

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL

TRUCK, FIRE FIGHTING: POWERED PUMPER, FOAM AND  
WATER, 500-GALLONS PER MINUTE CAPACITY  
CENTRIFUGAL PUMP, POWER TAKEOFF DRIVEN,  
400-GALLON WATER TANK,  
40-GALLON FOAM CHEMICAL TANK, CLASS 530B  
NONWINTERIZED,  
(WARD LAFRANCE MODEL M45A2WLF)  
FSN 4210-928-3515

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<p>This reprint includes all changes in effect at the time of publication; change 1.</p>
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HEADQUARTERS, DEPARTMENT OF THE ARMY

10 MAY 1968



## **SAFETY PRECAUTIONS**

### **BEFORE OPERATION**

Do not smoke or use open flame in the area when servicing the batteries. Batteries generate hydrogen, a highly explosive gas.

Keep metal decks free from grease, oil and mud to avoid possible injury.

When handling gasoline always provide a good metal-to-metal contact between fuel tank and container.

### **DURING OPERATION**

When water is being pumped through the discharge system, at least two men should control the hose nozzle to prevent the hose from whipping and causing serious injury.

Stop all operation before performing service adjustments.

Use of a nozzle too small for the pressure can rupture the hose.

### **AFTER OPERATION**

When handling gasoline always provide a good metal-to-metal contact between fuel tank and container.

Do not remove radiator cap from a hot engine until engine has been shut down for 5 minutes to relieve pressure and avoid being burned.



CHANGE

No. 1

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HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D. C., 23 March 1971

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

**TRUCK, FIRE FIGHTING: POWERED PUMPER, FOAM AND WATER,  
500 GALLONS PER MINUTE CAPACITY, CENTRIFUGAL PUMP,  
PC WER TAKE OFF DRIVEN, 400 GALLON WATER TANK,  
40 GALLON FOAM CHEMICAL TANK, CLASS 530B,  
NONWINTERIZED  
(WARD LAFRANCE MODEL M45A2WLF), FSN 4210-928-3515  
AND  
(AMERICAN AIR FILTER MODEL FT-500), FSN 4210-449-0431**

TM 5-4210-213-35, 10 May 1968 is changed as follows:

*Cover and page i.* Change title as indicated above.

*Page 1-1.* Paragraph 1-1a is superseded as follows:

a. These instructions are published for the use of direct and general support and depot maintenance personnel maintaining the Ward LaFrance Model M45A2WLF and American Air Filter Model FT-500 fire fighting trucks. They provide information on the maintenance of the equipment, which is beyond the scope of the tools, equipment, personnel, or supplies normally available to the using organizations.

Paragraph 1-3. In lines 1 and 2, change to read "A general description of the fire truck, the location \* \* \*"  
Paragraph 1-4a is superseded as follows:

a. *General.* This paragraph contains all the overhaul data pertinent to direct and

general support and depot maintenance personnel. Wiring diagrams figures 1-1 and 1-2 are furnished.

*Page 1-2.* Paragraph 1-5 is added immediately after 1-4.

**1-5. Difference in Models**

This manual covers the Ward LaFrance Model M45A2WLF and the American Air Filter Model FT-500 fire truck. Differences between the model M45A2WLF and model FT-500 fire trucks are noted in the individual paragraphs of this manual. Additional differences in models are described in TM 5-4210-213-12.

*Page 1-2.* Figure 1-1 caption is changed to read "Wiring diagram for model M45A2WLF."



Figure 1-2 is added as follows:

**Figure 1-2. During diagram for model FT.500.**  
(Located in back of manual)

Page 2-1. Paragraphs 2-1 and 2-2, delete "Ward LaFrance Model M45A2WLF".

Page 2-2, paragraph 2-11a, step (7). Add the following:

