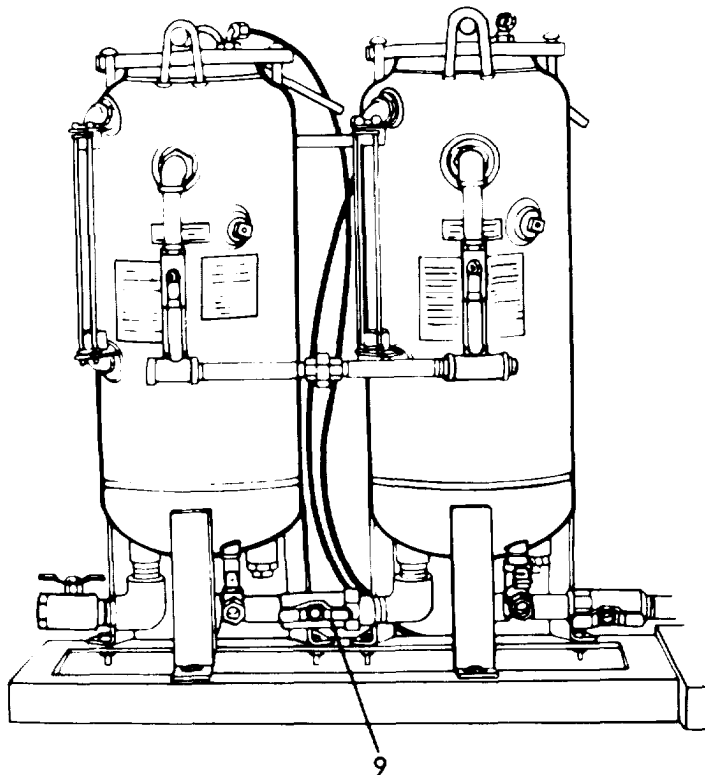
2.	Inter-vessel shutoff valve (9)	Unscrew to remove.	
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Replacement

Replace a defective valve with a serviceable-like item.

Installation

3.	Inter-vessel shutoff valve (9)	Install.	
----	--------------------------------	----------	--



9. Intervessel Shutoff Valve

4.	Restart system	Refer to paragraph 2-4.	
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4-36. WARNING, INSTRUCTION AND IDENTIFICATION PLATES - TYPE C AND D SEPARATORS.

This task covers:

- | | | |
|---------------|----------------|-----------------|
| a. Inspection | c. Cleaning | e. Installation |
| b. Removal | d. Replacement | |

INITIAL SETUP

Test Equipment
None

Material/Parts

- Cleaning solvent PD-680
- Appendix C. Item No. 2
- Clean cloths
- Warning, instruction and identification plates

Equipment Condition

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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Inspection

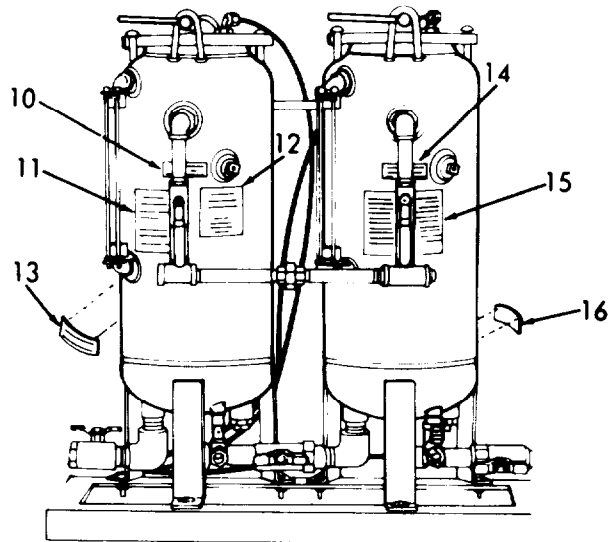
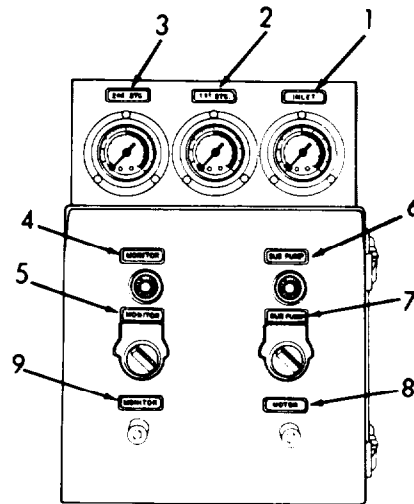
Inspect for missing, illegible or damaged plate.

Removal

- | | | | | |
|------------------|----|----------------------|---|--------------------------------------|
| 1. Legend plates | a. | Control box | Remove inlet (1), 1st (pre-filter) stage (2), 2nd stage (3), monitor (4 or 5), supply pump (6 or 7), motor 30 amp (8), or monitor 15 amp (9). | Remove only if damaged or illegible. |
| | b. | 2nd stage separator | Remove open valve only to discharge oil (10), instruction plate (11), warning plate (12) or outlet plate (13). | Remove only if damaged or illegible. |
| | c. | Pre-filter separator | Remove open valve only to discharge oil (14), identification plate (15) or inlet plate (16). | Remove only if damaged or illegible. |

4-36. WARNING, INSTRUCTION AND IDENTIFICATION PLATES - TYPE C AND D SEPARATORS (continued).

LOCATION	ITEM	ACTION	REMARKS
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- | | | | |
|----|-------------------------|-----|----------------------|
| 1. | Inlet | 9. | Monitor |
| 2. | First (Prefilter) Stage | 10. | Oil Discharge Valve |
| 3. | Second Stage | 11. | Instruction Plate |
| 4. | Monitor | 12. | Warning Plate |
| 5. | Monitor | 13. | Outlet Plate |
| 6. | Supply Pump | 14. | Oil Discharge Valve |
| 7. | Supply Pump | 15. | Identification Plate |
| 8. | Motor | 16. | Inlet Plate |

4-36. WARNING, INSTRUCTION AND IDENTIFICATION PLATES, TYPE C AND D SEPARATORS (Continued.)

LOCATION	ITEM	ACTION	REMARKS
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Cleaning

WARNING

Cleaning solvent Fed. Spec. P-D-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated or prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° - 138°F (38° - 59°C).

Using a clean cloth dampened with cleaning solvent, remove any adhesive adhering to the vessel. Dry thoroughly

Repair

Replace any missing, damaged or illegible, warning, instruction or legend plate with a serviceable-like item

Installation

Peel backing from plate being replaced and press firmly in-place on vessel.

4-37. MOUNTING FRAME - TYPE C AND D SEPARATORS.

This task covers:

- | | | |
|-------------|---------------|-----------------|
| a. Removal | c. Inspection | e. Installation |
| b. Cleaning | d. Repair | |

INITIAL SETUP

Test Equipment
None

Tools
Arc welder
Welding rods
Tool Kit, General Mechanics

<u>Material/Parts</u>	<u>Equipment Condition</u>
Sealing compound Appendix C. Item No. 6 Paint, MIL-P-23236, Type II, Class 3 Appendix C. Item No. 4 Mounting frame Cleaning solvent, PD-680 Appendix C. Item No. 2 Clean cloths Buckets	

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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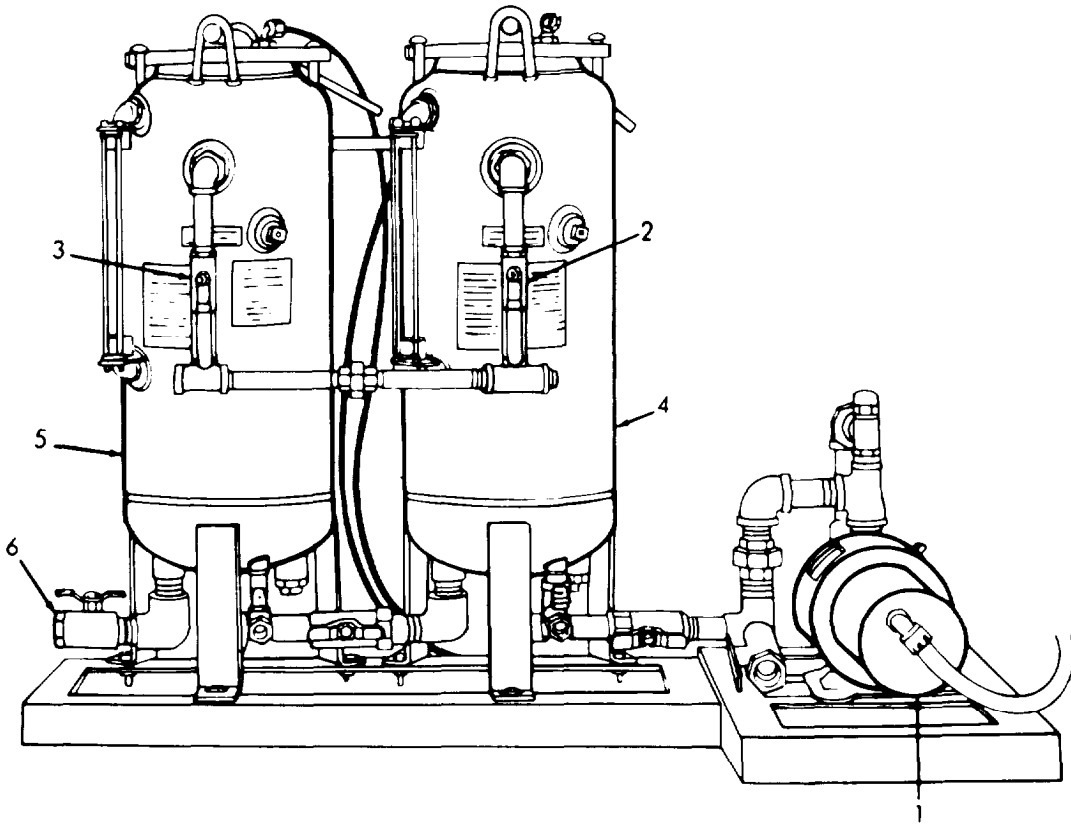
Remove

- | | | | |
|----|-----------------|----|---|
| 1. | Draining system | a. | <p>With the pump (1) running discharge as much oil as possible from the separator stages according to the following:</p> <p>(1) Open the oil discharge valve (2 or 3) on either the first (prefilter) or second stage (4 or 5).</p> |
|----|-----------------|----|---|

4-37. MOUNTING FRAME - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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(2) Close the water discharge valve (6):



- 1. Pump
- 2. Oil Discharge Valve
- 3. Oil Discharge Valve
- 4. First (Prefilter) Stage
- 5. Second Stage
- 6. Water Discharge Valve

4-37. MOUNTING FRAME - TYPE C AND D SEPARATORS.

LOCATION	ITEM	ACTION	REMARKS
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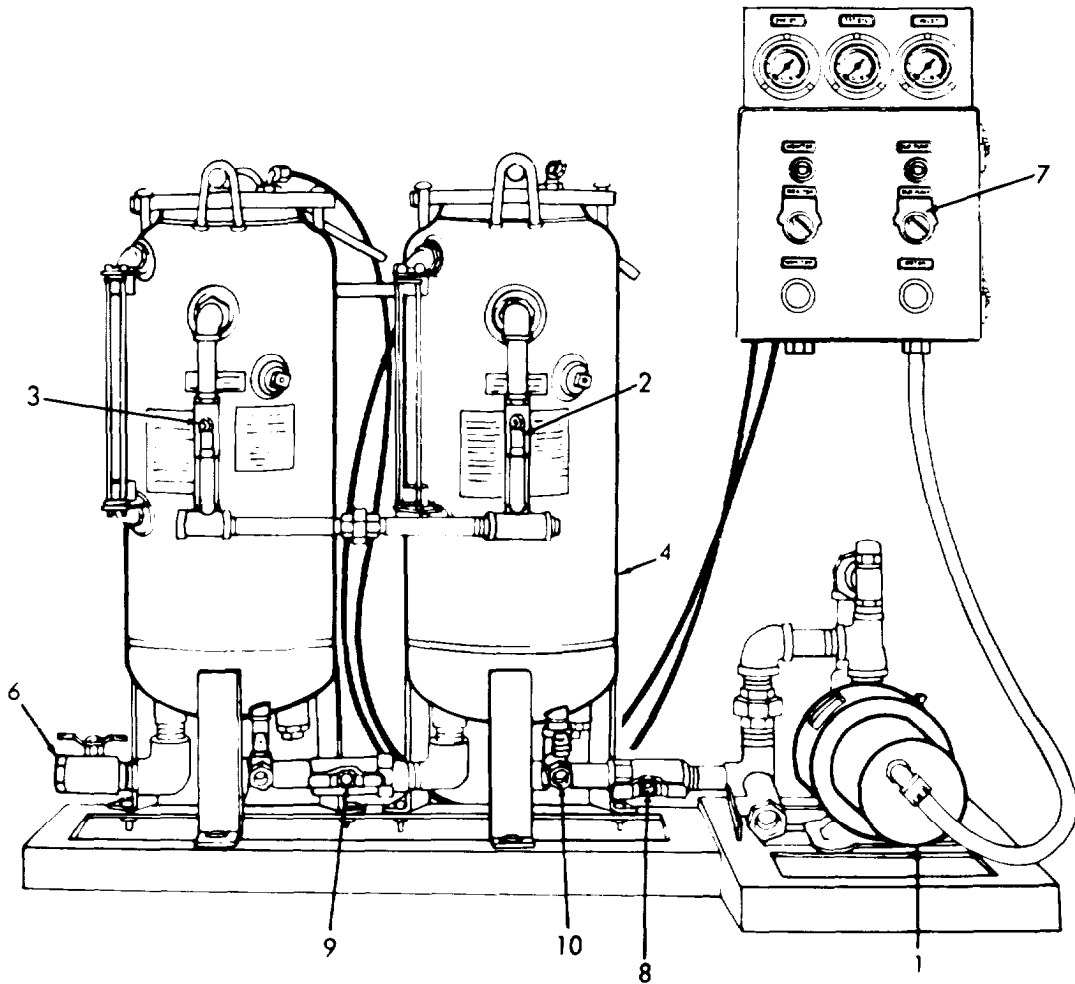
NOTE

Allow the oil to discharge for approximately one to two seconds after the oil disappears from the sight-glass before closing the oil discharge valve.

- (3) Open the water discharge valve (6) and close the oil discharge valve (2 or 3) after the oil has drained from the stage.
- b. Stop the supply pump (1) by turning the supply pump selector switch (7) OFF.
- c. Close the water discharge valve (6).
- d. To drain water from the first (prefilter) stage (4):
 - (1) Close the inlet valve (8) located at the inlet to the first (prefilter stage (4) and the intervessel shutoff (9) valve between the first (prefilter) and second stages.
 - (2) Open the drain valve (10) at the base of the vessel.

4-37. MOUNTING FRAME - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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1. Supply Pump
2. Oil Discharge Valve
3. Oil Discharge Valve
4. First (Prefilter) Stage
6. Water Discharge Valve
7. Selector Switch
8. Inlet Valve
9. Intervessel Shutoff Valve
10. Drain Valve

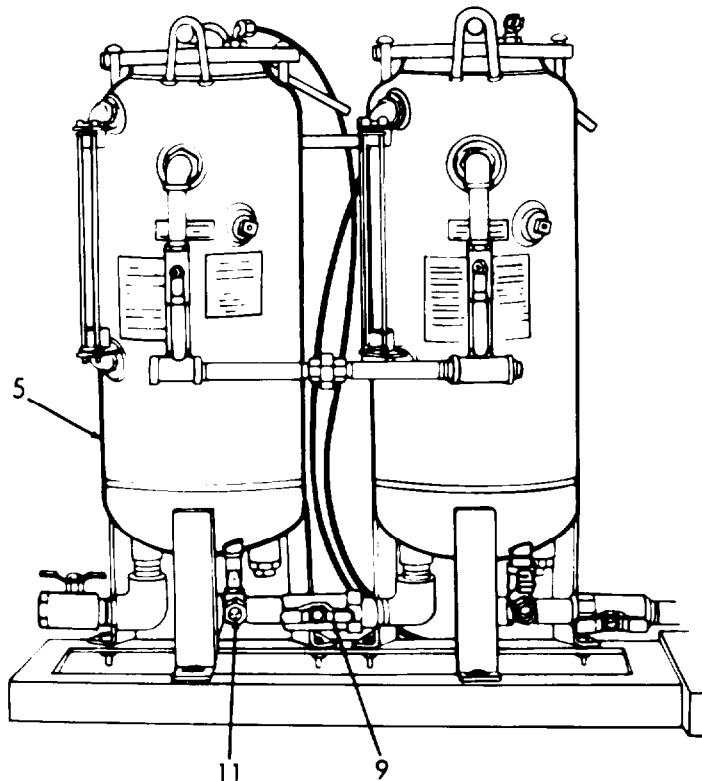
4-37. MOUNTING FRAME - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- e. To drain water from the second stage (5):
- (1) Close the intervessel shutoff valve (9) located between the first (prefilter) and second stages.
 - (2) Open the drain valve (11) at the base of the vessel.

WARNING

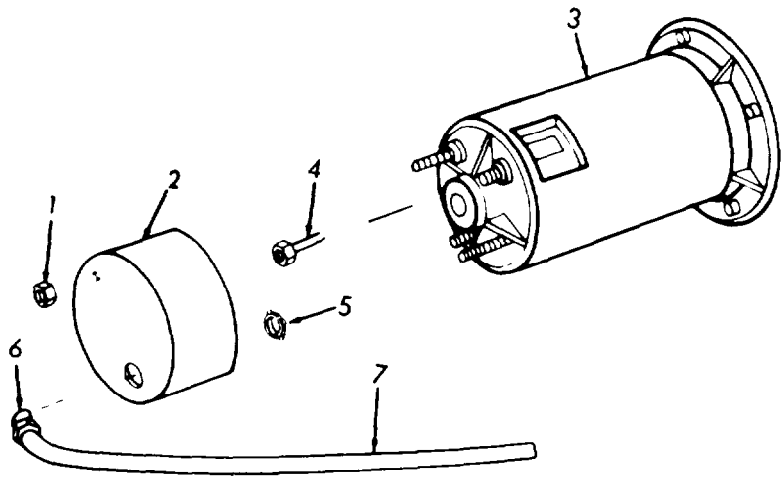
Electrical shock or serious injury may result if electrical power is not turned off prior to performing further maintenance.



5. Second Stage
9. Intervessel Shutoff Valve
11. Drain Valve

4-37. MOUNTING FRAME - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
2.	Electric power	Turn OFF.	
3.	Pump and motor assembly	a. Remove nuts (1). b. Cover (2) will separate from motor housing (3) far enough to tag and disconnect leads (4). c. Remove locknut (5) from elbow (6) and remove elbow with power cable (7) attached.	



- 1. Nut
- 2. Cover
- 3. Motor Housing
- 4. Lead
- 5. Locknut
- 6. Elbow
- 7. Power Cable

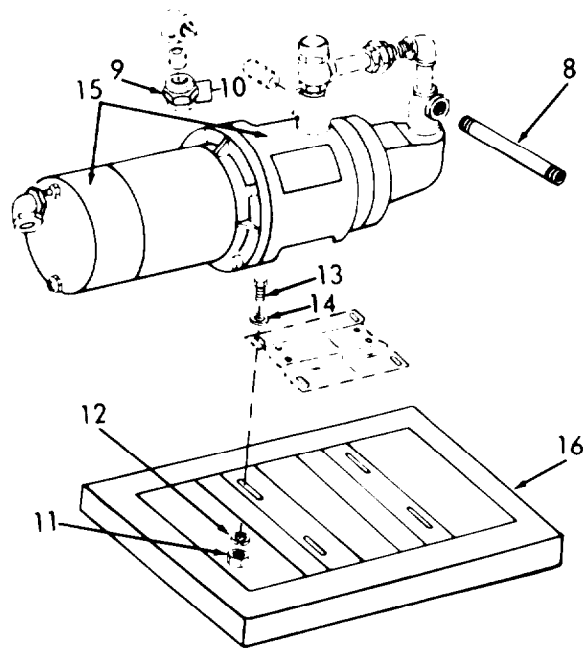
4-37. MOUNTING FRAME - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- | | | | |
|--|--|---|---|
| | | d. Remove inlet line (8) and unscrew collar (9) from union (10). | |
| | | e. Remove nuts (11), washers (12), bolts (13) and washers (14). | |
| | | f. Remove pump and motor assembly (15) from mounting frame (16) with piping attached. | Use a hoist and sling to lift pump and motor assembly from mounting frame. Set on a flat surface. |

Remove mounting frame (16).

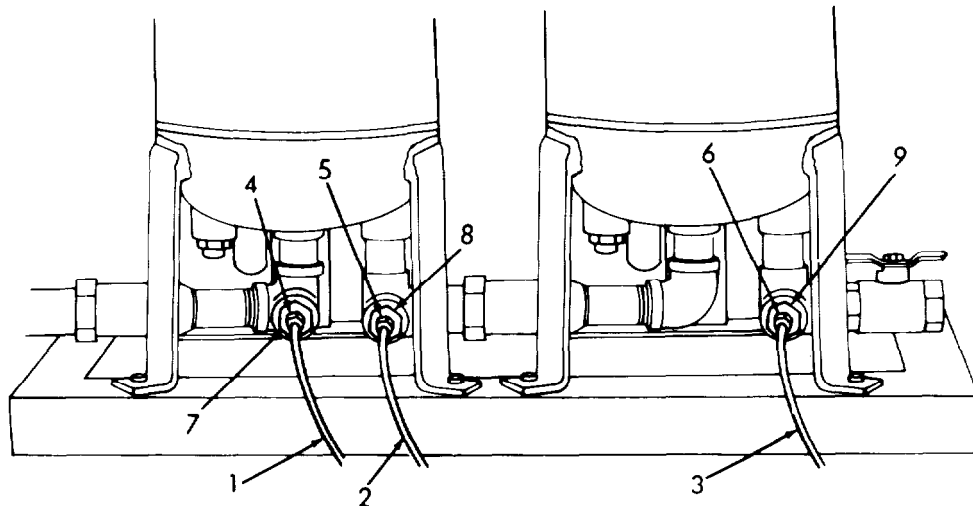
- 8. Inlet Line
- 9. Collar
- 10. Uni on
- 11. Nut
- 12. Washer
- 13. Bolt
- 14. Washer
- 15. Pump and Motor Assembly
- 16. Mounting Frame



4-37. MOUNTING FRAME - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Air lines Disconnect air lines (1, 2 and 3) by unscrewing female connectors (4, 5 and 6) from male connectors (7, 8 and 9).



- 1. Air Line
- 2. Air Line
- 3. Air Line
- 4. Female Connector
- 5. Female Connector
- 6. Female Connector
- 7. Male Connector
- 8. Male Connector
- 9. Male Connector

4-37. MOUNTING FRAME - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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5.	1st (pre-filter and 2nd stage separators	a. Remove oil discharge line (1) and water discharge line (2).	
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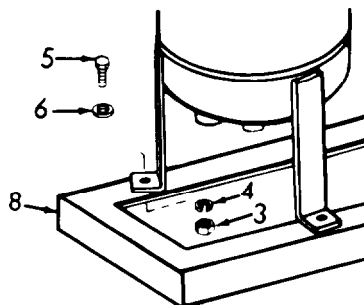
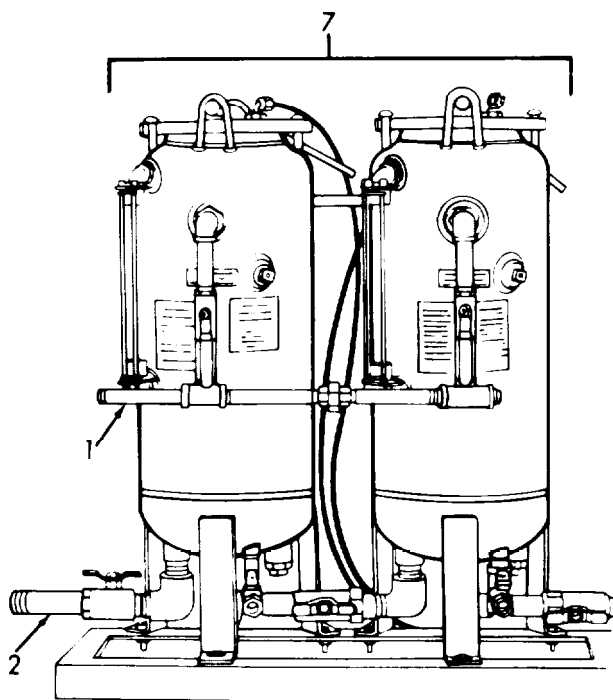
NOTE

Prior to removing separator mounting hardware, attach a sling to the separators and using a hoist, take up enough slack on the sling to make it taut.

b. Remove nuts (3), washers (4), bolts (5) and washers (6) from separators.

c. Remove separators (7) from mounting frame (8).

Use hoist to remove separators from mounting frame. Place on a flat surface and block sufficiently to prevent tipping over. Detach hoist and sling.



1. Oil Discharge Line
2. Water Discharge Line
3. Nut
4. Washer
5. Bolt
6. Washer
7. Separators
8. Mounting Frame

4-37. MOUNTING FRAME - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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WARNING

Cleaning solvent Fed. Spec. P-D-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated or prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° - 138°F (38°o -59°C).

Use a wire brush to remove rust or other foreign matter from mounting frame. Clean mounting frame using clean cloths and cleaning solvent PD-680 and dry thoroughly.

Inspection

Inspect mounting frame for cracks, broken welds or distortion.

Repair

Reweld broken welds and weld cracks using approved welding practices. Grind smooth. Straighten distortion. Clean and paint disturbed areas.

4-37. MOUNTING FRAME - TYPE C AND D SEPARATORS (Continued).

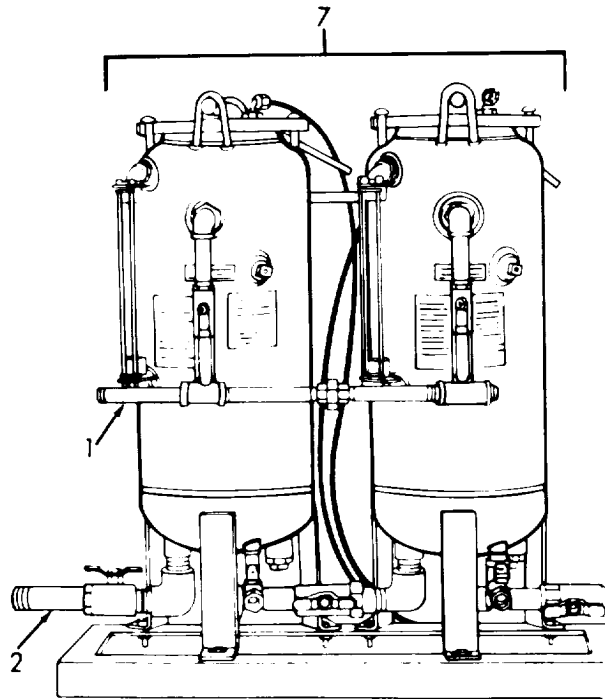
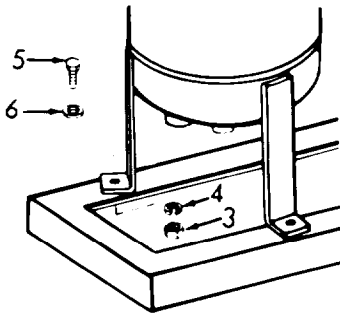
LOCATION	ITEM	ACTION	REMARKS
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Installation

NOTE

Attach a sling to the separators and with the aid of a hoist lift separators into position on the mounting frame.

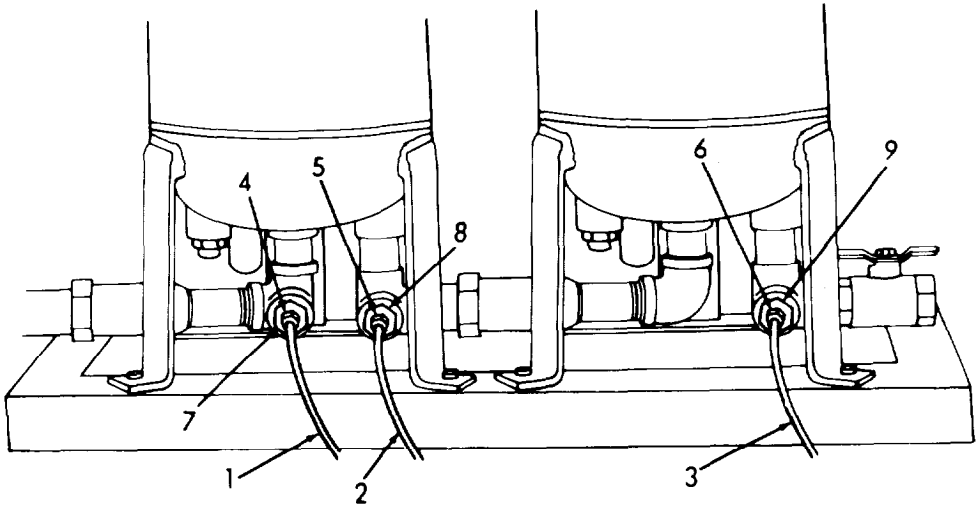
6. Separators
- a. Install separators (7) using washers (6), bolts (5), washers (4) and nuts (3).
 - b. Install water discharge line (2) and oil discharge line (1).



1. Oil Discharge Line
2. Water Discharge Line
3. Nut
4. Washer
5. Bolt
6. Washer
7. Separators

4-37. MOUNTING FRAME - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
7.	Air lines	Reconnect air lines (1, 2 and 3) by tightening female connectors (4, 5 and 6) to male connectors (7, 8 and 9).	



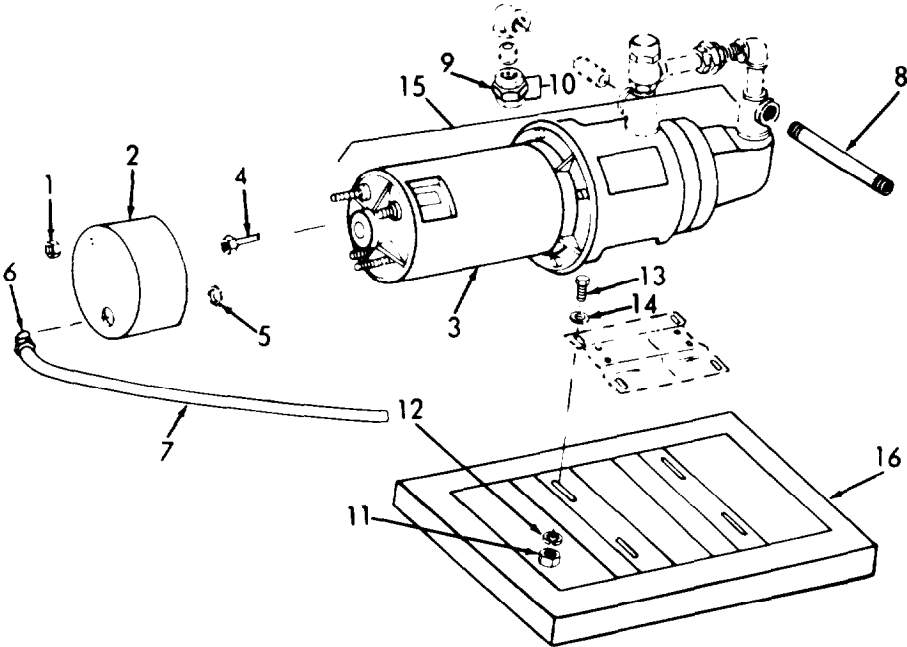
- 1. Air Line
- 2. Air Line
- 3. Air Line
- 4. Female Connector
- 5. Female Connector
- 6. Female Connector
- 7. Male Connector
- 8. Male Connector
- 9. Male Connector

4-37. MOUNTING FRAME - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
8.	Pump and motor assembly	a. Install pump and motor assembly (15) using washers (14) bolts (13), washers (12) and nuts (11). b. Secure to union (10) by tightening collar (9). c. Insert power cable (7) and elbow (6) into cover (2) and secure with lock-nut (5). d. Reconnect leads (4). e. Secure cover (2) to motor housing (3) with nuts (1).	
9.	Electric power	Turn ON.	
10.	Restart the system	Refer to paragraph 2-4.	

4-37. MOUNTING FRAME - TYPE C AND D SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 1. Nut
- 2. Cover
- 3. Motor Housing
- 4. Lead
- 5. Locknut
- 6. Elbow
- 7. Power Cable
- 9. Collar
- 10. Union
- 11. Nut
- 12. Washer
- 13. Bolt
- 14. Washer
- 15. Pump and Motor Assembly

4-38. MOUNTING FRAME - TYPE A AND B SEPARATORS.

This task covers:

- | | |
|--|--|
| <ul style="list-style-type: none"> a. Removal b. Cleaning c. Inspection | <ul style="list-style-type: none"> d. Repair e. Installation |
|--|--|

INITIAL SETUP

Test Equipment
None

Tools
Arc welder
Tool Kit, General Mechanics

<u>Material/Parts</u>	<u>Equipment Condition</u>
Sealing compound	
Appendix C. Item No. 6	
Paint, MIL-P-23236, Type II, Class 3	
Appendix C. Item No. 4	
Mounting frame	
Cleaning solvent P-D-680	
Appendix C. Item No. 2	
Clean cloths	
Bucket	

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
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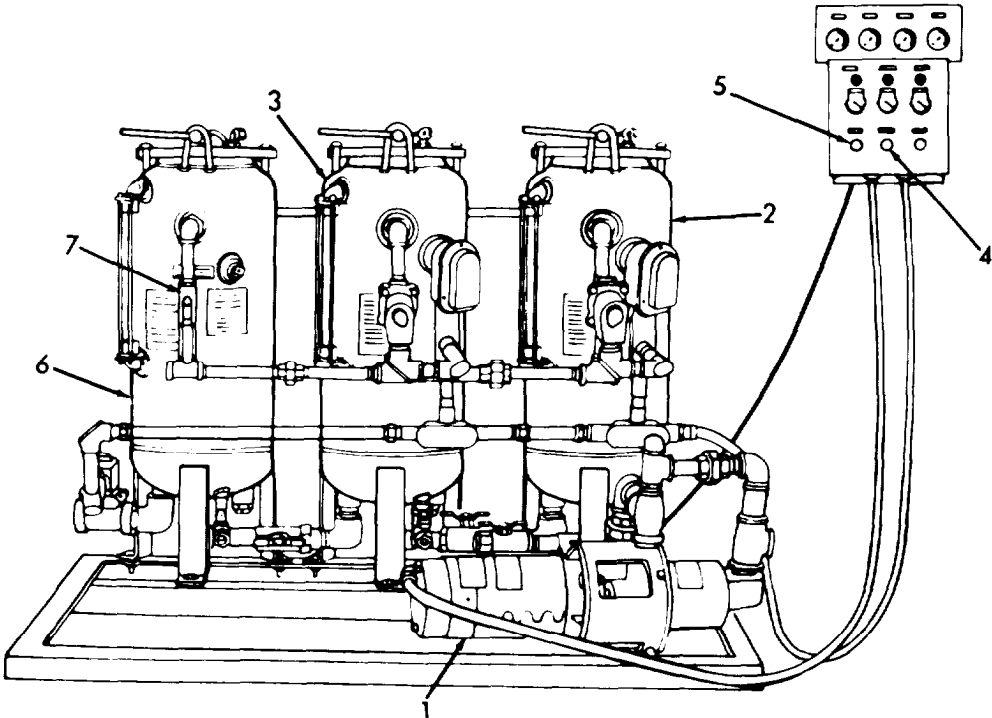
Removal

- | | | |
|----|-----------------|--|
| 1. | Draining system | <ul style="list-style-type: none"> a. With the pump (1) running and control power on, discharge as much oil as possible from the separator stages according to the following: |
|----|-----------------|--|

4-38. MOUNTING FRAME - TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- (1) To discharge from the first or second stages (2 or 3), manually depress the oil dump light/button (4 or 5) for the respective stage.
- (2) To discharge oil from the third stage (6), open the manual oil discharge valve (7) until all oil has been discharged.



- 1. Pump
- 2. First (Prefilter) Stage
- 3. Second Stage
- 4. Oil Dump Light/Button
- 5. Oil Dump Light/Button
- 6. Third Stage
- 7. Manual Oil Discharge Valve

4-38. MOUNTING FRAME - TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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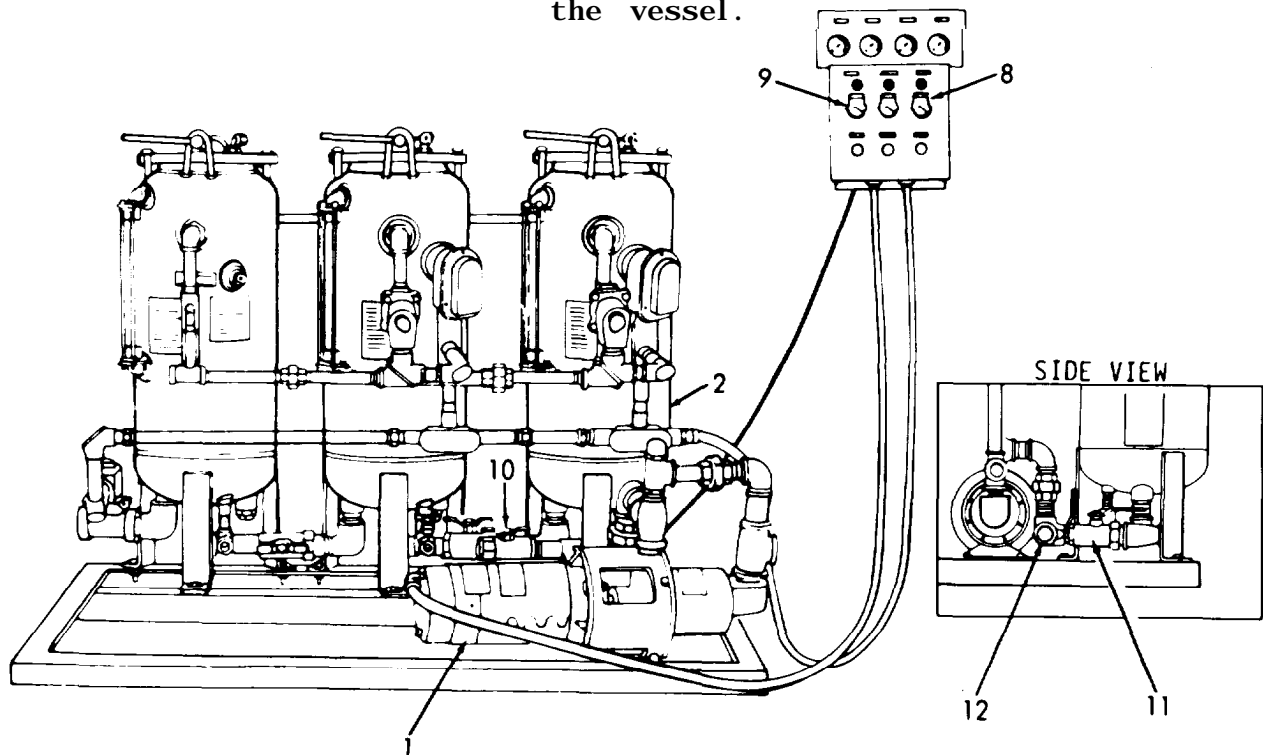
b. Stop the supply pump (1) by turning the supply pump selector switch (8) OFF.

c. Turn the auto controls selector switch (9) OFF.

d. To drain water from the first stage (2):

(1) Close the two manual shutoff valves (10) and (11) located on the main flow line at the inlet to the first stage (2) and between the first and second stages.

(2) Open the drain valve (12) at the base of the vessel.



1. Supply Pump
2. First (Prefilter) Stage

8. Selector Switch
9. Selector Switch

10. Shutoff Valve
11. Shutoff Valve
12. Drain valve

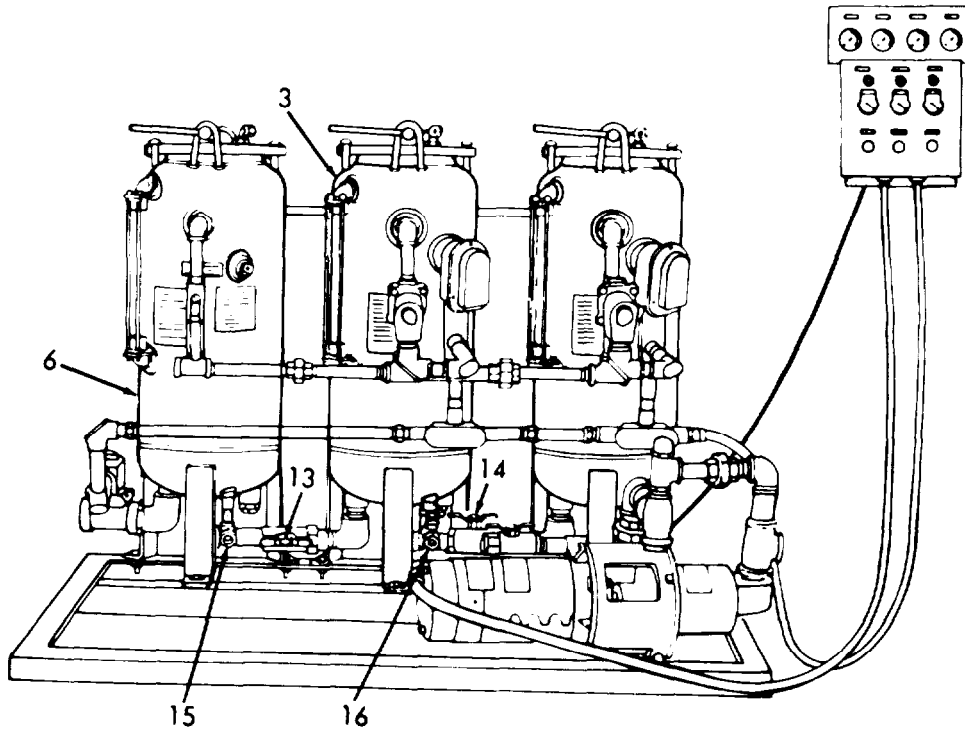
4-38. MOUNTING FRAME - TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

e. To drain water from the second or third stages (3 or 6):

(1) Close the two inter-vessel shutoff valves (13 and 14) on either side of the second stage (3) or the intervessel shut-off valve (13) for drainage of the third stage (6).

(2) Open the drain valve (15 or 16) at the base of the vessel.



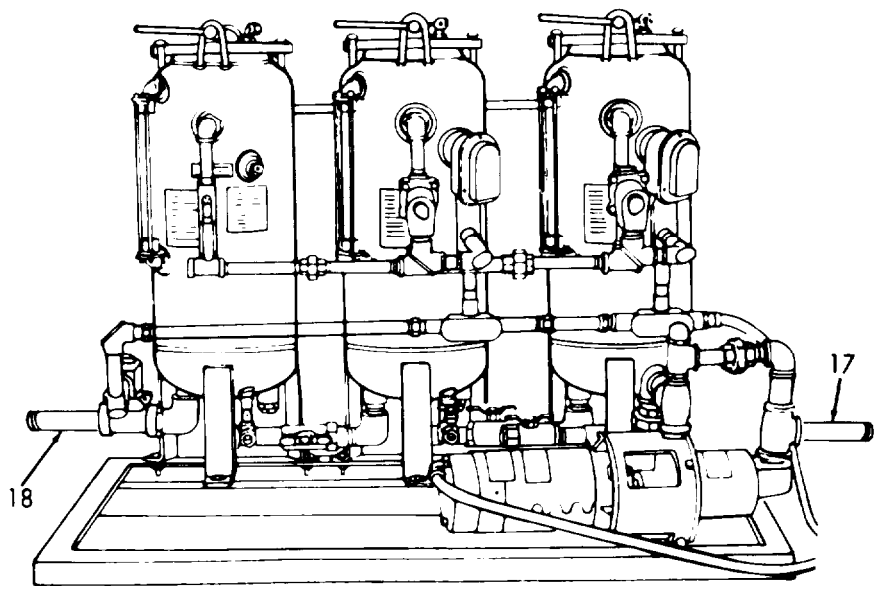
- 3. Second Stage
- 6. Third Stage
- 13. Intervessel Shutoff Valve
- 14. Intervessel Shutoff Valve
- 15. Drain Valve
- 16. Drain Valve

4-38. MOUNTING FRAME - TYPE A AND B SEPARATORS (Continued).

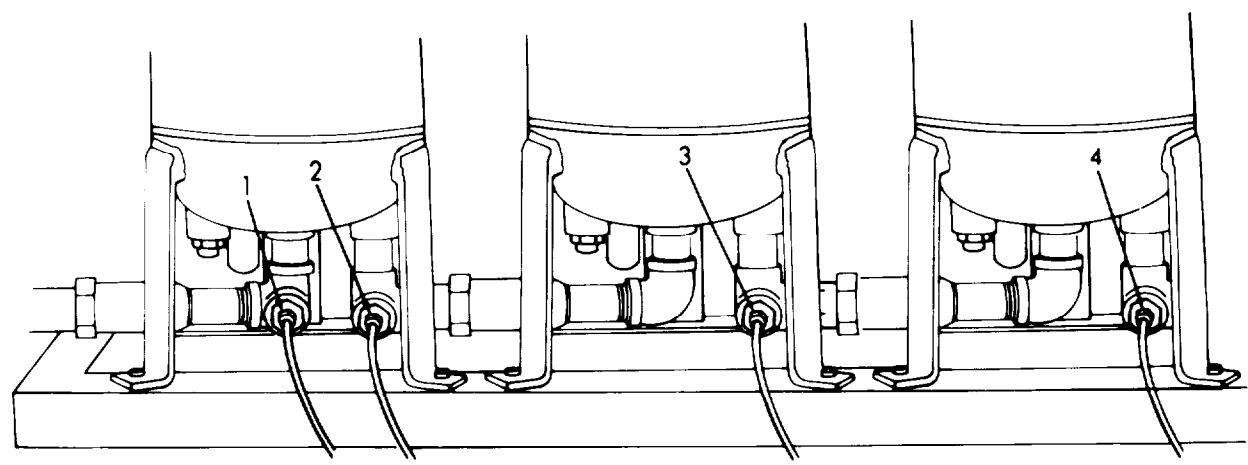
LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|----|----------------------------|---|--|
| 2. | Intake and discharge lines | a. Remove intake line (17).
b. Remove discharge line (18). | |
|----|----------------------------|---|--|

- | | | | |
|-----|----------------|--|--|
| 17. | Intake Line | | |
| 18. | Discharge Line | | |



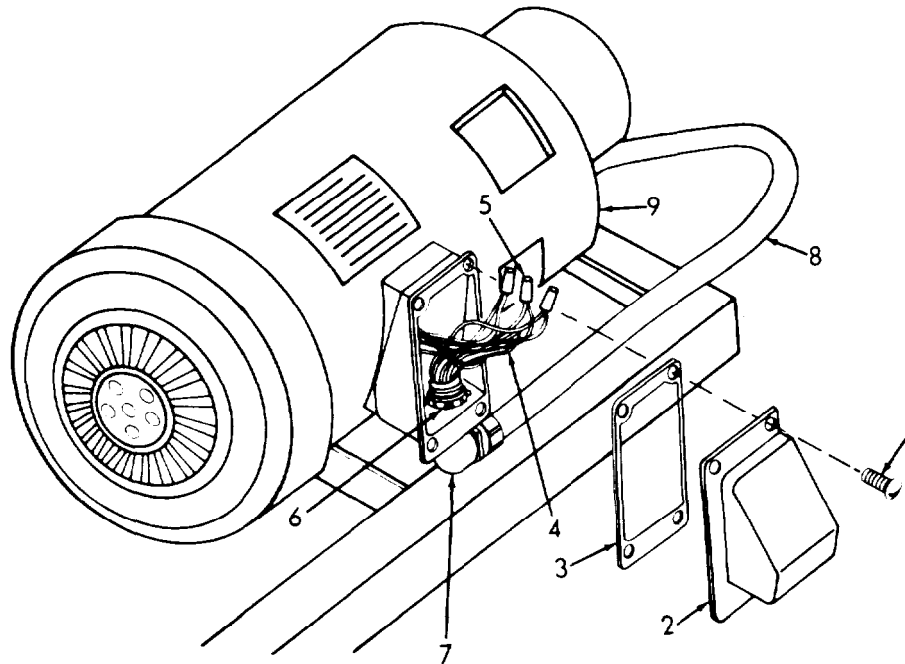
- | | | | |
|----|-----------|---|--|
| 3. | Air lines | Disconnect by unscrewing connectors (1, 2, 3, and 4). | |
|----|-----------|---|--|



- 1. Connector
- 2. Connector
- 3. Connector
- 4. Connector

4-38. MOUNTING FRAME - TYPE A AND B SEPARATORS (Continued).