**NOTE**

**Steps (7.1) through (7.4) apply to model FT-500 ONLY.**

**(7.1) Remove water and foam pipe and fittings from fire pump (para 3-2).**

**(7.2) Remove hose reel valves, tank fill valves, and tank suction valves (para 3-4).**

**(7.3) Remove foam tank drain valve and foam valve (para 3-8).**

**(7.4) Remove foam metering valve (para 3-9).**

**Paragraphs 11a (8) and b (1), change "figure 3-1" to read "figure 2-2 and 3-1".**

**Paragraph 11b, step (1). Add the following:**

**NOTE**

**Steps (1.1) thru (1.4) apply to model FT-500 ONLY.**

**(1.1) Install foam metering valve (para 3-9).**

**(1.2) Install foam tank drain valve and foam valve (para 3-8).**

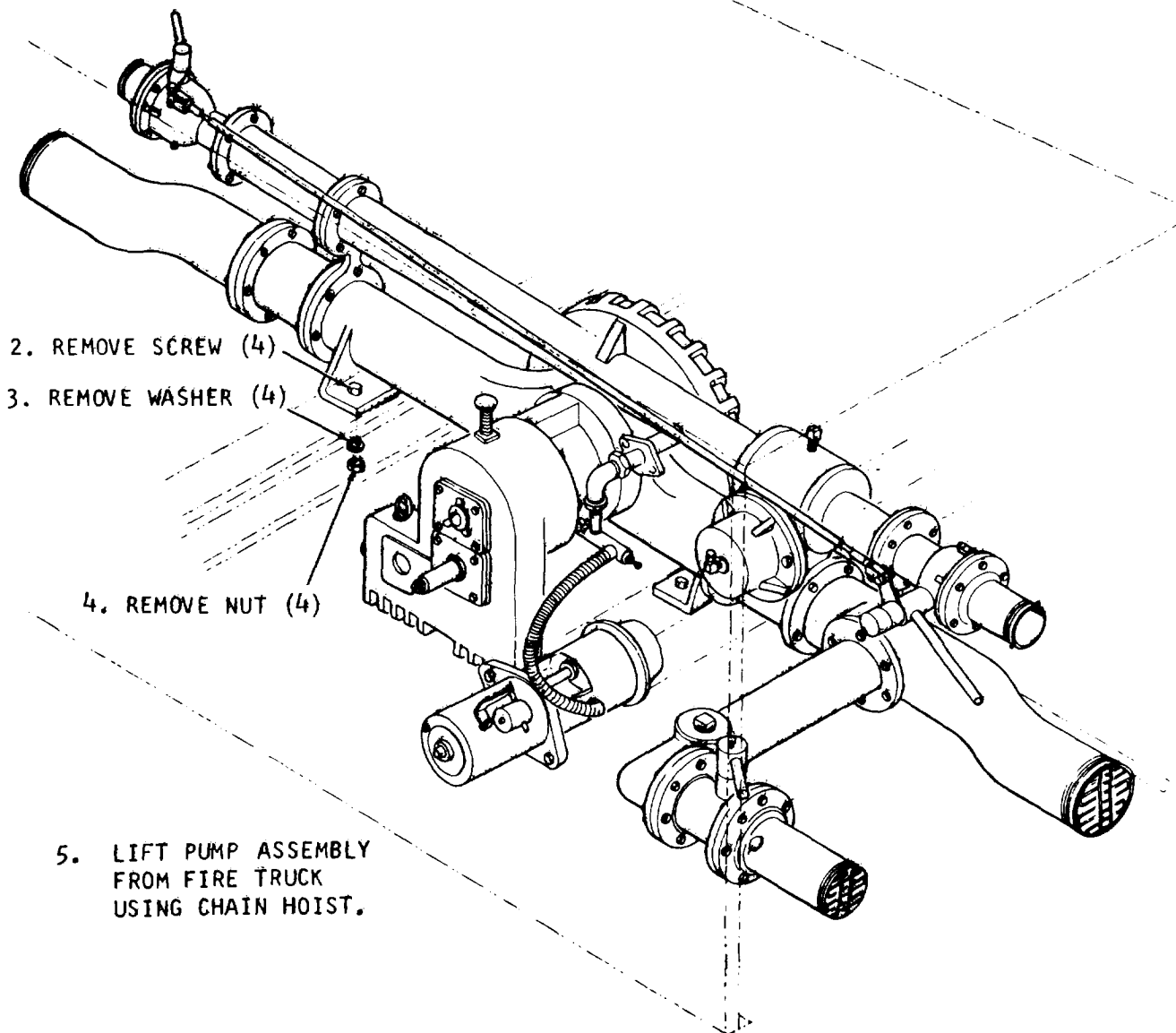
**(1.3) Install hose reel valves, tank fill valve, and tank suction valve (para 3-4).**

**(1.4) Install water and foam pipe and fittings (para 3-2).**



NOTE: INSURE THAT ALL LINES AND  
FITTINGS ARE DISCONNECTED  
FROM PUMP ASSEMBLY

1. REMOVE PUMP AND HOSE  
REEL COMPARTMENT



ME 4210-213-35/2-2.C1

Figure 2-2. Fire pump, removal and installation for model FT-500.



*Page 3-1.* Paragraphs 3-2b and g, change "figure 3-1" to read "figure 3-1 or 3-1A".

Paragraphs 3-3b and g, change "figure 3-1" to read "figures 3-1 or 3-1B".

Paragraphs 3-4b and g, change "figure 3-1" to read "figures 3-1 or 3-2A".

*Page 3-2.* Paragraphs 3-5c and f, change "figure 3-4" to read "figures 3-4 or 3-4A".

Paragraphs 3-6c and f, change "figure 3-5" to read "figures 3-5 or 3-5A".

Paragraphs 3-7c and f, change "figure 3-6" to read "figures 3-6 or 3-6A".

*Pages 3-2 and 3-3.* Paragraphs 3-9b and g, change "figure 3-1" to read "figures 3-1 or 3-2A".