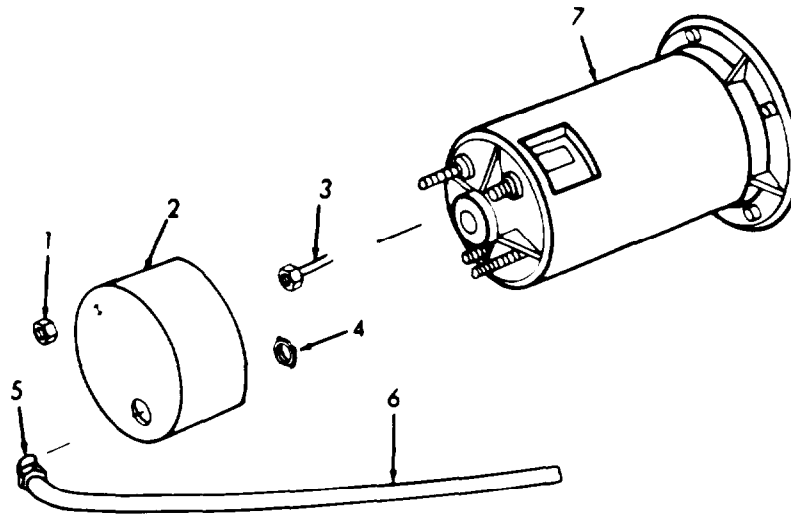
LOCATION	ITEM	ACTION	REMARKS
4.	Motor leads Type A separator	<p>Remove screws (1), cover (2) and gasket (3) from motor.</p> <p>Tag and disconnect leads (4) by removing connectors (5).</p> <p>Remove locknut (6) from elbow (7).</p> <p>Remove lead (8) from motor (9).</p>	



- 1. Screw
- 2. Cover
- 3. Gasket
- 4. Lead
- 5. Connector
- 6. Locknut
- 7. El bow
- 8. Lead
- 9. Motor

4-38. MOUNTING FRAME - TYPE A AND B SEPARATORS (Continued).

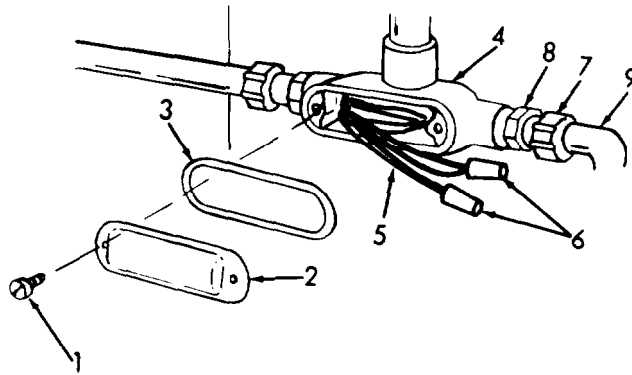
LOCATION	ITEM	ACTION	REMARKS
5.	Motor leads Type B separator	<p>a. Remove nuts (1) from end cover (2).</p> <p>b. Tag and disconnect leads (3).</p> <p>c. Remove locknut (4) from elbow (5).</p> <p>d. Remove lead (6) from motor (7).</p>	<p>End cover (2) can be separated from motor far enough to disconnect leads.</p>



1. Nut
2. End Cover
3. Lead
4. Locknut
5. El bow
6. Lead
7. Motor

4-38. MOUNTING FRAME - TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
6.	Control panel lead (9)	<p>a. Remove screws (1), tee cover (2) and gasket (3) from tee (4) on 1st stage separator.</p> <p>b. Tag and disconnect leads (5) by removing connectors (6).</p> <p>c. Unscrew collar (7) from connector (8).</p> <p>d. Separate lead (9) from separators.</p>	



- 1. Screw
- 2. Cover
- 3. Gasket
- 4. Tee
- 5. Lead
- 6. Connector
- 7. Collar
- 8. Connector
- 9. Lead

4-38. MOUNTING FRAME - TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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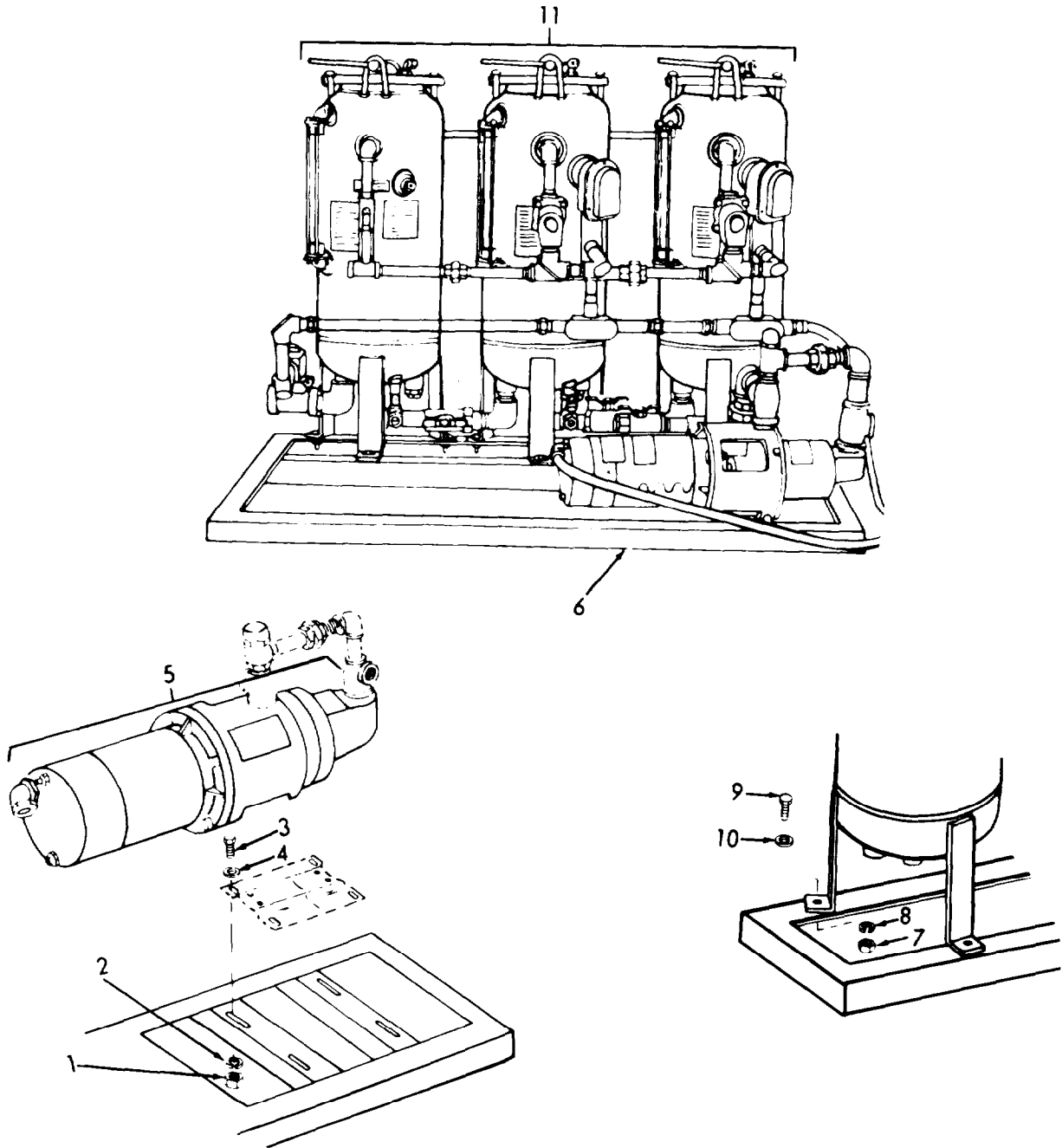
NOTE

Attach a suitable sling around the motor and separators. Using a hoist, lift the assembled separators from the mounting frame. Set on a flat surface and block sufficiently to prevent accidental tipping over. Detach hoist and sling

- | | | | |
|----|--|---|--|
| 7. | Motor and separators mounting hardware | <ul style="list-style-type: none"> a. Remove nuts (1), washers (2), screws (3) and washers (4), securing motor (5) to mounting frame (6). b. Remove nuts (7), washers (8), bolts (9) and washers (10) securing separators (11). c. Remove assembled separators (11). | |
|----|--|---|--|

4-38. MOUNTING FRAME - TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- 1. Nut
- 2. Washer
- 3. Screw
- 4. Washer
- 5. Motor
- 6. Mounting Frame

- 7. Nut
- 8. Washer
- 9. Bolt
- 10. Washer
- 11. Separator

4-38. MOUNTING FRAME - TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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Cleaning

WARNING

Cleaning solvent Fed. Spec. PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated or prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° - 138°F (38° - 59°C).

Inspection	Inspect mounting frame for cracks, distortion or broken welds.
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Repair	Repair cracks or broken welds using approved welding practices. Grind smooth. Clean, prime and paint disturbed areas.
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Installation

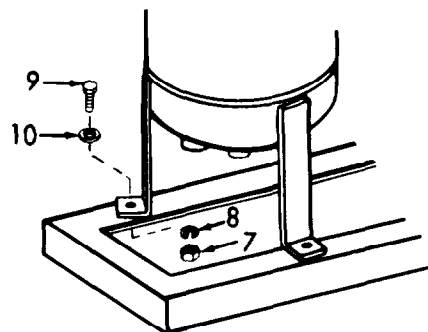
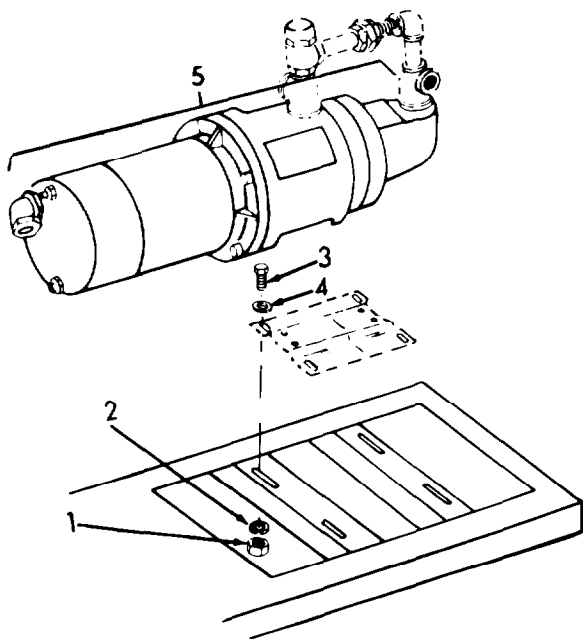
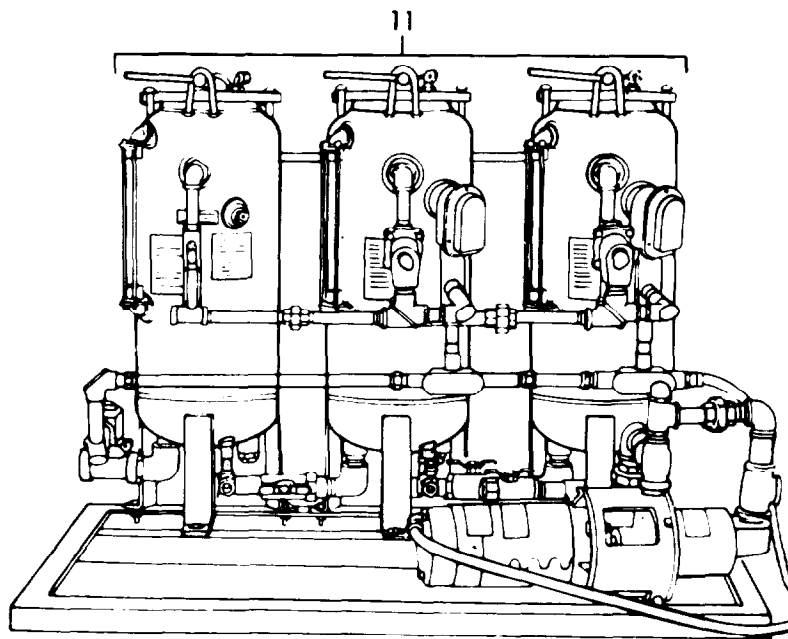
NOTE

Attach a suitable sling around the motor and separators. Using a hoist, place assembled separators into position on mounting frame.

- | | | |
|----|-----------------|---|
| 8. | Separators (11) | Install, using washers (10), bolts (9), washers (8) and nuts (7). |
| 9. | Motor (5) | Install, using washers (4), screws (3), washers (2) and nuts (1). |

4-38. MOUNTING FRAME - TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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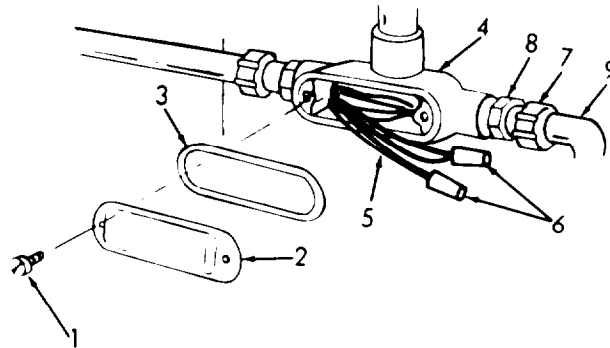


- 1. Nut
- 2. Washer
- 3. Screw
- 4. Washer
- 5. Motor

- 7. Nut
- 8. Washer
- 9. Bolt
- 10. Washer
- 11. Separator

4-38. MOUNTING FRAME - TYPE A AND B SEPARATORS (Continued).

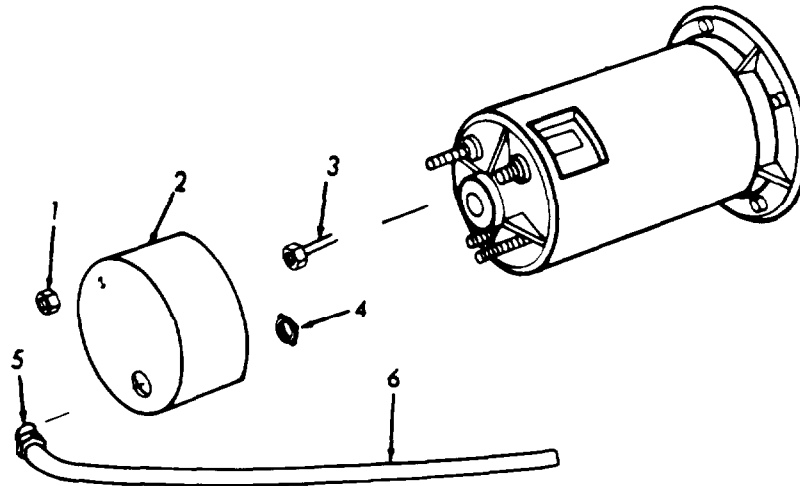
LOCATION	ITEM	ACTION	REMARKS
10.	Control panel lead (9)	<p>a. Thread leads (5) into tee (4).</p> <p>b. Connect lead (9) to connector (8) by tightening collar (7).</p> <p>c. Reconnect leads (5) using connectors (6).</p> <p>d. Install gasket (3) and cover (2) on tee (4) using screws (1).</p>	



1. Screw
2. Cover
3. Gasket
4. Tee
5. Lead
6. Connector
7. Collar
8. Connector
9. Lead

4-38. MOUNTING FRAME - TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
11.	Motor leads Type B separator	a. Secure lead (6) and elbow (5) to end cover (2) with locknut (4). b. Reconnect leads (3) and install end cover (2) using nuts (1).	

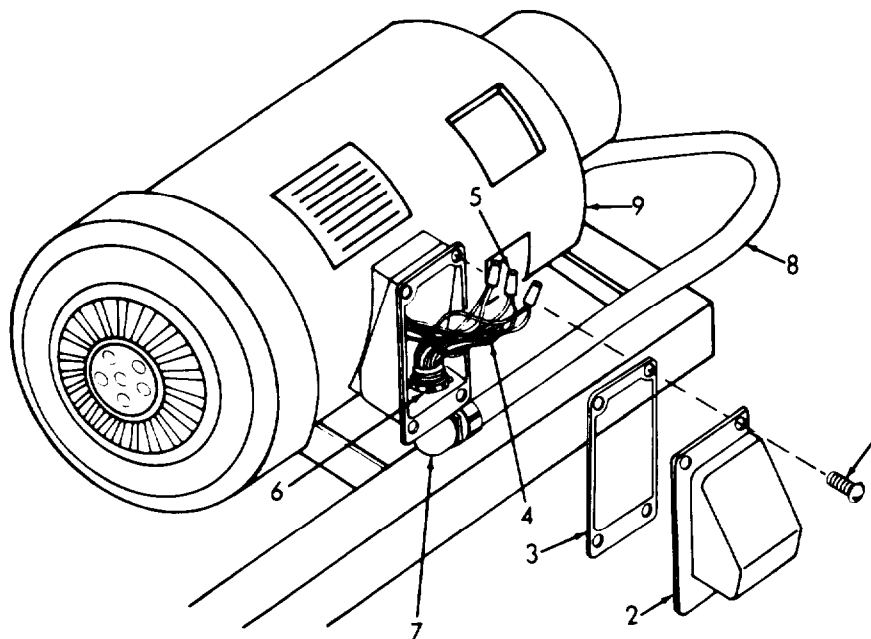


- 1. Nut
- 2. End Cover
- 3. Lead
- 4. Locknut
- 5. El bow
- 6. Lead

4-38. MOUNTING FRAME - TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
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- | | | | |
|-----|---------------------------------|---|--|
| 12. | Motor leads
Type A separator | Insert lead (8) and elbow (7) into motor housing (9).
a. Secure with locknut (6).
b. Reconnect leads (4) using connectors (5).
c. Install gasket (3) and cover (2) using screws (1).
d. | |
|-----|---------------------------------|---|--|

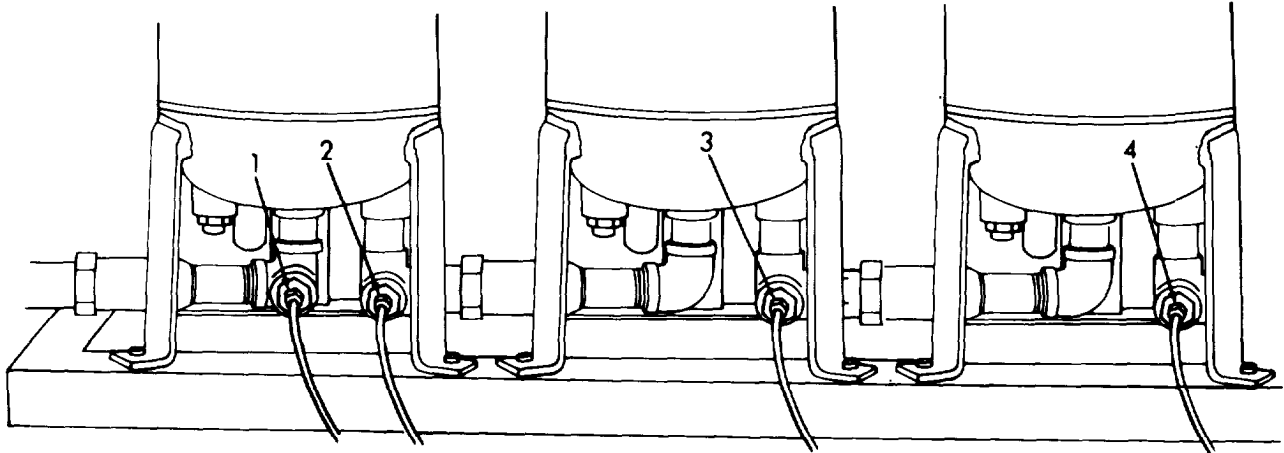


- 1. Screw
- 2. Cover
- 3. Gasket
- 4. Lead
- 5. Connector
- 6. Locknut
- 7. Elbow
- 8. Lead
- 9. Motor Housing

4-38. MOUNTING FRAME - TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

3. Air Lines Reconnect to vessel by tightening connectors (1, 2, 3, and 4).



- 1. Connector
- 2. Connector

- 3. Connector
- 4. Connector

14. Intake and discharge lines (17 and 18) Reinstall.

- 17. Intake Line
- 18. Discharge Line

15. Restart system Refer to paragraph 2-4.

CHAPTER 5
DIRECT SUPPORT MAINTENANCE

SECTION I.

GENERAL.

5-1. GENERAL.

This chapter is not applicable to Direct Support maintenance personnel.

CHAPTER 6

GENERAL SUPPORT

MAINTENANCE INSTRUCTIONS

	Page
● Overview	6-1
● Repair Parts and Special Tools	6-1
● Maintenance Procedures	6-3

6-1. OVERVIEW.

This chapter describes the separator repairs and parts replacement that are the responsibility of General Support Maintenance. Maintenance tasks given in Chapter 3 and 4 are not repeated in this chapter.

SECTION I.

REPAIR PARTS AND SPECIAL TOOLS

6-2. REPAIR PARTS.

See Appendix C for a listing of repair parts required for maintaining the separators.

6-3. SPECIAL TOOLS.

As required in Chapter 3.

SECTION II.
SERVICE UPON RECEIPT

Not applicable.

SECTION III.
OPERATIONAL CHECKS

6-4. OPERATIONAL CHECKS.

Not applicable.

SECTION IV.
PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

Not applicable.

SECTION V.
TROUBLESHOOTING.

Not applicable.

SECTION VI.
 MAINTENANCE PROCEDURES

6-5. SUMMARY AND DETAILED PROCEDURES.

Summary Procedures

Paragraph	Procedure
6-11	Circuit Board, Type A and B Separators
6-8	Control Panel, Type A and B Separators
6-9	Control Panel, Type C and D Separators
6-12	Flow Rate Indicator (#)
6-10	Inverter, Type B Separator Only
6-15	Motor, Pump (#)
6-18	Mounting Frame, Type A and B Separators
6-17	Mounting Frame, Type C and D Separators
6-13	Oil Discharge Valves, Electrically Operated (1st (Prefilter) and Second stage only), Type A and B Separators
6-14	Pump (#)
6-7	Separator Assembly, Type A and B
6-6	Separator Assembly, Type C and D
6-16	Vessel Sub-assembly



6-6. SEPARATOR ASSEMBLY, TYPE C AND D.

This task covers:

- a. Removal b. Repair c. Installation

INITIAL SETUP

Test Equipment

None

Tools

Tool Kit, General Mechanics
Paint Brush

Equipment Condition

<u>Para</u>	<u>Condition</u>	<u>Description</u>
4-14	Control panel removed	

Material/Parts

Paint MIL-P-23236 Type II Class 3
Appendix C. Item No. 4
Sealing compound
Appendix C. Item No. 6
Separator Assembly

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Testing

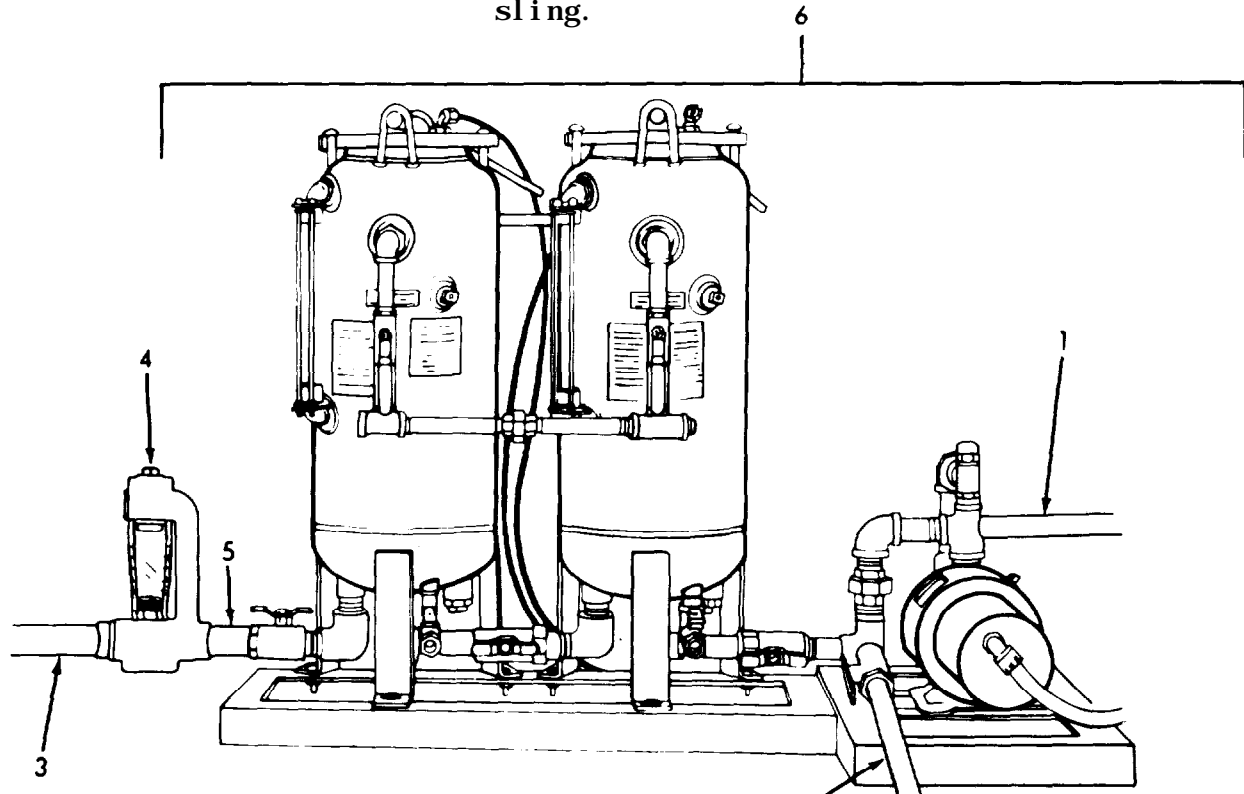
- | | | | |
|----|--|--|--|
| 1. | | Perform hydrostatic test.
If separator assembly fails test, replace assembly. | |
|----|--|--|--|

Removal

- | | | | |
|----|--|---------|--|
| 2. | Intake line (1) | Remove. | |
| 3. | By-pass line (2) | Remove. | |
| 4. | Flow rate indicator discharge line (3) | Remove. | |

6-6. SEPARATOR ASSEMBLY, TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
5.	Flow rate indicator (4)	Remove.	
6.	Water discharge line (5)	Remove.	
7.	Separator assembly (6)	a. Attach sling around separator assembly. b. With the aid of a hoist, remove separator assembly. c. Detach hoist and remove sling.	Set on flat surface and block to prevent tipping over.



- 1. Intake Line
- 2. By-pass Line
- 3. Flow Rate Indicator Discharge Line
- 4. Flow Rate Indicator
- 5. Water Discharge Line
- 6. Separator Assembly

6-6. SEPARATOR ASSEMBLY, TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Repair

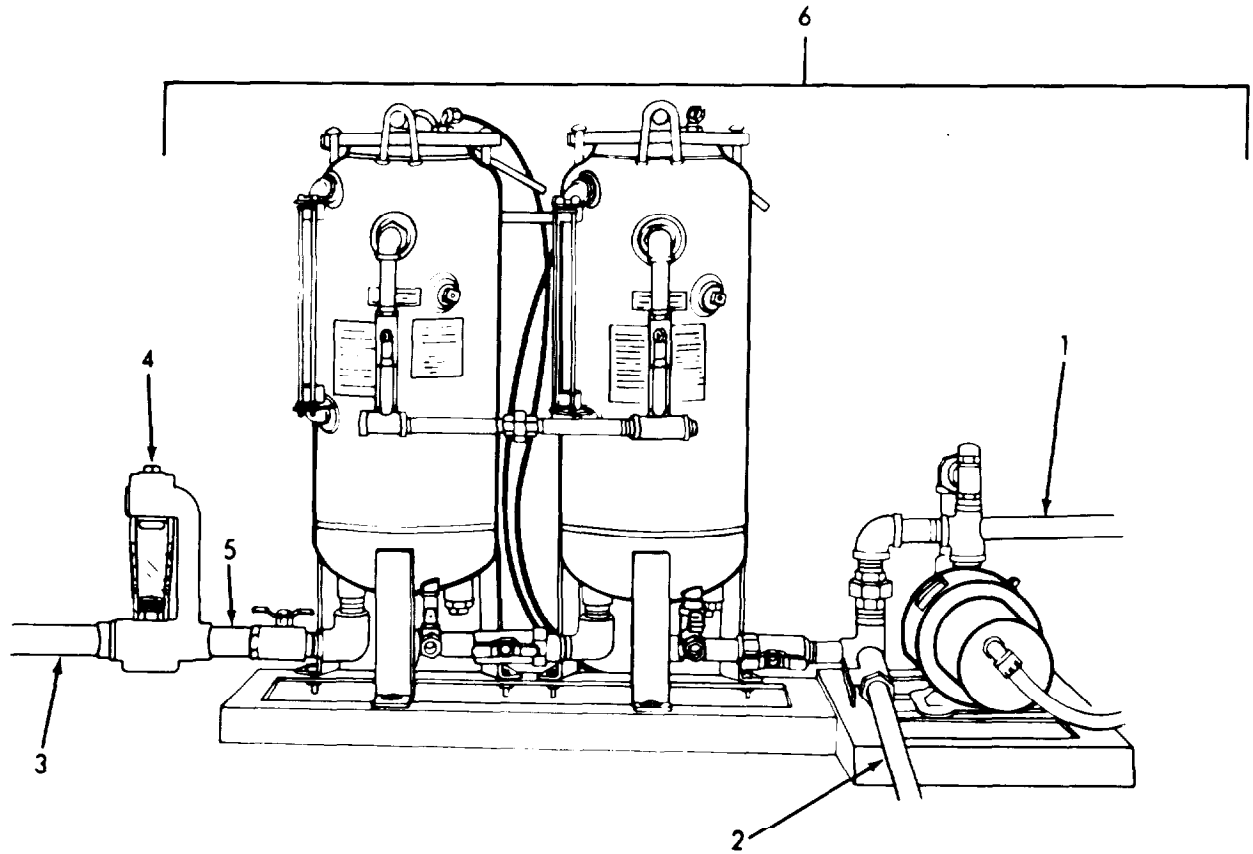
Replace defective separator assembly with a serviceable like item.

Installation

- | | | | |
|-----|--|---|--|
| 8. | Separator assembly (6) | a. Attach sling around separator assembly.
b. With the aid of a hoist, position separator assembly in place. | |
| 9. | Water discharge line (5) | Install. | |
| 10. | Flow rate indicator (4) | Install on water discharge line (5). | |
| 11. | Flow rate indicator discharge line (3) | Install on flow rate indicator (4). | |
| 12. | By-pass line (2) | Install. | |
| 13. | Intake line (1) | Install. | |

6-6. SEPARATOR ASSEMBLY, TYPE C AND D (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 1. Intake Line
- 2. By-pass Line
- 3. Flow Rate Indicator Discharge Line
- 4. Flow Rate Indicator
- 5. Water Discharge Line
- 6. Separator Assembly

6-7. SEPARATOR ASSEMBLY, TYPE A AND B.

This task covers:

- a. Test
- b. Removal
- c. Repair/Replace
- d. Installation

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics
Paint brush

Equipment Condition
Para

Condition Description

3-20 Control panel removed

Material/Parts

Paint MIL-P-23236 Type II Class 1
Appendix C. Item No. 4
Sealing compound
Appendix C. Item No. 6

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Testing

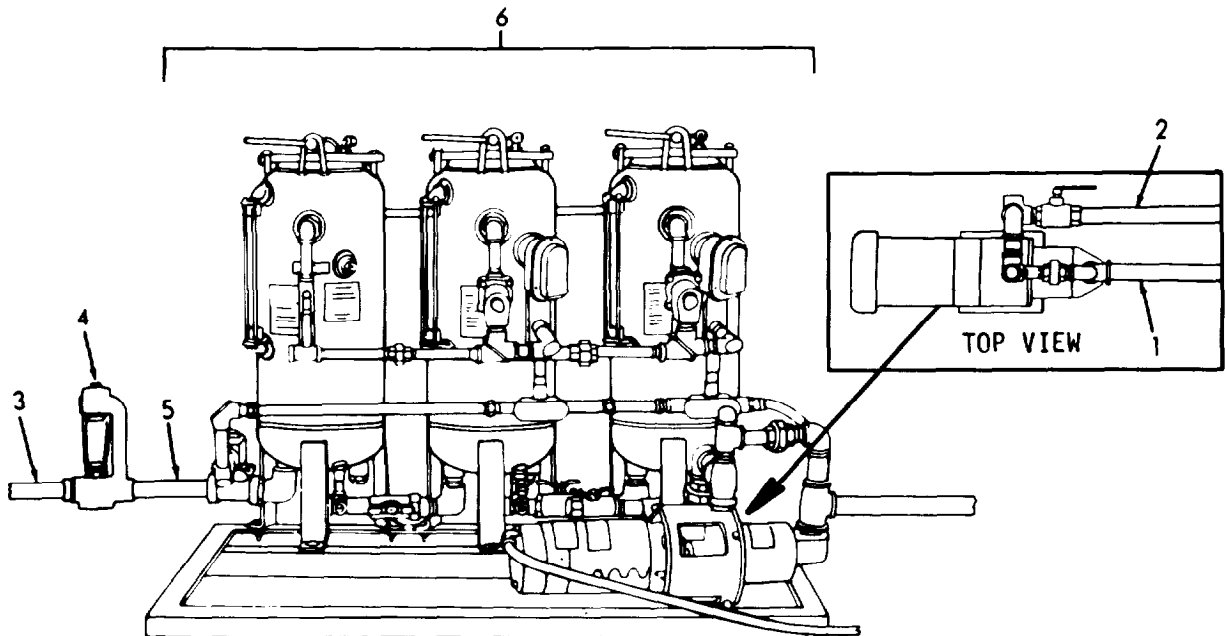
Perform hydrostatic test.
If separator assembly fails test, replace assembly.

Removal

- | | | | |
|----|--|---------|--|
| | Intake line (1) | Remove. | |
| 3. | By-pass line (2) | Remove. | |
| 4. | Flow rate indicator discharge line (3) | Remove. | |

6-7. SEPARATOR ASSEMBLY, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
5.	Flow rate indicator (4)	Remove.	
6.	Water discharge line (5)	Remove.	
7.	Separator assembly (6)	a. Attach sling around separator assembly. b. With the aid of a hoist, remove separator assembly. c. Detach hoist and remove sling.	Set on flat surface and block to prevent tipping over.



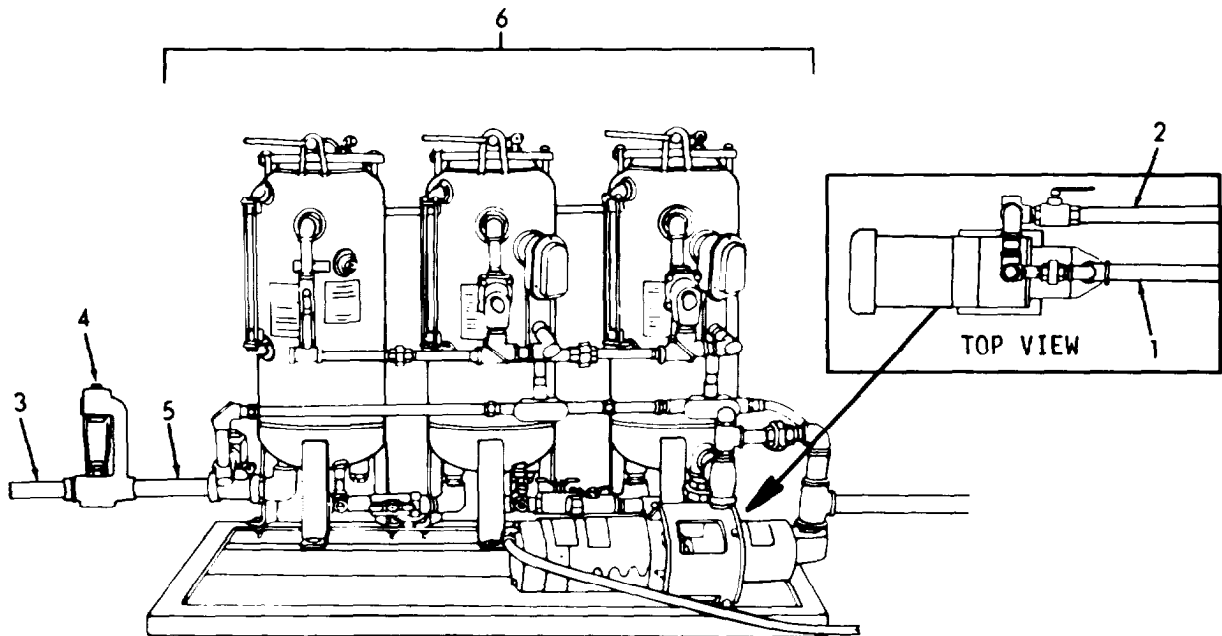
1. Intake Line
2. By-pass Line
3. Flow Rate Indicator Discharge Line
4. Flow Rate Indicator
5. Water Discharge Line
6. Separator Assembly

6-7. SEPARATOR ASSEMBLY, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
Repair		Replace defective separator assembly with a serviceable-like item.	
Installation			
8.	Separator assembly (6)	a. Attach sling around separator assembly. b. With the aid of a hoist, position separator assembly in place.	
9.	Water discharge line (5)	Install.	
10.	Flow rate indicator (4)	Install on water discharge line (5).	
11.	Flow rate indicator discharge line (3)	Install on flow rate indicator (4).	
12.	By-pass line (2)	Install.	
13.	Intake line (1)	Install.	

6-7. SEPARATOR ASSEMBLY, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



1. Intake Line
2. By-pass Line
3. Flow Rate Indicator Discharge Line
4. Flow Rate Indicator
5. Water Discharge Line
6. Separator Assembly

6-9. CONTROL PANEL, TYPE C AND D SEPARATORS.

This task covers:

- a. Repair/Replacement
- b. Overhaul

INITIAL SETUP

Test Equipment

None

Tools

Tool Kit, General Mechanics
Paint brush

Equipment
Condition
Para

Condition Description

4-14

Control Panel Removed

Material/Parts

Control panel
Paint MIL-P-23236 Type II Class 3
Appendix C, Item No. 4

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Repair

Control panel

Replace control panel with a serviceable-like item.

Overhaul

- a. Replace damaged or defective control panel components with a serviceable-like item in accordance with Chapters 3 and 4.
- b. Spot-paint disturbed areas.

6-10. INVERTER, TYPE B SEPARATOR ONLY.

This task covers:

Overhaul

INITIAL SETUP

Test Equipment

None

Tools

Tool Kit, General Mechanics

Equipment

Condition

Para

Condition Description

3-13

Inverter Removed

Material/Parts

Inverter

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
-----------------	-------------	---------------	----------------

Overhaul

1. Overhaul of the inverter is limited to replacement.
2. Return defective inverter to Depot for disposition.

6-11. CIRCUIT BOARD, TYPE A AND B SEPARATORS.

This task covers:

Overhaul

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Equipment Condition
Para

<u>Condition</u>	<u>Description</u>
3-14	Circuit board removed, Type B separator
3-17	Circuit board removed, Type A separator

Material/Parts
Circuit board

Personnel Required

1

<u>LOCATION</u>	<u>ITEM</u>	<u>ACTION</u>	<u>REMARKS</u>
-----------------	-------------	---------------	----------------

Overhaul

1. Overhaul of the circuit board is limited to replacement.
2. Return defective circuit board to Depot for disposition.

6-12. FLOW RATE INDICATOR (#).

This task covers:

- a. Disassembly
- b. Repair
- c. Assembly

INITIAL SETUP

Test Equipment

None

Tools

Tool Kit, General Mechanics

Equipment Condition Para

Condition Description

3-21

Flow rate indicator removed, type A and B separator.

4-15

Flow rate indicator removed, type C and D separator.

Material/Parts

Gaskets
"O" rings
Metering tube
Float

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Disassembly

- | | | | |
|----|---------------------|---|--|
| 1. | Flow rate indicator | <ul style="list-style-type: none"> a. Remove plug (1). b. Remove inlet fitting (2), float (3) and meter tube (4). | |
|----|---------------------|---|--|

WARNING

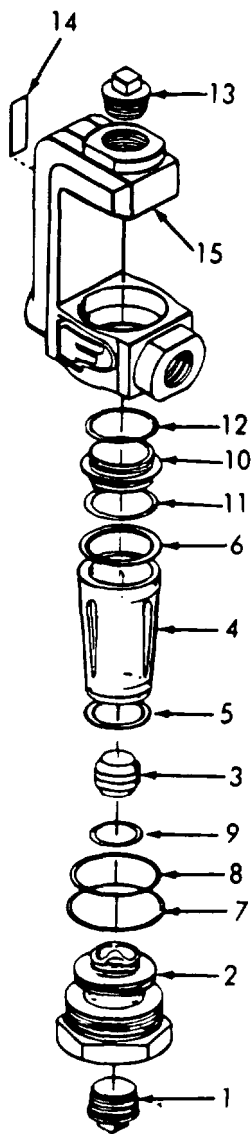
Use care when removing the inlet, as the float and tube are free to fall out of the meter body.

- c. Remove gaskets (5 and 6) and "O" rings (7, 8, and 9).

6-12. FLOW RATE INDICATOR (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- | | | | |
|--|--|---|---|
| | | d. Remove outlet adapter ring (10) and "O" rings (11 and 12). | |
| | | e. Remove plug (13) and name plate (14) from body (15). | Remove name plate only if defaced or illegible. |



1. Plug
2. Inlet Fitting
3. Float
4. Meter Tube
5. Gasket
6. Gasket
7. "O" Ring
8. "O" Ring
9. "O" Ring
10. Outlet Adapter Ring
11. "O" Ring
12. "O" Ring
13. Plug
14. Nameplate
15. Body

6-12. FLOW RATE INDICATOR (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Repair

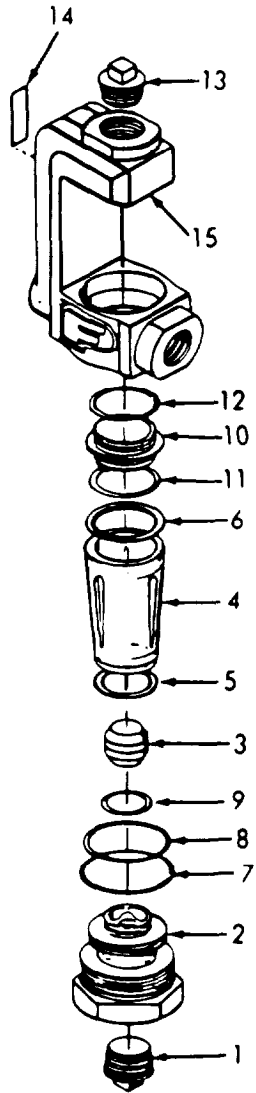
Replace gaskets and "O" rings. Replace other damaged or defective parts with a serviceable replacement part.

Assembly

- | | | |
|----|---------------------|---|
| 2. | Flow rate indicator | <ul style="list-style-type: none"> a. Install nameplate (14) if removed. b. Install plug (13) in body (15). c. Position "O" rings (11 and 12) in place and install outlet adapter ring (10) in body. d. Install "O" rings (7, 8 and 9). e. Position gaskets (5 and 6) in place and insert meter tube (4) into body. f. Insert float (3) into tube (4) with long stem facing upwards. g. Install inlet fitting (2) into body and plug (1) into fitting. |
|----|---------------------|---|

6-12. FLOW RATE INDICATOR (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



1. Plug
2. Inlet Fitting
3. Float
4. Meter Tube
5. Gasket
6. Gasket
7. "O" Ring
8. "O" Ring
9. "O" Ring
10. Outlet Adapter Ring
11. "O" Ring
12. "O" Ring
13. Plug
14. Nameplate
15. Body

6-13. OIL DISCHARGE VALVES, ELECTRICALLY OPERATED [1ST (PREFILTER) AND SECOND STAGE ONLY], TYPE A AND B SEPARATORS.

This task covers:

- a. Disassembly
- b. Cleaning
- c. Reassembly

INITIAL SETUP

Test Equipment
None

Tools
Tool Kit, General Mechanics

Equipment Condition
Para

Condition Description

3-24 Valve removed

Material/Parts

- Sealing compound
- Appendix C. Item No. 6
- Parts kit
- Cleaning Solvent P-D-680
- Appendix C. Item No. 2
- Clean lint free cloths
- Pail

Personnel Required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

NOTE

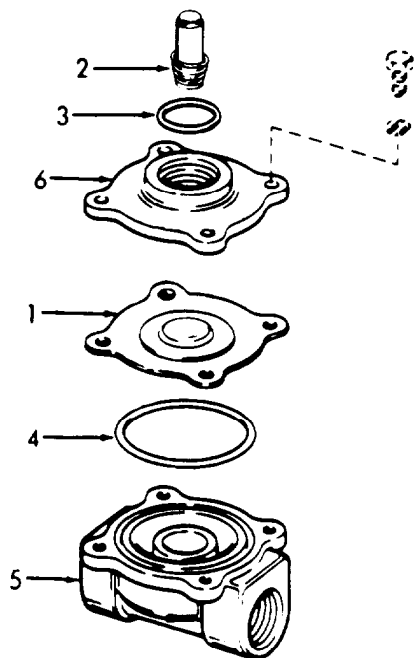
Overhaul of oil discharge valves is limited to replacement of parts contained in Parts Kit FV-158-934 (04854).

Disassembly

- | | | |
|----|---------------------|--|
| 1. | Oil discharge valve | <ul style="list-style-type: none"> a. Remove diaphragm subassembly (1). b. Remove core spring (2). c. Remove bonnet gasket (3). d. Remove body gasket (4) from body (5). |
|----|---------------------|--|

6-13. OIL DISCHARGE VALVES, ELECTRICALLY OPERATED [1ST (PREFILTER) AND SECOND STAGE ONLY], TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------



- 1. Diaphragm Subassembly
- 2. Core Spring
- 3. Bonnet Gasket
- 4. Body Gasket
- 5. Body

Cleaning

WARNING

Cleaning solvent Fed. Spec. PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated or prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° - 138°F (38° - 59°C)

- a. Clean metal parts of valve assembly in cleaning solvent Fed. Spec. PD-680 and dry thoroughly.
- b. Clean diaphragm and coil using a clean cloth.

6-13. OIL DISCHARGE VALVES, ELECTRICALLY OPERATED [1ST (PREFILTER) AND SECOND STAGE ONLY], TYPE A AND B SEPARATORS (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Reassembly

3.
 - a. Install new body gasket (4) in body (5).
 - b. Install bonnet gasket (3).

NOTE

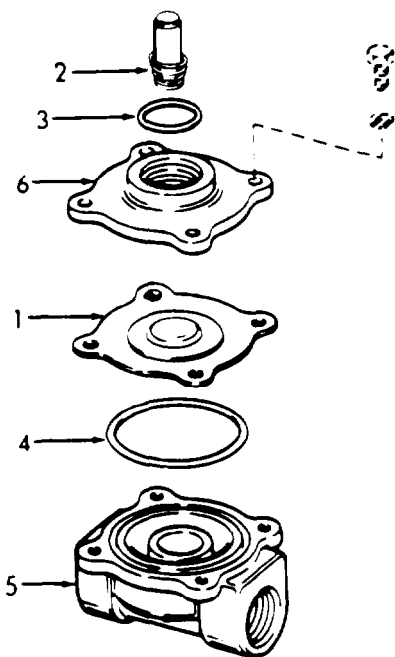
Install wide end of core spring in core first. Closed end protrudes from top of core.

- c. Install core spring

NOTE

Locate bleed hole in diaphragm assembly approximately 45° from outlet.

- d. Install diaphragm subassembly (1) in bonnet (6).



1. Diaphragm Subassembly
2. Core Spring
3. Bonnet Gasket
4. Body Gasket
5. Body
6. Bonnet

6-14. PUMP (#).