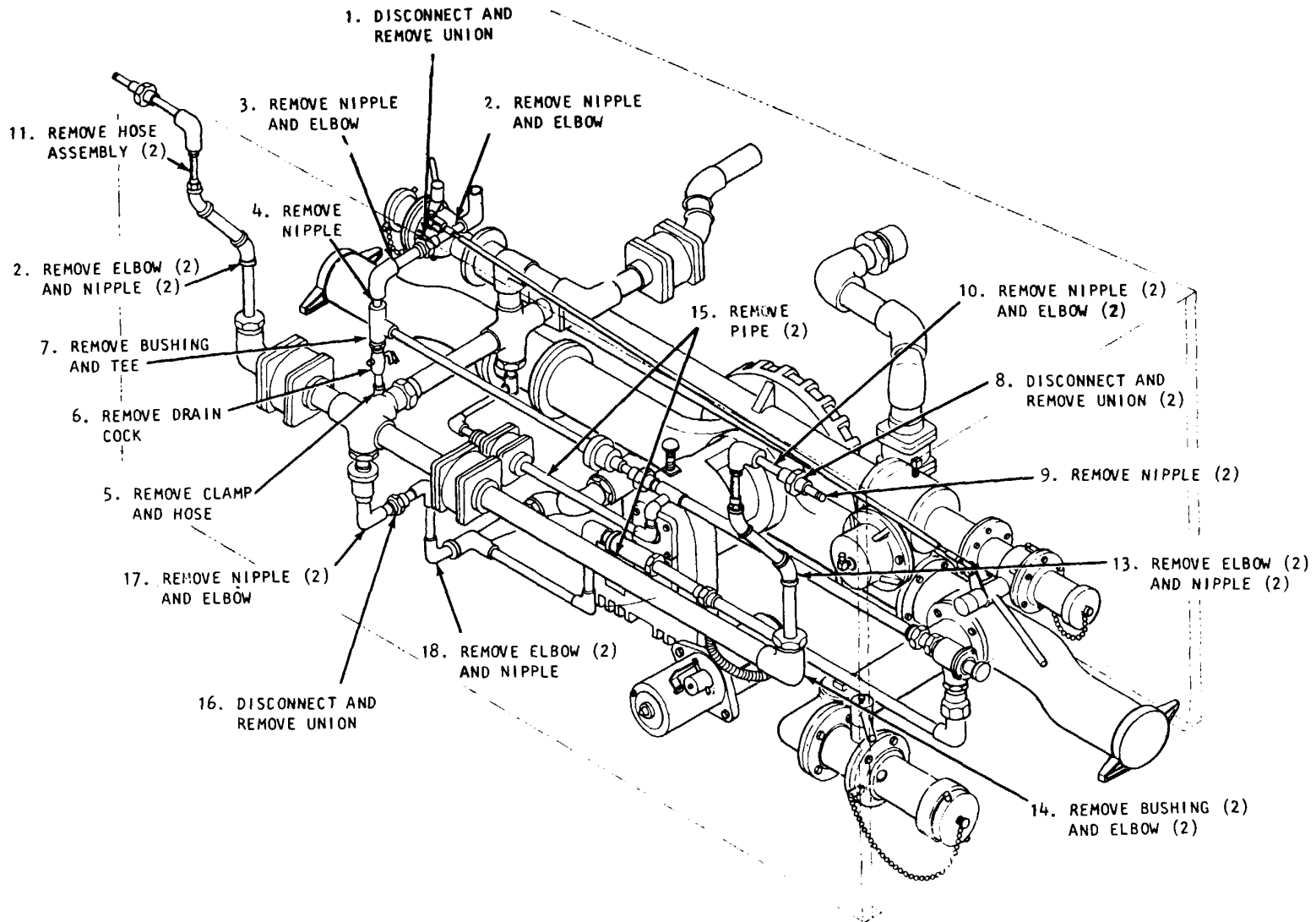
*Page 3-3.* Figure 3-1, caption is changed to read "Water pump, removal and installation for model M45A2WLF (sheet 1 of 3)."

*Page 3-4.* Figure 3-1, caption is changed to read "Water pump, removal and installation for model M45A2WLF (sheet 2 of 3)."

*Page 3-5.* Figure 3-1, caption is changed to read "Water pump, removal and installation for model M45A2WLF (sheet 3 of 3)."



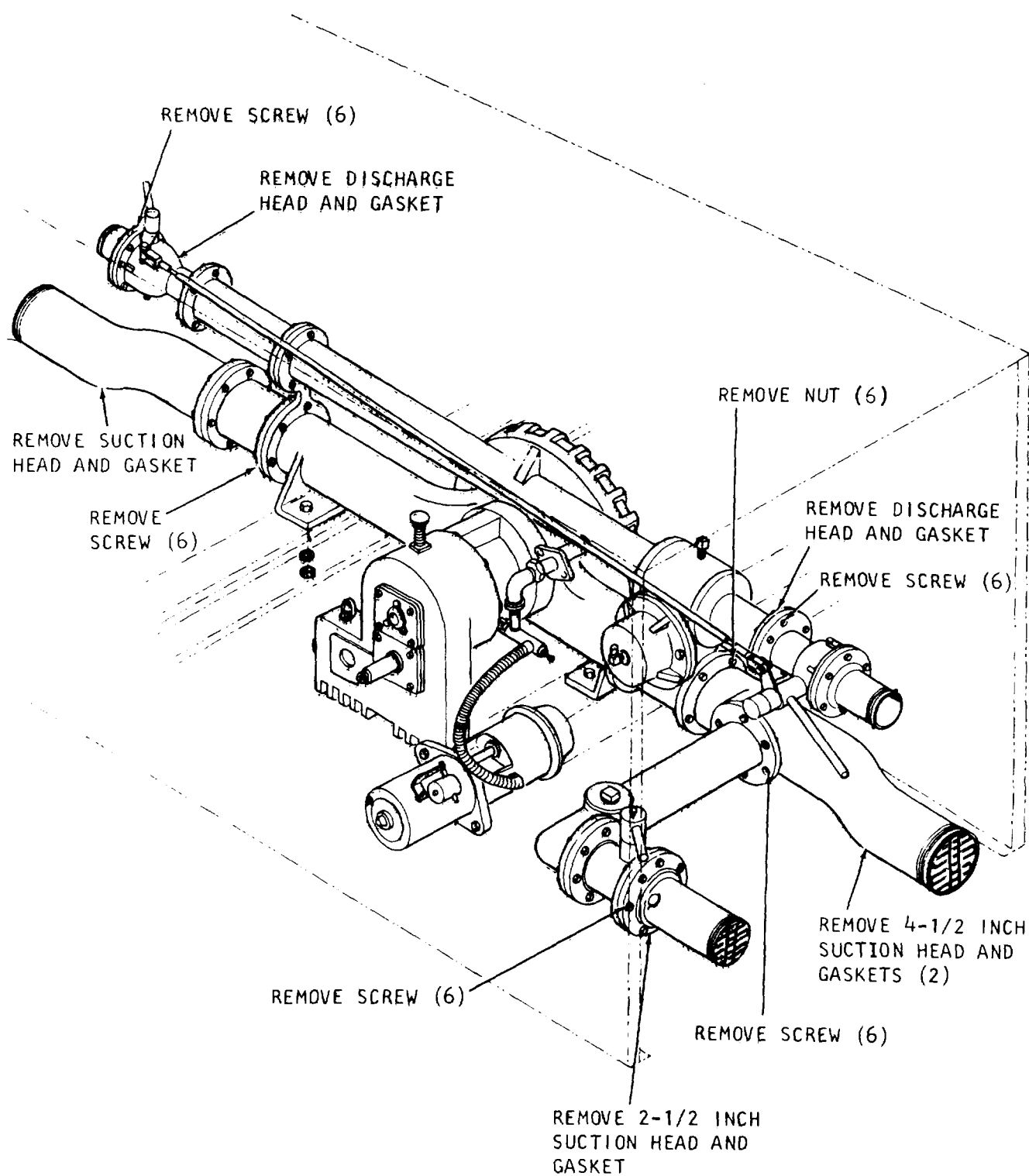
Figures 31A and 3-1B are added as follows:



ME 4210-213-35/3-1A C1

Figure 3-1A. Water and foam piping and fittings, removal and installation for model FT-500.



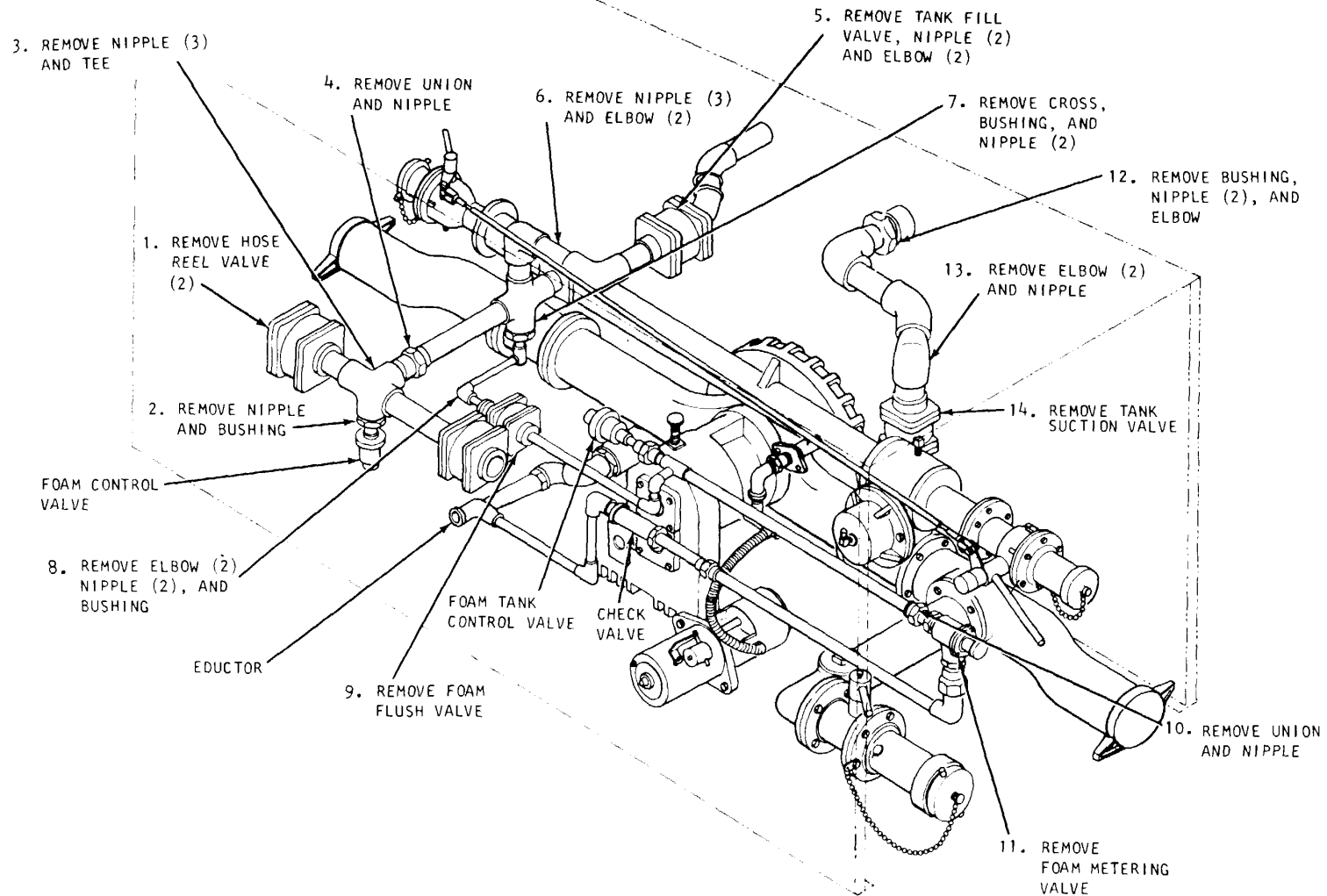


ME 4210-213-35/3-1B C1

Figure 3-1B. Suction and discharge valves, removal and installation for model FT-500.