This task covers:

- a. Disassembly
- b. Repair
- c. Reassembly
- d. Installation

INITIAL SETUP

Test Equipment
None

Tools
Hex wrench
Tool Kit, General Mechanics

Material/Parts
Seal assembly
Stator
Flexible joint
Stator ring
Rotor
Shaft coupling

Equipment Condition
Para

3-30

4-21

Condition Description

Pump removed, type A and B separators

Pump removed, type C and D separators

Personnel Required
1

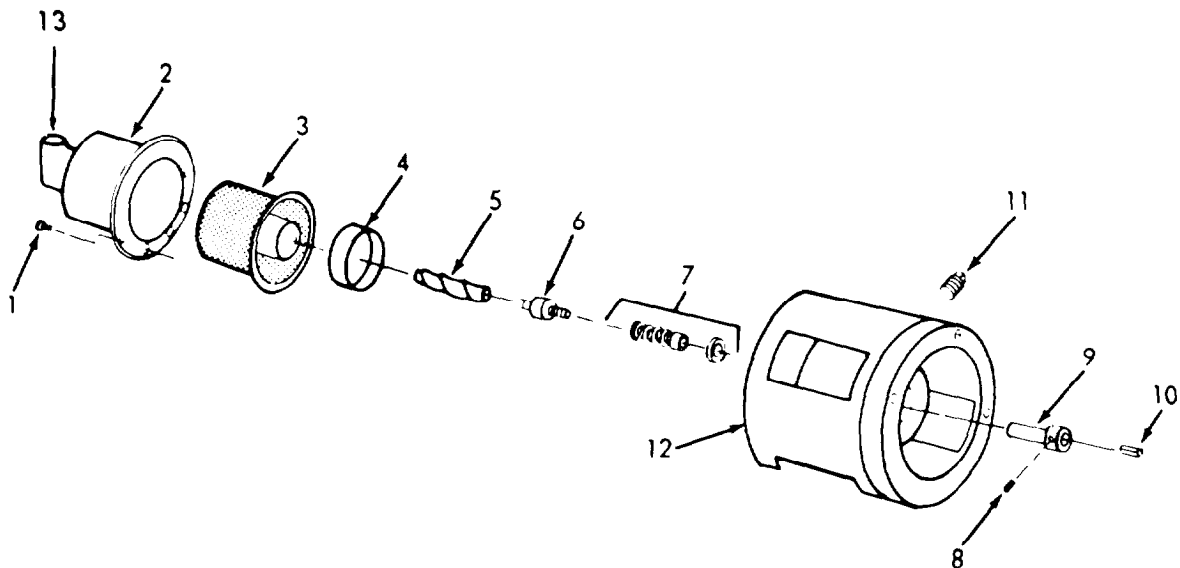
LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Disassembly

- | | | |
|----|---|--|
| 1. | <ul style="list-style-type: none"> a. Remove screws (1) from suction housing. b. Remove suction housing (2) and stator (3). Remove stator ring (4) from stator (3). c. Remove rotor (5) from flexible joint (6). | <p>Insert a 3/16 inch hex wrench into end of flexible joint. Turn counter-clockwise to remove. Carefully pry seal seat out of body (12).</p> |
|----|---|--|

6-14. PUMP (#) (Continued).

- d. Remove flexible joint (6) from shaft coupling (9).
- e. Carefully slide mechanical seal (7) off shaft coupling (9).
- f. Loosen setscrew (8) in shaft coupling and remove shaft coupling (9).
- g. Remove key (10).
- h. Remove pipe plugs (11) from pump housing (12).



- 1. Screws
- 2. Suction Housing
- 3. Stator
- 4. Stator Ring
- 5. Rotor
- 6. Flexible Joint
- 7. Mechanical Seal
- 8. Setscrew
- 9. Coupling
- 10. Key
- 11. Pipe Plugs
- 12. Pump Housing

6-14. PUMP (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Repair

2.

CAUTION

If any parts of seal assembly are worn or broken, replace the entire seal assembly. Seal components are matched parts and are not interchangeable.

NOTE

Replace damaged or defective parts with a serviceable like item.

Reassembly

3.

- a. Install pipe plugs (11) in pump housing (12).
- b. Insert key (10) in notch on motor shaft and install shaft coupling (9) using setscrew (8).
- c. Install seal assembly (7) into bore of pump body.

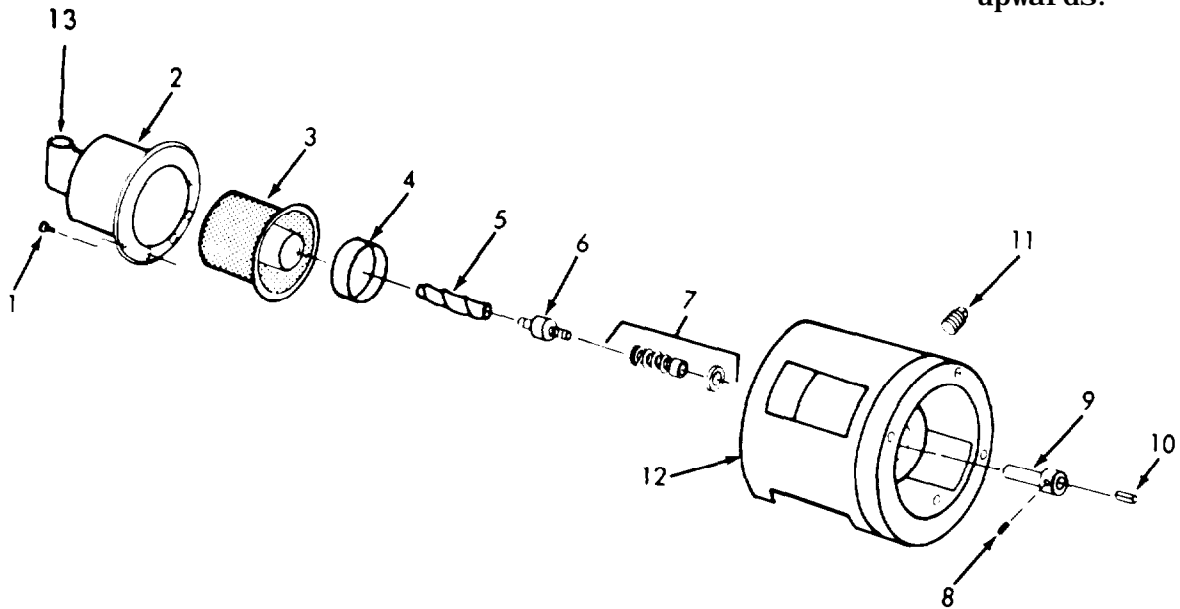
Lightly oil outer surface of ceramic seat before installing seal. Oil shaft lightly and slide cam bar down shaft to meet ceramic face. Install spring retainer on shaft. Use a 3/16 inch hex wrench and turn clockwise to install.

6-14. PUMP (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

- d. Thread flexible joint (6) into shaft coupling.
- e. Install rotor (5) onto flexible joint (6).
- f. Install stator ring (4) in stator (3). Slide stator (3) onto rotor.
- g. Install suction housing (2), using screws (1).

Install with suction port (13) facing upwards.



- 1. Screws
- 2. Suction Housing
- 3. Stator
- 4. Stator Ring
- 5. Rotor
- 6. Flexible Joint
- 7. Mechanical Seal
- 8. Setscrew
- 9. Coupling
- 10. Key
- 11. Pipe Plug
- 12. Pump Housing
- 13. Suction Port

6-15. MOTOR, PUMP (#).

This task covers: **Repair**

INITIAL SETUP

Test Equipment

None

Tools

Tool Kit,
General Mechanics

Material/Parts

Brush Assembly
Motor

Personnel Required

1

Equipment
Condition

Para

Condition Description

3-31

Pump motor removed,
type A and B separ-
ators

4-22

Pump motor removed,
type C and D separ-
ators

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Repair

NOTE

- a. Repair of motor for type B, C and D separator is limited to replacement of brushes.
- b. Repair of motor for type A separator is accomplished by replacement only.

- | | | |
|----|--------------|---|
| 1. | Cover
(2) | Remove screws (1) and cover
(2). |
| 2. | Brush
(6) | <ul style="list-style-type: none"> a. Remove terminal (3) from post (4). b. Lift up on spring (5) and remove brush (6). |

NOTE

Remove cover and brush from other side of motor in the same manner.

6-15. MOTOR, PUMP (#) (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

NOTE

Remove cover and brush from other side of motor in same manner.

Installation

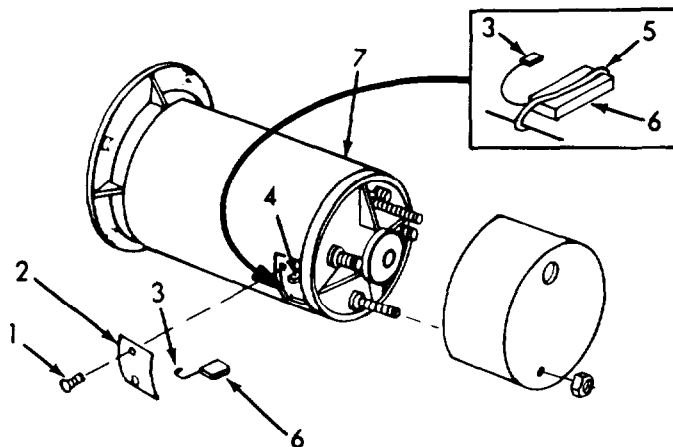
- | | | |
|----|--------------|--|
| 3. | Brush
(6) | a. Lift up on spring (5) and insert brush (6) in brush holder.

b. Slide terminal (3) over post (4). |
| 4. | Cover
(2) | a. Position in place on housing (7).

b. Install screws (1). |

NOTE

Install cover and brush on other side of motor in same manner.



- 1. Screws
- 2. Cover
- 3. Terminal
- 4. Post
- 5. Spring
- 6. Brush
- 7. Housing

6-16. VESSEL SUB-ASSEMBLY.

This task covers:

- a. Cleaning
- b. Overhaul

INITIAL SETUP

Test Equipment
None

Tools

Tool kit, General Mechanics
Paint brush
Appendix C. Item No. 4

Equipment Condition
Para

Condition Description

3-33

Vessel sub-assembly removed and disassembled, type A and B separators.

Material/Parts

Filter elements
Instruction or warning plates
Anodes
"O" rings (covers)
Paint MIL-P-23236, Type II, Class 1
Cleaning Solvent PD-680
Appendix C. Item No. 2
Clean cloths
Bucket

4-24

Vessel sub-assembly removed and disassembled, type C and D separators.

Personnel required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Cleaning

- a. Flush interior of vessels with clean water.

WARNING

Cleaning solvent PD-680, used to clean parts, is potentially dangerous to personnel and property. Avoid repeated or prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° - 138°F (38° - 59°C).

6-16. VESSEL SUB - ASSEMBLY (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

CAUTION

Do not allow cleaning solvent to enter electrical connections.

- b. Clean outer surface of vessels with a cloth dampened in cleaning solvent Fed. Spec. PD-680. Dry thoroughly.

Overhaul

2.

- a. Replace elements.
- b. Replace anode.
- c. Replace missing or illegible warning and instruction plates.
- d. Spot-paint disturbed areas.

6-17. MOUNTING FRAME, TYPE C AND D SEPARATORS.

This task covers:

- a. Cleaning b. Inspection c. Repair

INITIAL SETUP

Test Equipment

None

Tools

Tool Kit, General Mechanics
Acetylene torch
Paint brush

Equipment
Condition

Para

Condition Description

4-37 Mounting frame removed

Material/Parts

Mounting Frame
Paint MIL-P-23236, Type II, Class 3
Appendix C. Item No. 4
Cleaning solvent PD-680
Appendix C. Item No. 2
Clean cloths
Bucket

Personnel required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Cleaning



Cleaning solvent Fed. Spec. PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated or prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° - 138°F (38° - 59°C).

Use a wire brush to remove rust or other foreign matter from mounting frame.

Inspection

Inspect mounting frame for cracks, broken welds or distortion.

6-17. MOUNTING FRAME - TYPE C AND D SEPARATORS (continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Repair			
--------	--	--	--

Reweld broken welds and weld cracks using approved welding practices. Straighten distortion, clean, and paint disturbed areas. Replace a mounting frame damaged beyond repair with a serviceable-like item.

6-18. MOUNTING FRAME, TYPE A AND B SEPARATORS.

This task covers:

- a. Cleaning b. Inspection c. Repair

INITIAL SETUP

Test Equipment

None

Tools

Tool Kit, General Mechanics
Acetylene torch
Paint brush

Equipment Condition

Para

Condition Description

4-38 Mounting frame removed.

Material/Parts

Mounting frame
Paint MIL-P-23236, Type II, Class 1
Appendix C. Item No. 4
Cleaning solvent PD-680
Appendix C. Item No. 2
Clean cloths
Bucket

Personel required

1

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Cleaning

WARNING

Cleaning solvent Fed. Spec. PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated or prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100° - 138°F (38° - 59°C).

Use a wire brush to remove rust or other foreign matter from mounting frame.

6-18. MOUNTING FRAMES, TYPE A AND B (Continued).

LOCATION	ITEM	ACTION	REMARKS
----------	------	--------	---------

Inspection

Inspect mounting frame for cracks, distortion or broken welds.

Repair

Repair cracks or broken welds using approved welding practices. Replace mounting frame with a serviceable-like item if damaged beyond repair. Clean and paint disturbed areas.

APPENDIX A

REFERENCES

- TM 740-90-1 Administrative Storage of Equipment
- TM 38-750 Army Maintenance Management System (TAMMS), The
- FM 21-11 Artificial Respiration
- TM 750-244-3 Procedures for Destruction of Equipment to Prevent
Enemy Use



APPENDIX B

MAINTENANCE ALLOCATION CHART

SECTION I.

INTRODUCTION

B-1. GENERAL.

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

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

c. Section III contains supplemental instructions or explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS.

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

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

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

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

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

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

TM 55-2090-201-14&P

B-2. MAINTENANCE FUNCTIONS (Continued).

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

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

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, or replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, re-machining, 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/actions) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMMR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

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

B-3. COLUMN ENTRIES USED IN THE MAC.

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

b. Column 2, Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

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

d. Column 4, Maintenance Level. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform the maintenance function at the indicated level of maintenance.

B-3. COLUMN ENTRIES USED IN THE MAC (Continued).

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

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

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

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

B-4. COLUMN ENTRIES USED IN TOOL AND TEST EQUIPMENT REQUIREMENTS.

a. Column 1, Reference Code. The code scheme recorded in column 5, Section II.

b. Column 2, Maintenance Category. This column shows the lowest level of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. This column lists the name or identification of the tool or test equipment.

d. Column 4, National/NATO Stock Number. This column lists the National/NATO Stock number of the tool or test equipment.

e. Column 5, Tool Number. This column lists the manufacturer's code or part number of the tool or test equipment.

SECTION II. MAINTENANCE ALLOCATION CHART
FOR
OIL-WATER SEPARATOR

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT	(6) REMARKS	
			UNIT		D/S	G/S			DEP
			C	O	F	H			D
01	OIL/WATER SEPARATOR ASSEMBLY	TEST				3.0			
		REPLACE				20.0			
		OVERHAUL				20.0			
02	CONTROL PANEL	TEST	0.2					A, B, C, D	
		REPLACE				7.0			
		REPAIR	2.5						A, B, C, D
		OVERHAUL				16.0			
	PRESSURE GAUGES	SERVICE	2.0						A, B, C, D
		REPLACE	1.5						A, B, C, D
	FUSES	INSPECT	0.5						
		REPLACE	0.1						A, B, C, D
	FUSE HOLDERS	INSPECT	0.1						
		REPLACE	0.2						A, B, C, D
	LAMPS	INSPECT	0.1						
		REPLACE	0.2						A, B, C, D
	INDICATOR LIGHTS	INSPECT	0.1						
		REPLACE	1.8						A, B, C, D
	CONTROL BOX SWITCHES & WIRING	INSPECT	0.1						
		REPLACE	0.2						A, B, C, D
	CONTROL BOX LEGEND & IDENTIFICATION PLATES	INSPECT	0.1						
		REPLACE	0.3						A, B, C, D
	DIVERter	REPLACE	3.0						B
		OVERHAUL					2.5		B
CIRCUIT BOARD	REPLACE	2.0						A, B	
	OVERHAUL					2.5		A, B	
RELAY	INSPECT	1.0							
	REPLACE	3.0						B, C, D	
TERMI NALS	INSPECT	1.0							
	REPLACE	1.5						A, B, C, D	

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			UNIT		D/S	G/S	DEP		
			C	O	F	H	D		
02 (cont)	WIRING	INSPECT REPLACE	0.1	2.0				A, B, C, D	
03	FLOW RATE INDICATOR	INSPECT SERVICE REPLACE REPAIR OVERHAUL	0.1 0.3 0.8 1.0			4.0		A, B, C, D A, B, C, D A, B, C, D	
04	CONDUIT, CONNECTORS and WIRING	INSPECT REPLACE	0.1 4.0					A, B, C, D	
05	PIPING, AIR LINES and FITTINGS	INSPECT REPLACE	0.1 4.0					A, B, C, D	
	DISCHARGE VALVES, OIL ELECTRICALLY OPERATED [1st (pre-filter) and 2nd stage only]	REPLACE REPAIR OVERHAUL	1.0 0.5			4.0		A, B A, B A, B	
	DISCHARGE VALVES, OIL, (MANUALLY OPERATED)	INSPECT REPLACE	1.0 1.5					A, B, C, D	
	PRESSURE GAUGE, and VESSEL TUBING	INSPECT REPLACE	1.0 1.5					A, B, C, D	
	AIR DISCHARGE LINES, COVER	INSPECT REPLACE	0.1 0.5						
06	SUPPLY PUMP ASSEMBLY	TEST REPLACE OVERHAUL	1.0 4.0			10.0		A, B, C, D	
	SUCTION STRAINER	INSPECT SERVICE	0.2 0.2						

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			UNIT		D/S	G/S	DEP		
			C	O	F	H	D		
06 (cont)	SUPPLY PUMP	INSPECT	1.0					A, B, C, D	
		REPLACE	3.0						
		REPAIR			8.0				
07	SUPPLY PUMP MOTOR (TYPE A MOTOR is BRUSHLESS)	INSPECT	0.1					A, B, C, D	
		REPLACE	3.0			1.0			
		REPAIR							
07	RELIEF VALVE	ADJUST	0.2					A, B, C, D	
		REPLACE	0.8						
	VESSEL SUBASSEMBLY	INSPECT	1.0					A, B A, B, C, D	
		REPLACE	4.0						
		REPAIR	2.0						
		OVERHAUL			6.0				
	CAM BAR	INSPECT	0.5					A, B, C, D	
		REPLACE	0.1						
	COVER	INSPECT	0.5					A, B, C, D	
		REPLACE	0.5						
	COVER SEAL (O-RING)	INSPECT	0.5						
		REPLACE	0.1						
	AIR ELIMINATOR VALVE	INSPECT	0.1					A, B, C, D A, B, C, D	
		SERVICE	0.1						
		REPLACE	0.5						
REPAIR		0.7							
FILTER ELEMENT	INSPECT	0.1							
	REPLACE	0.4							
FILTER SUPPORT	INSPECT	1.0					A, B, C, D		
	REPLACE	2.0							
SIGHTGLASS and FITTINGS	INSPECT	1.0					A, B, C, D		
	REPLACE	2.0							
ANODE	INSPECT	0.1							
	REPLACE	0.4							
1st STAGE (Pre-filter) and 2nd or 3rd STAGE SEPARATOR	SERVICE	1.5					A, B, C, D		
	REPLACE	5.5							

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			UNIT		D/S	G/S	DEP		
			C	O	F	H	D		
07 (cont)	WATER SAMPLE/ DRAIN VALVES	INSPECT	1.0					53918	A, B, C, D
		REPLACE	1.5						
	WATER DISCHARGE VALVE (SOLENOID OPERATED)	REPLACE	2.0						A, B
		REPAIR OVERHAUL	1.0			4.0			A, B A, B
	WATER DISCHARGE VALVE (MANUALLY OPERATED)	INSPECT	1.0						C, D
		REPLACE		2.0					
	INLET VALVE, FLUID (MANUALLY OPERATED)	INSPECT	1.0						A, B, C, D
		REPLACE	3.0						
	INTERVESSEL SHUTOFF VALVES (MANUAL)	INSPECT	1.0						A, B, C, D
		REPLACE	2.0						
MINI - PROBE	TEST	0.5					A, B		
	REPLACE	1.5					A, B		
WARNING INSTRUCTION and IDENTI- FICATION PLATES	INSPECT	0.1					A, B, C, D		
	REPLACE	0.3							
08	MOUNTING FRAME	INSPECT REPAIR REPLACE	0.1	3.5		8.0		A, B, C, D	

SECTION II.

MAINTENANCE ALLOCATION CHART (CONTINUED)

FOR

OIL - WATER SEPARATOR

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance LEVEL					(5) Tools and Equipment	(6) Remark
			C	O	F	H	D		
07 (Continued)									
	Air Eliminator Valve	Inspect Service Replace Replace Repair Repair	0.1 0.1 0.5 0.7 0.7	0.5 0.7				A B C D A B C D	
	Filter Element	Inspect Replace	0.1 0.4						
	Filter Support	Replace Replace	2.0	2.0				A B C D	
	Sightglass and Fittings	Replace Replace	2.0	2.0				A B C D	
	Anode	Inspect Replace	0.1 0.4						
	1st Stage (Pre-filter) and 2nd or 3rd Stage Separator	Service Replace Replace	1.5 5.5	5.5				A B C D	
	Water Sample/ Drain Valves	Replace Replace	1.5	1.5				A B C D	
	Water Discharge Valve (Solenoid Operated)	Replace Repair Overhaul	2.0 1.0			4.0		A B A B A B	

SECTION II.

MAINTENANCE ALLOCATION CHART (CONTINUED)

FOR

OIL - WATER SEPARATOR

(1) Group Number	(2) Component/ Assembly	Maintenance Function	Maintenance Level					Tools and Equipment	(6) Remark!
			C	O	F	H	D		
07 (Continued)	Water Dis- Charge Valve (Manually Operated)	Replace		2.0					C D
	Inlet Valve, Fluid (Manually Operated)	Replace Replace	3.0	3.0					A B C D
	Inter- Vessel Shut- off Valves (Manual)	Replace Replace	2.0	2.0					A B C D
	Mini-Probe	Test Replace	0.5 1.5					53918	A B A B
	Warning Instruction and Identi- fication Plates	Inspect Replace Replace	0.1 0.3	0.3					A B C D
08	Mounting Frame	Inspect Repair Repair Replace	0.1	3.5 3.5		8.0			A B C D

SECTION III.

REMARKS

TOOL AND TEST EQUIPMENT

REQUIREMENTS

(1)	(2)	(3)	(4)	(5)
REFERENCE CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
53918	C	Socket, Thin Wall	5120-00-277-1465	53918

APPENDIX C
ORGANIZATIONAL, DIRECT SUPPORT
AND GENERAL SUPPORT
MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND
SPECIAL TOOLS)

SECTION I.

INTRODUCTION

C-1. Scope.

This appendix lists repair parts, special tools, special test, measurement, and diagnostic equipment (TMDE), and other special support equipment required for performance of organizational, direct, and general support maintenance of the oil and water separator. It authorizes the requisitioning and issue of repair parts as indicated by the source and maintenance codes.

C-2. General.

This Repair Parts and Special Tools List is divided into the following sections:

a. 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 numeric sequence, with the parts in each group listed in figure and item number sequence.

b. Section III. Special Tools List. A list of special tools authorized for the performance of maintenance.

C-2. General (Continued).

Section IV. National Stock Number and Part Number Index. A list, in National item identification number (NIIN) sequence, of all National Stock Numbers (NSN) appearing in the listings, followed by a list in alphameric sequence of all part numbers appearing in the listings. National Stock Numbers and part numbers are cross-referenced to each illustration figure and item number appearance. This index is followed by a cross-reference list of reference designators to figure and item numbers.

C-3. Explanation of Columns.

a. Illustration. This column is divided as follows:

(1) Figure Number. Indicates the figure number of the illustration of which the item is shown.

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

b. Source, Maintenance, and Recoverability (SMR) Codes.

(1) Source Code. Source codes 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.

C-3. Explanation of Columns (Continued).

Code	Definition
PG -	Item procured and stocked to provide for sustained support for the life of the equipment. It is applied 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 a 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 a 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.
MD -	Item to be manufactured or fabricated at organizational level.
MF -	Item to be manufactured or fabricated at the direct support maintenance level.
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.

C-3. Explanation of Columns (Continued).

NOTE

Cannibalization or salvage may be used as a source of supply for any items coded above except those coded XA and support items as restricted by AR 700-42.

(2) 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:

Code	Application/Explanation
C	- Crew or operator maintenance performed within 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, or 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.

C-3. Explanation of Columns (Continued).

Code	Application/Explanation
0 -	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.
L -	Repair restricted to designated, Specialized Repair Activity.
Z -	Nonreparable. 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:

Recoverability

Codes	Definition
Z -	Nonreparable item. When unserviceable, condemn and dispose at the level indicated in position 3.
0 -	Reparable item. When uneconomically repairable, condemn and dispose at organizational level.
F -	Reparable item. When uneconomically repairable, condemn and dispose at the direct support level.
H -	Reparable item. When uneconomically repairable, condemn and dispose at the general support level.
D -	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal not authorized below depot level.
L -	Reparable item. Repair, condemnation, and disposal not authorized below depot/specialized repair activity level.

C-3. Explanation of Columns (Continued).

Codes

Definition

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 which will be used for requisitioning.

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 item received may have a different part number than the part being replaced.

Federal Supply Code for Manufacturer (FSCM). The FSCM is a 5-digit numeric code listed in SB 708-42; which is used to identify the manufacturer, distributor, or Government agency, etc.

f. Description. Indicates the Federal item name and, if required, a minimum description to identify the items. Items that are included in kits and sets are listed below the name of the kit or set with the quantity of each item in the kit or set indicated in the quantity incorporated in unit column.

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 Incorporated in Unit. Indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for 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, (e.g., shims, spacers, etc).

C-4. Special Information.

MODEL

SERIES

INSTALLED ON

Type A

B84308 DBM

LCU-1466A

1905-01-031-6077

BD-100T 264B

1935-00-264-6219

FMS 7011

1935-00-375-3000

C-4. Special Information (Continued).

MODEL	SERIES	INSTALLED ON
Type B	B84308 DBN	LT-100 3006 and 1925-00-375-3002 1925-00-375-3003
Type C	B84308 DBP	LCM - 8 and BG231B 1905-00-267-1097 1905-00-935-6057 1930-00-375-2972
Type D	B84308 DBQ	ST65-3004 1925-00-374-3002

C-5. How to Locate Repair Parts.

a. When National Stock Number or Part Number is Unknown:

(1) Using the table of contents determine the assembly group within which the repair part belongs. This is necessary since illustrations are prepared for assembly groups, and listings are divided into the same groups.

(2) Find the illustration covering the assembly group to which the repair part belongs.

(3) Identify the repair part on the illustration and note the illustration figure number and item number of the repair part.

(4) Using the repair parts listing, find the assembly group to which the repair part belongs and locate the illustration figure and item number noted on the illustration.

b. When National Stock Number of Part Number is Known:

(1) First. Using the Index of National Stock Numbers and Part Numbers, find the pertinent National stock number or part number. This index is in NIIN sequence followed by a list of part numbers in alphameric sequence, cross-referenced to the illustration figure number and item number.

(2) Second. After finding the figure and item number, locate the figure and item number in the repair parts list.

SECTION II.

REPAIR PARTS AND SPECIAL TOOLS

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		Mini-Probe Assembly Models A and B (DBM, DBN)	C31	C- 72
		Vessel Piping Models A and B (DBM, DBN)	C32	C- 74
		Cover and Air Eliminator Models A and B (DBM, DBN)	C33	C- 76
		Separator Sub-Assembly, Models A and B (DBM, DBN)	C34	C- 78
		Sight Glass, Models A and B (DBM, DBN)	C35	C- 80
		Valve Solenoid, Models A and B (DBM, DBN)	C36	C- 82
GROUP	08	Mounting Frame	C37	C- 84
		Mounting Frame		
GROUP	09	Suction Hose Assembly	C38	C- 86
Section III.		SPECIAL TOOLS LIST		
GROUP	10	Special Tools Socket Wrench	C39	C- 88
Section	IV	NATIONAL STOCK NUMBER AND REFERENCE NUMBER INDEX		C- 90

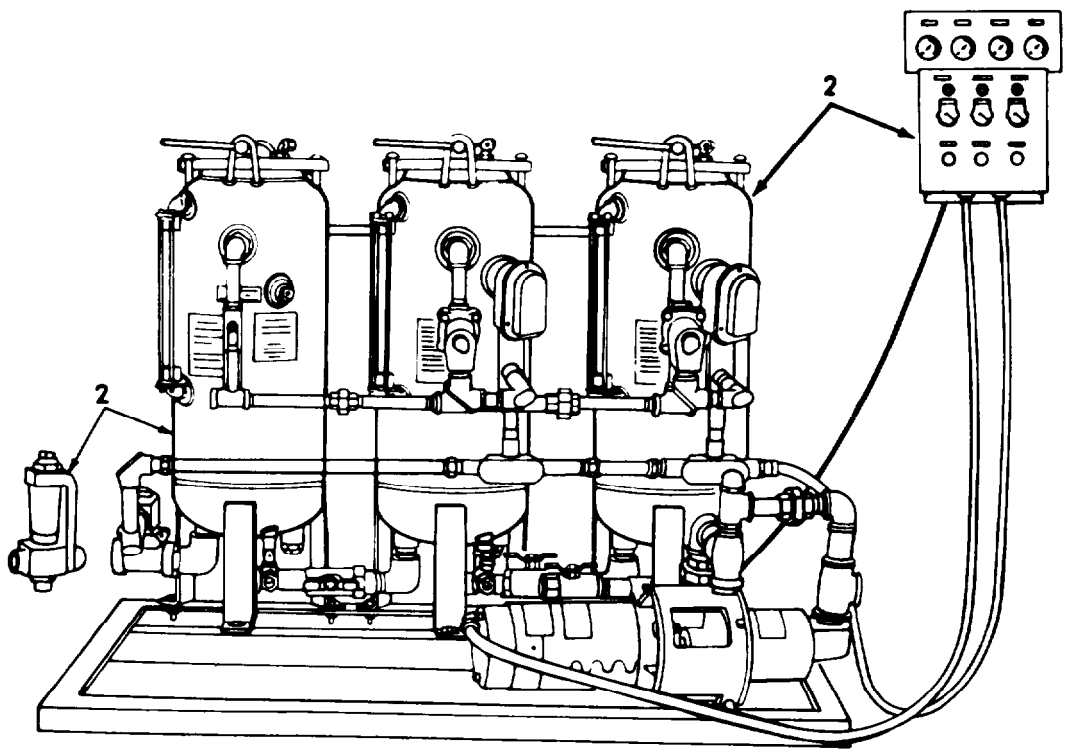
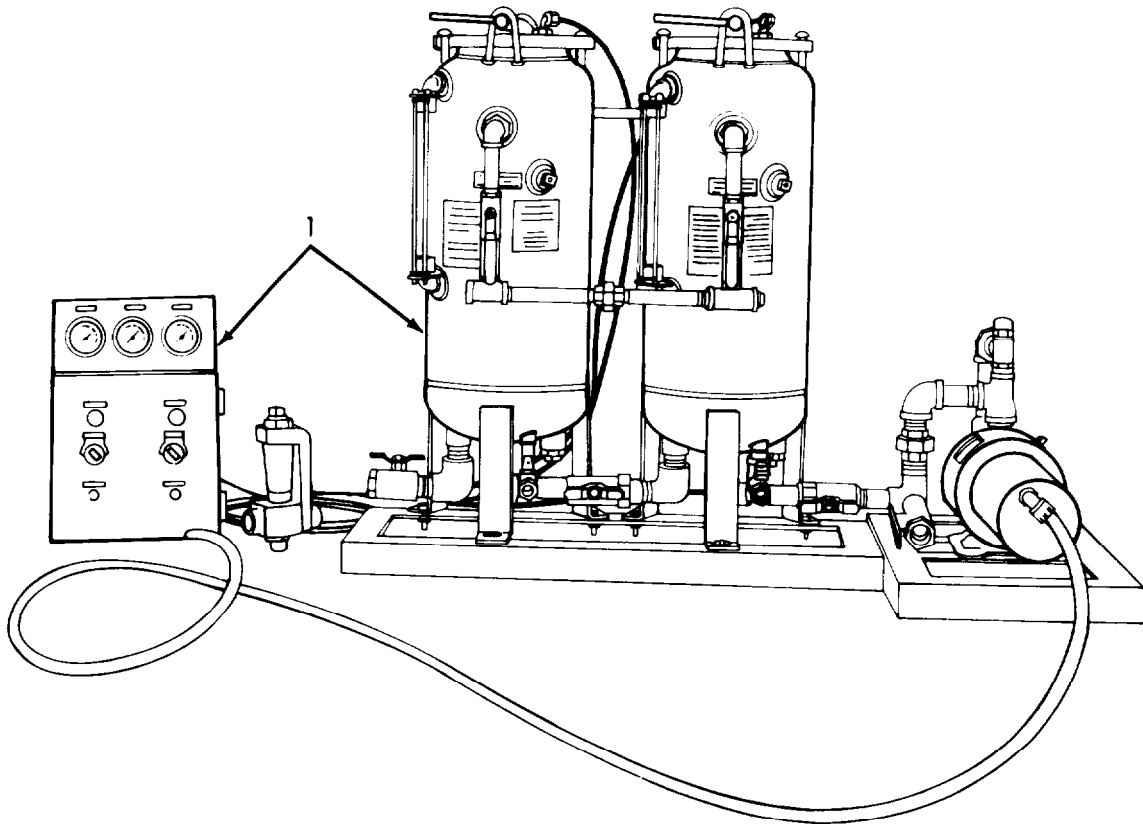


Figure C-1. Oil/Water Separator Assembly

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
						GROUP 01 OIL/WATER SEPARATOR ASSEMBLY		
C-1	1	PDCHH	2090-01-076-5849	53918	05A-AA-3V-230VAC	OIL-WATER SEPARATOR TYPE A\	EA	1
C-1	1	PACHH	2090-01-076-5850	53918	05B-AB-3V-120VDC	OIL-WATER SEPARATOR TYPE B	EA	1
C-1	2	PACHH	2090-01-076-5851	53918	05C-CC-2V-024VDC	OIL-WATER SEPARATOR TYPE C	EA	1
C-1	2	PACHH	2090-01-076-5852	53918	05D-CB-2V-120VDC	OIL-WATER SEPARATOR TYPE D	EA	1

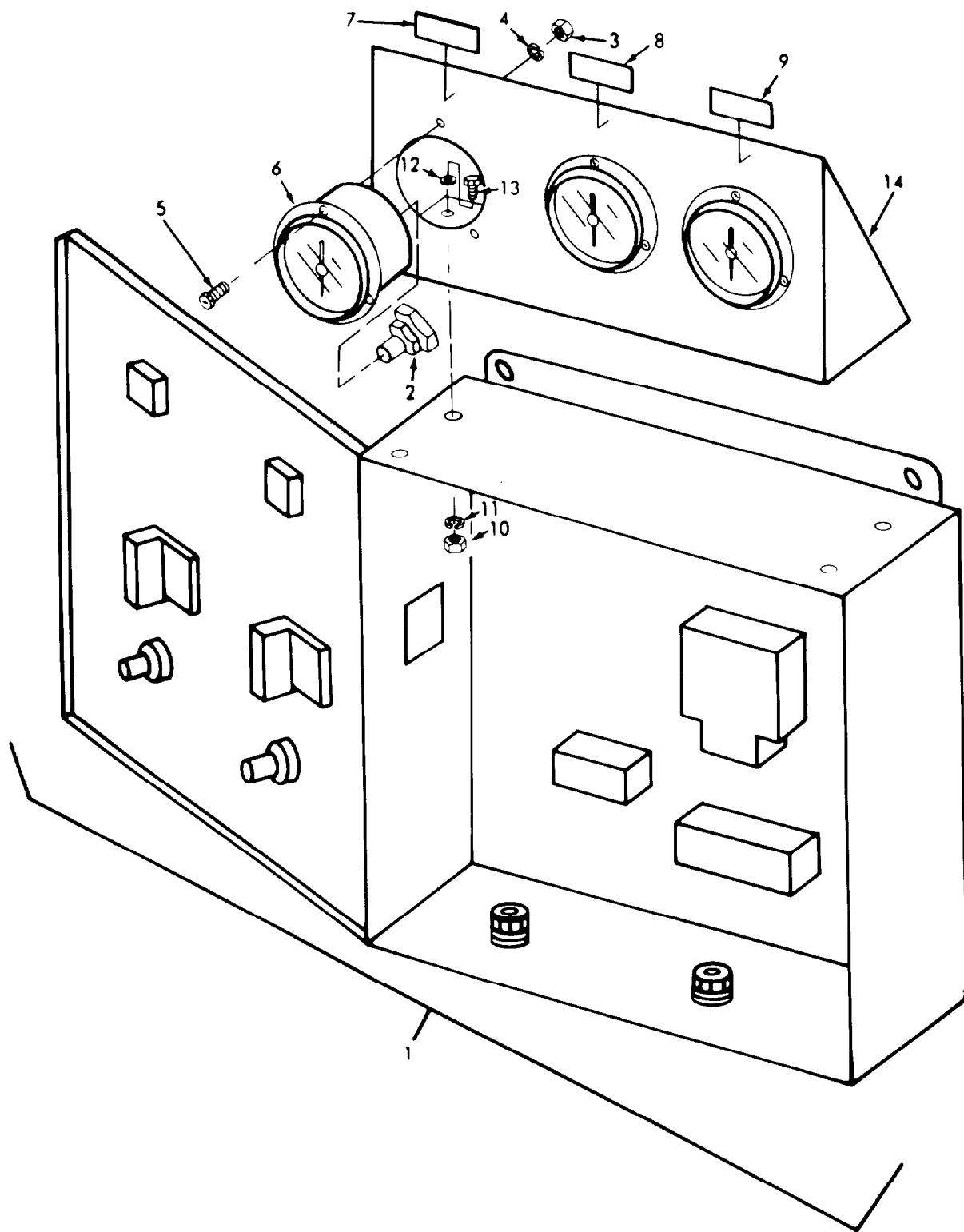


Figure C-2. Gauges Model C (DBP)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
GROUP 02 CONTROL PANEL								
C-2	1	XBCHH		53918	944-24VDC	BOX ASSY CONTROL DBP	EA	1
	2	XDCZZ		83259	N4FC2	.CONNECTOR FEMALE 1/8 NPT X 1/4 IN FLEX TUBE DBP	EA	3
C-2	3	PAOZZ	5310-00-934-9761	96906	MS35649-264	.NUT, PLAIN, HEXAGON 5-32 DBP	EA	9
C-2	4	PAOZZ	5310-00-209-0788	96906	MS35335--30	.WASHER, LOCK #5 DBP	EA	9
C-2	5	PAOZZ	5305-00-984-4988	96906	MS35206-228	.SCREW, MACHINE 6-32 X 3/8 IN DBP	EA	9
C-2	6	PAOZZ	6685-01-079-1789	61349	P845FF21N100PS1	.GAGE, PRESSURE, DIAL 1/8 NPT FITTING DBP	EA	3
C-2	7	XDOZZ		53918	869-12	.PLATE, LEGEND, OUTLET 2ND STAGE DBP	EA	1
C-2	7	ZDOZZ		53918	869-11	.PLATE, LEGEND 2ND STAGE DBP	EA	1
C-2	8	XDOZZ		53918	869-10	.PLATE LEGEND 1ST STAGE DBP	EA	1
C-2	9	XDOZZ		53918	869-6	.PLATE LEGEND INLET DBP	EA	1
C-2	10	PAOZZ	5310-00-761-6882	96906	MS51967-2	.NUT, PLAIN, HEXAGON 1/4-20 DBP	EA	4
C-2	11	PAOZZ	5310-00-582-5965	96906	MS35338-44	.WASHER, LOCK, SPRING 1/4 IN DBP	EA	4
C-2	12	PAOZZ	5310-00-141-1795	88044	AN960-416	.WASHER, FLAT 1/4 IN DBP	EA	4
C-2	13	PAOZZ	5305-00-225-3839	96906	MS90725-8	.SCREW, CAP, HEXAGON H 1/4-20 X 1 IN DBP	EA	4
C-2	14	XDOZZ		53918	959	.GAUGE BRACKET CS DBP	EA	1

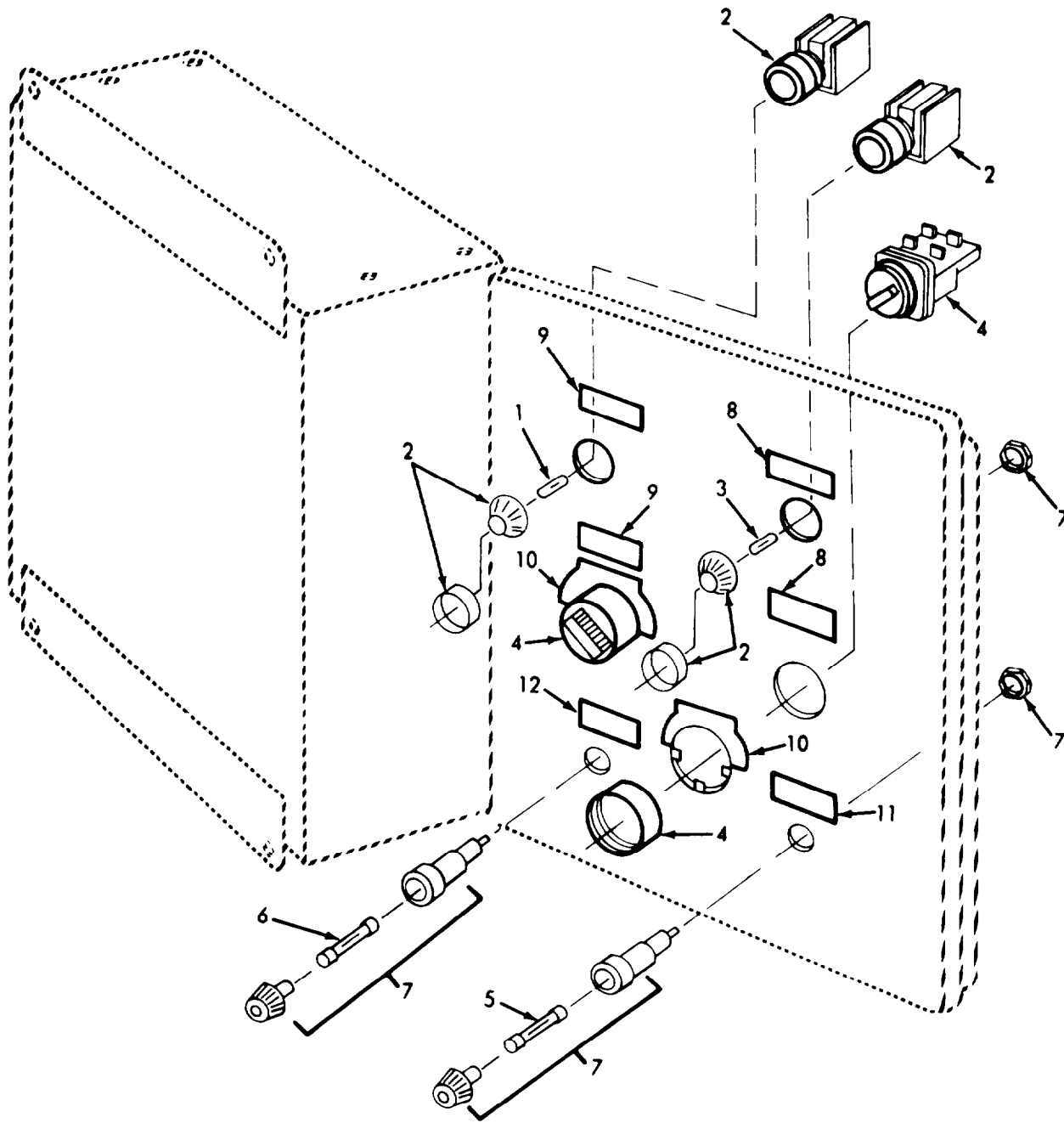


Figure C-3. Switches, Lights and Fuses Model C (DBP)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-3	1	PAOZZ	6240-00-143-7513	08108	656-24V	. LAMP INDICATOR 24V DBP	EA	1
C-3	2	XDOZD	6210-01-115-3029	36355	L2GNFBGL24NA	. LIGHT INDICATOR GREEN 24V LAMP DBP	EA	2
C-3	3	PAOZZ	6240-00-223-9100	81439	M15098-10-001	. LAMP IND 110V 2W DBP	EA	1
C-3	4	XDOZZ		96906	MS21B	. SWITCH ON-OFF 600V OIL LIGHT HD DBP	EA	2
C-3	5	PAOZZ	5920-00-142-7379	71400	MDL25	. FUSE, CARTRIDGE 1/4 X 1 1/4 IN BUSS GLASS TUBE DBP	EA	1
C-3	6	PAOZZ	5920-00-012-0151	81349	F02A32V15A	. FUSE, CARTRIDGE 15 AMP NON-REMEWABLE 1/4 IN DIA X 1/4 IN LONG DBP		1
C-3	7	XDOZZ	5920-00-892-9311	81349	FHN26G1	. HOLDER FUSE PANEL MOUNTING DBP	EA	2
C-3	8	XDOZZ		53918	869-3	. PLATE LEGEND SUPPLY PUMP DBP	EA	2
C-3	9	XDOZZ		53918	869-3	. PLATE LEGEND MONITOR DBP	EA	2
C-3	10	XDOZZ		23826	D11805-001	. PLATE LEGEND ON-OFF DBP	EA	2
C-3	11	XDOZZ		53918	869-16	. PLATE LEGEND MOTOR 25 AMP DBP	EA	1
C-3	12	XDOZZ		53918	869-14	. PLATE LEGEND MONITOR 15 AMP DBP	EA	1

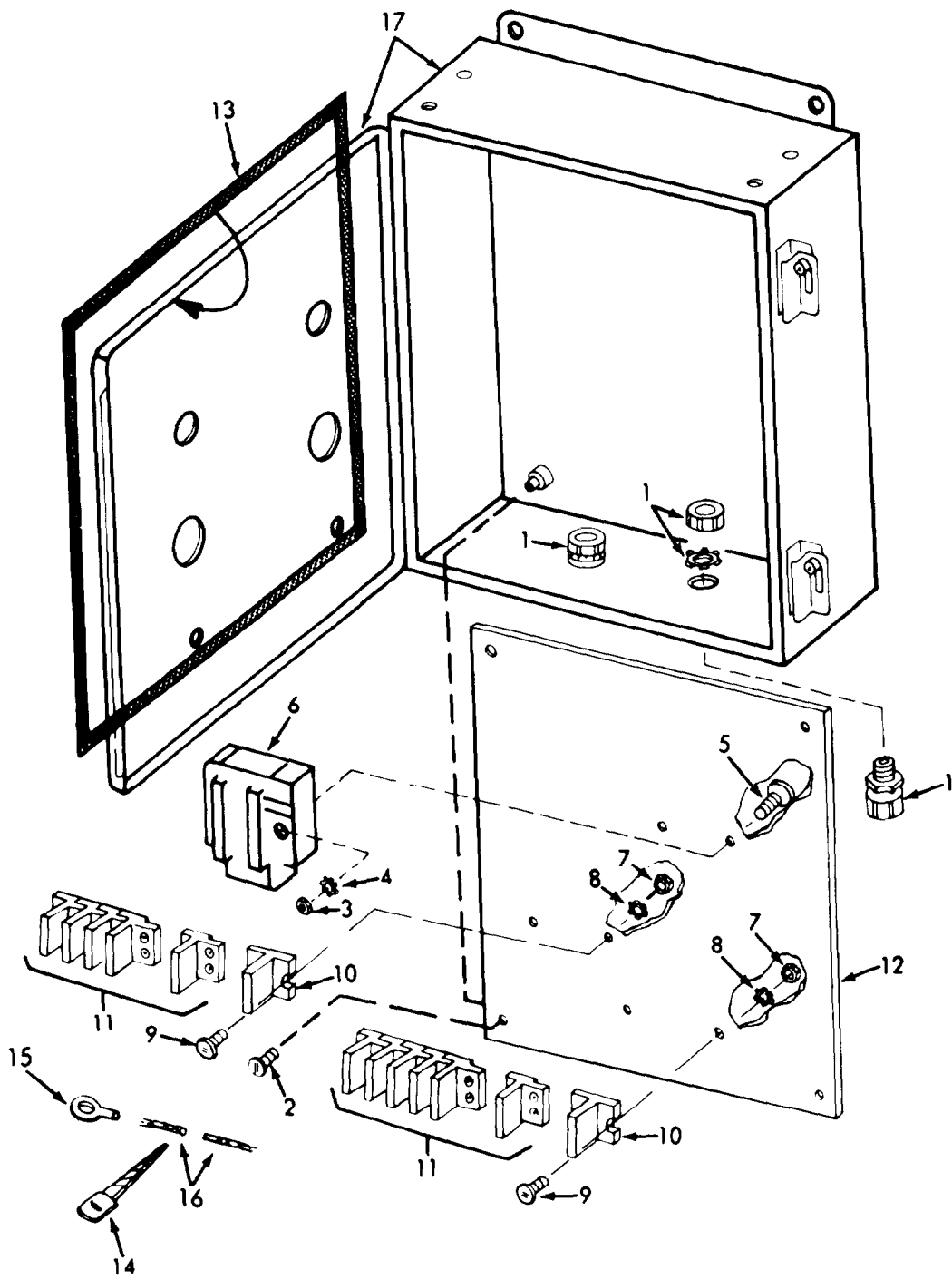


Figure C-4. Relay and Terminals Model C (DBP)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-4	1	XDOZZ	5975-00-655-3136	59730	5231	.CONN 1/2 NPT X 3/8 IN DBP	EA	2
C-4	2	PAOZZ	5305-01-115-4441	88044	AN504-1032-6	. SCREW, TAPPING, THREA D CUTTING 10-32 DBP	EA	4
C-4	3	PAOZZ	5310-00-934-9760	96906	MS35649-204	. NUT, PLAIN, HEXAGON 10-24 DBP	EA	2
C-4	4	PAOZZ	5305-00-596-7691	96906	MS35335-32	. WASHER, LOCK #10 DBP	EA	2
C-4	5	PAOZZ	5305-00-984-6212	96906	MS35206-265	. SCREW, MACHINE 10-24 X 3/4 IN DBP	EA	2
C-4	6	XDOZZ		28478	20245-82	. RELAY 25 AMP 24 VDC DBP	EA	1
C-4	7	PAOZZ	5310-00-934-9761	96906	MS35649-264	. NUT, PLAIN HEXAGON 5-32 DBP	EA	4
C-4	8	PAOZZ	5310-00-209-0788	96906	MS35335-30	. WASHER, LOCK #6 DBP	EA	4
C-4	9	PAOZZ	5305-00-889-3000	96906	MS35206-230	. SCREW, MACHINE 6-32 X 1/2 IN DBP	EA	4
C-4	10	XDOZZ	5940-00-244-9749	89020	530	. END, TERMINAL BOARD DBP	EA	2
C-4	11	XDOZZ	5940-00-727-8481	89020	525	. SECTION CONTACT DBP	EA	10
C-4	12	XDOZZ		53918	971-2	. PANEL MOUNTING DBP	EA	1
C-4	13	MOOZZ		00843	A-10106CH SEAKL	. SEAL, DOOR MFG FROM TAPE, ADHESIVE, FOAM 9320-00-720-0378 DBP	FT	V
C-4	14	PAOZZ		96906	MS3367-1-9	. STRAP, TIEDOWN, ELECT DBP	EA	V
C-4	15	PACZZ	5940-00-197-8694	96906	MS21003-3	. TERMINAL LUG DBP	EA	8
C-4	16	PACZZ	6145-00-533-0828	96906	MS25471-14	. WIRE, ELECTRICAL DBP	FT	V
C-4	17	XDOZZ		53918	971-1	. ENCLOSURE DBP	EA	1