Page 3-7. Figure 3-2A is added as follows:



ME 4210-213-35/3-2A.C1

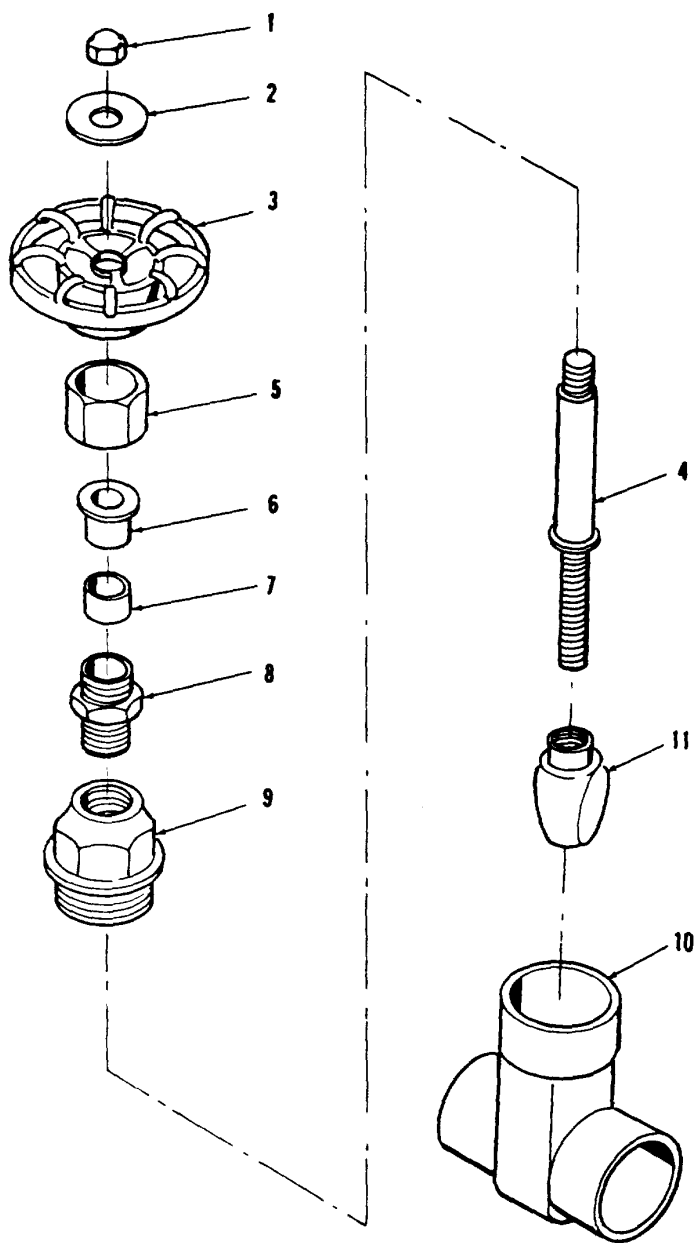
**Figure 3-2A. Hose reel valves, tank fill valve, tank suction valve, and foam metering valve removal and installation for model FT 500.**



Pages 3-10 and 3-11 Figure 3-4 caption is changed to read "Water tank drain valve,

for model M45A2WLF, exploded view."

Page 3-11 Figure 34A is added as follows:



ME 4210-213-35/3-4A C1

- |                         |                 |          |
|-------------------------|-----------------|----------|
| 1 Nut, handwheel        | 5 Nut, packing  | 9 Bonnet |
| 2 Plate, identification | 6 Gland         | 10 Body  |
| 3 Handwheel             | 7 Packing       | 11 Wedge |
| 4 Stem                  | 8 Box, stuffing |          |