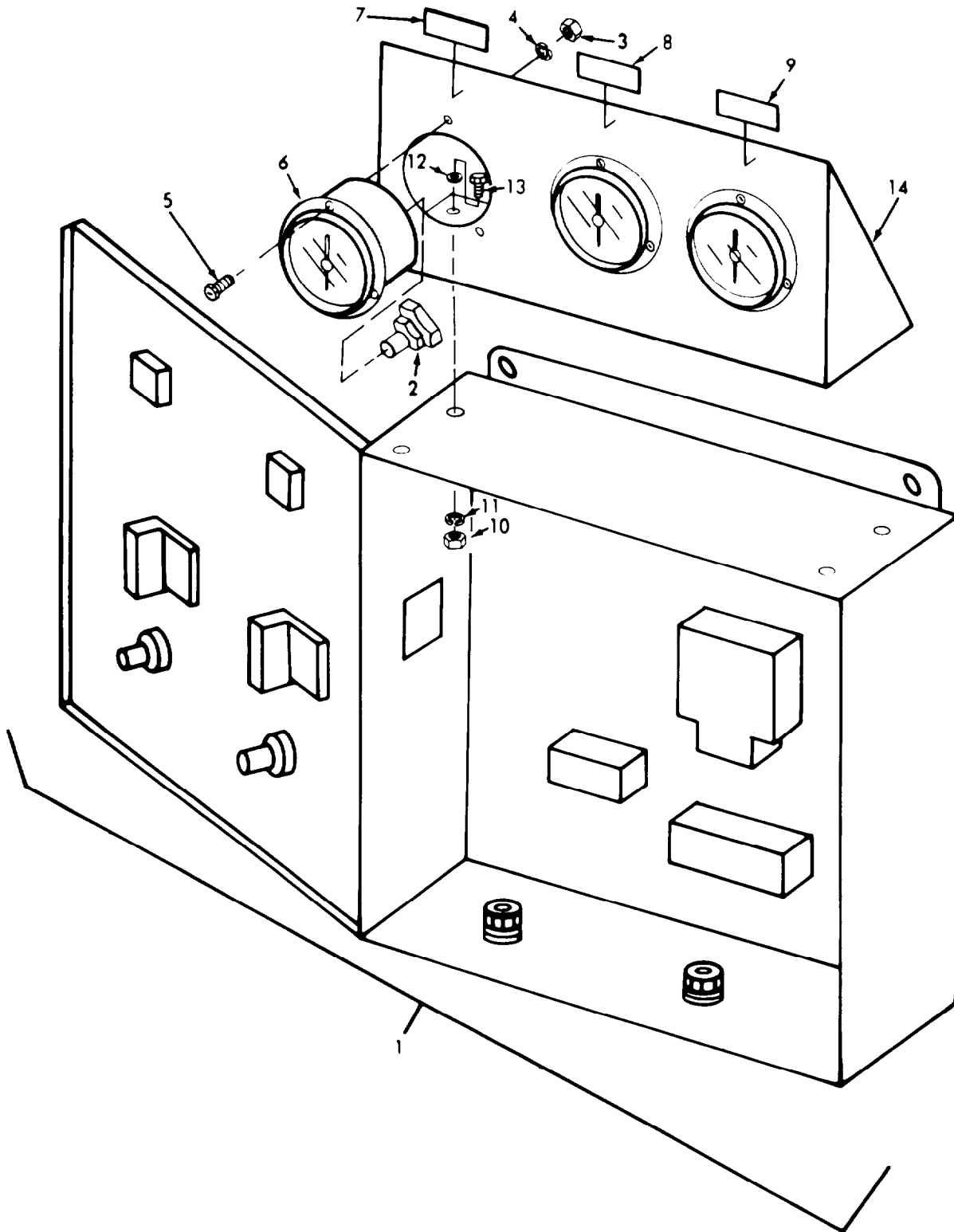


Figure C-5. Gauges Model D (DBQ)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-5	1	XBCHH		53918	1051-110VDC	BOX ASSY CONTROL	DBQ	1
C-5	2	XDCZZ		83259	N4FC2	. CONNECTOR FEMALE 1/8 NPT X 1/4 IN FLEX TUBE	DBQ	3
C-5	3	PAOZZ	5310-00-934-9761	96906	MS35649-264	. NUT, PLAIN, HEXAGON 6-32	DBQ	9
C-5	4	PAOZZ	5310-00-209-0788	96906	MS35335-30	. WASHER, LOCK #6	DBQ	9
C-5	5	PAOZZ	5310-00-984-4988	96906	MS35206-228	. SCREW, MACHINE 6-32 X 3/8 IN	DBQ	9
C-5	6	PAOZZ	6685-01-079-1789	61349	P845FF21N100PSI	. GAGE, PRESSURE, DAIL 1/8 NPT FITTING	DBQ	3
C-5	7	XDOZZ		53918	869-11	. PLATE, LEGEND 2ND STAGE	DBQ	1
C-5	8	XDOZZ		53918	869-10	. PLATE LEGEND 1ST STAGE	DBQ	1
C-5	9	XDOZZ		53918	869-9	. PLATE LEGEND INLET	DBQ	1
C-5	10	PAOZZ	5310-00-761-6882	96906	MS51967-2	. NUT, PLAIN, HEXAGON 1/4-20	DBQ	4
C-5	11	PAOZZ	5310-00-582-5965	96906	MS35338-44	. WASHER, LOCK, SPRING 1/4 IN	DBQ	4
C-5	12	PAOZZ	5310-00-141-1795	88044	AN960-416	. WASHER, FLAT 1/4 IN	DBQ	4
C-5	13	XDOZZ	5310-00-25-3839	96906	MS90725-8	. SCREW, CAP, HEXAGON H 1/4-20 X 1 IN\	DBQ	4
C-5	14	XDOZZ		53918	959	. BRACKET GAUGE	DBQ	1

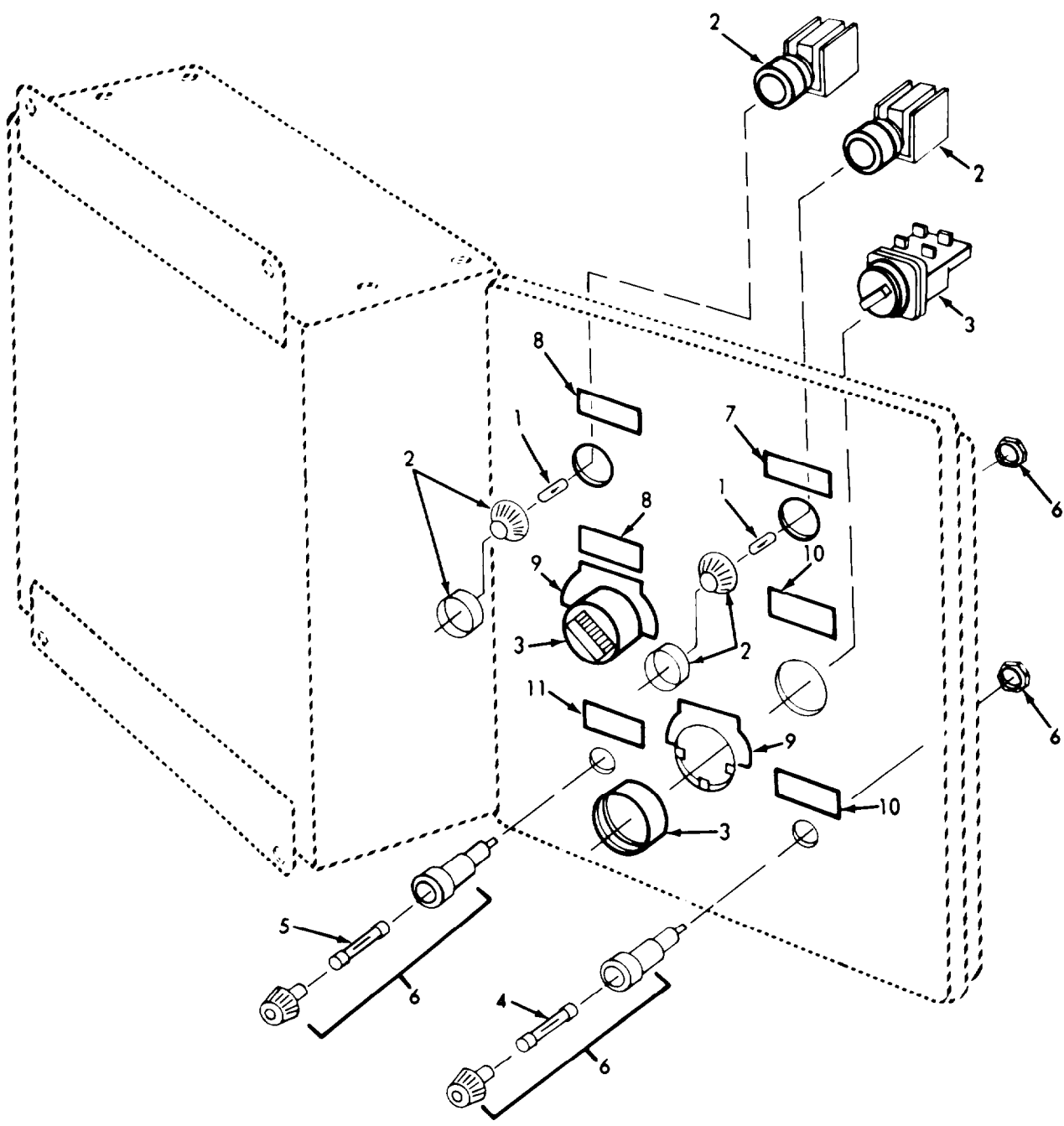


Figure C-6. Switches, Lights and Fuses Model D (DBQ)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-6	1	PAOZZ	6240-00-223-9100	81349	M15098-10-001	. LAMP IND 110V 2W DBQ	EA	2
C-6	2	XDCZD	6210-01-115-3029	36355	L2GNFBGL24NA	. LIGHT, INDICATOR GREEN 24V LAMP DBQ	EA	2
C-6	3	XDCZZ		96906	MS218	. SWITCH ON-OFF 500V OIL LIGHT HD DBQ	EA	2
C-6	4	PAOZZ	5920-00-284-6795	81349	F02B32V10A	. FUSE, CARTRIDGE 10 AMP NON-RENEWABLE 1/4 IN DIA X 1 1/4 IN LONG DBQ	EA	1
C-6	5	PAOZZ	5920-00-012-0151	81349	F02A32V15A	. FUSE, CARTRIDGE 15 AMP NON-RENEWABLE 1/4 IN DIA X 1 1/4 IN LONG DBQ	EA	1
C-6	6	XDOZZ	5920-00-892-9311	81349	FHN26G1	. HOLDER FUSE PANEL MOUNTING DBQ	EA	2
C-6	7	XDOZZ		53918	869-3	. PLATE LEGEND SUPPLY PUMP DBQ	EA	2
C-6	8	XDOZZ		53918	869-2	. PLATE LEGEND MONITOR DBQ	EA	2
C-6	9	XDOZZ		23826	D11805-001	. PLATE LEGEND ON-OFF DBQ	EA	2
C-6	10	XDOZZ		53918	869-15	. PLATE LEGEND MOTOR 10 AMP DBQ	EA	1
C-6	11	XDOZZ		53918	869-14	. PLATE LEGEND MONITOR IS AMP DBQ	EA	1

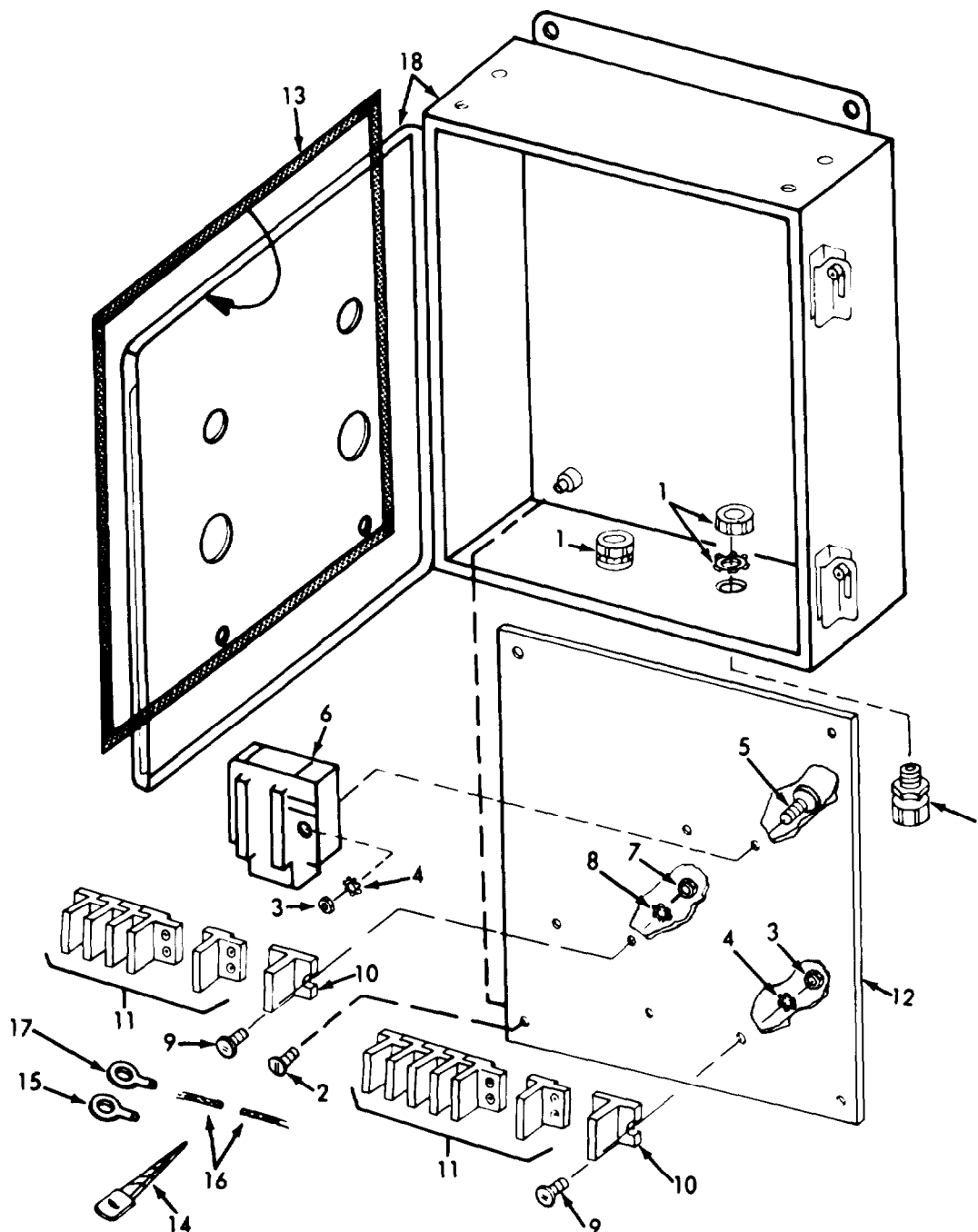


Figure C-7. Relay and Terminals Model D (DBQ)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-7	1	XDOZZ	5975-00-655-3136	59730	5231	.CONN 1/2 NPTX3/8 IN DBQ	EA	2
C-7	2	PAOZZ	5305-01-115-4441	88044	AN504-1032-6	.SCREW, TAPPING, THREA D CUTTING 10-32 DBQ	EA	4
C-7	3	PAOZZ	5310-00-934-9760	96906	MS35649-204	.NUT, PLAIN, HEXAGON 10-24 DBQ	EA	2
C-7	4	PAOZZ	5310-00-596-7691	96906	MS35335-32	.WASHER, LOCK #10 DBQ	EA	2
C-7	5	PAOZZ	5305-00-984-6212	96906	MS35206-265	.SCREW, MACHINE 10-24 X 3/4 IN DBQ	EA	2
C-7	6	XDOZZ		28478	20245-84	.RELAY 110 VDC 25 A DBQ	EA	1
C-7	7	PAOZZ	531000-934-9761	96906	MS35649-264	.NUT, PLAIN, HEXAGON 6-32 DBQ	EA	4
C-7	8	PAOZZ	5310-00-209-0788	96906	MS35335-30	.WASHER, LOCK #5 DBQ	EA	4
C-7	9	PAOZZ	5301-00-889-3000	96906	MS35206-230	.SCREW, MACHINE 6-32 X 1/2 IN DBQ	EA	4
C-7	10	XDOZZ	5940-00-244-9749	89020	530	.END, TERMINAL BOARD DBQ	EA	2
C-7	11	XDOZZ	5940-00-727-8481	89020	525	.SECTION CONTACT DBQ	EA	10
C-7	12	XDOZZ		53918	971-2	.PANEL MOUNTING DBQ	EA	1
C-7	13	MOOZZ		00843	A-101060H SEAL	.SEAL, DOOR MFG FROM TAPE, ADHESIVE, FOAM 9320-00-720-0378 DBQ	FT	V
C-7	14	PAOZZ		96906	MS3367-1-9	.STRAP, TIEDOWN, ELECT DBQ	EA	V
C-7	15	PAOZZ	5940-00-197-8739	96906	MS21003-16	.TERMINAL, LUG 14-16 GAUGE #10 STUD DBQ	EA	4
C-7	16	PAOZZ	6145-00-553-0832	96906	MS25471-22	.WIRE, ELECTRICAL 22 GAUGE DBQ	FT	V
C-7	17	PAOZZ	5940-00-197-8697	96906	MS21003-5	.TERMINAL, LUG 18-22 GAUGE #8 STUD DBQ	EA	10
C-7	18	XDOZZ		53918	971-1	.ENCLOSURE DBQ	EA	1

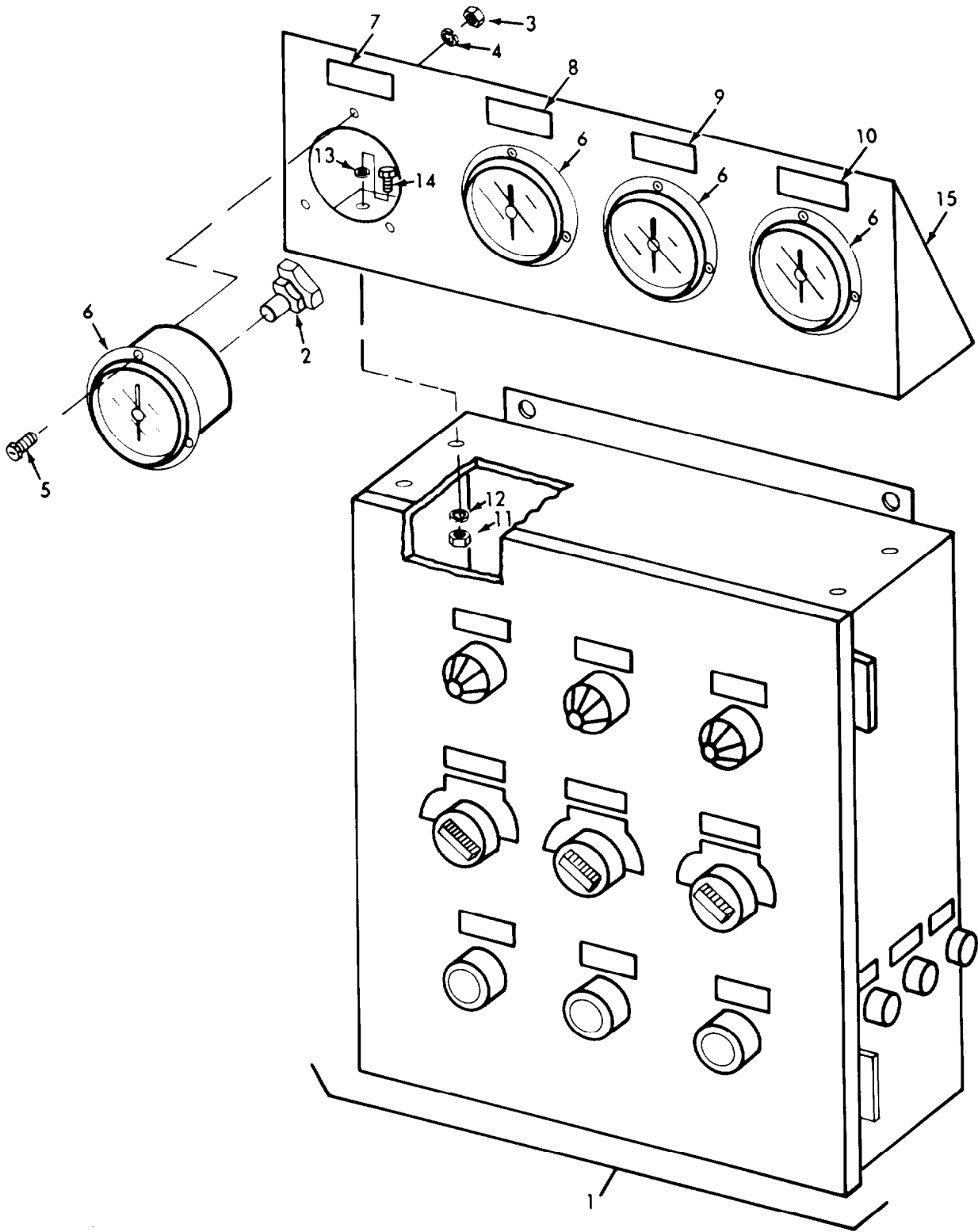


Figure C-8. Gauges Model A (DBM)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION	USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.								
C-8	1	XBCHH		53918	581	BOX ASSY CONTROL	DBM	EA	1
C-8	2	XDOZZ		83259	N4FC2	. CONNECTOR FEMALE 1/8 NPT X 1/4 IN FLEX TUBE	DBM	EA	4
C-8	3	PAOZZ	5310-00-934-9761	96906	MS35649-264	. NUT, PLAIN, HEXAGON 6-32	DBM	EA	12
C-8	4	PAOZZ	5310-00-209-0788	96906	MS35335-30	. WASHER, LOCK #6	DBM	EA	12
C-8	5	PAOZZ	5310-00-984-4988	96906	MS35206-228	. SCREW, MACHINE 6-32 X 3/8 IN	DBM	EA	12
C-8	6	PAOZZ	6685-01-079-1789	61349	P845FF21N100PS1	. GAGE, PRESSURE, DIAL 1/8 NPT FITTING	DBM	EA	4
C-8	7	XDOZZ		53918	869-12	. PLATE LEGEND OUTLET	DBM	EA	1
C-8	8	XDOZZ		53918	869-11	. PLATE LEGEND 2ND STAGE	DBM	EA	1
C-8	9	XDOZZ		53918	869-10	. PLATE LEGEND 1ST STAGE	DBM	EA	1
C-8	10	XDOZZ		53918	869-9	. PLATE LEGEND INLET	DBM	EA	1
C-8	11	PAOZZ	5310-00-761-6882	96906	MS51967-2	. NUT, PLAIN, HEXAGON 1/4-20	DBM	EA	4
C-8	12	PAOZZ	5310-00-582-5965	96906	MS35338-44	. WASHER, LOCK 1/4 IN	DBM	EA	4
C-8	13	PAOZZ	5310-00-141-1795	88044	AN960-416	. WASHER, FLAT 1/4 IN	DBM	EA	4
C-8	14	PAOZZ	5310-00-225-3839	96906	MS90725-8	. SCREW, CAP, HEXAGON H 1/4-20 X 1 IN	DBM	EA	4
C-8	15	XDOZZ		53918	958	. BRACKET GUAGE CS	DBM	EA	1

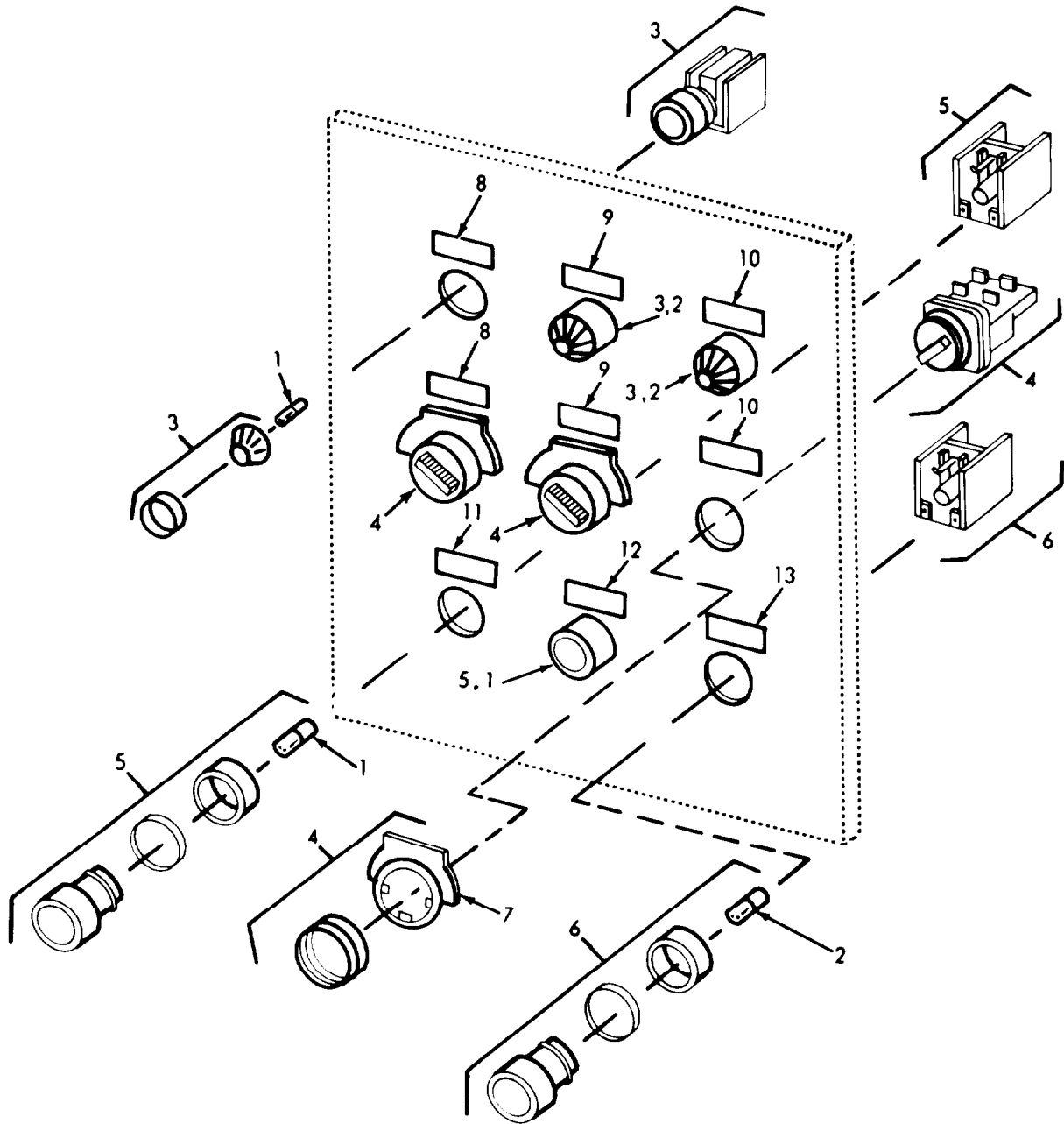


Figure C-9. Switches and Lights Model A (DBM)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE		(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.								
C-9	1	PAOZZ	6240-00-143-7513	08108	656-24V	. LAMP INDICATOR 24V	DBM	EA	4
C-9	2	PAOZZ	6240-00-223-9100	81349	M15098-10-001	. LAMP IND 110V 2W	DBM	EA	2
C-9	3	XDOZO	6210-01-115-3029	36355	L2GNFBGL24NA	. LIGHT, INDICATOR GREEN 24V LAMP	DBM	EA	3
C-9	4	XDOZZ		96906	MS218	. SWITCH ON-OFF 600V OIL LIGHT HD	DBM	EA	3
C-9	5	XDOZZ	6210-01-115-3039	36355	LT2GBKFBGL24NA	. LENS, LIGHT ILLUMINATED 24V LAMP	DBM	EA	2
C-9	6	XDOZZ	6210-01-115-3038	36355	LT2GNKFBGL24NA	. LENS, LIGHT ILLUMINATED 24V LAMP	DBM	EA	1
C-9	7	XDOZZ		23826	D11805-001	. PLATE LEGEND ON-OFF	DBM	EA	3
C-9	8	XDOZZ		53918	869-4	. PLATE LEGEND AUTO CONTROLS	DBM	EA	2
C-9	9	XDOZZ		53918	869-2	. PLATE LEGEND MONITOT	DBM	EA	2
C-9	10	XDOZZ		53918	869-3	. PLATE LEGEND SUPPLY PUMP	DBM	EA	2
C-9	11	XDOZZ		53918	869-7	. PLATE LEGEND OIL PUMP 1	DBM	EA	1
C-9	12	XDOZZ		53918	869-6	. PLATE LEGEND OIL PUMP 2	DBM	EA	1
C-9	13	XDOZZ		53918	869-5	. PLATE LEGEND OVERBOARD	DBM	EA	1

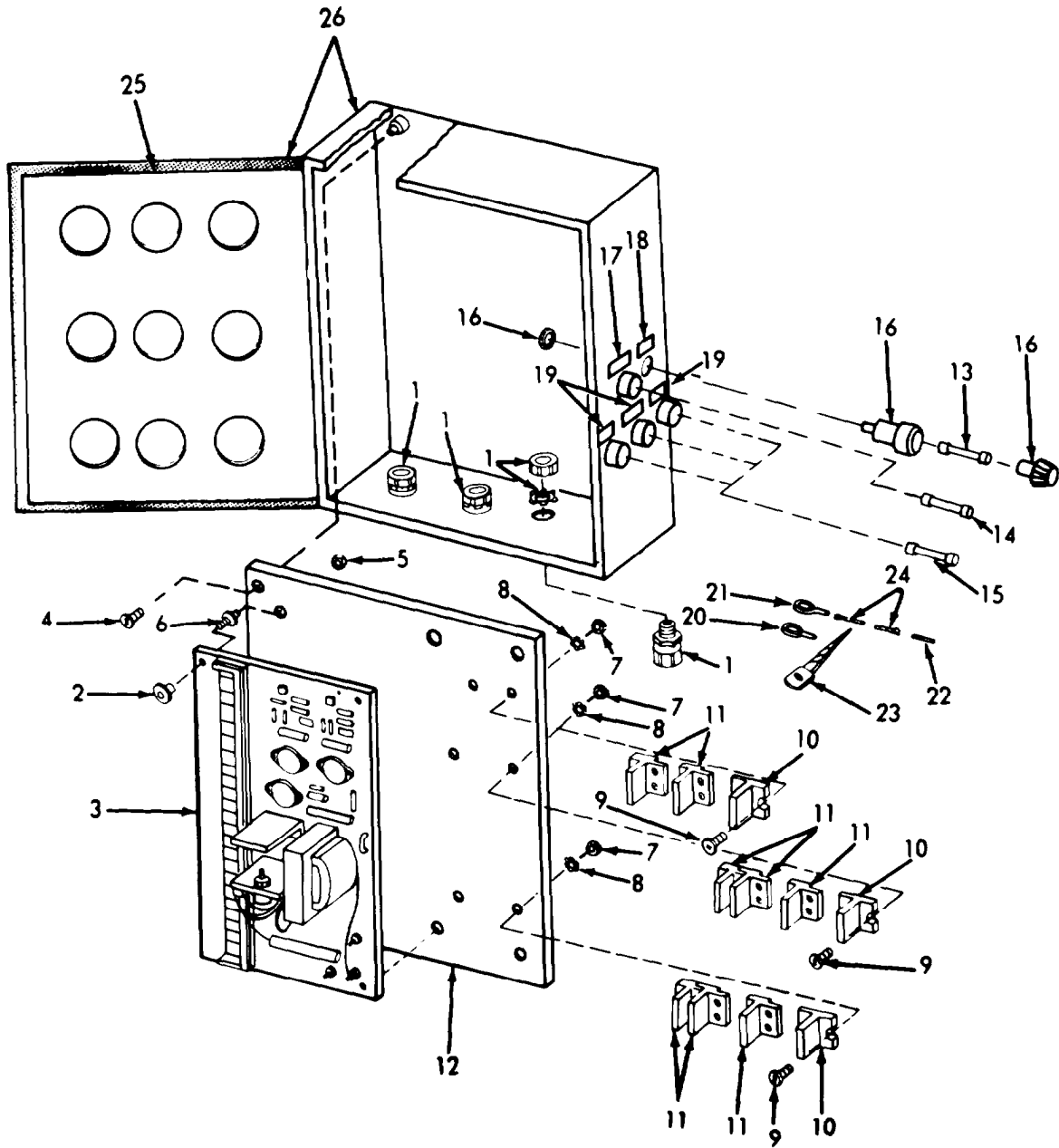


Figure C-10. Control Box Components Model A (DBM)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT	
(A) FIG. NO.	(B) ITEM NO.								
C-10	1	XDOZZ	5975-00-655-3136	59730	5231	. CONN 1/2 NPTX3/8 IN	DBM	EA	3
C-10	2	PAOZZ	5310-01-115-0757	96906	MS16994-488	. NUT, PLAIN, KNURLED 10-24 BRASS	DBM	EA	4
C-10	3	PAOHH		53918	932	. BOARD CIRCUIT	DBM	EA	1
C-10	4	PAOZZ	5305-01-115-4441	88044	AN504-1032-6	. SCREW, TAPPING, THREA D CUTTING 10-32	DBM	EA	4
C-10	5	PAOZZ	5310-00-934-9760	96906	MS35649-204	. NUT, PLAIN, HEXAGON 10-24	DBM	EA	4
C-10	6	XDOZZ		06383	F150	. STUD 10-24X1 1/2 IN SHOULDERED	DBM	EA	4
C-10	7	PAOZZ	5310-00-934-9761	96906	MS35649-264	. NUT, PLAIN, HEXAGON 6-32	DBM	EA	6
C-10	8	PAOZZ	5310-00-209-0788	96906	MS35335-30	. WASHER, LOCK #6	DBM	EA	6
C-10	9	PAOZZ	5305-00-889-3000	96906	MS35206-230	. SCREW, MACHINE 3-32 X 1/2 IN	DBM	EA	6
C-10	10	XDOZZ	5940-00-244-9749	89020	530	. END, TERMINAL BOARD	DBM	EA	3
C-10	11	XDOZZ	5940-00-727-8481	89020	525	. SECTION CONTACT	DBM	EA	8
C-10	12	XDCZZ		53918	969-2	. PANEL MOUNTING	DBM	EA	1
C-10	13	PAOZZ	5920-00-280-8342	71400	AGC 1	. FUSE, CARTRIDGE 1 AMP NON-RENEWABLE 1/4 IN DIA X 1 1/4 IN LONG	DBM	EA	1
C-10	14	PAOZZ	5920-00-012-0151	08134	9F02A32V15A	. FUSE, CARTRIDGE 15 AMP NON-RENEWABLE 1/4 IN DIA X 1 1/4 IN LONG	DBM	EA	1
C-10	15	PAOZZ	5920-00-284-6795	81349	F02B32V10A	. FUSE, CARTRIDGE 10 AMP NON-RENEWABLE 1/4 IN DIA X 1 1/4 IN LONG	DBM	EA	3
C-10	16	XDOZZ	5920-00-892-9311	81349	FHN26G1	. HOLDER FUSE PANEL MOUNTING	DBM	EA	5
C-10	17	XDOZZ		53918	896-13	. PLATE LEGEND CONTROL 1 AMP	DBM	EA	1
C-10	18	XDOZZ		53918	869-14	. PLATE LEGEND MONITOR 15 AMP	DBM	EA	1
C-10	19	XDOZZ		53918	869-15	. PLATE LEGEND MOTOR 10 AMP	DBM	EA	3
C-10	20	PAOZZ	5940-00-197-8694	96906	MS21003-3	. TERMINAL, LUG 18-22 GAUGE-#6 STUD	DBM	EA	20
C-10	21	PAOZZ	5940-00-197-8697	96906	MS21003-5	. TERMINAL, LUG 18-22 GAUGE-#8 STUD	DBM	EA	27
C-10	22	PAOZZ	5940-00-280-3499	14726	NP5115	. SPLICE, CONDUCTOR 13-22 GAUGE	DBM	EA	1
C-10	23	PAOZZ		96906	MS3367-1-9	. STRAP, TIEDOWN, ELECT	DBM	EA	V
C-10		PAOZZ	5940-00-280-3499	14726	NP5115	. SPLICE, CONDUCTOR	DBM	EA	1
C-10	24	PAOZZ	6145-00-553-0832	96906	MS25471-22	. WIRE, ELECTRICAL 22 GAUGE	DBM	FT	V
C-10	25	MOOZZ		00843	A-10106CH SEAL	. SEAL, DOOR MFG FROM TAPE, ADHESIVE, FOAM 9320-00-720-0378	DBM	FT	V
C-10	26	XBCZZ		53918	969-1	. ENCLOSURE	DBM	EA	1

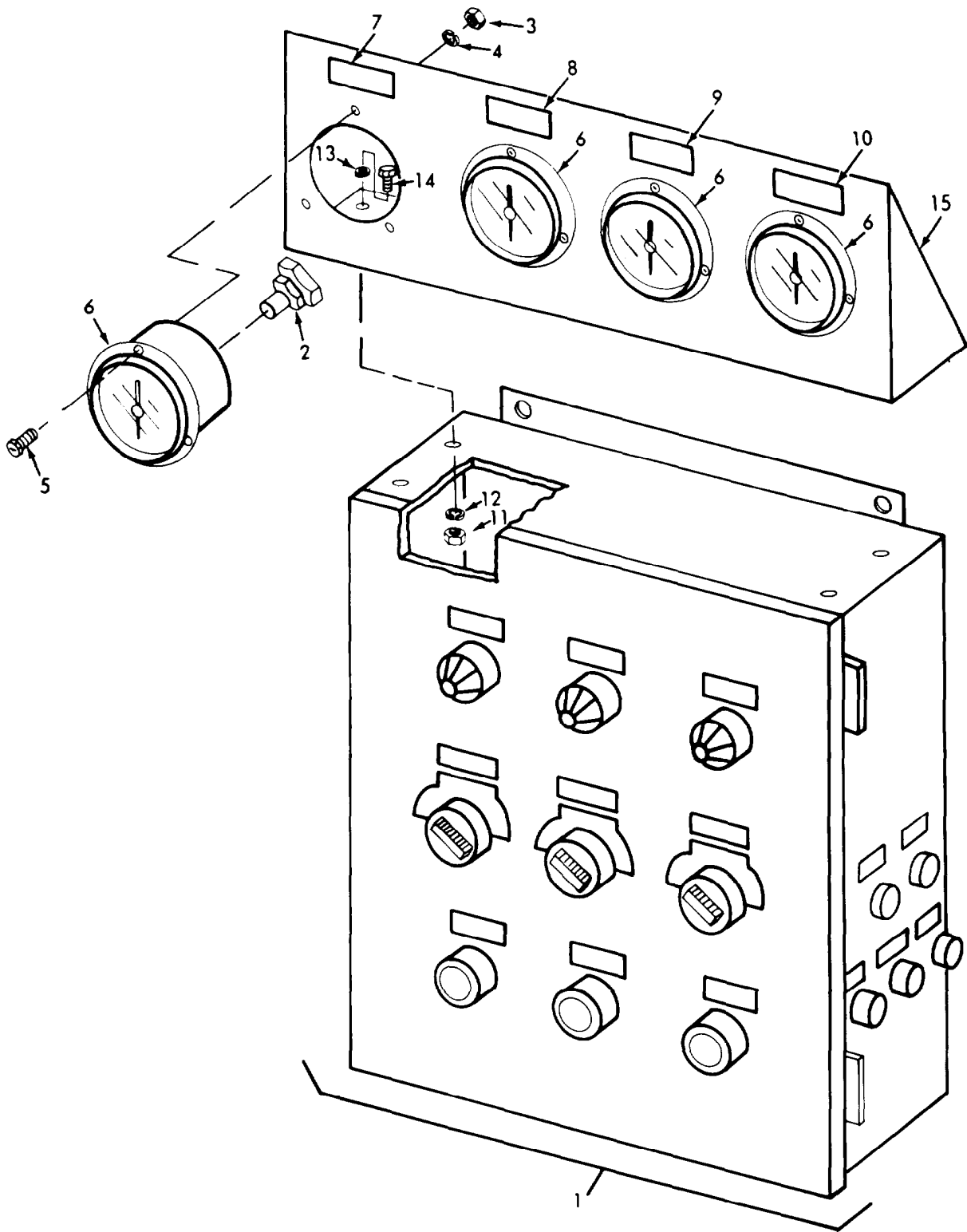


Figure C-11. Gauges Model B (DBN)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT	
(A) FIG. NO.	(B) ITEM NO.								
C-11	1	XBCHH		53918	937	BOX ASSY CONTROL	DBN	EA	1
C-11	2	XDOZZ		83259	N4FC2	. CONNECTOR FEMALE 1/8 NPT X 1/4 IN FLEX TUBE	DBN	EA	4
C-11	3	PAOZZ	5310-00-934-9761	96906	MS35649-264	. NUT, PLAIN, HEXAGON 5-32	DBN	EA	12
C-11	4	PAOZZ	5310-00-209-0788	96906	MS35335-30	. WASHER, LOCK #6	DBN	EA	12
C-11	5	PAOZZ	5305-00-984-4988	96906	MS35206-228	. SCREW, MACHINE 6-32 X 3/8 IN	DBN	EA	12
C-11	6	PAOZZ	6685-01-079-1789	61349	PB45FF21N100PS1	. GAGE, PRESSURE, DIAL 1/8 NPT FITTING	DBN	EA	4
C-11	7	XDOZZ		53918	869-12	. PLATE LEGEND OUTLET	DBN	EA	1
C-11	8	XDOZZ		53918	869-11	. PLATE LEGEND 2ND STAGE	DBN	EA	1
C-11	9	XDOZZ		53918	869-10	. PLATE LEGEND 1ST STAGE	DBN	EA	1
C-11	10	XDOZZ		53918	869-9	. PLATE LEGEND INLET	DBN	EA	1
C-11	11	PAOZZ	5310-00-761-6882	96906	MS51967-2	. NUT, PLAIN, HEXAGON 1/4-20	DBN	EA	4
C-11	12	PAOZZ	5310-00-582-5965	96909	MS35338-44	. WASHER, LOCK-SPRING 1/4 IN	DBN	EA	4
C-11	13	PAOZZ	5310-00-141-1795	88044	AN960-416	. WASHER, FLAT 1/4 IN	DBN	EA	4
C-11	14	PAOZZ	5305-00-225-3839	96906	MS90725-8	. SCREW, CAP, HEXAGON H 1/4-20 X 1 IN	DBN	EA	4
C-11	15	XDOZZ		53918	958	. BRACKET GAUGE CS	DBN	EA	1

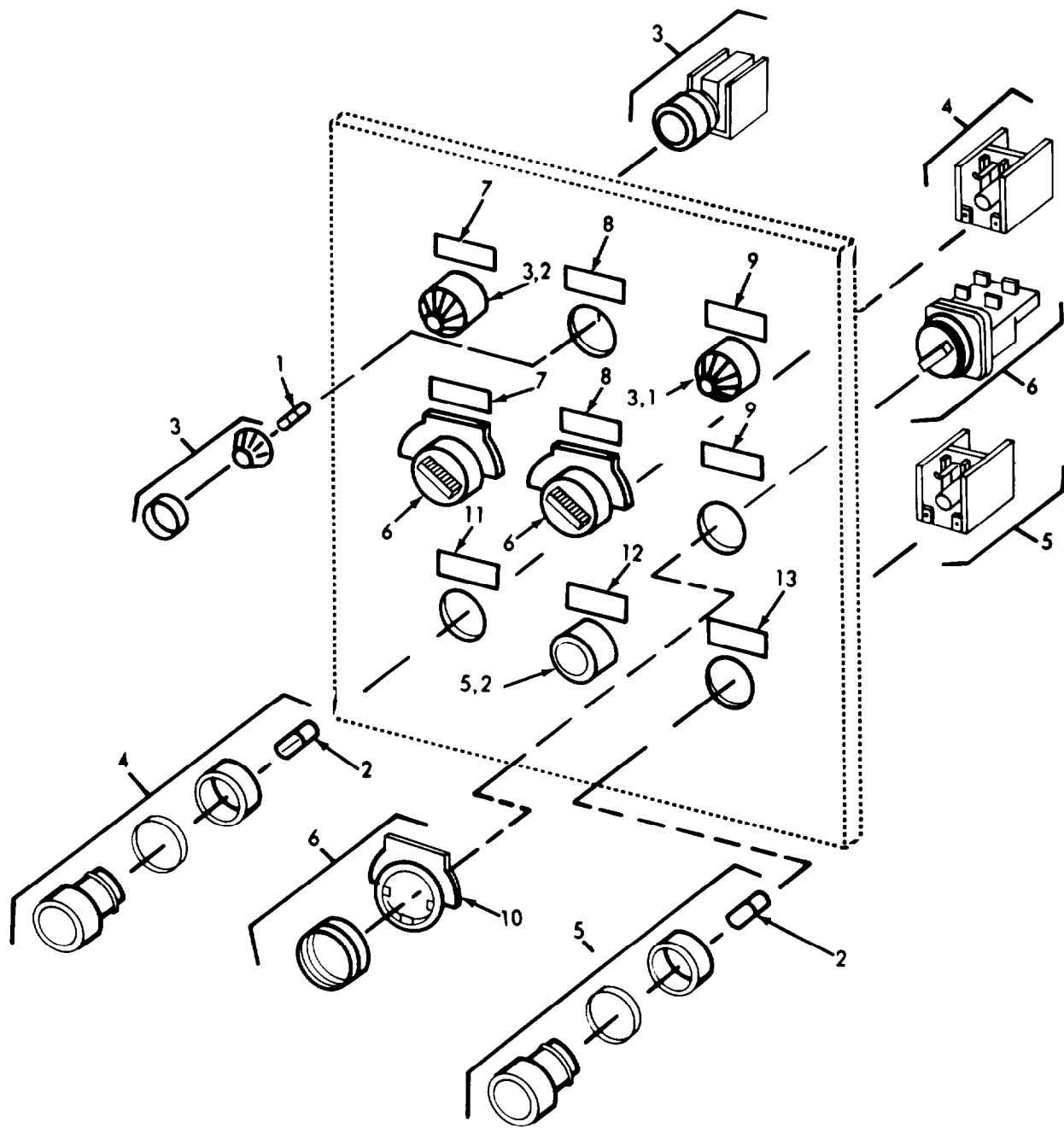


Figure C-12. Switches and Lights Model B (DBN)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE		(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.								
C-12	1	PAOZZ	6240-00-223-9100	81349	M15098-10-001	. LAMP IND 110V 2W	DBN	EA	2
C-12	2	PAOZZ	6240-00-143-7513	08108	656-24V	. LAMP INDICATOR 24V	DBN	EA	4
C-12	3	XDOZO	6210-01-115-3029	36355	L2GNFBGL24NA	. LIGHT, INDICATOR GREEN-24V LAMP	DBN	EA	3
C-12	4	XDOZZ	6210-01-115-3038	36355	LT2GNKFBGL24NA	. LENS, LIGHT IOLLUMINATED-24V LAMO	DBN	EA	1
C-12	5	XDOZZ	6210-01-115-3039	36355	LT2GBKFBGL24NA	. LENS, LIGHT ILLUMINATED-24V LAMP	DBN	EA	2
C-12	6	XDOZZ		96906	MS218	. SWITCH ON-OFF 600V OIL LIGHT HD	DBN	EA	3
C-12	7	XDOZZ		53918	869-4	. PLATE LEGEND AUTO CONTROLS	DBN	EA	2
C-12	8	XDOZZ		53918	869-2	PLATE LEGEND MONITOR	DBN	EA	2
C-12	9	XDOZZ		53918	869-3	PLATE LEGEND SUPPLY PUMP	DBN	EA	2
C-12	10	XDOZZ		23826	D11805-001	. PLATE LEGEND ON-OFF	DBN	EA	3
C-12	11	XDOZZ		53918	869-5	. PLATE LEGEND OVERBOARD	DBN	EA	1
C-12	12	XDOZZ		53918	869-6	. PLATE LEGEND OIL PUMP 2	DBN	EA	1
C-12	13	XDOZZ		53918	869-7	. PLATE LEGEND OIL PUMP 1	DBN	EA	1