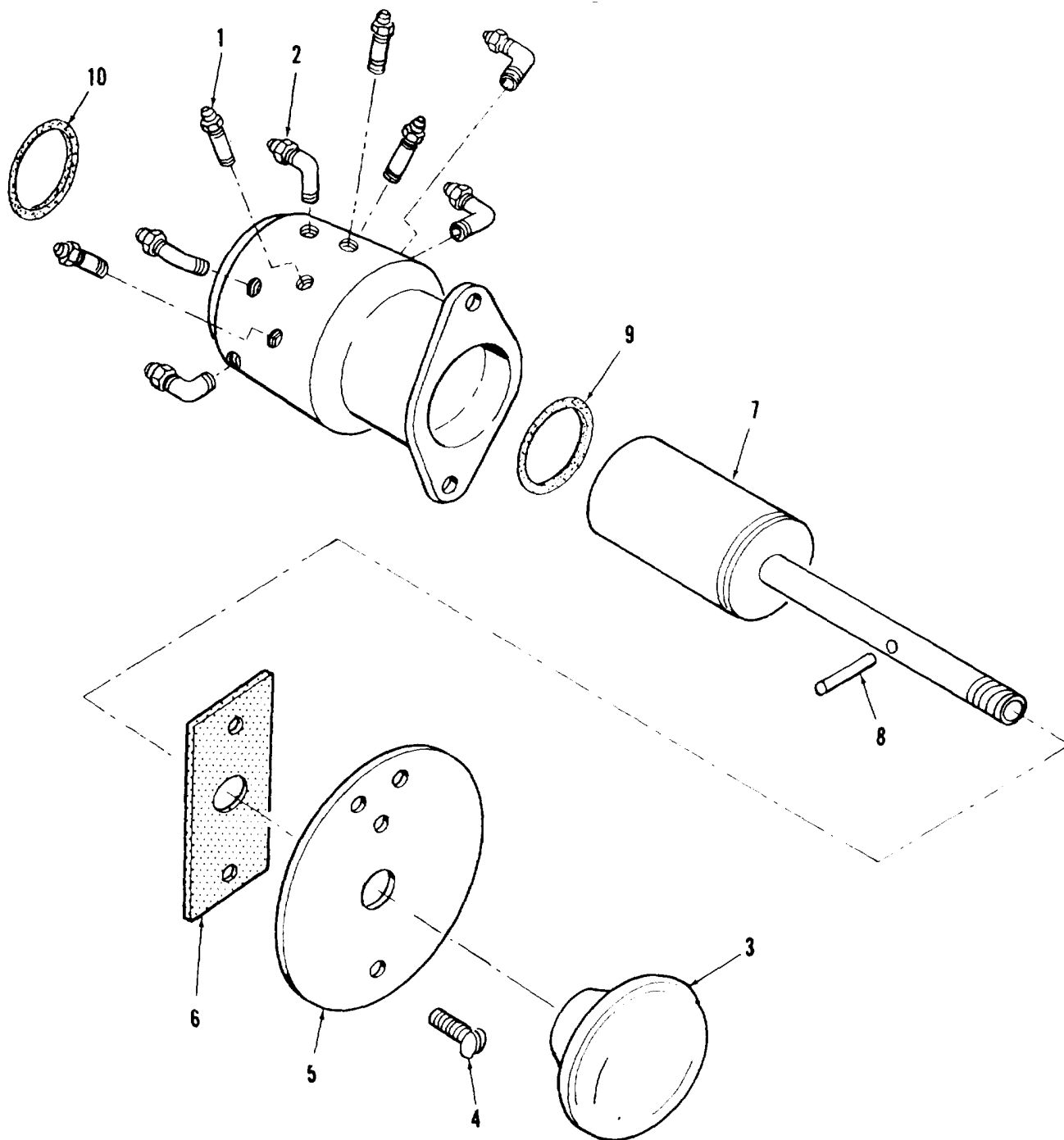
**Figure 3-4A. Water tank drain valve for model FT-500, exploded view.**



Pages 3-12 and 3-13 Figure 3-5 caption is changed to read "Drain line for model

M145A2WLF, exploded view."

Page 3-13 Figure 3-5A is added as follows:



ME 4210-312-35/3-5A C1

1 Adapter (4)  
2 Elbow (5)

3 Knob  
4 Screw (2)

5 Plate  
6 Stop plate

7 Piston  
8 Pin

9 Packing  
10 Packing

Figure 3-5A. Drain line valve for model FT-500, exploded view.



Pages 3-14 and 3-15 Figure 3-6 caption is changed to read "Relief valve for model

M45A2WLF, exploded view."

Page 3-15 Figure 36A is added as follows:

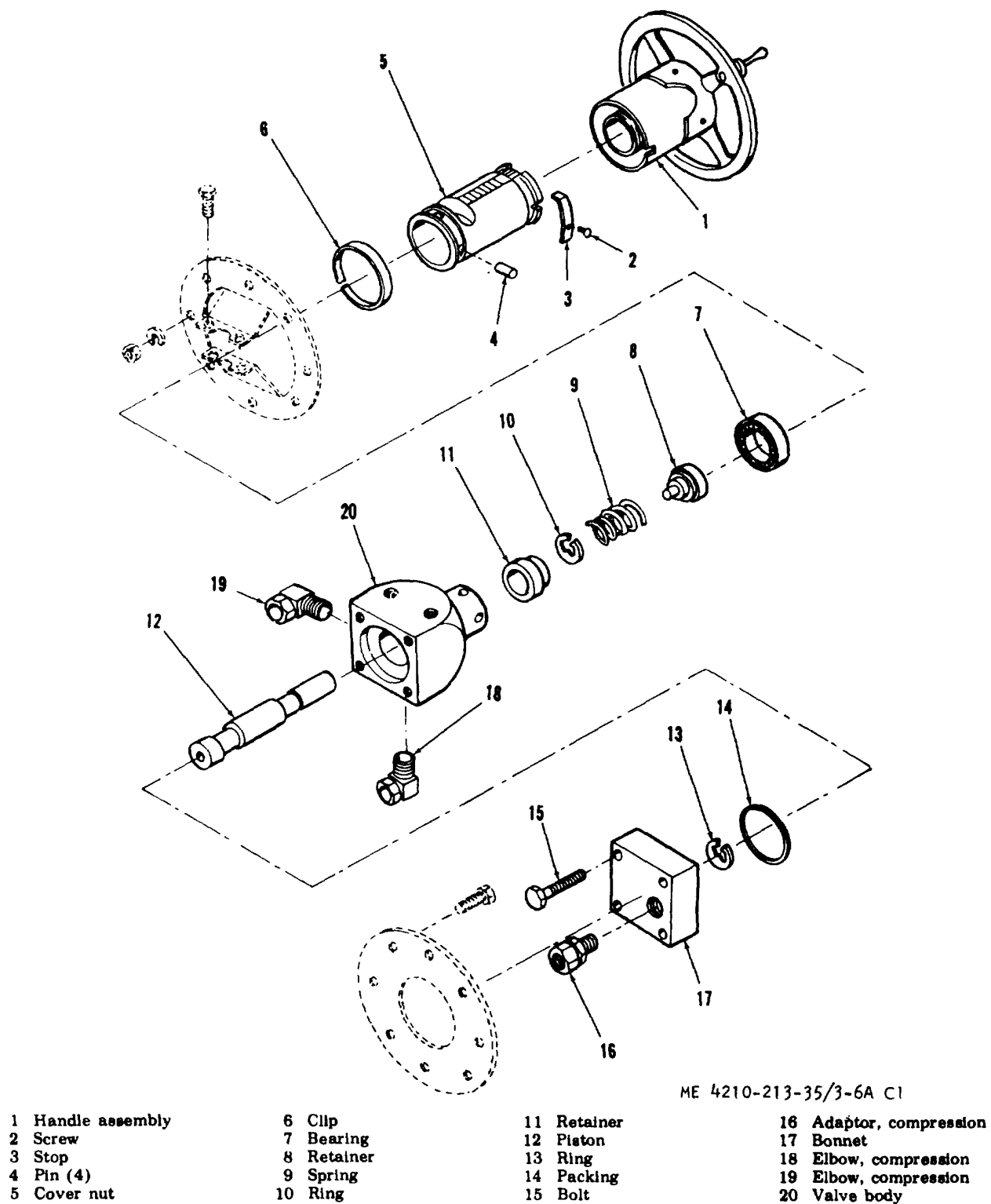


Figure 3-6A. Relief valve control for model FT-500, exploded view.

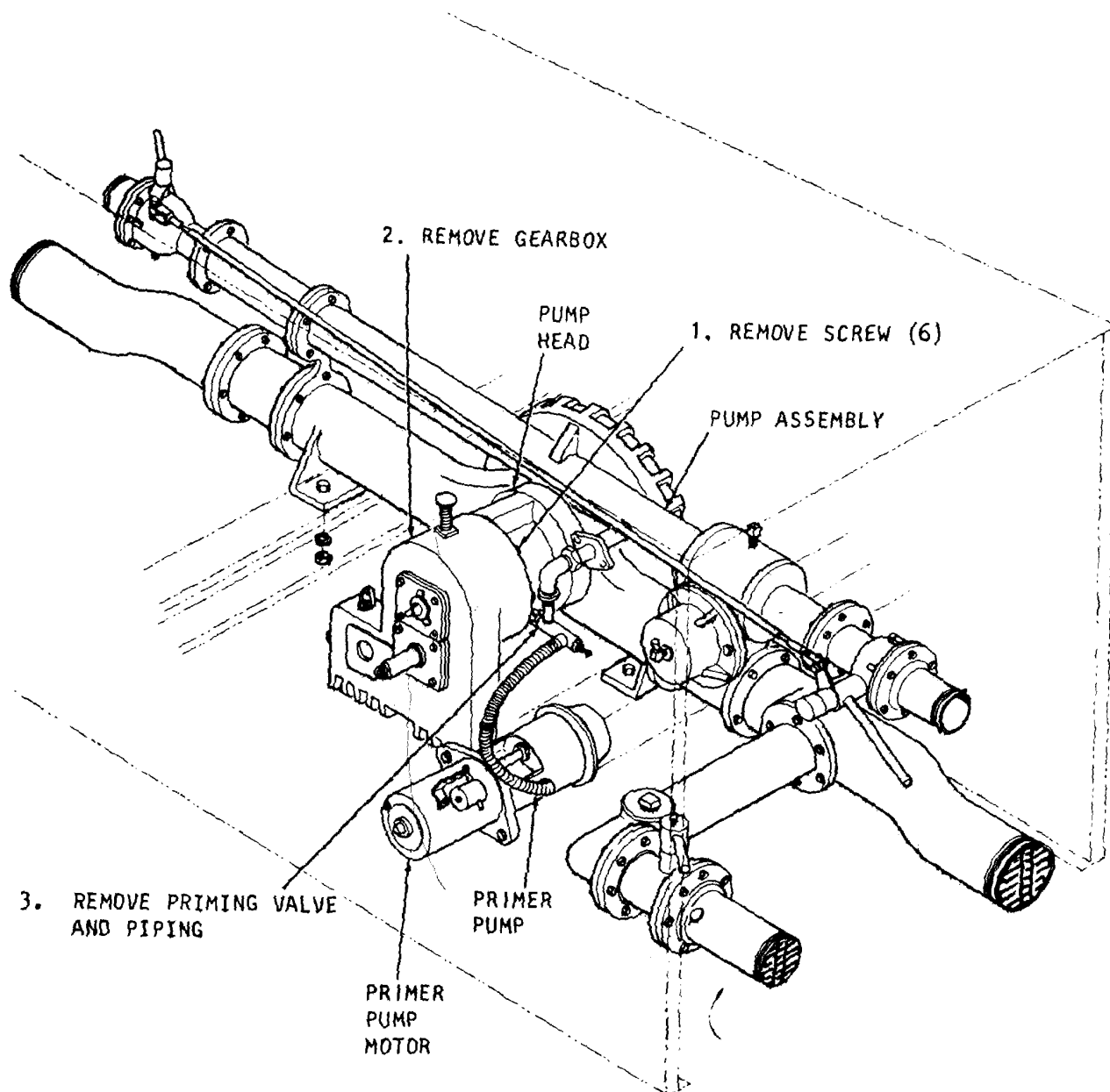


Page 3-18 Paragraphs 3-12b and g, change "figure 3-1" to read "figure 3-1 or 3-9A".

and g (1), change "figure 3-11" to read "figures 3-9A or 3-11".