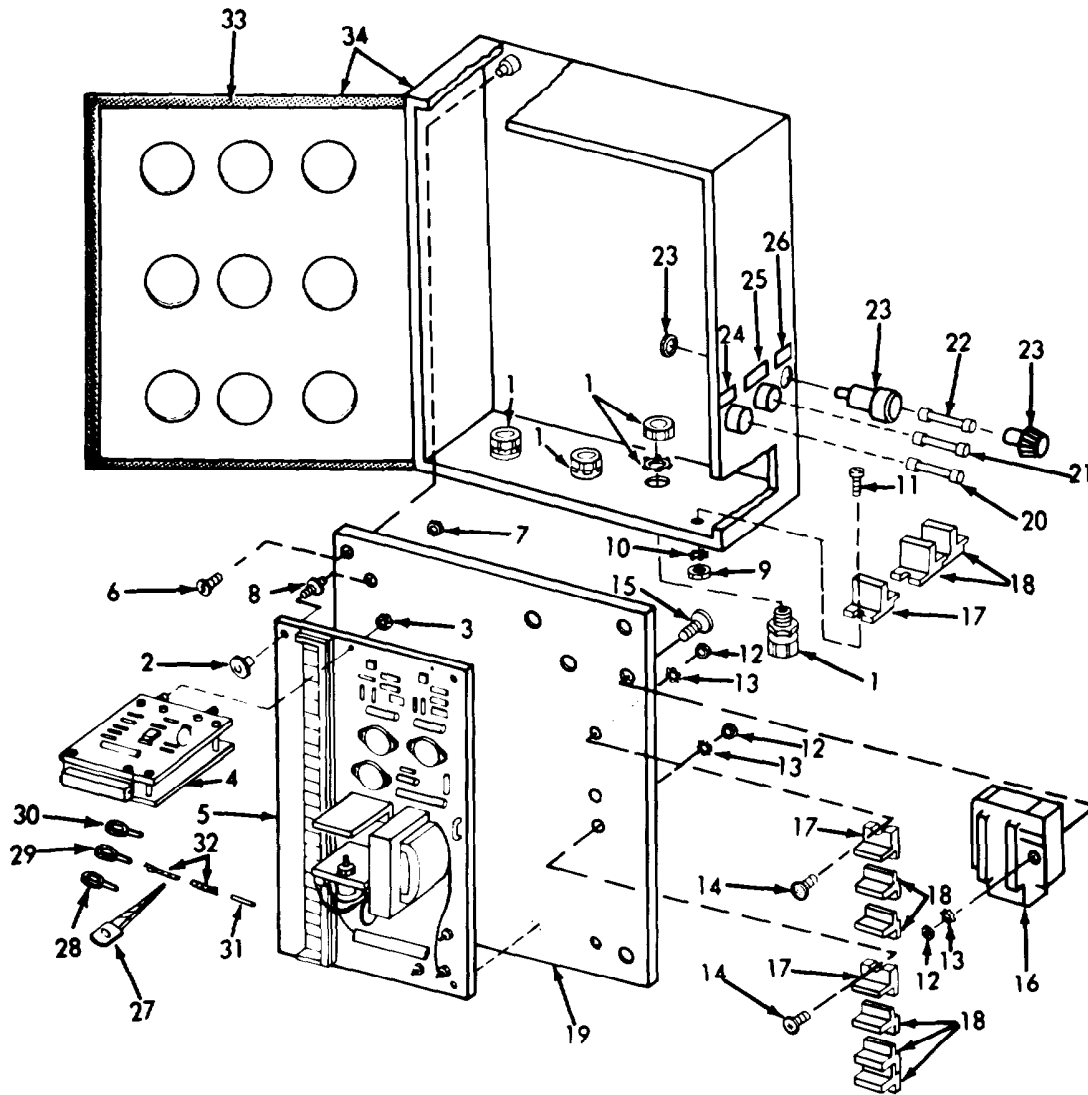


Figure C-13. Control Box Components Model B (DBN)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION	USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.								
C-13	1	XDOZZ	5975-00-655-3134	59730	5231	.CONN 1/2 NPTX3/8 IN	DBN	EA	3
C-13	2	PAOZZ	5310-01-115-0757	96906	MS16994-488	.NUT, PLAIN, KNURLED 10-24	DBN	EA	4
C-13	3	PAOZZ	5310-00-934-9739	96906	MS35649-242	.NUT, PLAIN, HEXAGON 4-40	DBN	EA	2
C-13	4	XDOHH		53918	12001	INVERTER 110 VDC	DBN	EA	1
C-13	5	PAOHH		53918	932	.BOARD, CIRCUIT	DBN	EA	1
C-13	6	PAOZZ	5305-01-115-4441	88044	AN504-1032-6	.SCREW, TAPPING, THREA D CUTTING 10-32	DBN	EA	4
C-13	7	PAOZZ	5310-00-934-9760	96906	MS35649-204	.NUT, PLAIN, HEXAGON 10-24	DBN	EA	4
C-13	8	XDOZZ		06383	F150	.STUD 10-24X1 1/2 IN SHOULDERED	DBN	EA	4
C-13	9	PAOZZ	5310-00-934-9761	96906	MS35649-264	.NUT, PLAIN, HEXAGON 6-32	DBN, DBN	EA	2
C-13	10	PACZZ	5310-00-616-3554	96906	MS35335-36	.WASHER, LOCK	DBN	EA	2
C-13	11	PAOZZ	5305-00-889-3000	96906	MS35206-230	.SCREW, MACHINE 6-32 X 1/2 IN	DBN	EA	4
C-13	12	PAOZZ	5310-00-934-9761	96906	MS35649-264	.NUT, PLAIN, HEXAGON 6-32	DBN	EA	6
C-13	13	PAOZZ	5310-00-209-0788	96906	MS35335-30	.WASHER, LOCK #6	DBN,DBQ	EA	6
C-13	14	PAOZZ	5305-00-889-3000	96906	MS35206-230	.SCREW, MACHINE 6-2 X 1/2 IN	DBN	EA	4
C-13	15	PAOZZ	5305-00-984-6221	96906	MS35206-234	.SCREW, MACHINE 6-32 X 1 IN	DBN	EA	2
C-13	16	XDOZZ		28478	20245-84	.RELAY 110 VDC 25 A	DBN	EA	1
C-13	17	XDOZZ	5940-00-244-9749	89020	530	.END, TERMINAL BOARD	DBN	EA	3
C-13	18	XDOZZ	5940-00-727-8481	89020	525	.SECTION CONTACT	DBN	EA	8
C-13	19	XDOZZ		53918	970-2	.PANEL MOUNTING	DBN	EA	1
C-13	20	PAOZZ	5920-00-284-6795	81349	F02B32V10A	.FUSE, CARTRIDGE 10 AMP NON-RENEWABLE 1/4 IN DIA X 1 1/4 IN LONG	DBN	EA	1
C-13	21	PAOZZ	5920-00-280-8342	71400	AGC 1	.FUSE, CARTRIDGE 1 AMP NON-RENEWABLE 1/4 IN DIA X 1 1/4 IN LONG	DBN	EA	1
C-13	22	PAOZZ	5920-00-012-0151	81349	F02A32V15A	.FUSE, CARTRIDGE 15 AMP NON-RENEWABLE 1/4 IN DIA X 1 1/4 IN LONG	DBN	EA	1
C-13	23	XDOZZ	5920-00-892-9311	81349	FHN26G1	.HOLDER FUSE PANEL MOUNTING	DBN	EA	3
C-13	24	XDOZZ		53918	869-15	.PLATE LEGEND MOTOR 10 AMP	DBN	EA	1
C-13	25	XDOZZ		53918	869-13	.PLATE LEGEND CONTROL 1 AMP	DBN	EA	1
C-13	26	XDOZZ		53918	869-14	.PLATE LEGEND MONITOR 15 AMP	DBN	EA	1
C-13	27	PAOZZ		96906	MS3367-1-9	.STRAP, TIEDOWN, ELECT	DBN	EA	V
C-13	28	PACZZ		96906	MS21003-3	.TERMINAL LUG	DBN	EA	20
C-13	29	PACZZ	5940-00-497-8697	96906	MS21003-5	.TERMINAL LUG	DBN	EA	27
C-13	30	PACZZ		14729	X5096205	.TERMINAL LUG	DBN	EA	8
C-13	31	PACZZ		14726	NP5115	.SPLICE, CONNECTER	DBN	EA	1
C-13	32	PACZZ	5940-00-280-3499	96906	MS25471-22	.WIRE, ELECTRICAL	DBN	EA	V
C-13	33	MOOZZ		00843	A-10106CH SEAL	.SEAL, DOOR MFG FROM TAPE, ADHESIVE, FOAM 9320-00-720-0378	DBN	EA	V
C-13	34	XDOZZ		53918	970-1	.ENCLOSURE	DBN	EA	1

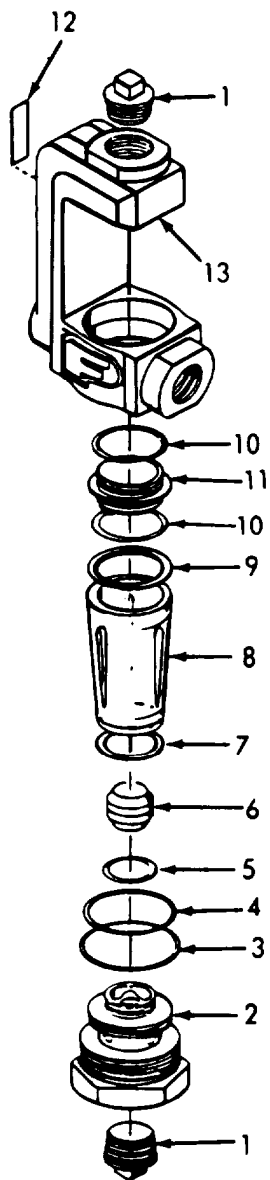


Figure C-14. Flow Rate Indicator

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
						GROUP 03 FLOW INDICATOR		
C-14		XDOHF	6680-01-115-1700	22375	A223590	INDICATOR, FLOW RATE	EA	1
C-14	1	XDOZZ		22375	112A043006	. PLUG BRASS	EA	2
C-14	2	XDOHH		22375	632A142B11	. FITTING INLET BRESS	EA	1
C-14	3	PAOZZ	5330-01-112-6662	22375	101A803001	.O RING BUNA N 2 3/16 IN DD X 1 15/16 IN ID	EA	1
C-14	4	PAOZZ	5330-01-112-7957	22375	101A802001	. O RING BUNA N 2 IN OD X 1 3/4 IN ID	EA	1
C-14	5	PAOZZ	5330-00-051-2547	22375	101A918001	. PACKING, PREFORMED	EA	1
C-14	6	PFOHH		22375	303J052B11	.FLOAT, FLOW METER BRASS	EA	1
C-14	7	PAOZZ	5330-00-615-1725	22375	3330515006	.GASKET .015 IN THINK	EA	1
C-14	8	XDOZZ		22375	44B0808001	. TUBE METER GLASS 1 IN ARS-580	EA	1
C-14	9	PAOZZ	5330-00-571-9637	22375	3330515007	. GASKET	EA	1
C-14	10	PAOZZ	5330-01-112-7959	22375	101A925001	. O RING BUNA N 1 9/16 IN OO X 1 3/8 IN ID	EA	2
C-14	11	XDOZZ		22375	3760034B11	. RING OUTLET ADAPTER BRASS\	EA	1
C-14	12	XDOZZ		22375	3388461A30	. NAMPLATE	EA	1
C-14	13	XDOHH		22375	322A036850	. BODY INDICAROR BRONZE	EA	1

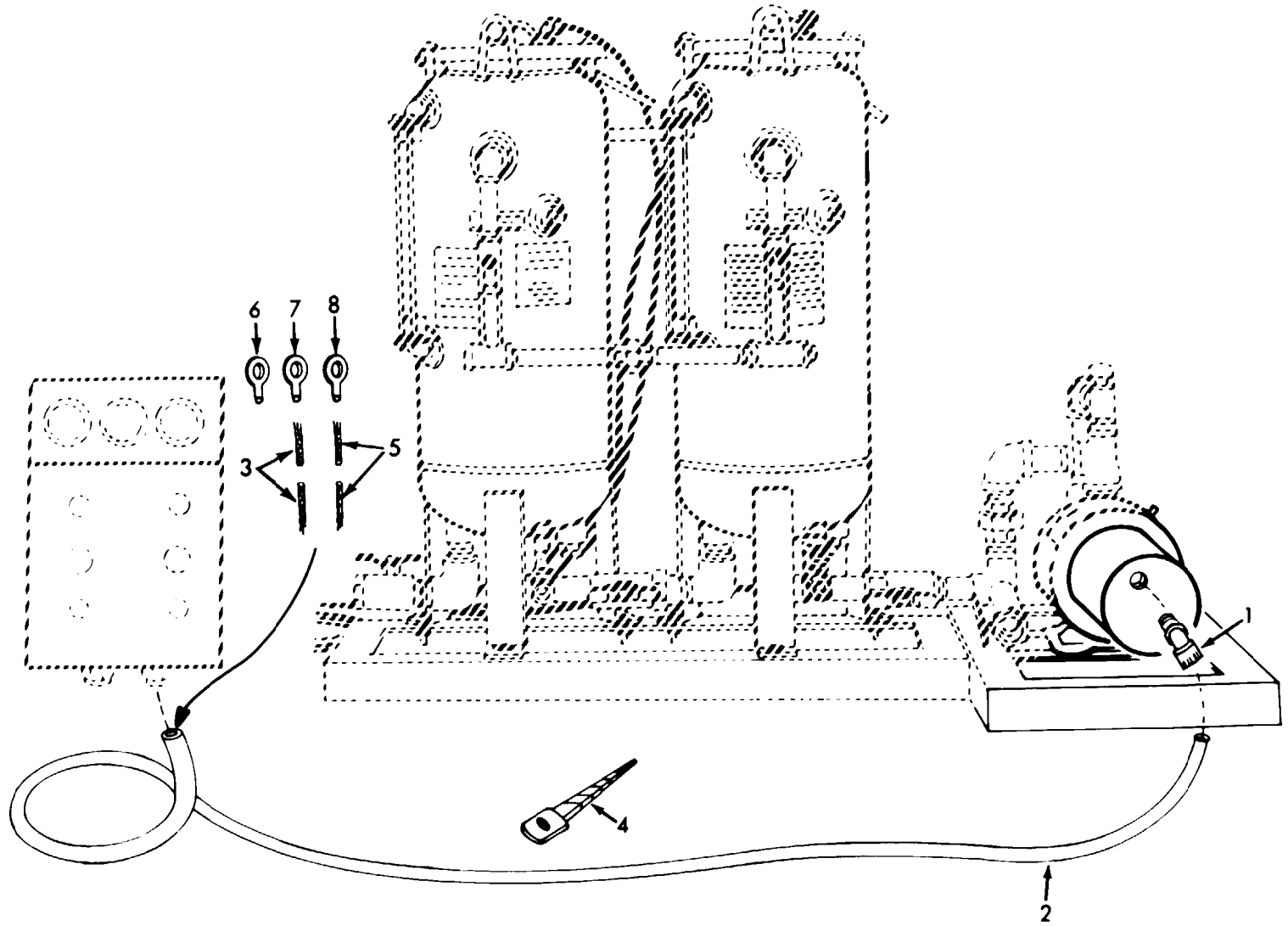


Figure C-15. Conduit and Fittings Models C and D (DBP, DBQ)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
GROUP 04 CONDUIT, CONNECTOR AND WIRING								
C-15	1	XDOZZ		59730	5351	ELBOW CONDUIT 3/8 90 DEG DBP,DBQ	EA	1
C-15	2	XDOZZ		53918	C030	CONDUIT 3/8 IN FLEX DBP,DBQ	FT	6
C-15	3	PAOZZ	6145-00-553-0832	96906	MS25471-22	WIRE, ELECTRICAL 22 GUAGE DBP	FT	V
C-15	4	PAOZZ	5975-00-451-5001	96906	MS3367-3-9	STRAP, TIEDOWN, ELECT DBP,DBQ	EA	V
C-15	5	PAOZZ	6145-00-553-0828	96906	MS35471-14	WIRE, ELECTRICAL 14 GUAGE DBP	FT	V
C-15	6	PAOZZ	5940-00-198-8694	96906	MS21003-3	TERMINAL, LUG 18-22 GAUGE-#6 STUD DBP	EA	8
C-15	7	PAOZZ	5940-00-197-8697	96906	MS21003-5	TERMINAL, LUG 18-22 GAUGE-#8 STUD DBP	EA	10
C-15	8	PAOZZ	5940-00-197-8739	96906	MS21003-16	TERMINAL, LUG 14-16 GAUGE-#10 STUD DBP	EA	4

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C16	1	XDCZZ		59730	5351	ELBLOW CONDUIT 3/8 90 DEG DBM, DBN	EA	1
C16	2	XDCZZ		53918	C030	CONDUIT 3/8 IN FLEX DBM, DBN	FT	12
C-16	3	XDOZZ	5975-00-655-3136	59730	5231	CONN 1/2 NPTX3/3 IN DBM, DBN	EA	1
C-16	4	XDOZZ		07337	AT-1	TEE CONCUIT 1/2 IN DBM, DBN	EA	4
C-16	5	XDOZZ		53918	C035	CONCUIT EMT 1/2 IN DBM, DBN	FT	3
C-16	6	XDOZZ		03743	FFL-50	ELBOW PULLING 90 DEG 1/2 NPT FEMALE DBM, DBN	EA	6
C-16	7	PAOZZ	4730-00-921-3612	96906	MS51953-73	NIPPLE, PIPE 1/2 CLOSE DBM, DBN	EA	4
C-16	8	PAOZZ	4730-00-196-1547	96906	MS51953-82	NIPPLE, PIPE 1/2 X 4 IN DBM, DBN	EA	1
C-16	9	PAOZZ		96906	MS51983-81	NIPPLE, PIPE 1/2 IN X 3 1/2 IN DBQ	EA	2
C-16	10	PACZZ	4730-00-196-1503	96906	MS51983-101	NIPPLE, PIPE DBN	EA	1
C-16	11	PAOZZ	4730-00-196-1548	96906	MS51953-83	NIPPLE, PIPE DBM, DBN	EA	1
C-16	12	PAOZZ	5975-00-451-5001	96906	MS3367-3-9	STRAP, TIEDOWN, ELECT DBM, DBN	EA	V

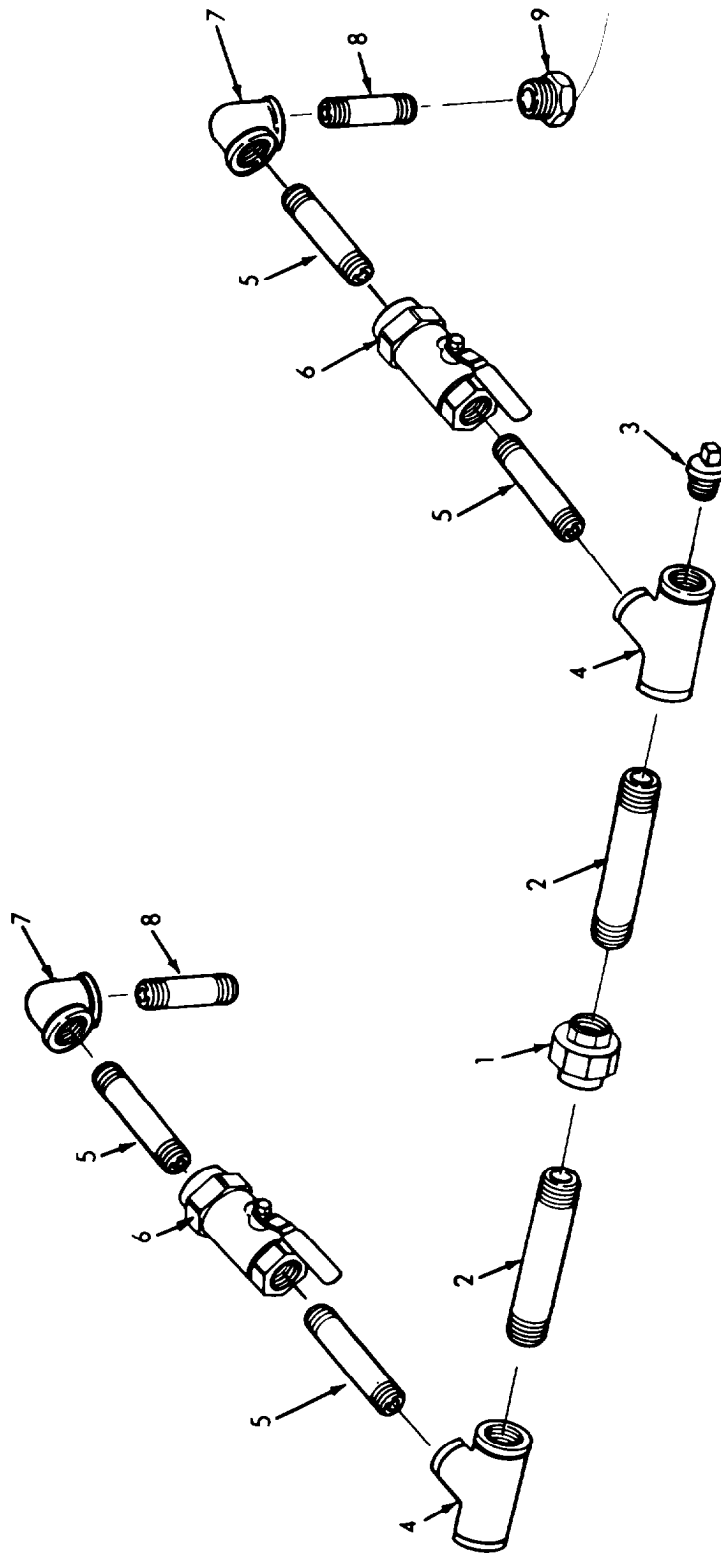


Figure C-17 Discharge Lines Models C and D (DBP, DBQ)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
GROUP 05 PIPING AND FITTING								
C-17	1	XDCZZ		53918	UN40	UNION 1/2 IN GALV DBP,DBQ	EA	1
C-17	2	PAOZZ	4730-00-196-1550	96906	MS51953-85	NIPPLE, PIPE 1/2 X 5 IN DBP,DBQ	EA	V
C-17	3	XDOZZ	4730-00-044-4587	96906	MS51884-7	PLUG 1/2 IN MI GALV DBP,DBQ	EA	1
C-17	4	XDOZZ		53918	TEQ5	TEE STRIGHT 1/2 IN DBP,DBQ	EA	2
C-17	5	PAOZZ	4730-00-196-1496	96906	MS51953-81	NIPPLE, PIPE 1/2 3 1/2 IN LONG DBP,DBQ	EA	4
C-17	6	PAOZZ	4820-01-110-1171	72219	70-143-01	VALVE, BALL 1/2 NPT BRONZE FEMALE DBP,DBQ	EA	2
C-17	7	XDOZZ		53918	EB60	ELBOW 1/2 IN GALV DBP,DBQ	EA	2
C-17	8	PAOZZ	4730-00-196-1493	96906	MS51953-78	NIPPLE, PIPE 1/2 X 2 IN LONG DBP,DBQ	EA	2
C-17	9	XDOZZ	4730-00-277-1840	96906	MS51887-23	BUSHING 1 INX 1/2 IN DBP,DBQ	EA	2

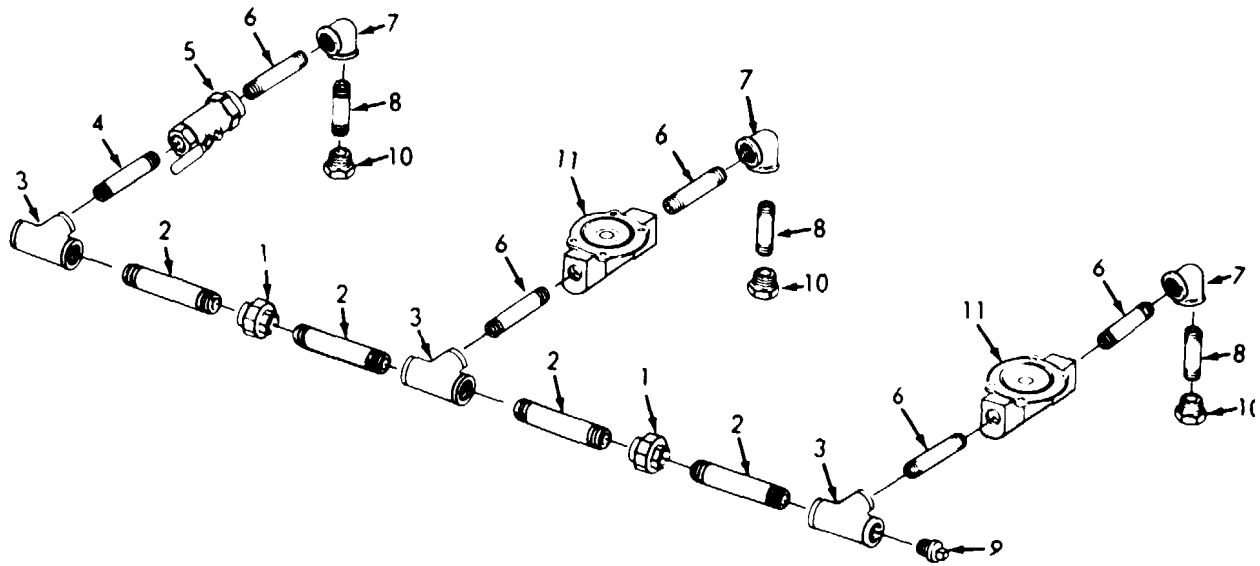


Figure C-18. Discharge Lines Models A and B (DBM, DBN)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION	USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.								
C-18	1	XDOZZ		53918	UN40	UNION 1/2 IN GALV	DBM,DBN	EA	2
C-18	2	PACZZ	4730-00-196-1503	96906	MS51983-101	NIPPLE, PIPE	DBM,DBN	EA	1
C-18	3	XDOZZ		53918	TE05	TEE STRIGHT 1/2 IN	DBM,DBN	EA	3
C-18	4	PAOZZ	4730-00-196-1496	96906	MS51953-81	NIPPLE, PIPE 1/2 X 1/2 IN LONG	DBM,DBN	EA	2
C-18	5	PAOZZ	4820-01-110-1171	72219	70-143-01	VALVE BALL 1/2 NPT BRONZE FEMALE	DBM,DBN	EA	1
C-18	6	PAOZZ	4730-00-196-1495	96906	MS51953-80	NIPPLE, PIPE 1/2 X 3 IN LONG	DBM,DBN	EA	7
C-18	7	XDOZZ		53918	EB60	ELBOW 1/2 IN GALV 90 DEG MI SCREWED	DBM,DBN	EA	3
C-18	8	PAOZZ	4730-00-196-1493	96906	MS51953-78	NIPPLE, PIPE 1/2 X 2 IN LONG	DBM,DBN	EA	5
C-18	9	XDOZZ	4730-00-044-4587	96906	MS51884-7	PLUG 1/2 IN MI GALV	DBM,DBN	EA	1
C-18	10	XDOZZ	4730-00-277-1840	96906	MS51887-23	BUSHING 1 INX 1/2IN	DBM,DBN	EA	3
C-18	11	XDOHH		04845	8210D2VD024	VALVE SOLENOID 1/2	DBM,DBN	EA	2

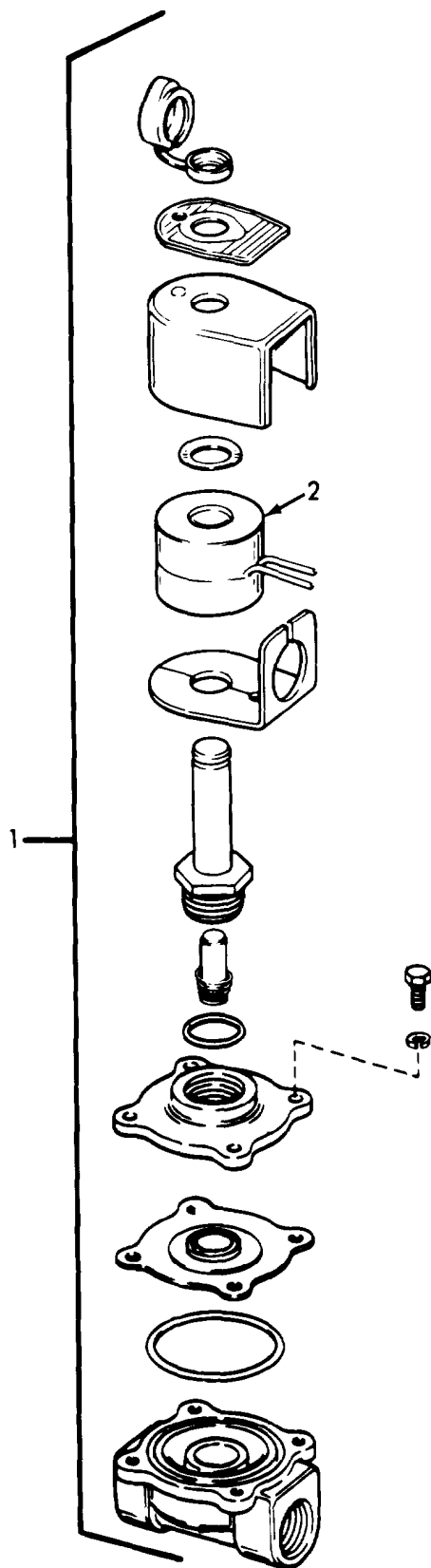


Figure C-19. Solenoid Valves Models A and 6 (DBM, DBN)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-19	1	PACZZ	4810-01-070-0629	04845	FV-158-934	PARTS KIT, VALVE DBM,DBN	EA	2
C-19	2	PACZZ	1450-00-083-9918	04845	27-463-4D	COIL 24VDC MOLDED DBM,DBN	EA	2

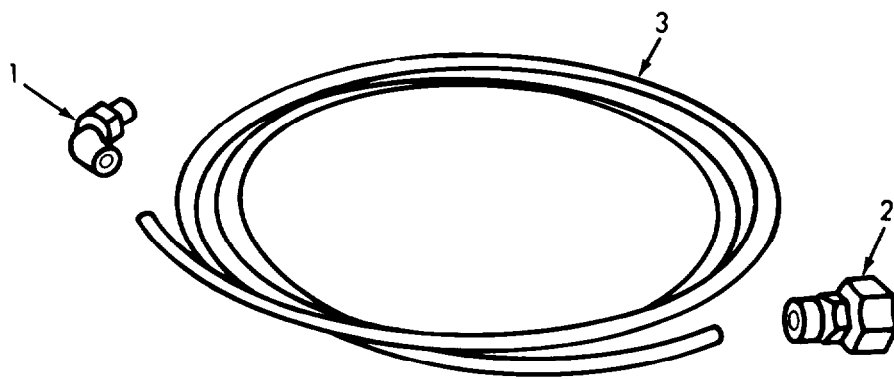


Figure C-20. Air Lines and Fitting

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-20	1	PAOZZ	4730-01-076-8903	87373	N4ME2	ELBOW, PIPE TO TUBE 1/4 TUBE X 1/8 NPT DBP,DBQ	EA	2
C-20	1	PAOZZ	4730-01-076-8903	87373	N4ME2	ELBOW, PIPE TO TUBE 1/4 TUBE X 1/8 NPT DBM,DBN	EA	3
C-20	2	XDOZZ		83259	P4MC4	CONN STRIGHT 1/4 TUBE X 1/4 NPT DBP,DBQ	EA	3
C-20	2	XDOZZ		83259	P4MC4	CONNECTOR STRIGHT 1/4 TUBE X 1/4 NPT DBM,DBN	EA	4
C-20	3	PAOZZ	4720-00-916-7092	30327	44SN	TUBING NYLON 1/4 IN DBP,DBQ	FT	20
C-20	3	PAOZZ	4720-00-916-7092	30327	44SN	TUBING NYLON 1/4 IN DBM,DBN	FT	30

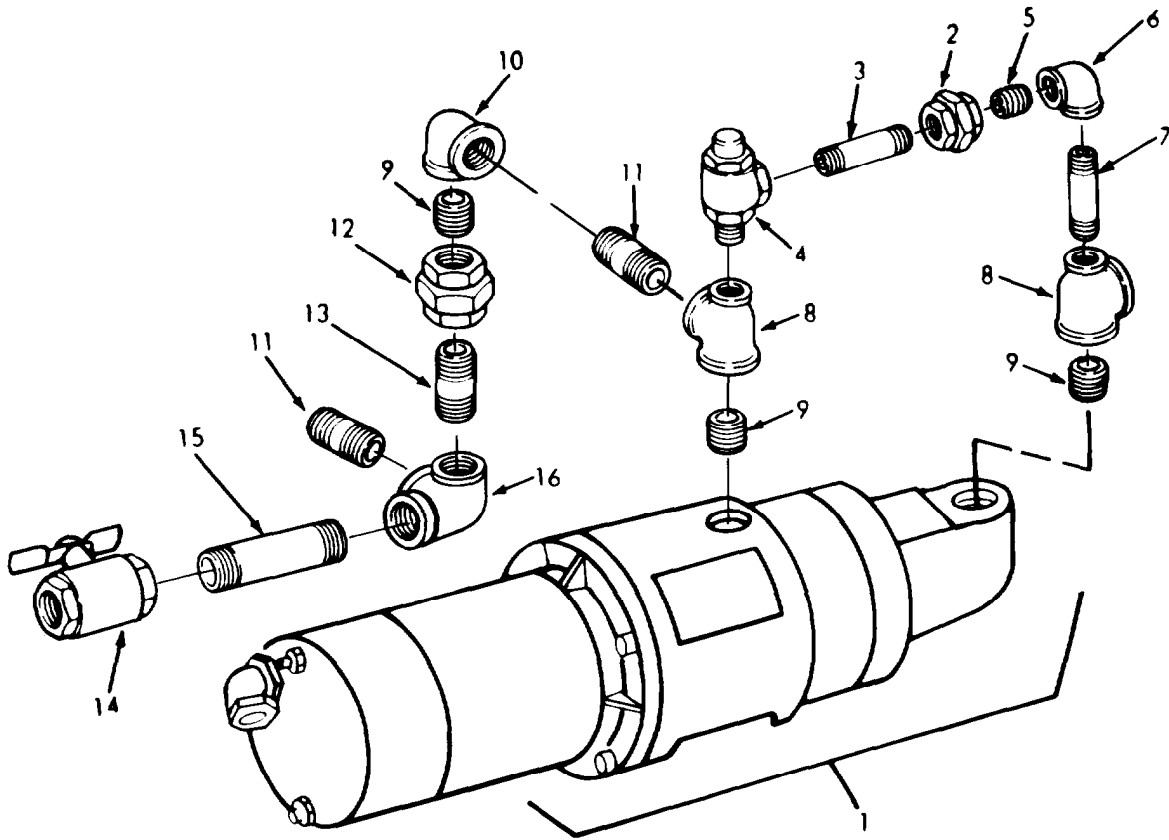


Figure C-21. Pump-Motor Assembly Models C and D (DBP, DBQ)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
GROUP 06 SUPPLY PUMP ASSEMBLY								
C-21	1	XBCHH		53918	953	PUMP-MOTOR ASSY DBP	EA	1
C-21	1	XBCHH		53918	954	PUMP-MOTOR ASSY DBQ	EA	1
C-21	2	XDOZZ		53918	UN42	. UNION 3/4 IN GALV DBP,DBQ	EA	1
C-21	3	PAOZZ	4730-00-196-1497	96906	MS51953-102	. NIPPLE,, PIPE 3/4 X 2 1/2 IN LONG DBP,DBQ	EA	1
C-21	4	PAOZZ		71342	MC 3/4-45 PSI	. VALVE RELIEF 3/4 IN BRONZE 90 DEG DBP,DBQ	EA	1
C-21	5	PAOZZ	4730-00-196-1468	96906	MS51953-97	. NIPPLE, PIPE 3/4 IN CLOSE DBP,DBQ	EA	2
C-21	6	XDOZZ		53918	EB61	. ELBOW 3/4 IN 90 DEG DBP,DBQ	EA	1
C-21	7	PAOZZ	4730-100-196-1498	96906	MS541953-103	. NIPPLE, PIPE 3/4 X 3 IN LONG DBP,DBQ	EA	1
C-21	8	XDOZZ		53918	TE15	. TEE REDUCING GALV 1 X 3/4 X 1 IN MI SCREWED DBP,DBQ	EA	2
C-21	9	PAOZZ	4730-00-196-1469	96906	MS51953-121	. NIPPLE, PIPE 1 IN CLOSE DBP,DBQ	EA	3
C-21	10	XDOZZ		53918	EB65	. ELBOW 1 IN GALV MI DBP,DBQ	EA	1
C-21	11	PAOZZ	4730-00-196-1524	96906	MS51953-126	. NIPPLE, PIPE 1 X 3 IN LONG DBP,DBQ	EA	2
C-21	12	XDOZZ		53918	UN44	. UNION 1 IN GALV MI DBP,DBQ	EA	1
C-21	13	PAOZZ	4730-00-196-1501	96906	MS51953-125	. NIPPLE, PIPE 1 X 2 1/2 IN LONG DBP,DBQ	EA	1
C-21	14	PAOZZ	4820-01-110-7091	722419	70-145-01	. VALVE BALL 1 IN BRONZE FEMALE DBP,DBQ	EA	1
C-21	15	PAOZZ	4730-00-196-1526	96906	MS51953-128	. NIPPLE, PIPE 1 X 4 IN LONG DBP,DBQ	EA	1
C-21	16	XDOZZ		539158	EB64	. ELBOW 1 IN GALV MI SIDE OUTLET SCREWED DBP,DBQ	EA	1

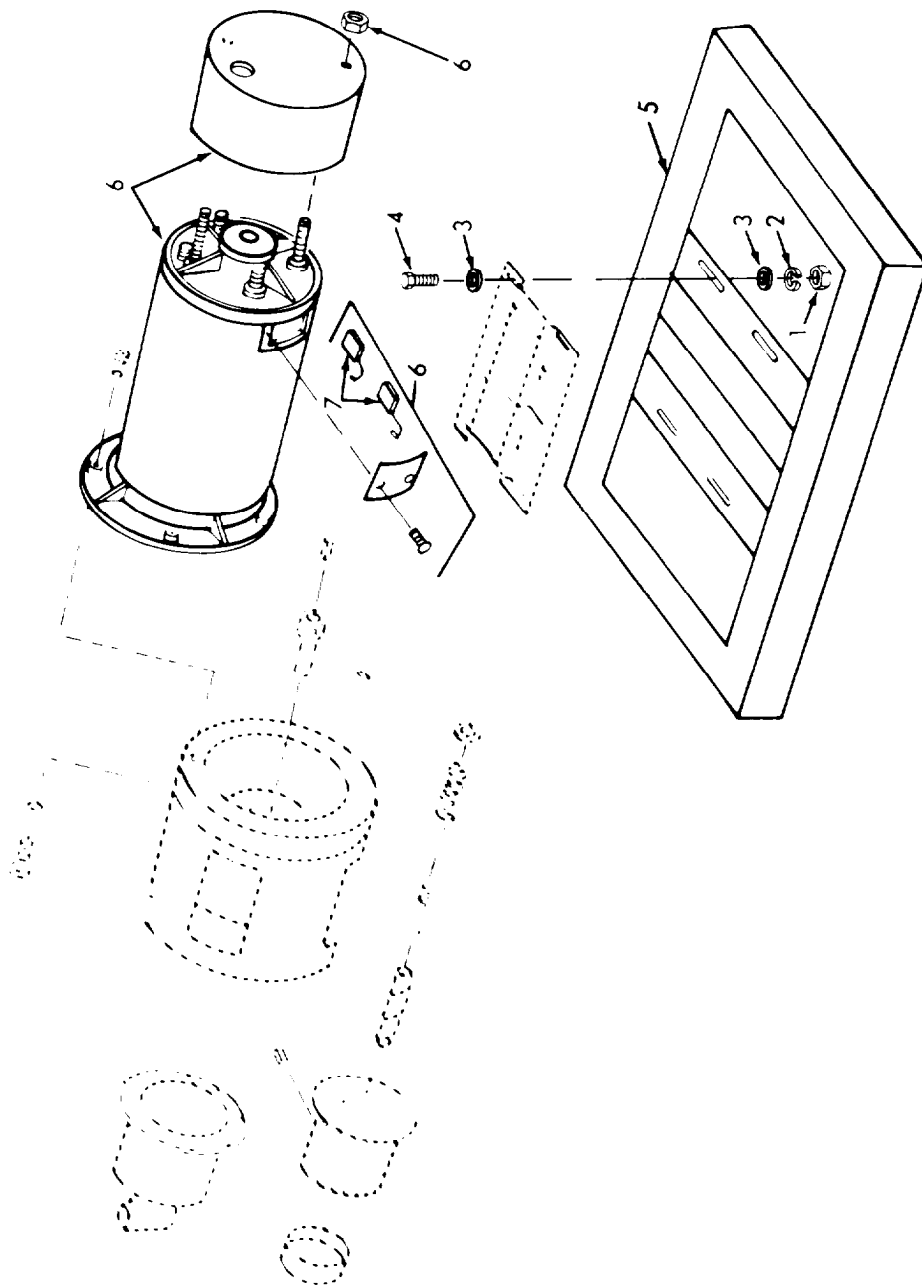


Figure C-22. Pump-Motor and Mounting Frame Models C and D (DBP, DBQ)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.					USABLE ON CODE		
C-22	1	PAOZZ	5310-00-880-7744	96906	MS51967-5	. NUT, PLAIN, HEXAGON 5/16-18	DBP,DBQ	EA 4
C-22	2	PAOZZ	5310-00-407-9566	96906	MS35338-45	. WASHER, LOCK 5/16 IN	DBP,DBQ	EA 4
C-22	3	PAOZZ	5310-00-167-0820	88044	AN960-516	. WASHER, FLAT 5/16 IN	DBP,DBQ	EA 4
C-22	4	PAOZZ	5306-00-225-8499	96906	MS90725-34	. BOLT, MACHINE 5/16-18 X 1 IN	DBP,DBQ	EA 4
C-22	5	XBOZZ		53918	956	. FRAME, MOPUNTING	DBP,DBQ	EA 1
C-22	6	PAOHH		58927	BA3628-3045-560	. MOTOR PUMP DRIVE 1/2 HP 24 VDC 1750 RMP	DBP	EA 1
C-22	6	PAOHH	6105-01-110-7702	55988	BA36283001-7-560	. MOTOR PUMP DRIVE 1/2 HP 110 VDC 1750 RMP	DBN	EA 1
C-22	7	PAOZZ		58927	YP00357	.. BRUSH ASSY	DBP	EA 2
C-22	7	PAOZZ		58927	YP00356	.. BRUSH ASSY	DBQ	EA 2

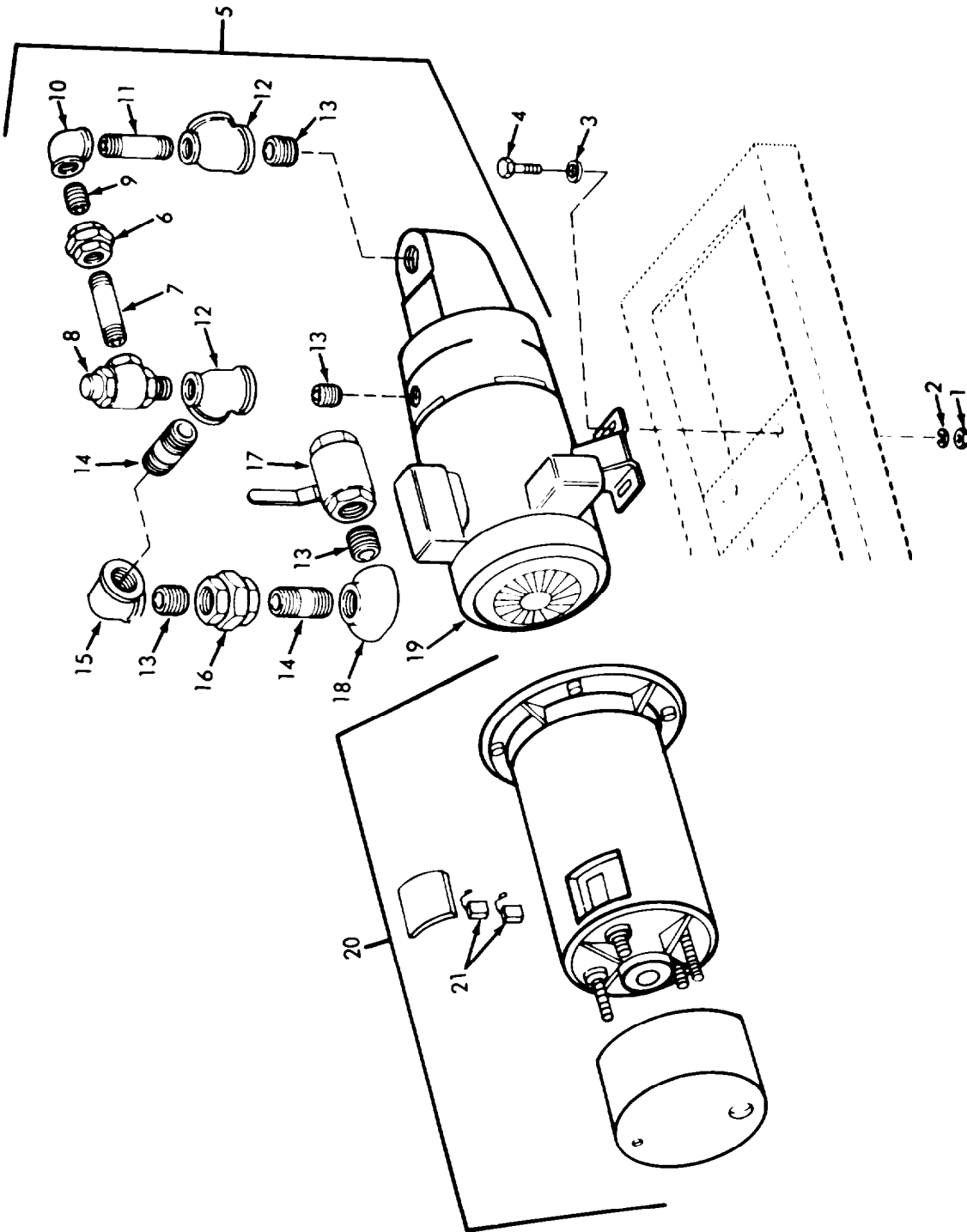


Figure C-23. Pump-Motor Assembly Models A and B (DBM, DBN)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION	USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.								
C-23	1	PAOZZ	5310-00-880-7744	96906	MS51967	NUT, PLAIN, HEZAGON 5/16-18	DBM,DBN	EA	4
C-23	2	PAOZZ	5310-00-407-9566	96906	MS35338-45	WASHER, LOCK 5/16 IN	DBM,DBN	EA	4
C-23	3	PAOZZ	5310-00-167-0820	88044	AN960-516	WASHER, FLAT 5/16 IN	DBM,DBN	EA	4
C-23	4	PAOZZ	5306-00-225-8499	96906	MS90725-34	BOLT, MACHINE	DBM,DBN	EA	4
C-23	5	XBOHH		53918	930	PUMP-MOTOR ASSY	DBM	EA	1
C-23	5	XBOHH		53918	952	PUMP-MOTOR ASSY	DBN	EA	1
C-23	6	XDOZZ		53918	UN42	. UNION 3/4 IN GALV	DBM,DBN	EA	1
C-23	7	PAOZZ	4730-00-196-1498	96906	MS51953-103	. NIPPLE, PIPE 3/4 X 3 IN LONG	DBM,DBN	EA	1
C-23	8	XDOZZ		71342	MC 3/4-45 PSI	. VAKVE RELIEF 3/4 IN BRONZE 90 DEG	DBM,DBN	EA	1
C-23	9	PAOZZ	4730-00-196-1468	96906	MS51953-97	. NIPPLE, PIPE 3/4 IN CLOSE	DBM,DBN	EA	1
C-23	10	XDOZZ		53918	EB61	. ELBOW 3/4 IN 90 DEG GALV MI SCREWED	DBM,DBN	EA	1
C-23	11	PAOZZ	4730-00-196-1497	96906	MS51953-102	. NIPPLE, PIPE 3/4 X 1/2 IN	DBM,DBN	EA	1
C-23	12	XDOZZ		53918	TE15	. TEE REDUCING GALV 1 X 3/4 X 1 IN	DBM,DBN	EA	2
C-23	13	PAOZZ	4730-00-196-1469	96906	MS51953-121	. NIPPLE, PIPE 1 IN CLOSE	DBM,DBN	EA	4
C-23	14	PAOZZ	4730-00-196-1501	96906	MS51953-125	. NIPPLE, PIPE 12 X 2 1/2 IN LONG	DBM,DBN	EA	2
C-23	15	XDOZZ		53918	EB65	. ELBOW 1 IN 90 DEG	DBM,DBN	EA	1
C-23	16	XDOZZ		53918	UN44	. UNION 1 IN GALV MI	DBM,DBN	EA	1
C-23	17	PAOZZ	4820-01-110-7091	72219	70-145-01	. VALVE BALL 1 IN BRONZE FEMALE	DBM,DBN	EA	1
C-23	18	XDOZZ		53918	EB64	. ELBOW SIDE OUTLET 1 IN	DBM,DBN	EA	1
C-23	19	PAOZF	6105-00-306-9519	03510	5K38NG508	. MOTOR, ALTERNATING C 1/2 HP 230/460 VAC 1750 RPM	DBM	EA	1
C-23	20	PAOHH	6105-01-110-7702	55988	BA36283001-7-56C	. MOTOR PUMP DRIVE 1/2 HP 110 VDC 1750 RPM	DBQ	EA	1
C-23	21	PAOZZ		58927	Y00356	. BRRUSH ASSY	DBN	EA	2

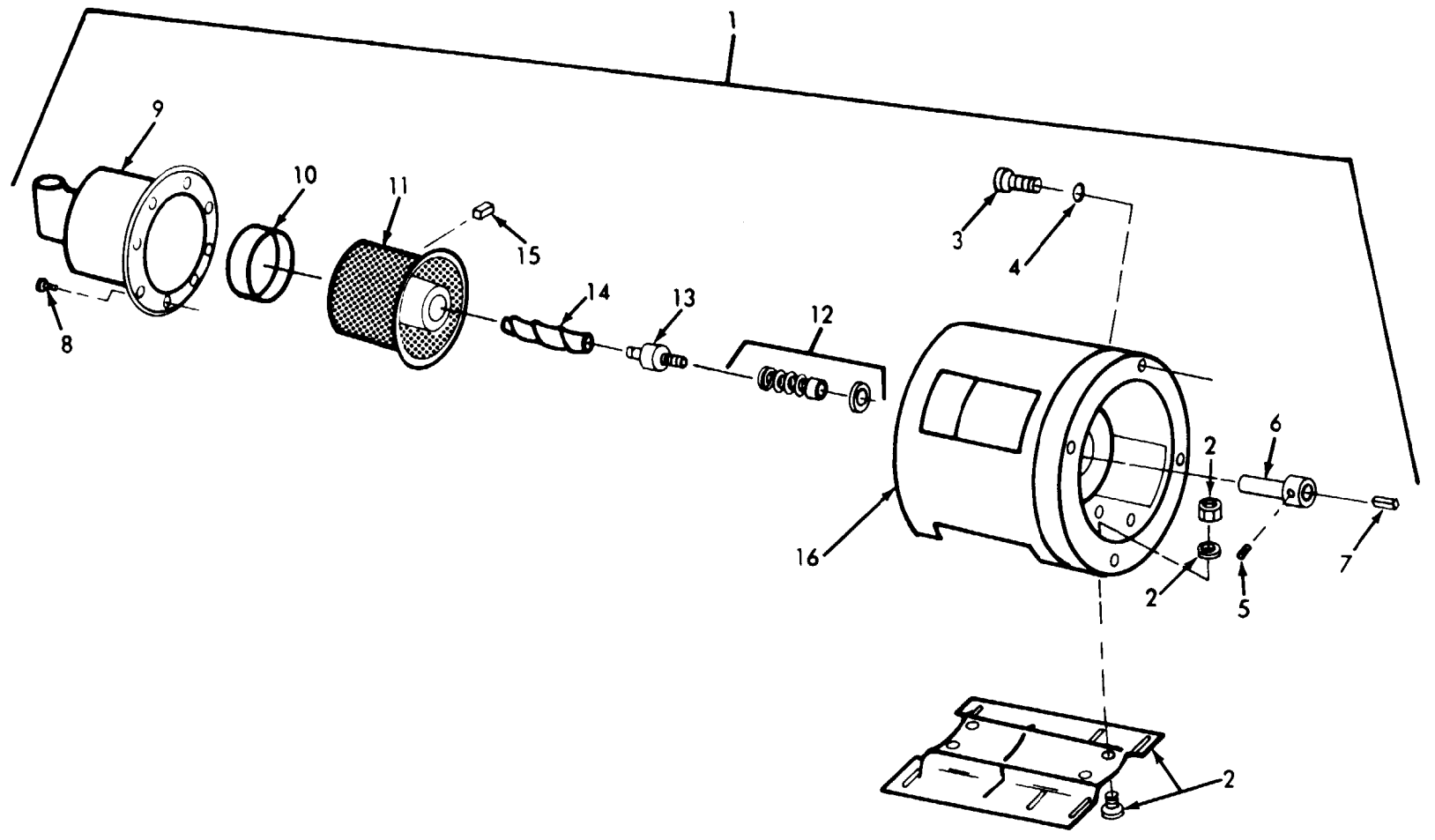


Figure C-24. Pump Assembly

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-24	1	XDOHH		58927	SI200	PUMP 5 GPM POSTIVE DISPLACEMENT CAVITY	EA	1
C-24	2	XDOZZ		51064	SI200-390	. FOOT W/BOLTS STEEL	EA	1
C-24	3	PAOZZ	5305-00-942-2196	96906	MS18154-60	. SCREW, CAP, HEXAGON H 3/8-16 X 1 IN	EA	4
C-24	4	PAOZZ		96906	MS35338-46	. WASHER, LOCK, SPRING 3/8 IN	EA	4
C-24	5	PAOZZ	5305-00-638-8691	96906	MS51021-57	. SETSCREW 1/4-20	EA	2
C-24	6	PAOZZ		58927	SI200-380	. COUPLING SHAFT CS	EA	1
C-24	7	XDOZZ		24123	AB136D	. KEY, SHAFT 3/16 X 3/16 X 1 IN	EA	1
C-24	8	XDOZZ		51064	SI200-212	. SCREW 10-24 X 5/8 IN HEX HEAD STAINLESS	EA	8
C-24	9	XDOZZ		58927	SI200-012	. HOUSING SUCTION CAST IRON	EA	1
C-24	10	XDOZZ		51064	SI200-235	. STATOR RING CS	EA	1
C-24	11	PAOZZ	4320-01-110-8968	58927	SI200-121	. STATOR BUNA N	EA	1
C-24	12	PAOZZ	4320-01-051-9879	58927	SI200-169	. SEAL, MACHANICAL CERAMIC AND CARBON	EA	1
C-24	13	PAOZZ	3010-01-115-2236	58927	SI200-124	. JOINT FLEXIBLE STEEL AND BUNA N	EA	1
C-24	14	PAOZF	4320-01-110-9683	58927	SI200-122	. ROTOR 416 SS	EA	1
C-24	15	XDOZZ	4730-00-187-4207	96906	MS51884-3	. PLUG, PIPE 1/4 NPT	EA	2
C-24	16	XDOZZ		58927	SI200-011	. BODY PUMP CAST IRON	EA	1

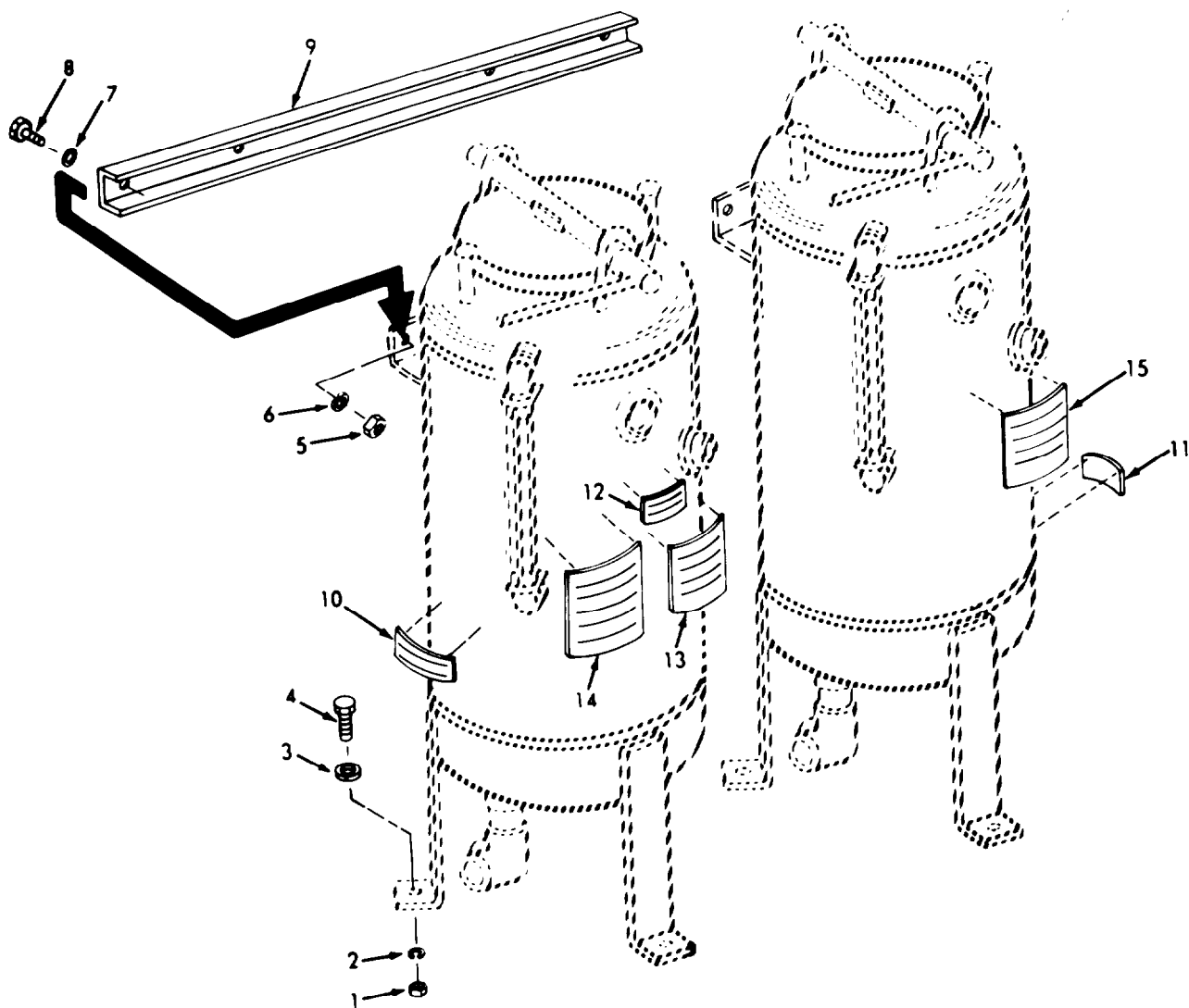


Figure C-25. Support Angle and Legend Plates
Models C and D (DBP, DBQ)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
GROUP 07 VESSEL ASSEMBLY								
C-25	1	PAOZZ	5310-00-732-0558	96906	MS51967-8	NUT, PLAIN, HEXAGON 3/8-16 DBP,DBQ	EA	6
C-25	2	PAOZZ	5310-00-637-9541	96906	MS35338-46	WASHER, LOCK 3/8 IN DBP,DBQ	EA	6
C-25	3	PAOZZ	5310-00-167-0821	88044	AN960-616	WASHER, FLAT 3/8 IN DBP,DBQ	EA	6
C-25	4	PAOZZ	5305-00-269-3214	96906	MS90725-64	SCREW,CAP,HEXAGON H 3/8-16 X 1 1/2 IN DBP,DPQ	EA	6
C-25	5	PAOZZ	5310-00-761-6882	96906	MS51967-2	NUT,PLAIN,HEXAGON 1/4-20 DBP,DPQ	EA	4
C-25	6	PAOZZ	5310-00-582-5965	96906	MS35338-44	WASHER,LOCK,SPRING 1/4 IN DBP,DPQ	EA	4
C-25	7	PAOZZ	5310-00-141-1795	88044	AN960-416	WASHER,FLAT 1/4 IN DBP,DBQ	EA	4
C-25	8	PAOZZ	5305-00-225-3839	96906	MS90725-8	SCREW,CAP,HEXAGON H 1/4-20 X 1 IN DBP,DBQ	EA	4
C-25	9	XDOZZ		53918	936-2	ANGLE SUPPORT CS DBP,DBQ	EA	1
C-25	10	XDOZZ		53918	926-36	PLATE LEGEND OUTLET DBP,DBQ	EA	1
C-25	11	XDOZZ		53918	926-35	PLATE LEGEND INLET DBP,DBQ	EA	1
C-25	12	XDOZZ		53918	926-38	PLATE LEGEND OPEN VALVE ONLY TO DISCHARGE OIL DBP,DBQ	EA	1
C-25	13	XDOZZ		53918	941-32	PLATE LEGEND WARNING 24 VDC DBP	EA	1
C-25	13	XDOZZ		53918	934-37	PLATE LEGEND WARNING 110 VDC DBQ	EA	1
C-25	14	XDOZZ		53918	926-34	PLATE LEGEND INSTRUCTIONS DBP,DBQ	EA	1
C-25	15	XDOZZ		53918	941-28	PLATE IDENT TYPE C DBP	EA	1
C-25	15	XDOZZ		53918	947-27	PLATE IDENT TYPE D DBQ	EA	1

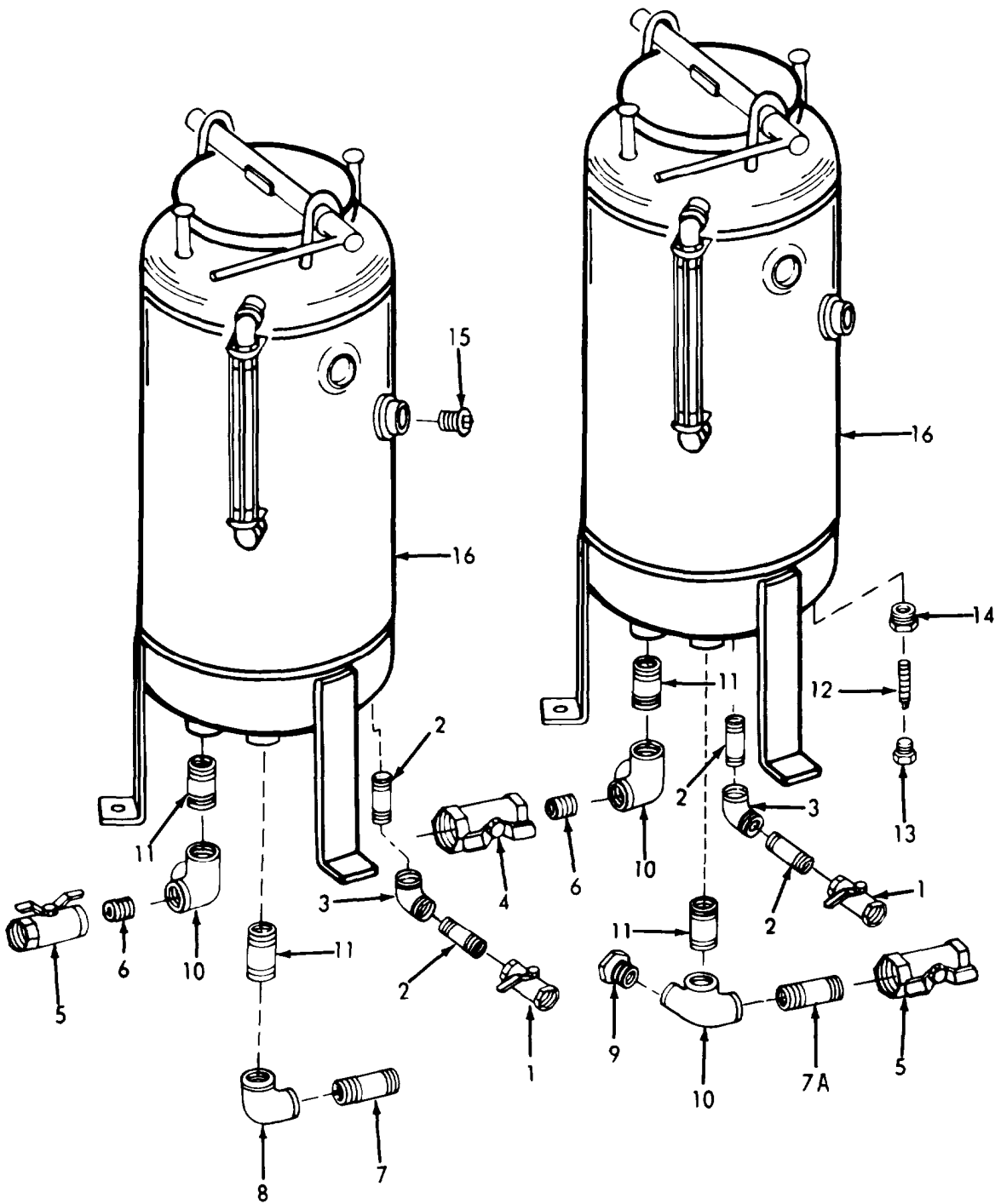


Figure C-26. Vessel Piping Models C and D (DBP, DBQ)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-26		XBCHH		53918	945	VESSEL SUBASSEMBLY DBP,DBQ	EA	1
C-26	1	PAOZZ	4820-01-110-1171	72219	70-143-01	VALVE BALL ½ IN BRONZE FEMALE DBP,DBQ	EA	2
C-26	2	PAOZZ	4730-00-196-1493	96906	MS51953-78	NIPPLE,PIPE ½ X 2 IN LONG DBP,DBQ	EA	4
C-26	3	PAOZZ		53918	EB60	ELBOW ½ IN GALV DBP,DPQ	EA	2
C-26	4	PAOZZ	4820-01-115-3454	72219	70-345-01	VALVE BALL 1 IN BRONZE,FEMALE, UNION END DBP,DPQ	EA	1
C-26	5	PAOZZ	4820-01-110-7091	72219	70-145-01	VALVE BALL 1 IN BRONZE,FEMALE DBP,DPQ	EA	2
C-26	6	PAOZZ	4730-00-196-1469	96906	MS51953-121	NIPPLE,PIPE 1 IN CLOSE DBP,DBQ	EA	2
C-26	7	PAOZZ	4730-00-196-1525	96906	MS51953-127	NIPPLE,PIPE 1 X 3 ½ IN LONG DBP,DBQ	EA	2
C-26	7A	PAOZZ	4730-00-196-1555	96906	MS51953-139	NIPPLE,PIPE 1 X 4 ½ IN DBP,DBQ	EA	1
C-26	8	XDOZZ		53918	EB65	ELBOW 1 IN GALV MI DBP,DBQ	EA	1
C-26	9	XDOZZ		96906	MS51887-27	BUSHING 1X1/4 IN MI DBP,DBQ	EA	2
C-26	10	XDOZZ		53918	EB64	ELBOW 1 IN GALV MI SIDE OUTLET SCREWED DBP,DBQ	EA	3
C-26	11	PAOZZ	4730-00-196-1501	96906	MS51953-125	NIPPLE, PIPE 1 X 2 ½ IN LONG DBP,DPQ	EA	4
C-26	12	PAOZZ	5340-01-081-0460	16115	P500-2	ANODE 3/8-16UNCX2IN ZINC DBP,DPQ	EA	2
C-26	13	XDOZZ		16115	PP375B	PLUG,ANODE RETAINER BRONZE DBP,DPQ	EA	2
C-26	14	XDOZZ		96906	MS51847-12	BUSHING 1 X 3/8 NPT BRONZE DBP,DPQ	EA	2
C-26	15	XDOZZ	4730-00-187-4210	96906	MS51884-9	PLUG PIPE ¾ IN MI DBP,DPQ	EA	2
C-26	16	XBCHH		53918	071-2	VESSEL ASSEMBLY DBP,DPQ	EA	2

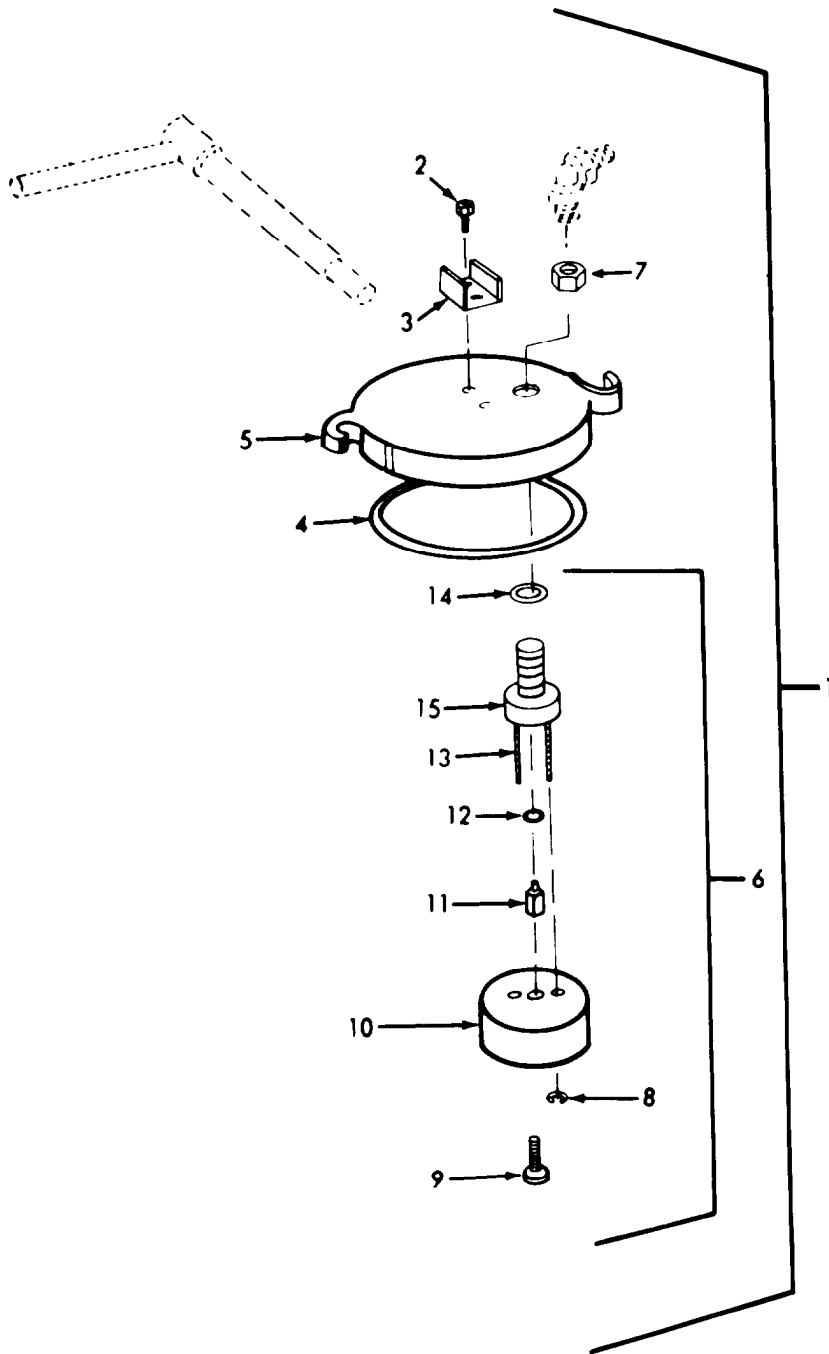


Figure C-27. Cover and Air Eliminator
Models C and D (DBP, DBQ)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.					USABLE ON CODE		
C-27	1	XBCHH		53918	968	COVER ASSY W/EL IM	DBP,DBQ	EA 2
C-27	2	PAOZZ	5305-00-957-6649	96906	MS35190-285	SCREW,MACHINE ¼-20 X 3/8 IN FH	DBP,DBQ	EA 4
C-27	3	XDOZZ		53918	070F2-20	LOCATOR CS PLATED	DBP,DBQ	EA 2
C-27	4	PAOZZ	5330-00-585-3646	96906	MS28775-438	PACKING,PREFORMED 6 ¾ IN OD X 6 ¼ IN ID	DBP,DBQ	EA 2
C-27	5	XDOZZ		53918	080	COVER VESSEL CS PLATE	DBP,DBQ	EA 2
C-27	6	XDOHH		53918	967	ELIMINATOR ASSY AIR	DBP,DBQ	EA 2
C-27	7	PAOZZ	5310-00-842-1190	96906	MS35691-61	NUT,PLAIN,HEXAGON ¾-16	DBP,DBQ	EA 2
C-27	8	PAOZZ	5365-00-825-5187	79136	X5133-9	RING,RETAINING 3/32 SHAFT SIZE	DBP,DBQ	EA 2
C-27	9	PAOZZ	5305-00-978-9347	96906	MS16997-19	SCREW CAP 6-3 2X3/8	DBP,DBQ	EA 2
C-27	10	XDOZZ		53918	967-F1-2	FLOAT 2 ½ DIA X 1 CLOSED CELL 10-12 LB/ CUFT DENSITY NITROPHYL	DBP,DBQ	EA 2
C-27	11	PAOZZ		53918	967-F1-3	VALVE NEEDLE ¼ SQ X ¾ LONG 303 STAINLESS STEEL	DBP DBQ	EA 2
C-27	12	PAOZZ	5330-00-631-1346	96906	MS28775-005	PACKING,PREFORMED .241 IN OD X .101 IN ID	DBP,DBQ	EA 2
C-27	13	XDOZZ		53918	967-F1-4	PIN GUIDE 3/32 X 1.55 IN LONG 303 STAINLESS STEEL	DBP DBQ	EA 4
C-27	14	PAOZZ	5330-00-579-8156	96906	MS28775-212	PACKING,PREFORMED 1.137 IN OD X .859 IN ID	DBP,DBQ	EA 2
C-27	15	XDOZZ		53918	967-F1-1	BODY AIR ELIMINATOR 1 3/8 DIA X 1 5/8 IN LONG 303 STAINLESS STEEL	DBP,DBQ	EA 2

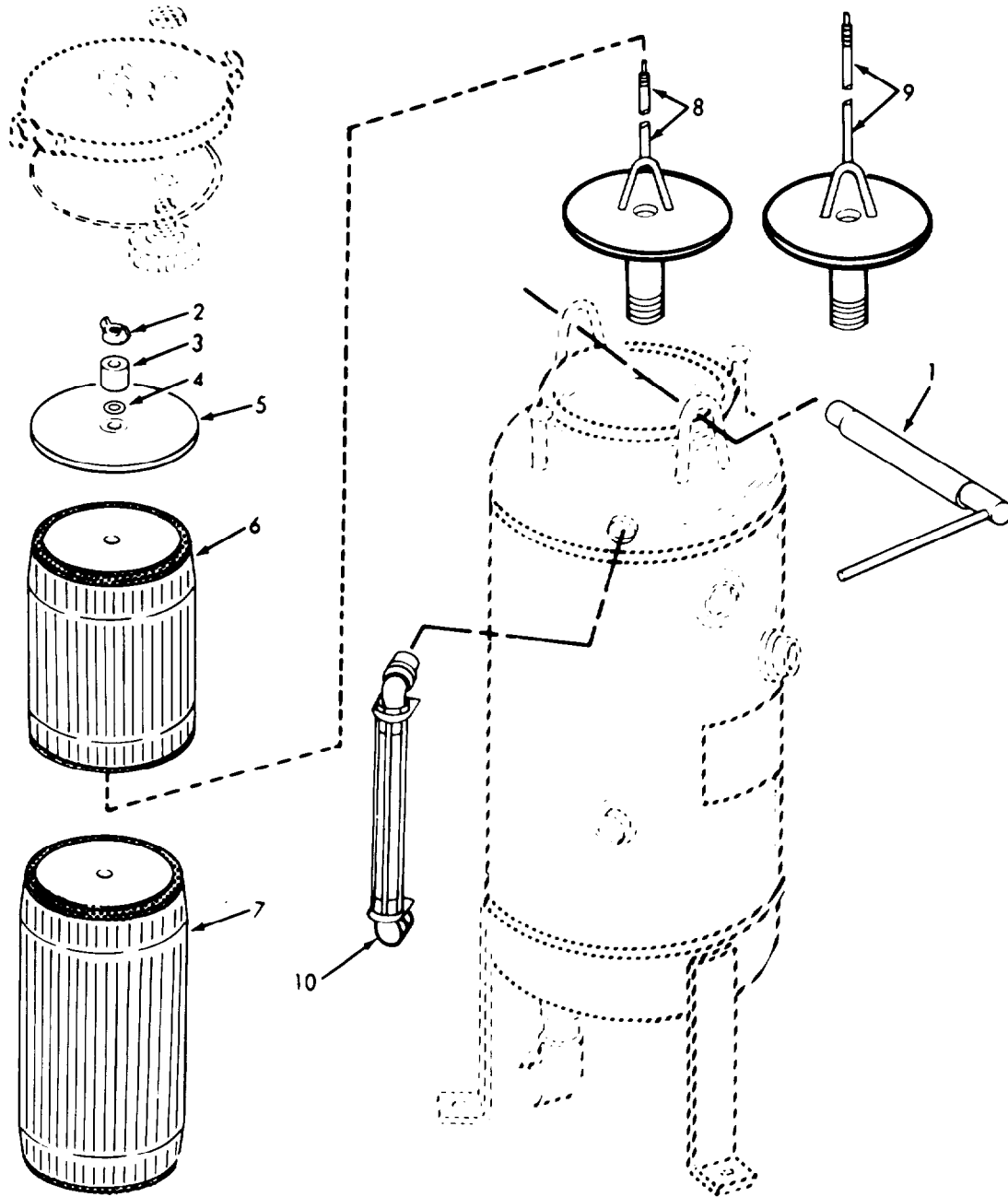


Figure C-28. Separator Sub-Assembly Models C and D (DBP, DBQ)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.					USABLE ON CODE		
C-28	1	XDOZZ		53918	966	BAR CAM CS	DBP,DBQ	EA 2
C-28	2	PAOZZ	5310-00-823-8756	96906	MS35425-44	NUT, PLAIN, WING ½ - 13	DBP, BBQ	EA 2
C-28	3	PAOZZ	5365-01-080-9496	53918	079-3-05	SPACER,SLEEVE	DBP,DBQ	EA 2
C-28	4	PAOZZ		96906	MS28775-206	PACKING,PREFORMED ¾ IN OD X ½ IN ID	DBP,DBQ	EA 2
C-28	5	XDOZZ		53918	079-3-02	PLATE HOLD DOWN CS	DBP,DBQ	EA 2
C-28	6	PAOZZ	4330-01-070-6656	53918	611-100	ELEMENT,COALESCER	DBP,DBQ	EA 1
C-28	7	PAOZZ	4330-01-078-8893	53918	614-501	FILTER ELEMENT,FLJI	DBP,DBQ	EA 1
C-28	8	XBOZZ		53918	307-2	SUPPORT ASSY FILTER	DBP,DBQ	EA 1
C-28	9	XBOZZ		53918	307-1	SUPPORT ASSY FILTER	DBP,DBQ	EA 1
C-28	10	XDCHH		53918	423-2	SIGHTGLASS ASSY	DBP,DBQ	EA 2

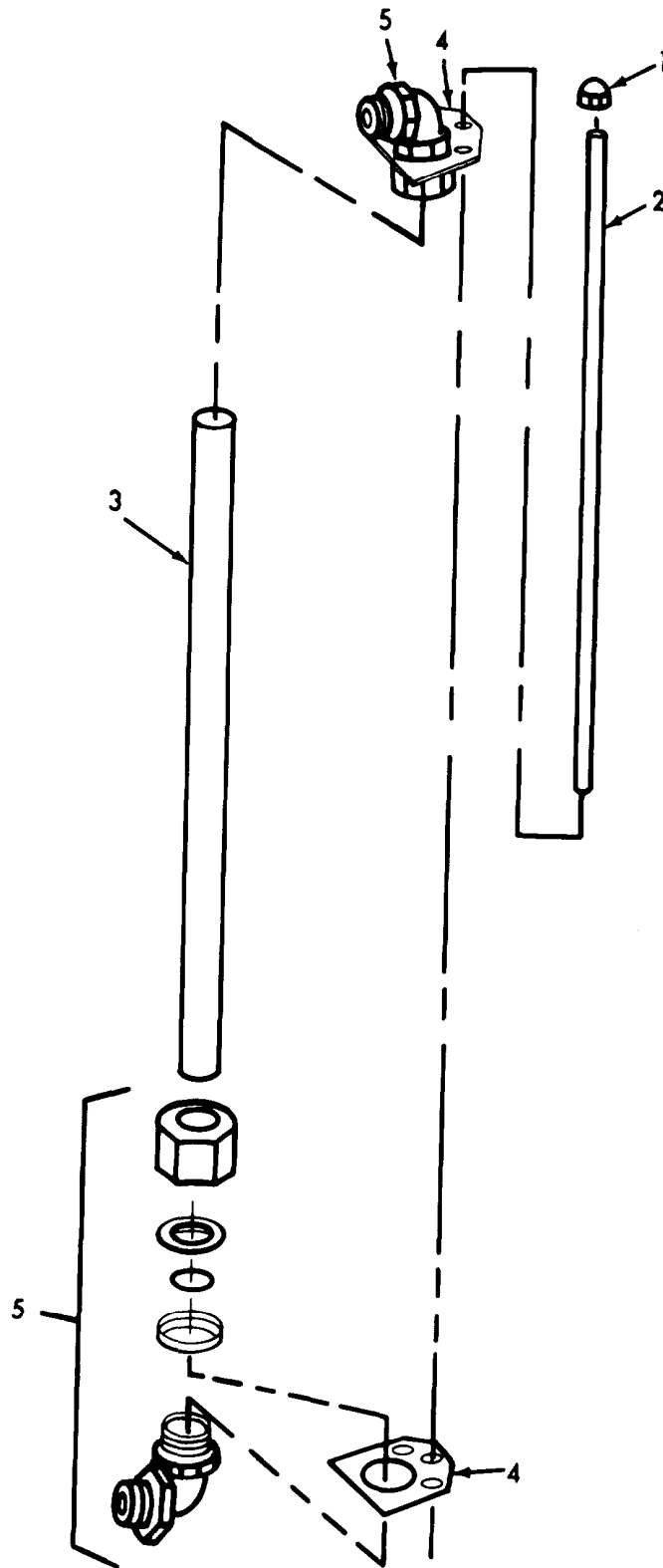


Figure C-29. Sight Glass Models C and D (DBP, DBQ)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-29	1	PAOZZ		77122	PC188	NUT PUSH 3/16 IN DBP,DBQ	EA	6
C-29	2	XDOZZ		77553	RACO 106 PI	ROD,3/16 X 11.5 IN COPPER COATED PAGE WIRE WELD ROD DBP DBQ	EA	6
C-29	3	PAOZZ		53918	TU20X10.9	SIGHTGLASS 10.9 IN 5/8 OD X 1/8 IN WALL PLEXIGLASS TUBE DBP,DBQ	EA	2
C-29	4	XDOZZ		53918	094	BRACKET SIGHTGLASS 16 GA CS DBP,DBQ	EA	4
C-29	5	PAOZZ		53918	SPF-N10ME8-1	ELBOW,NYLON,90 DEG, BALL CHECK 5/8 TUBE X 1/2 NPTM DBP DBQ	EA	4

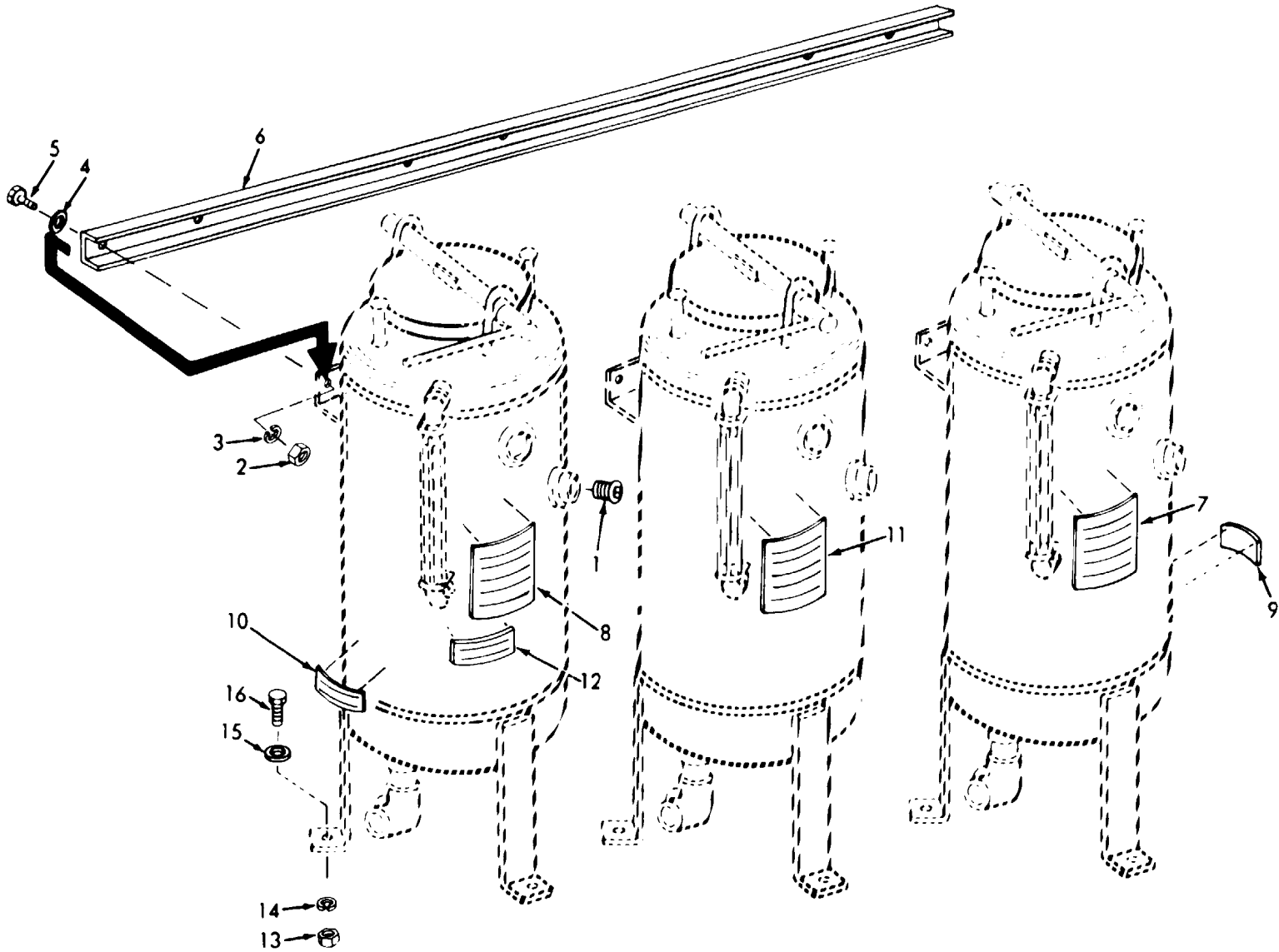


Figure C-30. Support Angle and Legend Plates
Models A and B (DBM, DBN)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-30	1	XDOZZ	4730-00-187-4210	96906	MS51884-9	PLUG PIPE 3/4 IN MI DBM,DBN	EA	1
C-30	2	PAOZZ	5310-00-761-6882	96906	MS51967-2	NUT,PLAIN,HEXAGON 1/4-20 DBM,DBN	EA	6
C-30	3	PAOZZ	5310-00-582-5965	96906	MS35338-44	WASHER,LOCK,SPRING 1/4 IN DBM,DBN	EA	6
C-30	4	PAOZZ	5310-00-141-1795	88044	AN960-416	WASHER FLAT 1/4 IN DBM,DBN	EA	6
C-30	5	PAOZZ	5305-00-225-3839	96906	MS90725-8	SCREW,CAP HEXAGON H 1/4-20 X 1 IN DBM,DBN	EA	6
C-30	6	XBOZZ		53918	936-1	ANGLE SUPPORT CS DBM,DBN	EA	1
C-30	7	XDOZZ		53918	926-33	PLATE IDENT TYPE A DBM	EA	1
C-30	7	XDOZZ		53918	934-33	PLATE IDENT TYPE B DBN	EA	1
C-30	8	XDOZZ		53918	926-34	PLATE LEGEND INSTRUCTIONS DBM,DBN	EA	1
C-30	9	XDOZZ		53918	926-35	PLATE LEGEND INLET DBM,DBN	EA	1
C-30	10	XDOZZ		53918	926-36	PLATE LEGEND OUTLET DBM,DBN	EA	1
C-30	11	XDOZZ		53918	926-37	PLATE LEGEND WARNING 220 VAC DBM	EA	1
C-30	11	XDOZZ		53918	934-37	PLATE LEGEND WARNING 110 VDC DBN	EA	1
C-30	12	XDOZZ		53918	926-38	PLATE LEGEND OPEN VALVE ONLY TO DISCHARGE OIL DBM,DBN	EA	1
C-30	13	PAOZZ	5310-00-732-0558	96906	MS51967-8	NUT,PLAIN,HEXAGON 3/8-16 DBM,DBN	EA	9
C-30	14	PAOZZ		96906	MS35338-46	WASHER,LOCK,SPRING 3/8 IN DBM,DBN	EA	9
C-30	15	PAOZZ	5310-00-167-0821	88044	AN960-616	WASHER,FLAT 3/8 IN DBM,DBN	EA	9
C-30	16	PAOZZ	5305-00-269-3214	96906	MS90725-64	SCREW,CAP,HEXAGON H 3/8-16 X 1 1/2 IN DBM,DBN	EA	9

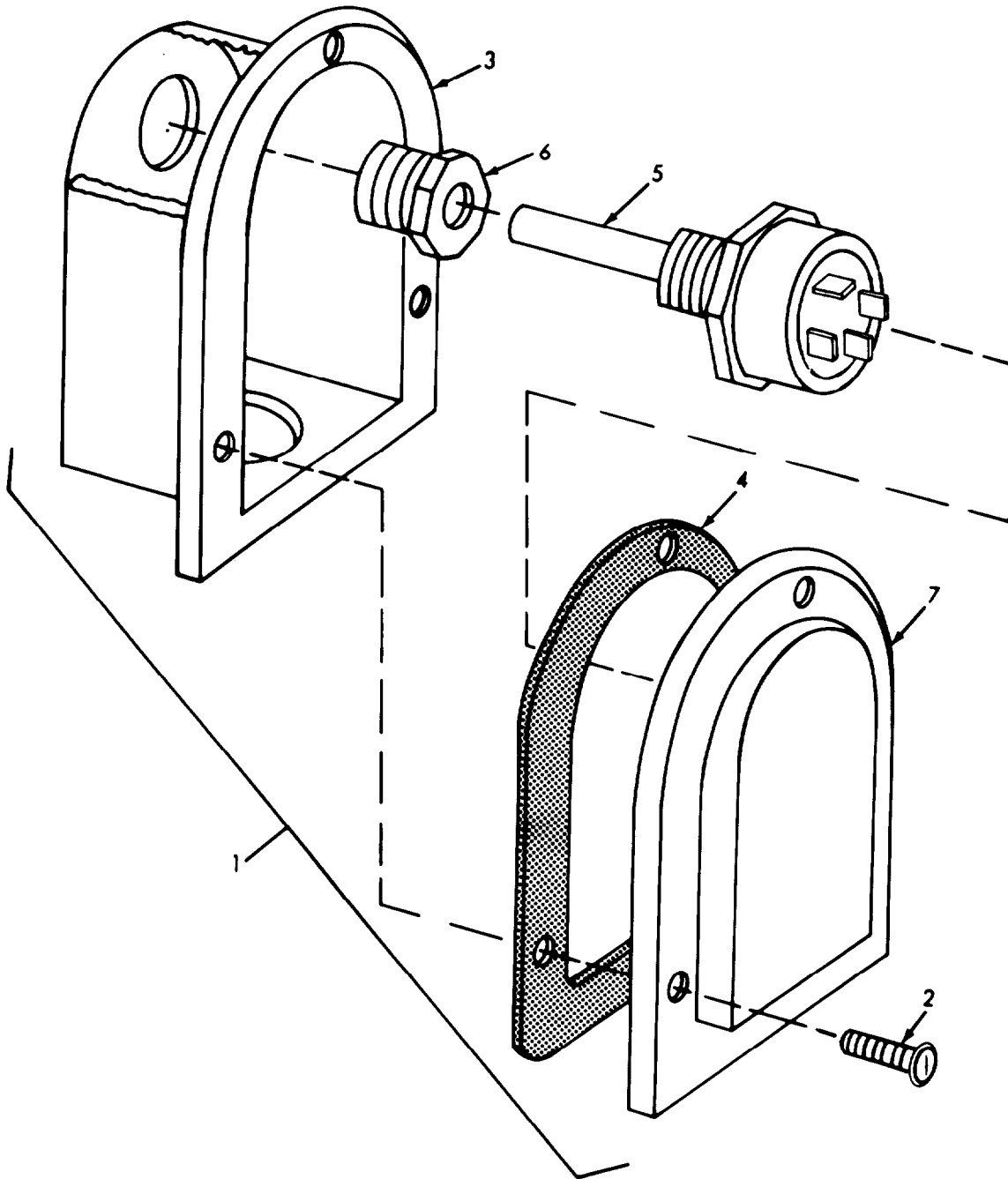


Figure C-31. Mini-Probe Assembly Models A and B (DBM, DBN)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.					USABLE ON CODE		
C-31	1	XDOHH		53918	392	MINI-PROBE ASSY	DBM,DBN	EA 2
C-31	2	PAOZZ	5305-00-984-5189	96906	MS35206-241	SCREW MACHINE 8-32 X 1/4 IN	DBM,DBN	EA 6
C-31	3	XDOZZ		82434	168-808-1	COVER 20 GA CS	DBM,DBN	EA 2
C-31	4	PAOZZ	5330-00-301-6280	04845	172-759-1	GASKET	DBM,DBN	EA 2
C-31	5	PAOZZ		00543	613NLGX	MINI-PROBE	DBM,DBN	EA 2
C-31	6	PAOZZ	4730-01-007-2917	14889	839-098	BUSHING,PIPE 3/4 X 1/4 IPS HEX HEAD	DBM,DBN	EA 2
C-31	7	PAOZZ		82434	168-736-5	BODY HOUSING 20 GUAGE CS	DBM,DBN	EA 2

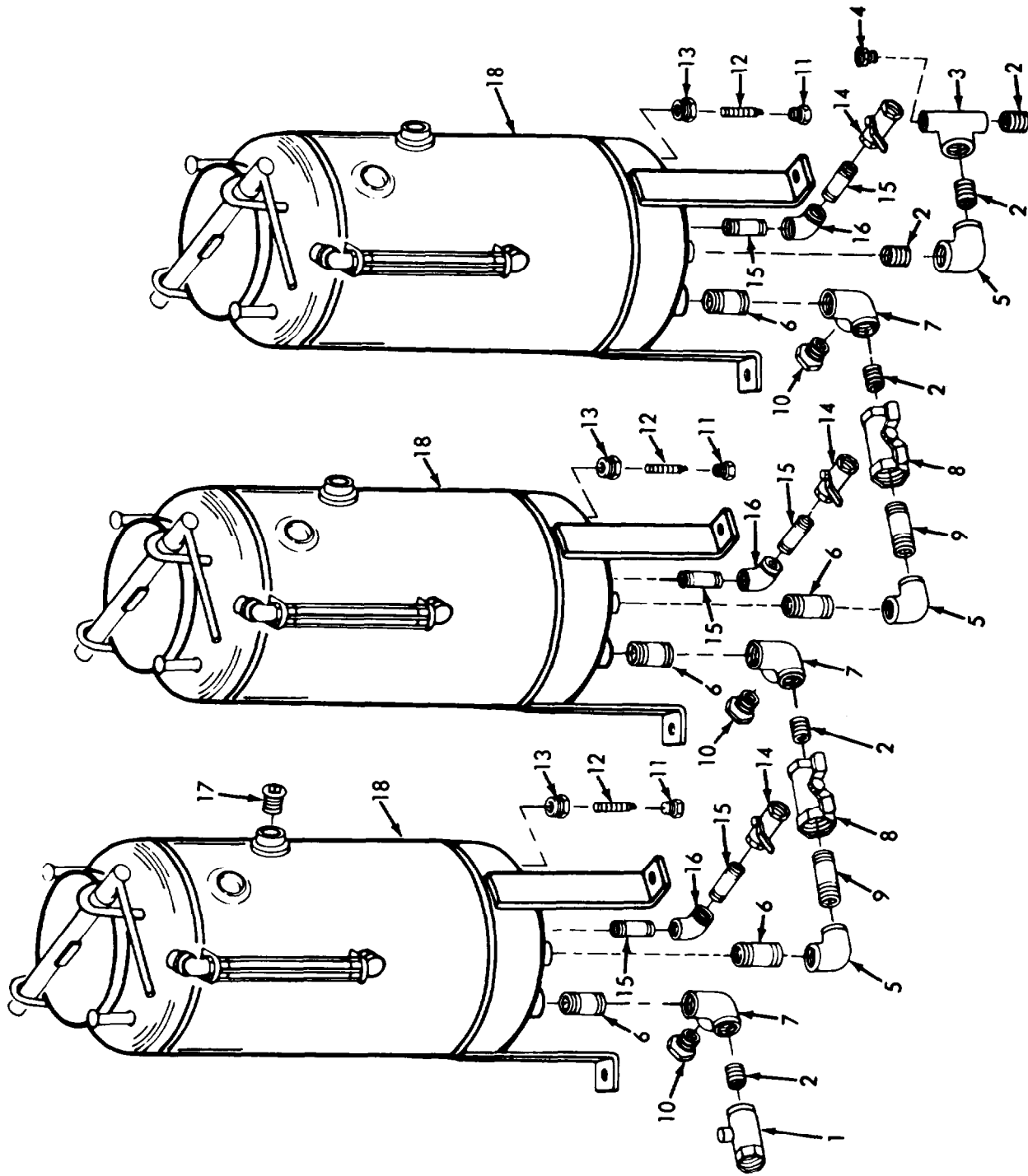


Figure C-32. Vessel Piping Models A and B (DBM, DBN)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-32		XBOHH		53918	928	VESSEL SUBASSEMBLY DBM,DBN	EA	1
C-32	1	PAOZZ	4820-02-110-7091	72219	70-145-01	BALBE BALL 1 IN 1 IN NPT FEMALE ENDS DBM,DBN	EA	1
C-32	2	PAOZZ	4730-00-196-1469	96906	MS51953-121	NIPPLE,PIPE 1 IN CLOSE DBM,DBN	EA	6
C-32	3	XDOZZ		53918	TE15	TEE REDUCING GALV 1 X ¾ X 1 IN M I SCREWED DBM,DBN	EA	1
C-32	4	XDOZZ	4730-00-363-4138	96906	MS51887-17	BUSHING 3/4X1/4 IN HEX HEAD GALV M I SCREWED DBM,DBN	EA	1
C-32	5	XDOZZ		53918	EB65	ELBOW 1 IN GALV MI DBM,DBN	EA	3
C-32	6	PAOZZ	4730-00-196-1501	96906	MS51953-125	NIPPLE,PIPE 1 X 2 ½ IN LONG DBM,DBN	EA	5
C-32	7	XDOZZ		53918	EB64	ELBOW 1 IN GALV MI SIDE OUTLET SCREWED DBM,DBN	EA	3
C-32	8	PAOZO	4820-01-115-3454	72219	70-345-01	VALVE BALL 1 IN BRONZE FEMALE UNION END DBM,DBN	EA	2
C-32	9	PAOZZ	4730-00-196-1525	96906	MS51953-127	NIPPLE,PIPE 1 X 3 ½ IN LONG DBM,DBN	EA	2
C-32	10	XDOZZ		96906	MS51887-27	BUSHING 1X1/4 IN MI DBM,DBN	EA	3
C-32	11	XDOZZ		16115	PP375B	PLUG,ANODE RETAINER BRONZE DBM,DBN	EA	3
C-32	12	PAOZZ	5340-01-081-0460	16115	P500-2	ANODE 3/8-16UNCX2IN ZINC DBM,DBN	EA	3
C-32	13	XDOZZ		96906	MS51847-12	BUSHING,1 X 3/8 NPT BRONZE DBM,DBN	EA	3
C-32	14	PAOZZ	4820-01-110-1171	72219	70-143-01	VALVE BALL ½ IN DBM,DBN	EA	3
C-32	15	PAOZZ	4730-00-196-1493	96906	MS51953-78	NIPPLE,PIPE ½ X 2 IN LONG DBM,DBN	EA	5
C-32	16	XDOZZ		53918	EB60	ELBOW ½ GALV DBM,DBN	EA	3
C-32	17	PAOZZ	4730-00-187-4210	96906	MS51884-9	PLUG,PIPE DBM,DBN	EA	1
C-32	18	XBOHH		53918	071-2	VESSEL ASSEMBLY DBM,DBN	EA	3

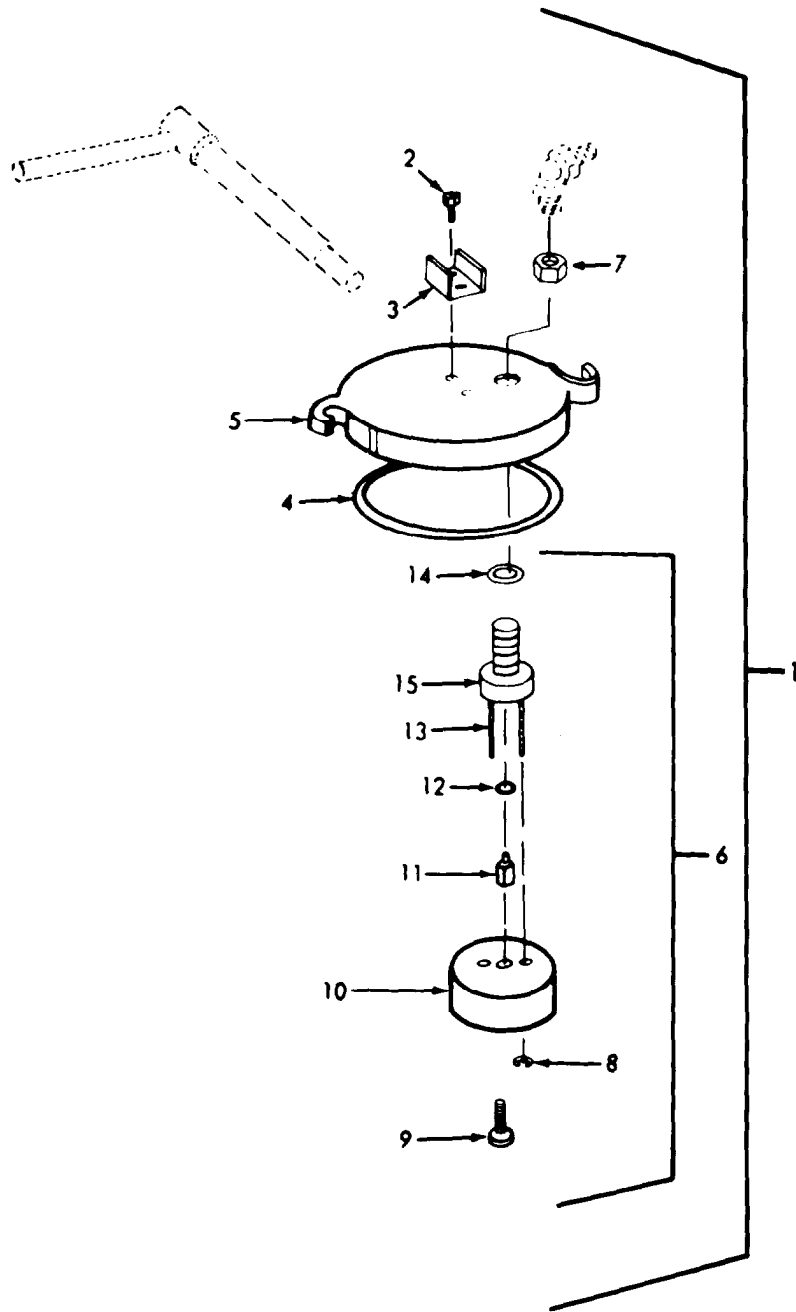


Figure C-33. Cover and Air Eliminator
Models A and B (DBM, DBN)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.					USABLE ON CODE		
C-33	1	XBCHH		53918	968	COVER ASSY W/ELIM	DBM,DBN	EA 3
C-33	2	PAOZZ	5305-00-957-6649	96906	MS35190-285	SCREW,MACHINE ¼-20 X 3/8 IN FH	DBM,DBN	EA 6
C-33	3	XDOZZ		53918	070F2-20	LOCATOR CS PLATED	DBM,DBN	EA 3
C-33	4	PAOZZ	5330-00-585-3646	96906	MS28775-438	PACKING,PREFORMED 6 ¾ IN OD X 6 ¼ IN ID	DBM,DBN	EA 3
C-33	5	XDOZZ		53918	080	COVER,VESSEL	DBM,DBN	EA 3
C-33	6	XDOHH		53918	967	ELIMINATOR ASSY AIR	DBM,DBN	EA 3
C-33	7	PAOZZ	5310-00-842-1190	96906	MS35691-61	NUT,PLAIN,HEXAGON ¾-16	DBM,DBN	EA 3
C-33	8	PAOZZ	5365-00-825-5187	79136	X5133-9	RING,RETAINING 3/32 SHAFT SIZE	DBM,DBN	EA 3
C-33	9	PAOZZ	5305-00-978-9347	96906	MS16997-19	SCREW,CAP SOCKET HE 6-32 X 3/8 IN	DBM,DBN	EA 6
C-33	10	XDOZZ		53918	967-F1-2	FLOAT 2 ½ DIA X 1 CLOSED CELL 10-12 LB/CU FT DENSITY NITROPHYL	DBM,DBN	EA 3
C-33	11	XDOZZ		53918	967-F1-3	VALVE,NEEDLE ¼ SQ X ¾ LONG 303 STAINLESS STEEL	DBM DBN	EA 3
C-33	12	PAOZZ	5330-00-631-1346	96906	MS28775-005	PACKING,PREFORME .241 IN OD X .101 IN ID	DBM,DBN	EA 3
C-33	13	XDOZZ		53918	967-F1-4	PIN,GUIDE 3/32 X 1.55 IN LONG 303 STAINLESS STEEL	DBM DBN	EA 6
C-33	14	PAOZZ	5330-00-579-8156	96906	MS28775-212	PACKING,PREFORMED 1.137 IN OD X .859 IN ID	DBM,DBN	EA 3
C-33	15	XDOZZ		53918	967-F1-1	BODY,AIR ELIMINATOR 1 3/8 DIA X 1 5/8 IN LONG 303 STAINLESS STEEL	DBM,DBN	EA 3

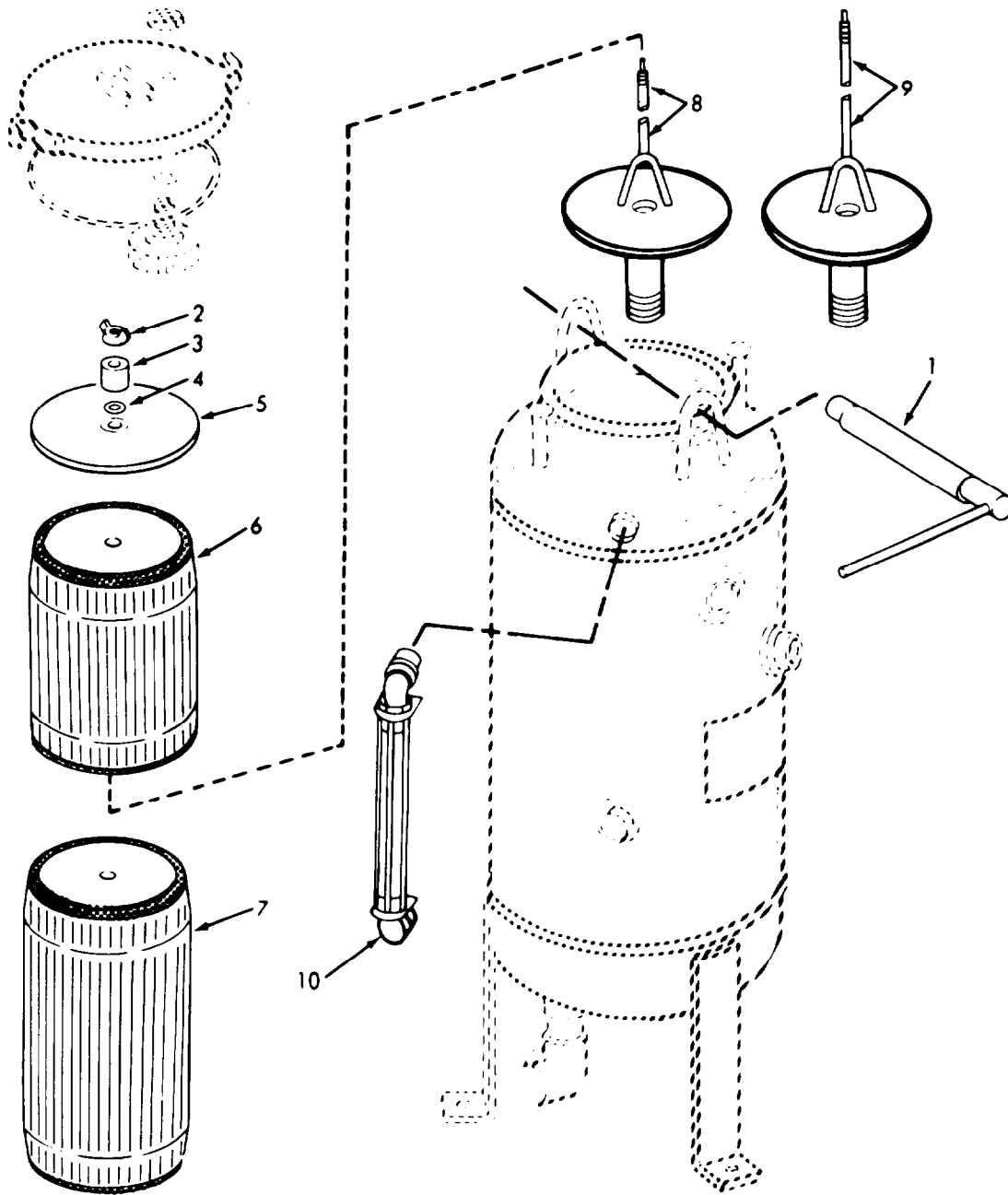


Figure C-34. Separator Sub-Assembly Models A and B (DBM, DBN)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-34	1	XDOZZ		53918	966	BAR CAM CS DBM,DBN	EA	3
C-34	2	PAOZZ	5310-00-823-8756	96906	MS35425-44	NUT,PLAIN,WING ½-13 DBM,DBN	EA	3
C-34	3	PAOZZ	5365-01-080-9496	53918	079-3-05	SPACER,SLEEVE DBM,DBN	EA	3
C-34	4	PAOZZ		96906	MS28775-206	PACKING,PREFORMED ¾ IN OD X ½ IN ID DBM,DBN	EA	3
C-34	5	XDOZZ		53918	079-03-02	PLATE HOLD DOWN CS DBM,DBN	EA	3
C-34	6	PAOZZ	4330-01-070-6656	53918	611-100	ELEMENT,COALESCER DBM,DBN	EA	2
C-34	7	PAOZZ	4330-01-078-8893	53918	614-501	FILTER ELEMENT,FLJI DBM,DBN	EA	1
C-34	8	XBOZZ		53918	307-2	SUPPORT ASSY FILTER DBM,DBN	EA	2
C-34	9	XBOZZ		53918	307-1	SUPPORT ASSY FILTER DBM,DBN	EA	1
C-34	10	XBCHH		53918	423-2	SIGHTGLASS ASSY DBM,DBN	EA	3

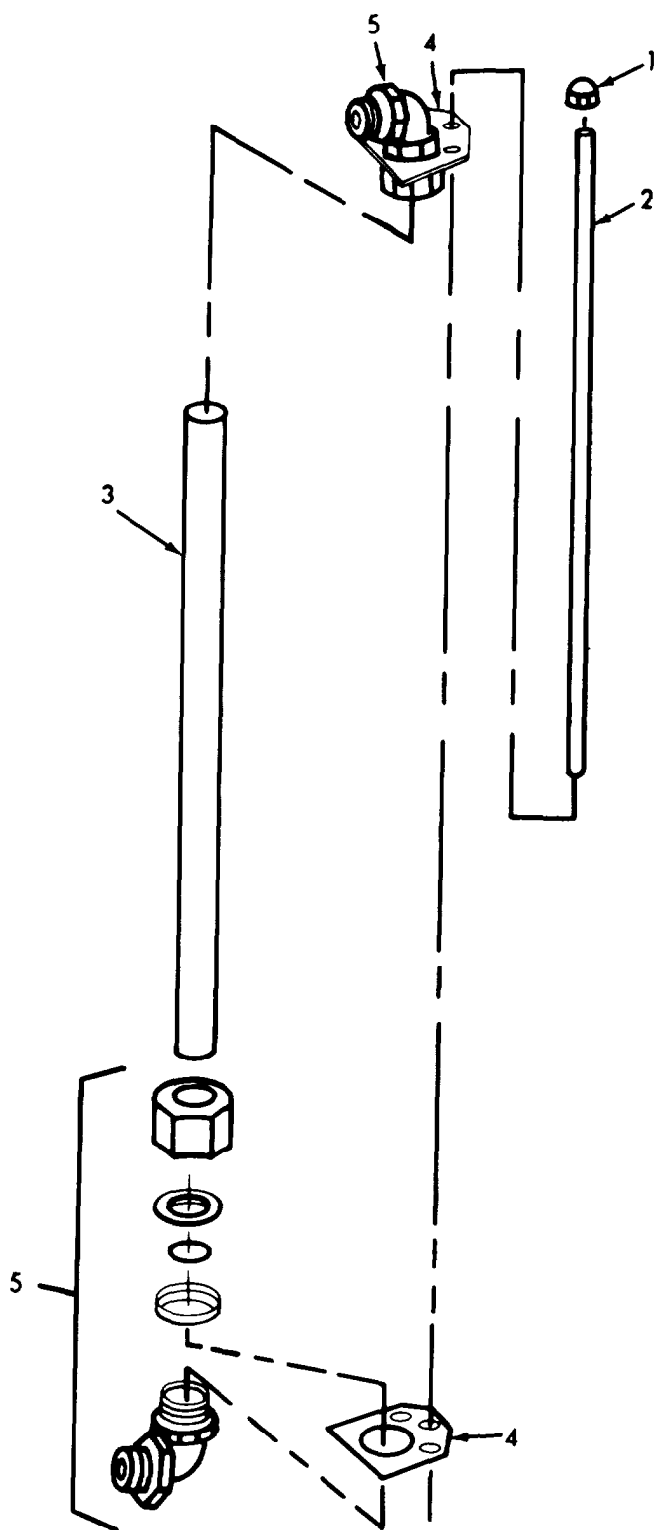


Figure C-35. Sight Glass Models A and B (DBM, DBN)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-35	1	PAOZZ		77122	P0188	NUT PUSH 3/16 IN DBM,DBN	EA	9
C-35	2	XDOZZ		77553	RACO 106 PI	ROD 3-16 X 11.5 COPPER COATED PAGE WIRE WELD ROD DBM DBN	EA	9
C-35	3	PAOZZ		53918	TU20X10.9	SIGHTGLASS 6.9 IN 5/8 OD X 1/8 WALL PLEXIGLASS TUBE DBM DBN	EA	3
C-35	4	XDOZZ		53918	094	BRACKET,SIGHTGLASS DBM,DBN	EA	6
C-35	5	PAOZZ		53918	SPF-N10ME8-1	ELBOW,NYLON,90 DEG. BALL CHECK 5/8 TUBE X 1/2 NPTM DBM DBN	EA	6

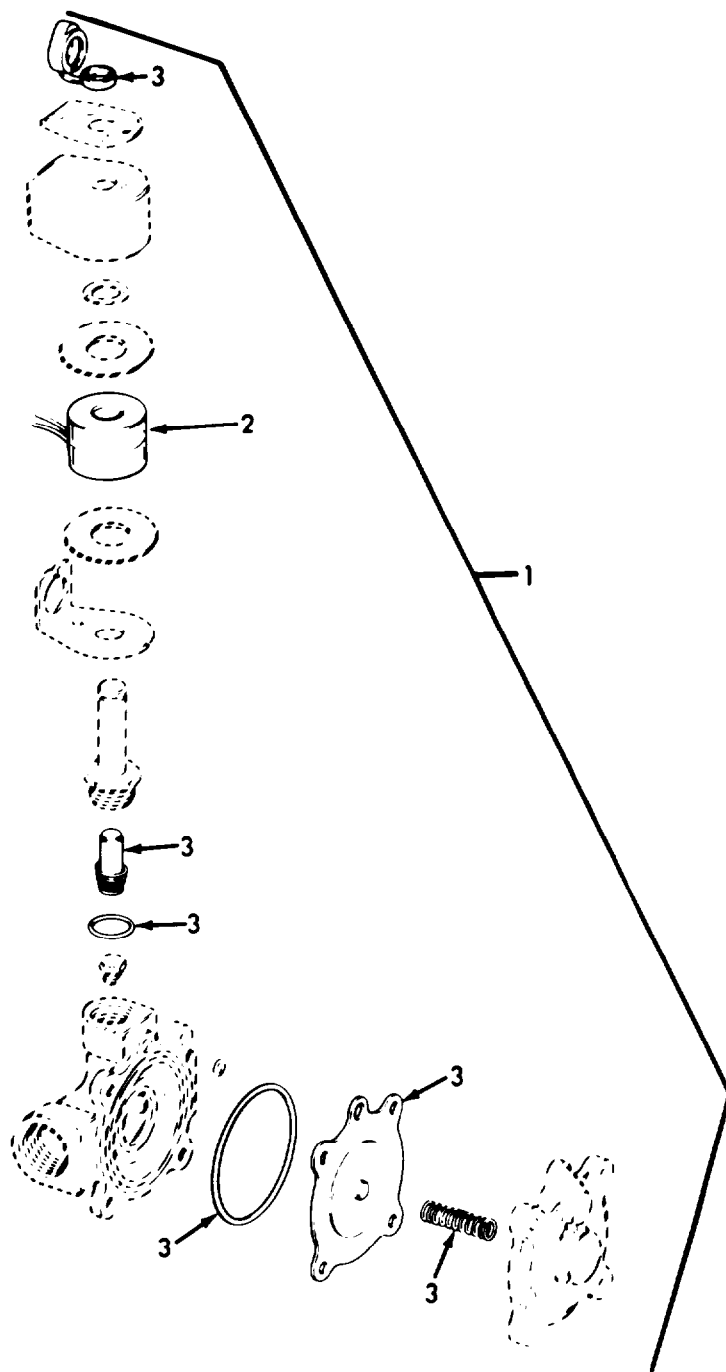


Figure C-36. Valve Solenoid Models A and B (DBM, DBN)

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-36	1	XDOHH		04845	8210D4VDO24	VAVLE SOLENOID 1 IN DBM,DBN	EA	1
C-36	2	PAOZZ	1450-00-083-9918	04845	27-463-4D	COIL 24 VDC MOLDED DBM,DBN	EA	1
C-36	3	PAOZZ	4810-01-030-9228	04845	FV172-881	PARTS KIT,PRESSURE DBM,DBN	EA	1

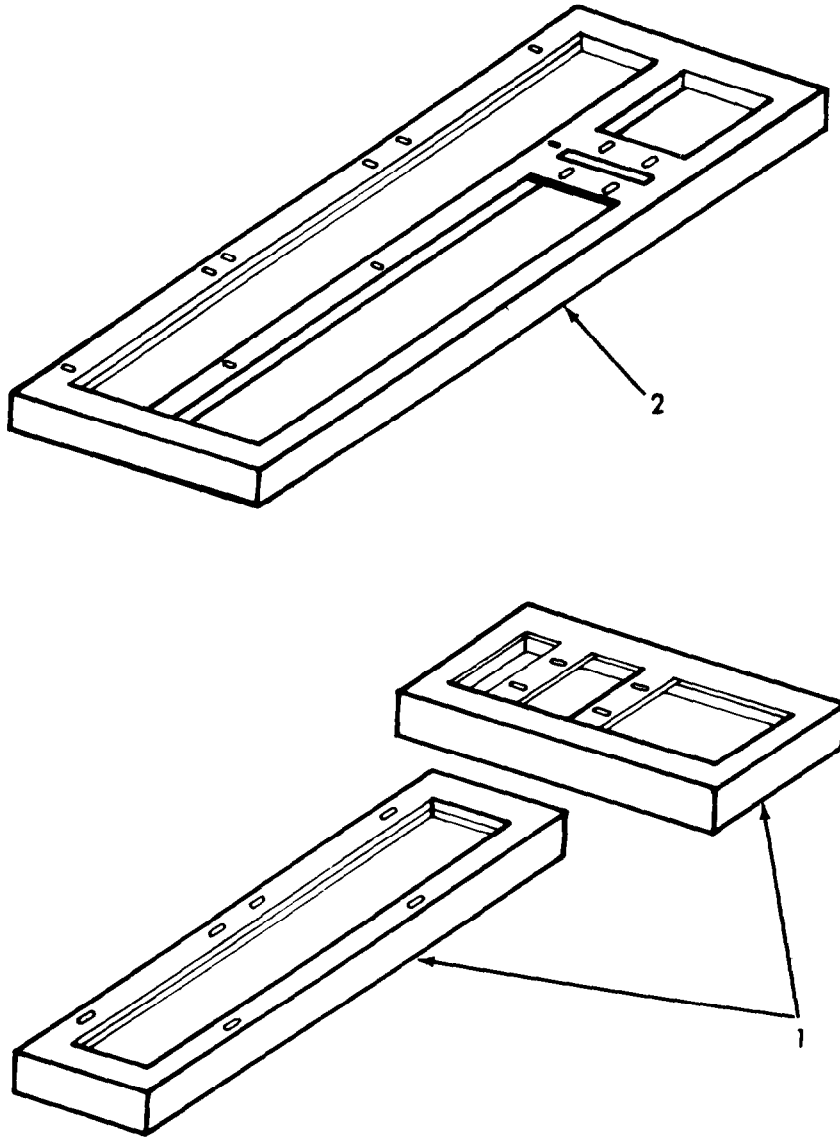


Figure C-37. Mounting Frames

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-37	1	XBOZZ		53918	943	GROUP 08 MOUNTING FRAME FRAME,MOUNTING DBP,DPQ	EA	1
C-37	2	XBOZZ		53918	929	FRAME,MOUNTING DBM,DBN	EA	1

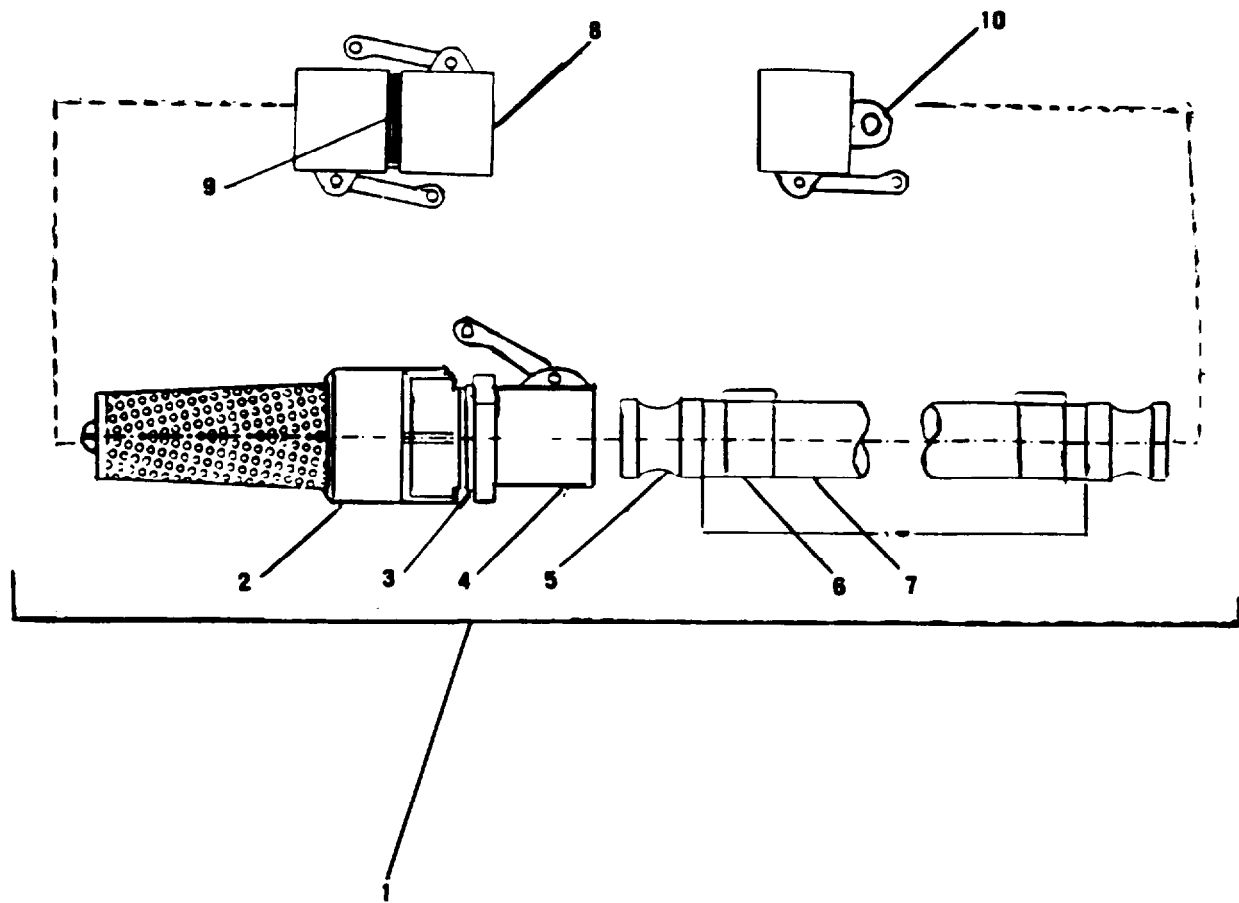


Figure C-38. Suction Hose

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
						GROUP 09 SUCTION HOSE ASSEMBLY		
C-38	1	XDOFH		53918	SX-1075	SUCTION HOSE ASSEMBLY	EA	1
C-38	2			53918	400-1	FOOT VALVE 1" NPT W/ STRAINER	EA	1
C-38	3			53918	B034-BR	BUSHING, 1/2" X 1" NPT	EA	1
C-38	4			53918	50-B-BR	CONNECTOR, 1/2" FEM OD X 1/2" NPT	EA	2
C-38	5			53918	50-E-BR	CONNECTOR, 1/2" MOD X 1/2" HOSE BARB	EA	2
C-38	6			53918	TYPE 55 SF	CLAMP, 1/2"	EA	2
C-38	7			53918	KSS	HOSE, 1/2" I. D.	FT	15
C-38	8			53918	50-D-BR	COUPLING, O.D. 1/2" FEM X 1/2" FEM NPT	EA	2
C-38	9			53918	50-DC-BR	CAP, O.D. 1/2"	EA	1
C-38	10			53918	NJ 40-BR	NIPPLE, PIPE 1/2" X CLOSE	EA	1

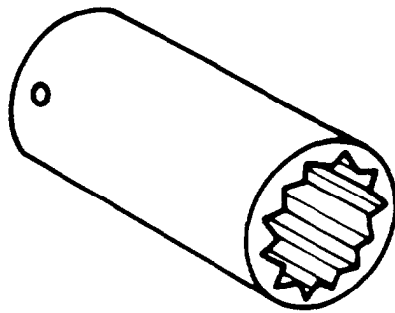


Figure C-39. Socket Wrench

SECTION II

TM 55-2090-201-14&P

(1) ILLUSTRATION		(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
(A) FIG. NO.	(B) ITEM NO.							
C-39	1	PAOZZ	5120-00-277-1465	81348	GGGW641	GROUP 10 SPECIAL TOOLS LIST SOCKET, SOCKET WRENC THIN WALL 1-1/2 X 1/2 IN SQ. DRIVE	EA	1

SECTION IV

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5920-00-012-0151	C-10	14	4730-00-187-4210	C-26	15
5920-00-012-0151	C-13	22	4730-00-187-4210	C-30	1
5920-00-012-0151	C-3	6	4730-00-187-4210	C-32	17
5920-00-012-0151	C-6	5	4730-00-196-1468	C-21	5
4730-00-044-4587	C-17	3	4730-00-196-1468	C-23	9
4730-00-044-4587	C-18	9	4730-00-196-1469	C-21	9
5330-00-051-2547	C-14	5	4730-00-196-1469	C-23	13
5305-00-525-3839	C-11	14	4730-00-196-1469	C-26	6
5305-00-525-3839	C-2	13	4730-00-196-1469	C-32	2
5305-00-525-3839	C-25	8	4730-00-196-1493	C-17	8
5305-00-525-3839	C-30	5	4730-00-196-1493	C-18	8
5305-00-525-3839	C-5	13	4730-00-196-1493	C-26	2
5305-00-525-3839	C-8	14	4730-00-196-1493	C-32	15
5305-00-525-3839	C-2	13	4730-00-196-1495	C-18	6
5305-00-525-3839	C-25	8	4730-00-196-1496	C-17	5
5305-00-525-3839	C-30	5	4730-00-196-1496	C-18	4
5305-00-525-3839	C-5	13	4730-00-196-1497	C-21	3
5305-00-525-3839	C-8	14	4730-00-196-1497	C-23	11
5305-00-525-3839	C-2	13	4730-00-196-1498	C-21	7
5305-00-525-3839	C-25	8	4730-00-196-1498	C-23	7
5305-00-525-3839	C-30	5	4730-00-196-1501	C-21	13
5305-00-525-3839	C-5	13	4730-00-196-1501	C-23	14
5305-00-525-3839	C-8	14	4730-00-196-1501	C-26	11
1450-00-083-9918	C-19	2	4730-00-196-1501	C-32	6
1450-00-083-9918	C-36	2	4730-00-196-1503	C-16	10
5310-00-141-1795	C-11	13	4730-00-196-1503	C-18	2
5310-00-141-1795	C-2	12	4730-00-196-1524	C-21	11
5310-00-141-1795	C-25	7	4730-00-196-1525	C-26	7
5310-00-141-1795	C-30	4	4730-00-196-1525	C-32	9
5310-00-141-1795	C-5	12	4730-00-196-1526	C-21	15
5310-00-141-1795	C-8	13	4730-00-196-1547	C-16	8
5920-00-142-7379	C-3	5	4730-00-196-1548	C-16	11
6240-00-143-7513	C-12	2	4730-00-196-1550	C-17	2
6240-00-143-7513	C-3	1	4730-00-196-1555	C-26	7A
6240-00-143-7513	C-9	1	5940-00-197-8694	C-10	20
5310-00-167-0820	C-22	3	5940-00-197-8694	C-4	15
5310-00-167-0820	C-23	3	5940-00-197-8694	C-15	5
5310-00-167-0821	C-25	3	5940-00-197-8697	C-10	21
5310-00-1'67-0821	C-30	15	5940-00-197-8697	C-15	7
4730-00-187-4207	C-24	15			

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

STOCKNUMBER	FIG.	ITEM	STOCKNUMBER	FIG.	ITEM
5940-00-197-8697	C-13	29	4730-00-277-1840	C-18	10
5940-00-197-8694	C-7	17	5940-00-280-3499	C-10	22
5940-00-197-8739	C-15	8	5940-00-280-3499	c-13	32
5940-00-197-8739	C-7	15	5940-00-280-3499	C-10	24
5310-00-209-0788	C-10	8	5920-00-280-8342	C-10	13
5310-00-209-0788	C-11	4	5920-00-280-8342	C-13	21
5310-00-209-0788	C-13	13	5920-00-284-6795	C-10	15
5310-00-209-0788	C-2	4	5920-00-284-6795	C-13	20
5310-00-209-0788	C-4	8	5920-00-284-6795	C-6	4
5310-00-209-0788	C-5	4	5330-00-301-6280	C-31	4
5310-00-209-0788	C-7	8	6105-00-306-9519	C-23	19
5310-00-209-0788	C-8	4	4730-00-363-4138	C-32	4
6240-00-223-9100	C-12	1	5310-00-407-9566	C-22	2
6240-00-223-9100	C-3	3	5310-00-407-9566	C-23	2
6240-00-223-9100	C-6	1	5975-00-451-5001	C-15	4
6240-00-223-9100	C-9	2	5975-00-451-5001	C-16	12
5305-00-225-3839	C-11	14	5305-00-525-3839	C-11	14
5305-00-225-3839	C-2	13	5305-00-525-3839	C-2	13
5305-00-225-3839	C-25	8	5305-00-525-3839	C-25	8
5305-00-225-3839	C-30	5	5305-00-525-3839	C-30	5
5305-00-225-3839	C-5	13	5305-00-525-3839	C-5	13
5305-00-225-3839	C-8	14	5305-00-525-3839	C-8	14
5305-00-525-3839	C-11	14	5145-00-553-0828	C-15	3
5305-00-525-3839	C-2	13	6145-00-553-0828	c-4	16
5305-00-525-3839	C-25	8	5145-00-553-0832	C-10	24
5305-00-525-3839	C-30	5	6145-00-553-0832	C-15	
5305-00-525-3839	C-5	13	6145-00-553-0832	C-7	16
5305-00-525-3839	C-8	14	5330-00-571-9637	C-14	9
5306-00-225-8499	C-22	4	5330-00-579-8186	C-27	14
5306-00-225-8499	C-23	4	5330-00-579-8156	C-33	14
5940-00-244-9749	C-10	10	5310-00-582-5965	C-11	12
5940-00-244-9749	C-13	17	5310-00-582-5965	C-2	11
5940-00-244-9749	C-7	10	5310-00-582-5965	C-25	6
5305-00-269-3214	C-25	4	5310-00-582-5965	C-30	3
5305-00-269-3214	C-30	16	5310-00-582-5965	C-5	11
■ 5120-00-277-1465	C-39	1	5310-00-582-5965	C-8	12
4730-00-277-1840	C-17	9	5330-00-585-3646	C-27	4

		NATIONAL STOCK		NUMBER INDEX	
STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5330-00-585-3646	C-33	4	5920-00-892-9311	C-10	16
5310-00-596-7691	C-4	4	5920-00-892-9311	C-13	23
5310-00-596-7691	C-7	4	5920-00-892-9311	C-3	7
5330-00-615-1725	C-14	7	5920-00-892-9311	C-6	6
5310-00-616-3554	C-13	10	4720-00-916-7092	C-20	3
5330-00-631-1346	C-27	12	4720-00-916-7092	C-20	3
5330-00-631-1346	C-33	12	4730-00-921-3612	C-16	7
5310-00-637-9541	C-25	2	5310-00-934-9739	C-13	3
5305-00-638-8691	C-24	5	5310-00-934-9760	C-10	5
5975-00-3136-3136	C-10	1	5310-00-934-9760	C-13	7
5975-00-655-3136	C-13	1	5310-00-934-9760	C-4	3
5975-00-655-3136	C-16	3	5310-00-934-9760	C-7	3
5975-00-655-3136	C-4	1	5310-00-934-9761	C-10	7
5975-00-655-3136	C-7	1	5310-00-934-9761	C-11	3
5940-00-727-8481	C-10	11	5310-00-934-9761	C-13	9
5940-00-727-8481	C-13	18	5310-00-934-9761	C-13	12
5940-00-727-8481	C-4	11	5310-00-934-9761	C-2	3
5940-00-727-8481	C-7	11	5310-00-934-9761	C-4	7
5310-00-732-0558	C-25	1	5310-00-934-9761	C-5	3
5310-00-732-0558	C-30	13	5310-00-934-9761	C-7	7
5310-00-761-6882	C-11	11	5310-00-934-9761	C-8	3
5310-00-761-6882	C-2	10	5305-00-942-2196	C-24	3
5310-00-761-6882	C-25	5	5305-00-957-6649	C-27	2
5310-00-761-6882	C-30	2	5305-00-957-6649	C-33	2
5310-00-761-6882	C-5	10	5305-00-978-9347	C-27	8
5310-00-761-6682	C-8	11	5305-00-978-9347	C-33	9
5310-00-823-8756	C-28	2	5305-00-978-4988	C-11	5
5310-00-823-8756	C-34	2	5305-00984-4988	C-2	5
5365-00-825-5187	C-27	8	5305-00-984-4988	C-5	5
5365-00-825-5187	C-33	8	5305-00-984-4988	C-8	5
5310-00-842-1190	C-27	7	5305-00-984-6189	C-31	2
5310-00-842-1190	C-33	7	5305-00-984-6212	C-4	5
5310-00-880-7744	C-22	1	5305-00-984-6212	C-7	5
5310-00-880-7744	C-23	1	5305-00-964-6212	C-13	15
5305-00-889-3000	C-10	9	4730-01-007-2917	C-31	6
5305-00-889-3000	C-13	11	4810-01-030-9228	C-36	3
5305-00-889-3000	C-13	14	4320-01-051-9879	C-24	12
5305-00-889-3000	C-4	9	4810-01-070-0629	C-19	1
5305-00-89-3000	C-7	9	4330-01-070-6656	C-28	6

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STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
4330-01-070-6656	C-34	6	4820-01-110-7091	C-32	1
2090-01-076-5850	C-1	1	6105-01-110-7702	C-22	6
2090-01-076-5851	C-1	2	6105-01-110-7702	C-23	20
2090-01-076-5852	C-1	2	4320-01-110-8968	C-24	11
2090-01-076-5849	C-1	1	4320-01-110-9683	C-24	14
4730-01-076-8903	C-20	1	5330-01-112-6662	C-14	3
4730-01-076-8903	C-28	7	5330-01-112-7957	C-14	4
4730-01-076-8903	C-34	7	5330-01-112-7959	C-14	10
5685-01-079-1789	C-11	6	5310-01-115-0757	C-10	2
6685-01-079-1789	C-2	6	5310-01-115-0757	C-13	2
5685-01-079-1789	C-5	6	6680-01-115-1700	C-14	
5685-01-079-1789	C-8	6	3010-01-115-2236	C-24	13
5365-01-0809496	C-28	3	6210-01-115-3029	C-12	3
5365-01-080-9496	C-34	3	6210-01-115-3029	C-3	2
5340-01-081-0460	C-26	12	6210-01-115-3029	C-6	2
5340-01-081-0460	C-32	12	6210-01-115-3029	C-9	3
4820-01-110-1171	C-17	6	6210-01-115-3038	C-12	4
4820-01-110-1171	C-18	5	6210-01-115-3038	C-9	6
4820-01-110-1171	C-26	1	6210-01-115-3039	C-12	5
4620-01-110-1171	C-32	14	6210-01-115-3039	C-9	5
4820-01-110-7091	C-21	14	4820-01-115-3454	C-26	4
4820-01-110-7091	C-23	17	4820-01-115-3454	C-32	8
4820-01-110-7091	C-26	5	5305-01-115-4441	C-10	4
			5305-01-115-4441	C-13	6
			5305-01-115-4441	C-4	2
			5305-01-115-4441	C-7	2

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00843	A-10106CH SEAL	C-10	26	53918	EB61	C-21	6
00843	A-10106CH SEAL	C-13	33	53918	EB61	C-23	10
00843	A-10106CH SEAL	C-4	13	53918	EB64	C-21	16
00843	A-10106CH SEAL	C-4	13	53918	EB64	C-23	18
24123	AB136D	C-24	7	53918	EB64	C-26	10
71400	AGC 1	C-10	13	53918	EB64	C-32	7
71400	AGC 1	C-13	21	53918	EB65	C-21	10
88044	AN504-1032-6	C-10	4	53918	EB65	C-23	15
88044	AN504-1032-6	C-13	6	53918	EB65	C-26	8
88044	AN504-1032-6	C-4	2	53918	EB65	C-32	5
88044	AN504-1032-6	C-7	2	03743	FFL-50	C-16	6
88044	AN960-416	C-11	13	81349	FHN26GI	C-10	16
88044	AN960-416	C-25	7	81349	FHN26GI	C-13	23
88044	AN960-416	C-30	4	81349	FHN26GI	C-3	7
88044	AN960-416	C-2	12	81349	FHN26GI	C-6	6
88044	AN960-416	C-5	12	04845	FV-158-934	C-19	1
88044	AN960-416	C-8	13	04845	FV172-881	C-36	3
88044	AN960-516	C-22	3	81349	F02 A32V15A	C-13	22
88044	AN960-516	C-23	3	81349	F02 A32V15A	C-3	6
88044	AN960-616	C-25	3	81349	F02 A32V15A	C-6	5
880044	AN960-616	C-30	15	81349	F02 B32V10A	C-10	15
07337	AT-1	C-16	4	81349	F02 B32V10A	C-13	20
22375	A223590	C-14		81349	F02 B32V10A	C-6	4
58927	BA3628-3045-56C	C-22	6	06383	F15C	C-10	6
55988	BA36283001-7-56C	C-22	6	06383	F15C	C-13	8
55988	BA36283001-7-56C	C-23	20	81348	GGGW641	C-39	1
53918	B034-BR	C-38	3	53918	KSS	C-38	7
53918	C030	C-16	2	36355	LT2GBKFBGL 24NA	C-12	5
53918	C030	C-15	2	36355	LT2BKFBGL 24NA	C-9	5
53918	C035	C-16	5	36355	LT2BKFBGL 24NA	C-12	4
23826	D11805-001	C-12	10	36355	LT2GN<FBGL 24NA	C-9	6
23826	D11805-001	C-3	10	36355	L 2GNFBGL 24NA	C-12	3
23826	D11805-001	C-6	9	36355	L 2GNFBGL 24NA	C-9	3
23826	D11805-001	C-9	7	71342	MC 3/4-45 PSI	C-21	4
53918	EB60	C-17	7	71342	MC 3/4-45 PSI	C-23	8
53918	EB60	C-18	7	71400	MDL 25	C-3	5
53918	EB60	C-26	3	96906	MS16994-48B	C-10	2
53918	EB60	C-32	16				

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FSCM	PART NUMBER	FIG. NO.	ITEM NO.	FSCM	PART NUMBER	FIG. NO.	ITEM NO.
96906	MS16994- 48B	C- 13	2	96906	MS35190- 285	C- 33	2
96906	MS16997- 19	C- 27	8	96906	MS35206- 228	C- 11	5
96906	MS16997- 19	C- 33	9	96906	MS35206- 228	C- 2	5
96906	MS18154- 60	C- 24	3	96906	MS35206- 228	C- 5	5
96906	MS21B	C- 12	6	96906	MS35206- 228	C- 8	5
96906	MS21B	C- 3	4	96906	MS35206- 230	C- 10	9
96906	MS21B	C- 6	3	96906	MS35206- 230	C- 13	11
96906	MS21B	C- 9	4	96906	MS35206- 230	C- 13	14
96906	MS21003- 16	C- 15	8	96906	MS35206- 230	C- 4	9
96906	MS21003- 16	C- 7	15	96906	MS35206- 230	C- 7	9
96906	MS21003- 2	C- 13	28	96906	MS35206- 234	C- 13	15
96906	MS21003- 3	C- 10	20	96906	MS35206- 241	C- 31	2
96906	MS21003- 3	C- 15	6	96906	MS35206- 265	C- 4	5
96906	MS21003- 5	C- 13	29	96906	MS35206- 265	C- 7	5
96906	MS21003- 5	C- 10	21	96906	MS35335- 30	C- 10	8
96906	MS21003- 5	C- 15	7	96906	MS35335- 30	C- 11	4
96906	MS21003- 5	C- 7	17	96906	MS35335- 30	C- 13	13
96906	MS25471- 14	C- 4	16	96906	MS35335- 30	C- 2	4
96906	MS25471- 14	C- 15	5	96906	MS35335- 30	C- 4	8
96906	MS25471- 22	C- 13	32	96906	MS35335- 30	C- 5	4
96906	MS25471- 22	C- 10	25	96906	MS35335- 30	C- 7	8
96906	MS25471- 22	C- 15	3	96906	MS35335- 30	C- 8	4
96906	MS25471- 22	C- 7	16	96906	MS35335- 32	C- 4	4
96906	MS28775- 005	C- 27	12	96906	MS35335- 32	C- 7	4
96906	MS28775- 005	C- 33	12	96906	MS35335- 36	C- 13	10
96906	MS28775- 206	C- 28	4	96906	MS35338- 44	C- 11	12
96906	MS28775- 206	C- 34	4	96906	MS35338- 44	C- 25	6
96906	MS28775- 212	C- 27	14	96906	MS35338- 44	C- 30	3
96906	MS28775- 212	C- 33	14	96906	MS35338- 44	C- 2	11
96906	MS28775- 438	C- 27	4	96906	MS35338- 44	C- 5	11
96906	MS28775- 438	C- 33	4	96906	MS35338- 44	C- 8	12
96906	MS3367- 1- 9	C- 10	23	96906	MS35338- 45	C- 22	2
96906	MS3367- 1- 9	C- 13	27	96906	MS35338- 45	C- 23	2
96906	MS3367- 1- 9	C- 4	14	96906	MS35338- 46	C- 24	4
96906	MS3367- 1- 9	C- 7	14	96906	MS35338- 46	C- 25	2
96906	MS3367- 3- 9	C- 15	4	96906	MS35338- 46	C- 30	14
96906	MS3367- 3- 9	C- 16	12	96906	MS35425- 44	C- 28	2
96906	MS35190- 285	C- 27	2				

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FSCM	PART NUMBER	FIG. NO.	ITEM NO.	FSCM	PART NUMBER	FIG. NO.	ITEM NO.
96906	MS35425-44	C-34	2	96906	MS51953-121	C-32	2
96906	MS35649-204	C-10	5	96906	MS51953-125	C-21	13
96906	MS35649-204	C-13	7	96906	MS51953-125	C-23	14
96906	MS35649-204	C-4	3	96906	MS51953-125	C-26	11
96906	NS35649-204	C-7	3	96906	MS51953-125	C-32	6
96906	MS35649-242	C-13	3	96906	MS51953-126	C-21	11
96906	MS35649-264	C-10	7	96906	MS51953-127	C-26	7
96906	MS35649-264	C-11	3	96906	MS51953-127	C-32	9
96906	MS35649-264	C-13	9	96906	MS51953-128	C-21	15
96906	MS35649-264	C-13	12	96906	MS51953-129	C-26	7A
96906	MS35649-264	C-2	3	96906	MS51953-73	C-16	7
96906	MS35649-264	C-4		96906	MS51953-78	C-17	8
96906	MS35649-264	C-5	1	96906	MS51953-78	C-18	8
96906	MS35649-264	C-7	7	96906	MS51953-78	C-26	2
96906	MS35649-264	C-8	3	96906	MS51953-78	C-32	15
96906	MS35691-61	C-27	7	96906	MS51953-80	C-18	6
96906	MS35691-61	C-33	7	96906	MS51953-81	C-17	5
96906	MS51021-57	C-24	5	96906	MS51953-81	C-18	4
96906	MS51847-12	C-26	14	96906	MS51953-82	C-16	8
96906	MS51847-12	C-32	13	96906	MS51953-83	C-16	11
96906	MS51884-3	C-24	15	96906	MS51953-85	C-17	2
96906	MS51884-7	C-17	3	96906	MS51953-97	C-21	5
96906	MS51884-7	C-18	9	96906	MS51953-97	C-23	9
96906	MS51884-9	C-26	15	96906	MS51967-2	C-11	11
96906	MS51884-9	C-30	1	96906	MS51967-2	C-25	5
96906	MS51884-9	C-32	17	96906	MS51967-2	C-30	2
96906	MS51887-17	C-32	4	96906	MS51967-2	C-2	10
96906	MS51887-23	C-17	9	96906	MS51967-2	C-5	10
96906	MS51887-23	C-18	10	96906	MS51967-2	C-8	11
96906	MS51887-27	C-26	9	96906	MS51967-2	C-22	1
96906	MS51887-27	C-32	10	96906	MS51967-5	C-23	1
96906	MS51953-102	C-21	3	96906	MS51967-5	C-25	1
96906	MS51953-102	C-23	11	96906	MS51967-8	C-30	13
96906	MS51953-103	C-21	7	96906	MS51983-81	C-16	9
96906	MS51953-103	C-23	7	96906	MS51983-101	C-16	10
96906	MS51953-121	C-21	9	96906	MS51983-101	C-18	2
96906	MS51953-121	C-23	13	96906	MS90725-34	C-22	4
96906	MS51953-121	C-26	6				

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FSCM	PART NUMBER	FIG. NO.	ITEM NO.	FSCM	PART NUMBER	FIG. NO.	ITEM NO.
96906	MS90725-34	C-23	4	61349	P845FF21V100PSI	C-8	6
96906	MS90725-64	C-25	4	77533	RAC0 106 P I	C-29	2
96906	MS90725-64	C-30	16	77533	RAC0 106 P I	C-35	2
96906	MS90725-8	C-11	14	58927	S I200	C-24	1
96906	MS90725-8	C-25	8	58927	S I200-011	C-24	16
96906	MS90725-8	C-30	5	58927	S I200-012	C-24	9
96906	MS90725-8	C-2	13	58927	S I200-121	C-24	11
96906	MS90725-8	C-5	13	58927	S I200-122	C-24	14
96906	MS90725-8	C-8	14	58927	S I200-124	C-24	13
81349	M15098-10-001	C-12	1	58927	S I200-169	C-24	12
81349	M15098-10-001	C-3	3	58927	S I200-212	C-24	8
81349	M15098-10-001	C-6	1	58927	S I200-235	C-24	10
81349	M15098-10-001	C-9	2	58927	S I200-380	C-24	6
14726	NP5115	C-13	31	58927	S I200-390	C-24	2
14726	NP5115	C-10	22	53918	SPF-V10ME8-1	C-29	5
14726	NP5115	C-10	24	53918	SPF-V10ME8-1	C-35	5
83259	N4FC2	C-11	2	53918	SX-1075	C-38	1
83259	N4FC2	C-2	2	53918	TE05	C-17	4
83259	N4FC2	C-5	2	53918	TE05	C-18	3
83259	N4FC2	C-8	2	53918	TE15	C-21	8
87373	N4ME2	C-20	1	53918	TE15	C-23	12
87373	N4ME2	C-29	1	53918	TE15	C-32	3
5973	OMFC5351	C-16	1	53918	TU20X10.9	C-29	3
53918	05A-AA-3V-230VAC	C-1	1	53918TU20X10.9		C-35	3
53918	05B-AB-3V-120VDC	C-1	1	53918	TYPE 55 SF	C-38	6
53918	05C-CC-2V-024VDC	C-1	2	53918	UN40	C-17	1
53918	05D-CB-2V-120VDC	C-1	2	53918	UN40	C-18	1
77122	PC188	C-29	1	53918	UN42	C-21	2
77122	PC188	C-35	1	53918	UN42	C-23	6
16115	PP3758	C-26	13	53918	UN44	C-21	12
16115	PP3758	C-32	11	53918	UN44	C-23	16
83259	P4MC4	C-20	2	79136	X5133-9	C-27	8
83259	P4MC4	C-20	2	79133	X5133-9	C-33	8
16115	P500-2	C-26	12	58927	YP00356	C-22	7
16115	P500-2	C-32	12	58927	YP00357	C-22	7
61349	P845FF21V100PSI	C-11	6	58927	YP00356	C-23	21
61349	P845FF21V100PSI	C-2	6	53918	070F2-20	C-27	3
61349	P845FF21V100PSI	C-5	6				

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FSCM	PART NUMBER	FIG. NO.	ITEM NO.	FSCM	PART NUMBER	FIG. NO.	ITEM NO.
72219	70-145-01	C-21	14	53918	869-4	C-12	7
72219	70-145-01	C-23	17	53918	869-4	C-9	8
72219	70-145-01	C-26	5	53918	869-5	C-12	11
72219	70-145-01	C-32	1	53918	869-5	C-9	13
72219	70-345-01	C-26	4	53918	869-6	C-12	12
72219	70-345-01	C-32	8	53918	869-6	C-9	12
04845	821DD2VDC24	C-18	11	53918	869-7	C-12	13
04845	821DD4VDC24	C-36	1	53918	869-7	C-9	11
14889	839-098	C-31	6	53918	869-9	C-11	10
53918	869-10	C-11	9	53918	869-9	C-2	9
53918	869-10	C-2	8	53918	869-9	C-5	9
53918	869-10	C-5	8	53918	869-9	C-8	10
53918	869-10	C-8	9	C8134	9F02A32V15A	C-10	14
53918	869-11	C-11	8	53918	926-33	C-30	7
53918	869-11	C-2	7	53918	926-34	C-25	14
53918	869-11	C-5	7	53918	926-34	C-30	8
53918	869-11	C-8	8	53918	926-35	C-25	11
53918	869-12	C-11	7	53918	926-35	C-30	9
53918	869-12	C-2	7	53918	926-36	C-25	10
53918	869-12	C-8	7	53918	926-36	C-30	10
53918	869-13	C-10	17	53918	926-37	C-30	11
53918	869-13	C-13	25	53918	926-38	C-25	12
53918	869-14	C-10	18	53918	926-38	C-30	12
53918	869-14	C-13	26	53918	928	C-32	
53918	869-14	C-3	12	53918	929	C-37	2
53918	869-14	C-6	11	53918	930	C-23	5
53918	869-15	C-10	19	53918	931	C-8	1
53918	869-15	C-13	24	53918	932	C-10	3
53918	869-16	C-3	11	53918	932	C-13	5
53918	869-2	C-12	8	53918	934-33	C-30	7
53918	869-2	C-3	9	53918	934-37	C-25	13
53918	869-2	C-6	8	53918	934-37	C-30	11
53918	869-2	C-9	9	53918	935-1	C-30	6
53918	869-3	C-12	9	53918	935-2	C-25	9
53918	869-3	C-3	8	53918	937	C-11	1
53918	869-3	C-6	7	53918	941-23	C-25	15
53918	869-3	C-9	10	53918	941-32	C-25	13
				53918	943	C-37	1

PART NUMBER INDEX

FSCM	PART NUMBER	FIG. NO.	ITEM NO.	FSCM	PART NUMBER	FIG. NO.	ITEM NO.
53918	070F2-20	C-33	3	53918	423-2	C-28	10
53918	071-2	C-26	16	53918	423-2	C-34	10
53918	071-2	C-32	18	30327	44SN	C-20	3
53918	079-03-02	C-34	5	22375	448C808J01	C-14	8
53918	079-3-02	C-28	5	03510	5K38NG508	C-23	19
53918	079-3-05	C-28	3	53918	50-B-BR	C-38	4
53918	079-3-05	C-34	3	53918	50-D-BR	C-36	8
53918	080	C-27	5	53918	50-DC-BR	C-38	9
53918	080	C-33	5	53918	50-E-BR	C-38	5
53918	094	C-29	4	59730	5231	C-10	1
53918	094	C-35	4	59730	5231	C-13	1
22375	101A802U01	C-14	4	58730	5231	C-16	3
22375	101A802U01	C-14	3	59730	5231	C-4	1
22375	101A918U01	C-14	5	59730	5231	C-7	1
22375	101A925U01	C-14	10	89020	525	C-10	11
53918	1051-110VDC	C-5	1	89020	525	C-13	18
22375	112A043U06	C-14	1	89020	525	C-4	11
53918	12001	C-13	4	89020	525	C-7	11
82434	168-736-5	C-31	7	89020	530	C-10	10
82434	168-808-1	C-31	3	89020	530	C-13	17
04845	172-759-1	C-31	4	89020	530	C-4	10
28478	20245-82	C-4	6	89020	530	C-7	10
28478	20245-84	C-13	16	59730	5351	C-15	1
28478	20245-84	C-7	6	59730	5351	C-16	1
04845	27-463-4D	C-19	2	08108	6S6-24V	C-12	2
04845	27-463-4D	C-36	2	08108	6S6-24V	C-3	1
22375	303J052B11	C-14	6	08108	6S6-24V	C-9	1
53918	307-1	C-28	9	53918	611-100	C-28	6
53918	307-1	C-34	9	53918	611-100	C-34	6
53918	307-2	C-28	8	00543	613NLGX	C-31	5
53918	307-2	C-34	8	53918	614-501	C-28	7
22375	322A036B50	C-14	13	53918	614-501	C-34	7
22375	333B461A30	C-14	12	22375	632A142B11	C-14	2
22375	333C515J06	C-14	7	72219	70-143-01	C-17	6
22375	333C515J07	C-14	9	72219	70-143-01	C-18	5
22375	376C034B11	C-14	11	72219	70-143-01	C-26	1
53918	392	C-31	1	72219	70-143-01	C-32	14
53918	400-1	C-38	2				

PART NUMBER INDEX

FSCM	PART NUMBER	FIG. NO.	ITEM NO.	FSCM	PART NUMBER	FIG. NO.	ITEM NO.
53918	944-24VDC	C-2	1				
53918	945	C-26					
53918	947-27	C-25	15				
53918	952	C-23	5				
53918	953	C-21	1				
53918	954	C-21	1				
53918	956	C-22	5				
53918	958	C-11	15				
53918	958	C-8	15				
53918	959	C-2	14				
53918	959	C-5	14				
5319	965	C-28	1				
5319	965	C-34	1				
5319	967	C-27	6				
5319	967	C-33	6				
5319	967-FL-1	C-27	15				
53918	967-FL-1	C-33	15				
5319	967-FL-2	C-27	10				
53918	967-FL-2	C-33	10				
53918	967-FL-3	C-27	11				
53918	967-FL-3	C-33	11				
53918	967-FL-4	C-27	13				
53918	967-FL-4	C-33	13				
53918	968	C-27	1				
53918	968	C-33	1				
53918	969-1	C-10	27				
53918	969-2	C-10	12				
53918	970-1	C-13	34				
53918	970-2	C-13	19				
53918	971-1	C-4	20				
53918	971-1	C-7	18				
53918	971-2	C-4	12				
53918	971-2	C-7	12				

APPENDIX D
BASIC ISSUE ITEMS LIST

SECTION I.

INTRODUCTION

D-1. SCOPE. This appendix lists basic issue items for the oil-water separators to help you inventory items required for safe and efficient operation.

D-2. GENERAL.

Basic issue items are the minimum essential items required to place the oil-water separator in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the oil-water separator during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

D-3. EXPLANATION OF COLUMNS

The following provides an explanation of columns found in the tabular listing:

a. Column (1) - Illustration Number (Illustration Number). This column indicates the number of the illustration in which the item is shown.

b. Column (2) - National Stock Number. Indicates the National Stock Number assigned to the item and will be used for requisitioning purposes.

c. Column (3) - Description. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (In parenthesis) followed by the part number. If item needed differs for different models of this equipment, the model is shown under the "Usable On" heading in this column. These codes are identified as:

<u>CODE</u>	<u>USED ON</u>
DBM	Type A
DBN	Type B

D-3. EXPLANATION OF COLUMNS (Continued).

<u>CODE</u>	<u>USED ON</u>
DBP	Type C
DBQ	Type D

d. Column (4) - Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two character alphabetical abbreviation (e.g., ea, in, pr).

e. Column (5) - Quality required (Qty rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

SECTION II.

BASIC ISSUE ITEM LIST

(1) ILLUSTRATION NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION FSCM AND PART NO.	USABLE ON CODE	(4) U/M	(5) QTY RQR
26	5340-01-081-0460	ANODE 3/8-16 UNC X 2 IN (16115) P-500-2	DBP, DBQ	EA	2
32	5340-01-081-0460	ANODE 3/8-16 UNC X 2 IN (16115) P-500-2	DBM, DBN	EA	3
10	6110-01-N95-4929	BOARD, CIRCUIT (53918) 932	DBM	EA	1
13	6110-01-N95-4929	BOARD, CIRCUIT (53918) 932	DBN	EA	1
22	5977-01-110-7490	BRUSH ASSY (55988) YP00356	DBQ	EA	1
23	5977-01-110-7490	BRUSH ASSY (55988) YP00356	DBN	EA	1
22	5977-01-110-7407	BRUSH ASSY (55988) YP00357	DBP	EA	1
28	4330-01-070-6656	ELEMENT COALESCER (53918) 611-100	DBP, DBQ	EA	7
34	4330-01-070-6656	ELEMENT COALESCER (53918) 611-100	DBM, DBM	EA	14
28	4330-01-078-8893	FILTER ELEMENT, FLUID (53918) 614-501	DBP, DBQ	EA	7
34	4330-01-078-8893	FILTER ELEMENT, FLUID (53918) 614-501	DBM, DBN	EA	7
10	5920-00-280-8342	FUSE, CARTRIDGE, 1 AMP (71400) AGC-1	DBM	EA	5
13	5920-00-280-8342	FUSE, CARTRIDGE, 1 AMP (71400) AGC-1	DBN	EA	5
6	5920-00-284-6795	FUSE, CARTRIDGE, 10 AMP (81349) F02B32V10A	DBQ	EA	5

SECTION II.

BASIC ISSUE ITEM LIST (CONTINUED)

(1) ILLUSTRATION NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION FSCM AND PART NO.	USABLE ON CODE	(4) U/M	(5) QTY RQR
10	5920-00-284-6795	FUSE, CARTRIDGE, 10 AMP (81349) Fo2B32V10A	DBM	EA	5
13	5920-00-284-6795	FUSE, CARTRIDGE, 10 AMP (81349) F02B32V10A	DBN	EA	5
3	5920-00-012-0151	FUSE, CARTRIDGE, 15 AMP (81349) F02A32V15A	DBP	EA	5
6	5920-00-012-0151	FUSE, CARTRIDGE, 15 AMP (81349) F02A32V15A	DBQ	EA	5
10	5920-00-012-0151	FUSE, CARTRIDGE, 15 AMP (81349) F02A3215A	DBM	EA	5
13	5920-00-013-0151	FUSE, CARTRIDGE, 15 AMP (81349) F02A3215A	DBN	EA	5
3	5920-00-142-7379	FUSE, CARTRIDGE, 25 AMP (71400) MDL-25	DBP	EA	5
13		INVERTER, 110 VDC (53918) 12001	DBN	EA	1
3	6240-00-223-9100	LAMP, IND 110V 2W (81349) M15098-10-001	DBP	EA	4
6	6240-00-223-9100	LAMP, IND 110V 2W (81349) M15098-10-001	DBQ	EA	8
9	6240-00-223-9100	LAMP, IND 110V 2W (81349) M15098-10-001	DBM	EA	6
12	6240-00-223-9100	LAMP, IND 110V 2W (81349) M15098-10-001	DBN	EA	6
3	6240-00-143-7513	LAMP, INDICATOR 24V (08108) 6S6-24V	DBP	EA	4
9	6240-00-143-7513	LAMP, INDICATOR 24V (08108) 6S6-24V	DBM	EA	6

SECTION II.

BASIC ISSUE ITEM LIST (CONTINUED)

(1) ILLUSTRATION NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION FSCM AND PART NO.	(4) USABLE ON CODE U/M	(5) QTY RQR
12	6240-00-143-7513	LAMP, INDICATOR 24V (08108) 6S6-24V	DBN	EA 6
31	5930-01-N95-5379	MINI-PROBE (00543) 613NLGX	DBM, DBN	EA 1
28	5310-00-823-8756	NUT, PLAIN, WING (96906) MS35425-44	DBP, DBQ	EA 4
34	5310-00-823-8756	NUT, PLAIN, WING (96906) MS35425-44	DBM, DBN	EA 5
28	5330-01-N75-8848	PACKING, PREFORMED (96906) MS28775-206	DBP, DBQ	EA 6
34	5330-01-N75-8848	PACKING, PREFORMED (96906) MS28775-206	DBM, DBN	EA 9
27	5330-01-N75-8849	PACKING, PREFORMED (96906) MS28775-438	DBP, DBQ	EA 2
33	5330-01-N75-8849	PACKING, PREFORMED (96906) MS28775-438	DBM, DBN	EA 3
20	4810-01-070-0629	PARTS KIT, VALVE (04845) FV 158-934	DBM, DBN	EA 1
36	4810-01-030-9228	PARTS KIT, VALVE (04845) FV 172-881	DBM, DBN	EA 1
28		PLATE, HOLD DOWN (53918) 079-03-02	DBP, DBQ	EA 2
34		PLATE, HOLD DOWN (53918) 079-03-02	DBM, DBN	EA 3
24	4320-01-110-9683	ROTOR 416SS (51064) 330-0906-000	DBM, DBN DBP, DBQ	EA 1
24	4320-01-051-9879	SEAL, MECHANICAL (51064) 320-2423-000	DBM, DBN DBP, DBQ	EA 1

SECTION II.

BASIC ISSUE ITEM LIST (CONTINUED)

(1) ILLUSTRATION NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION FSCM AND PART NO.	(4) USABLE ON CODE	(5) U/M	(6) QTY RQR
29		SIGHTGLASS ASSY (53918) 423-2	DBP, DBQ	EA	2
35		SIGHTGLASS ASSY (53918) 423-2	DBM, DBN	EA	3
38	5120-00-277-1465	SOCKET (81348) GGG W641	DBM, DBN	EA	1
28	5365-01-080-9496	SPACER, SLEEVE (53918) 079-3-05	DBP, DBQ	EA	4
34	5365-01-080-9496	SPACER, SLEEVE (53918) 079-3-05	DBM, DBN	EA	5
24	4320-01-110-8968	STATOR, BUNA N (51064) 320-2423-000	DBM, DBN DBP, DBQ	EA	1

A P P E N D I X E

E X P E N D A B L E S U P P L I E S A N D M A T E R I A L S L I S T

SECTION I.

I N T R O D U C T I O N

E-1. SCOPE.

This appendix lists expendable supplies and materials you will need to operate and maintain the oil-water separator. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

E-2. EXPLANATION OF COLUMNS.

a. Column (1) - Item number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 2 App.

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item

- C - Operator/Crew
- O - Organizational Maintenance
- F - Direct Support Maintenance
- H - General Support Maintenance

c. Column (3) - National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column (4) - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

e. Column (5) - Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

SECTION II.

EXPENDABLE SUPPLIES AND MATERIALS

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	C	7930-01-019-7941	CLEANING SOLUTION (81348) P-D-1747	
2	C	6850-00-274-5421	DRY CLEANING SOLVENT (81348) P-D-680	CN
3	C	3439-00-133-1107	SOLDER, 1 LB (03051) 5 CORE 50-50-16GA	CL
4	C	8030-00-162-9682	PAINT COATING SYSTEM-GAL (81349) TYPE 2 CLASS 3	CN
5	C	5970-00-184-2002	TAPE, INSULATION, ELEC (81348) HH-I-553	RO
6	C	8030-00-209-8005	SEALING COMPOUND (81348) TTA 580-1-2PTCN	CN
7	C	8305-00-927-3829	SCREENING - 36 IN X 100 FT (81348) L-S-125	RO
8	C	9505-00-180-7204	WIRE, STEEL 080 IN - 100 LB (81348) QQ-W-461	CL
9	C	7930-00-056-8144	CLEANING SOLUTION (26142) 409	

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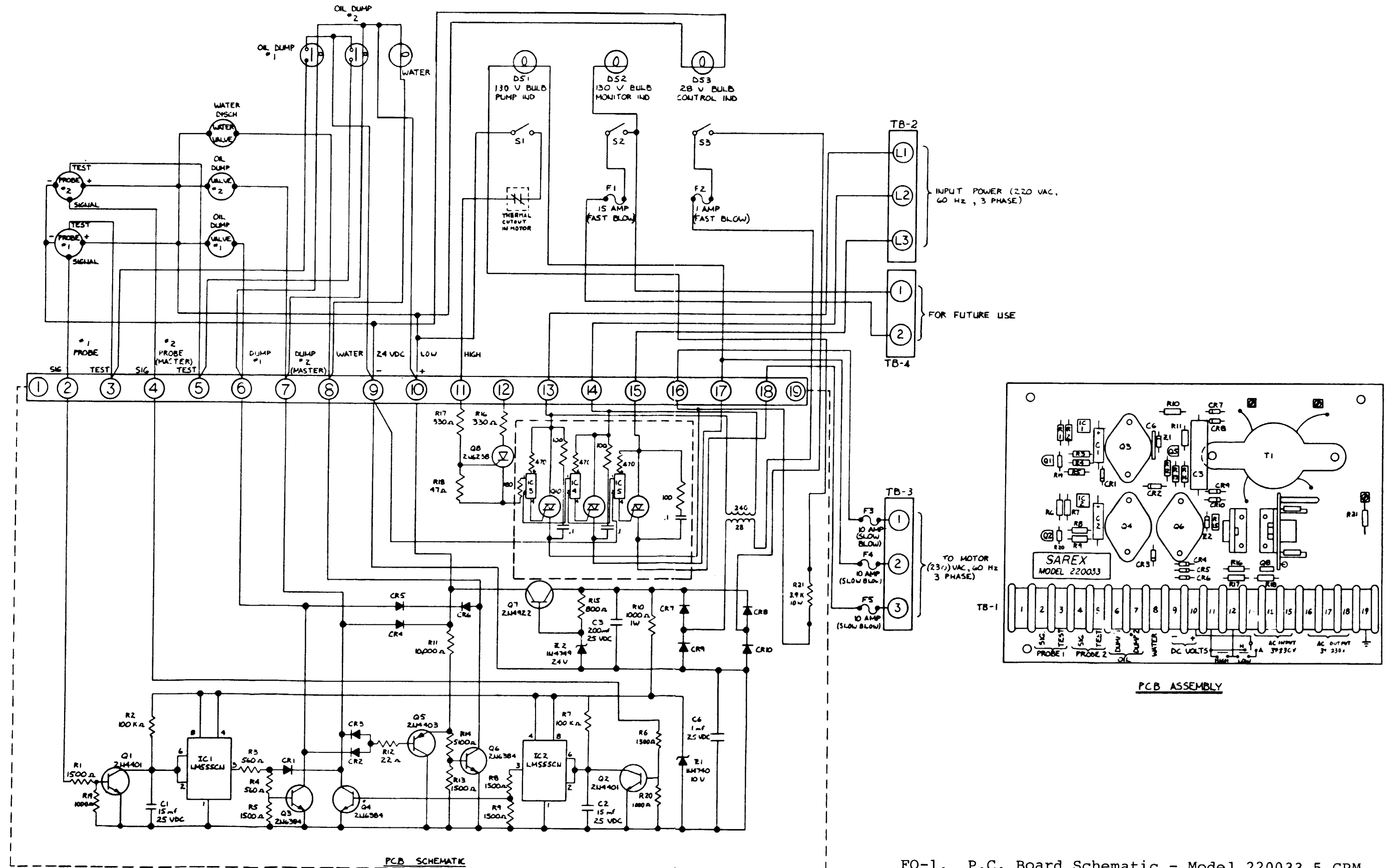
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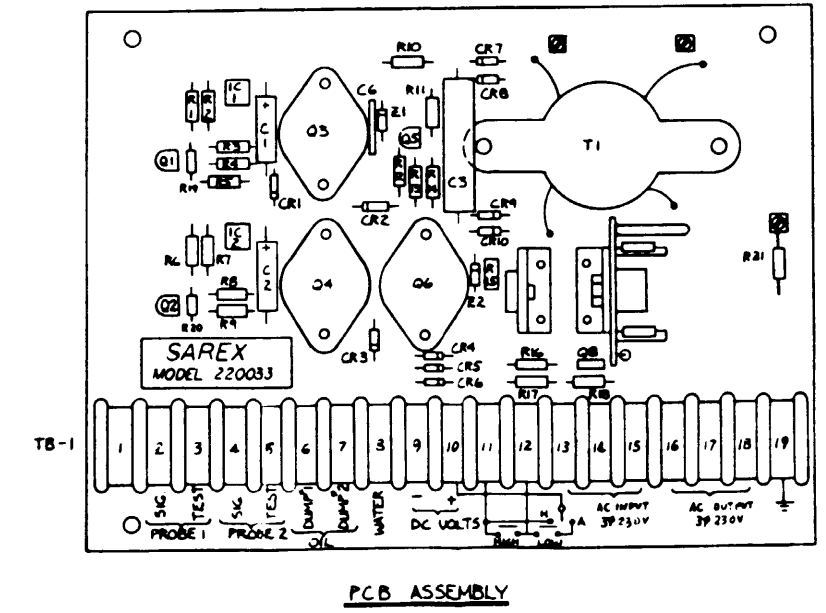
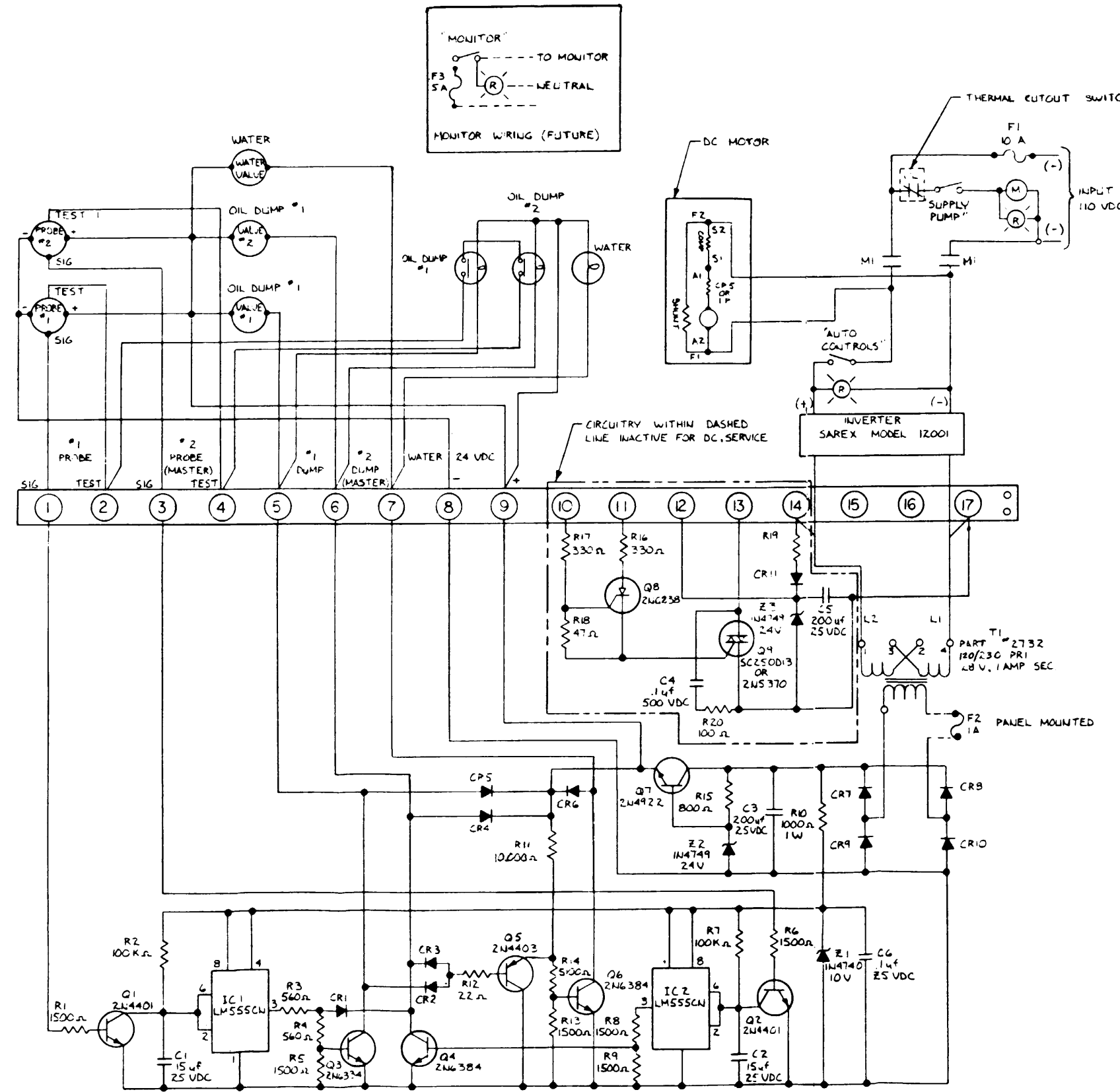
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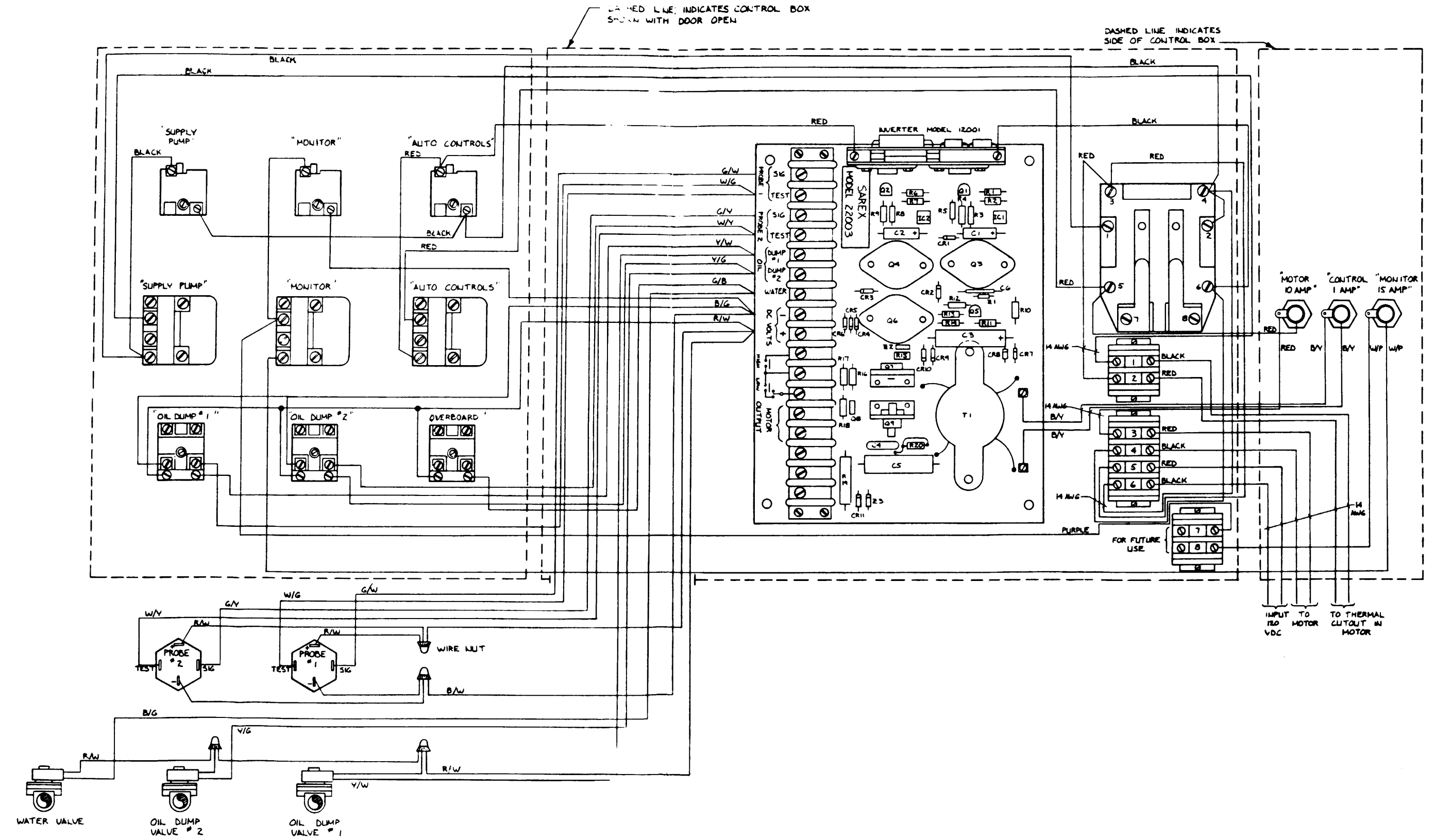
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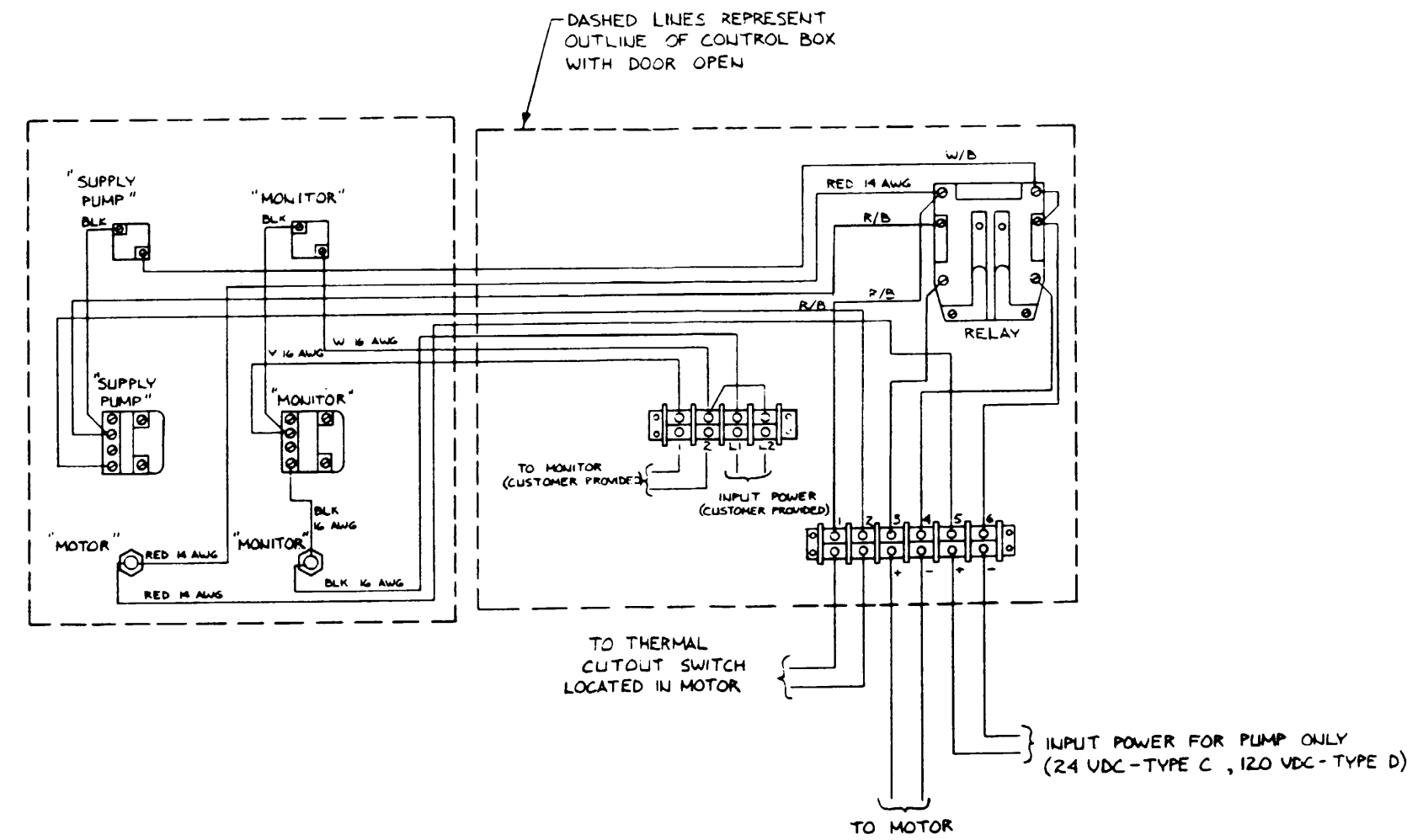
FO-1. P.C. Board Schematic - Model 220033 5 GPM O/W Separator - Automatic Type A.



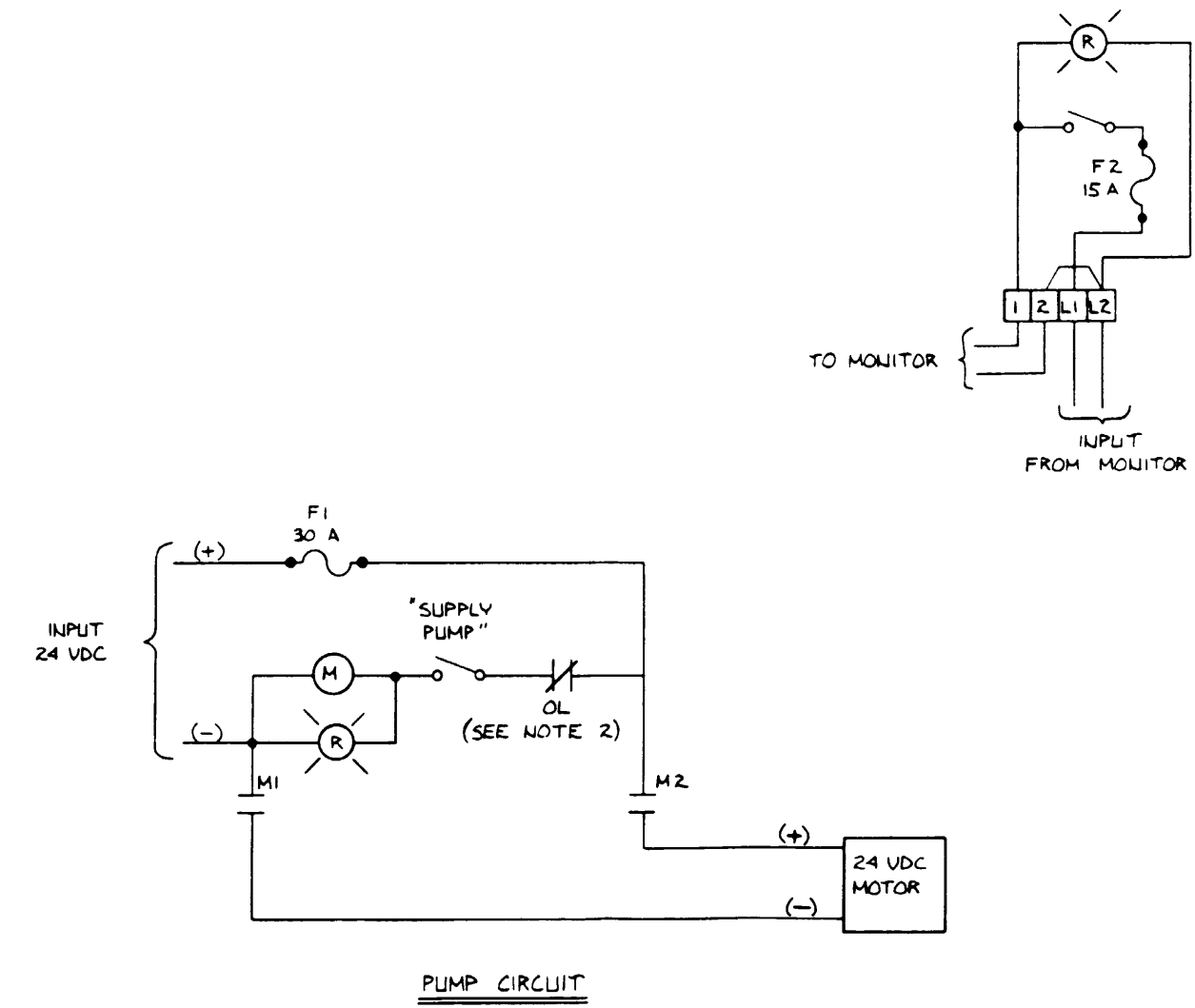
FO-3. Electrical Schematic 5 GPM O/W Separator - Automatic - 110 VDC Type B.



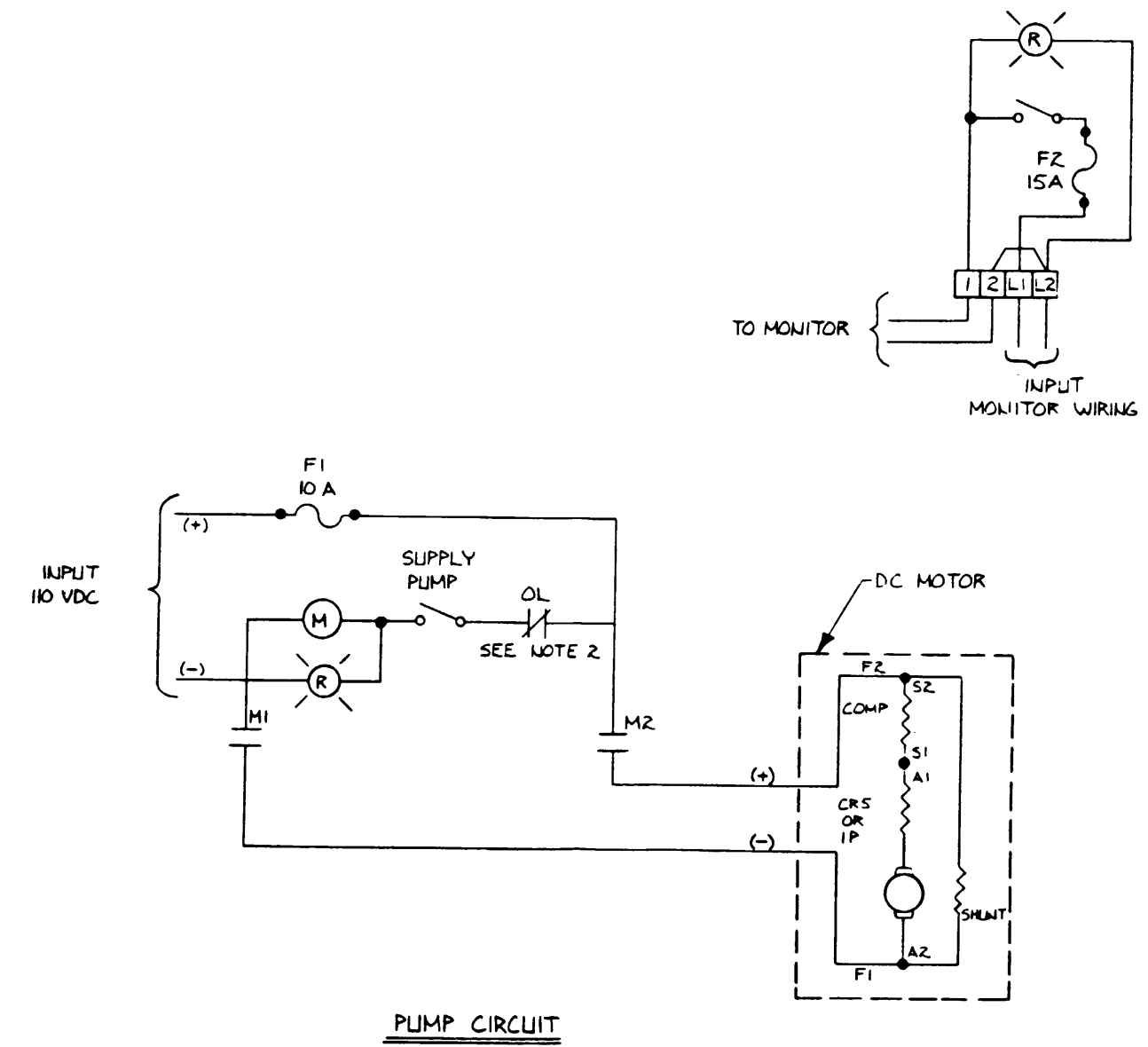
FO-4. Wiring Diagram 5 GPM O/W Separator - Automatic - 120 VDC Type B.



FO-5. Wiring Diagram 5 GPM O/W Separator - Manual - 24/110 VDC Type C and D.



FO-6. Schematic 5 GPM O/W Separator - Manual - 24 VDC Type C.



FO-7. Schematic 5 GPM O/W Separator - Manual - 110 VDC Type D.

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---	-------------------------------	---

BE EXACT... PIN-POINT WHERE IT IS				IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	
6	2-1 a			In line 6 of paragraph 2-1a the manual states the engine has <u>6</u> Cylinders. The engine on my set only has <u>4</u> Cylinders. Change the manual to show <u>4</u> Cylinders.
B1		4-3		Callout 16 on figure 4-3 is pointing at a <u>bolt</u> . In key to figure 4-3, item 16 is called a <u>shim</u> - Please correct one or the other.
125	line 20			I ordered a gasket, item 19 on figure B-16 by NSN 2 910-05-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered, so the NSN is wrong. Please give me a <u>good NSN</u>

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER JOHN DOE, PFC (268) 317-7111	SIGN HERE JOHN DOE
---	------------------------------

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TEAR ALONG PERFORATED LINE

The Metric System and Equivalents

Linear Measure

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

Weights

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

Liquid Measure

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

Square Measure

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

Cubic Measure

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

Approximate Conversion Factors

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

Temperature (Exact)

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