Pages 3-18 and 3-19 Paragraphs 3-14 (2)

Page 3-21 Figure 3-9A Is added as follows:



ME 4210-213-35/3-9A C1

Figure 3-9A. Primer valve and pump gearbox, removal and installation for model FT-500.



*Page 3-23* Figure 3-11 caption is changed to read "Pump gearbox, removal and installation for model M45A2WLF."

*Page 3-35* Paragraph 3-21b, step (2), (2.1) is added as follows:

(2.1) Remove hose bed and partition (TM 5-4210-213-12).

Paragraphs 3-21b (3) and g (1), change

"figure 3-16" to read "figures 3-16 or 3-16A".

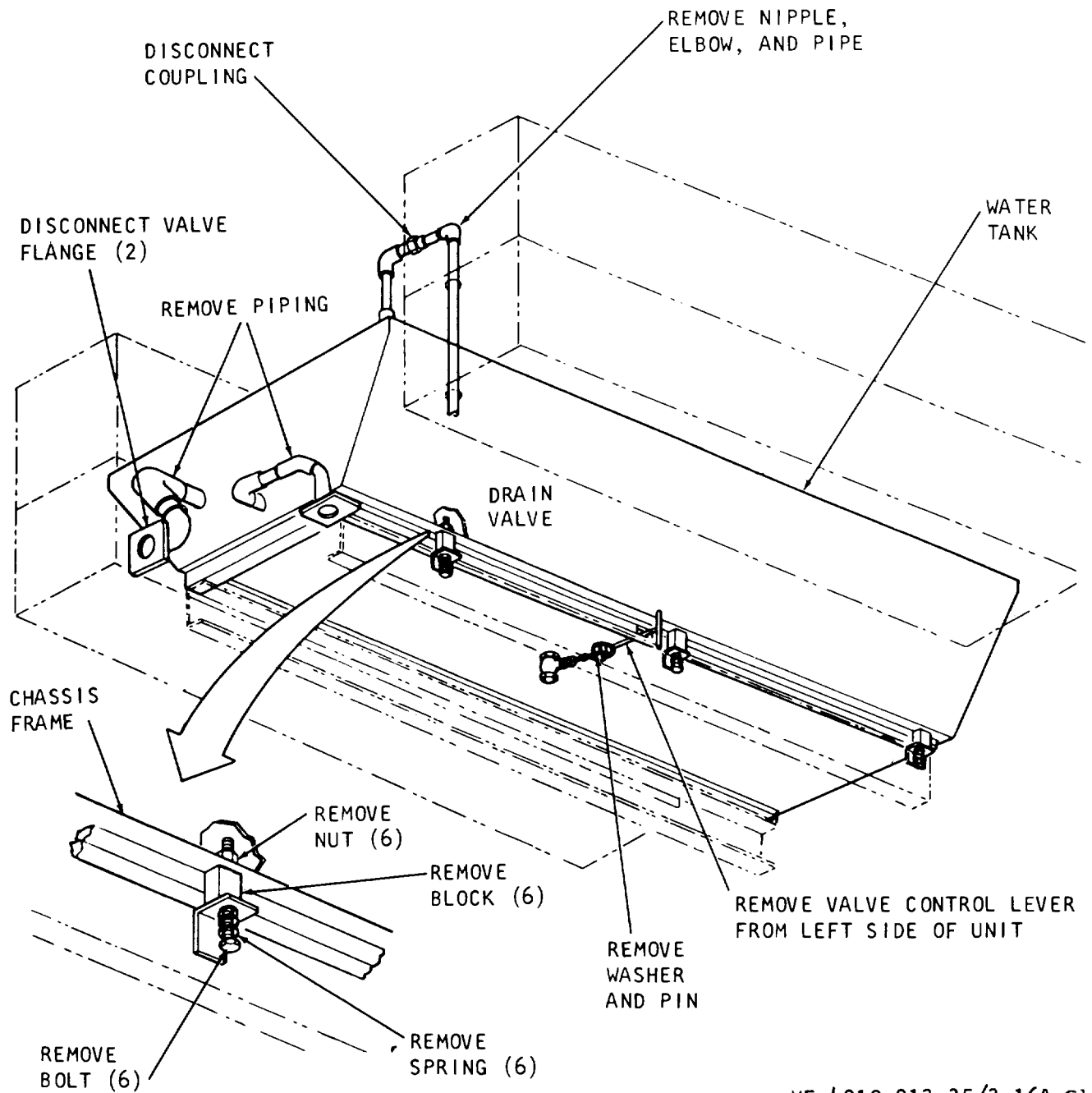
Paragraph 3-21g step (1), (1.1) is added as follows:

(1.1) Install hose bed and partition (TM 5-4210-213-12).

*Pages 3-36 and 3-37* Figure 3-16 caption is changed to read "Water tank and lines, removal and installation for model M45A2WLF."



Page 3-37 Figure 3-16A is added as follows:



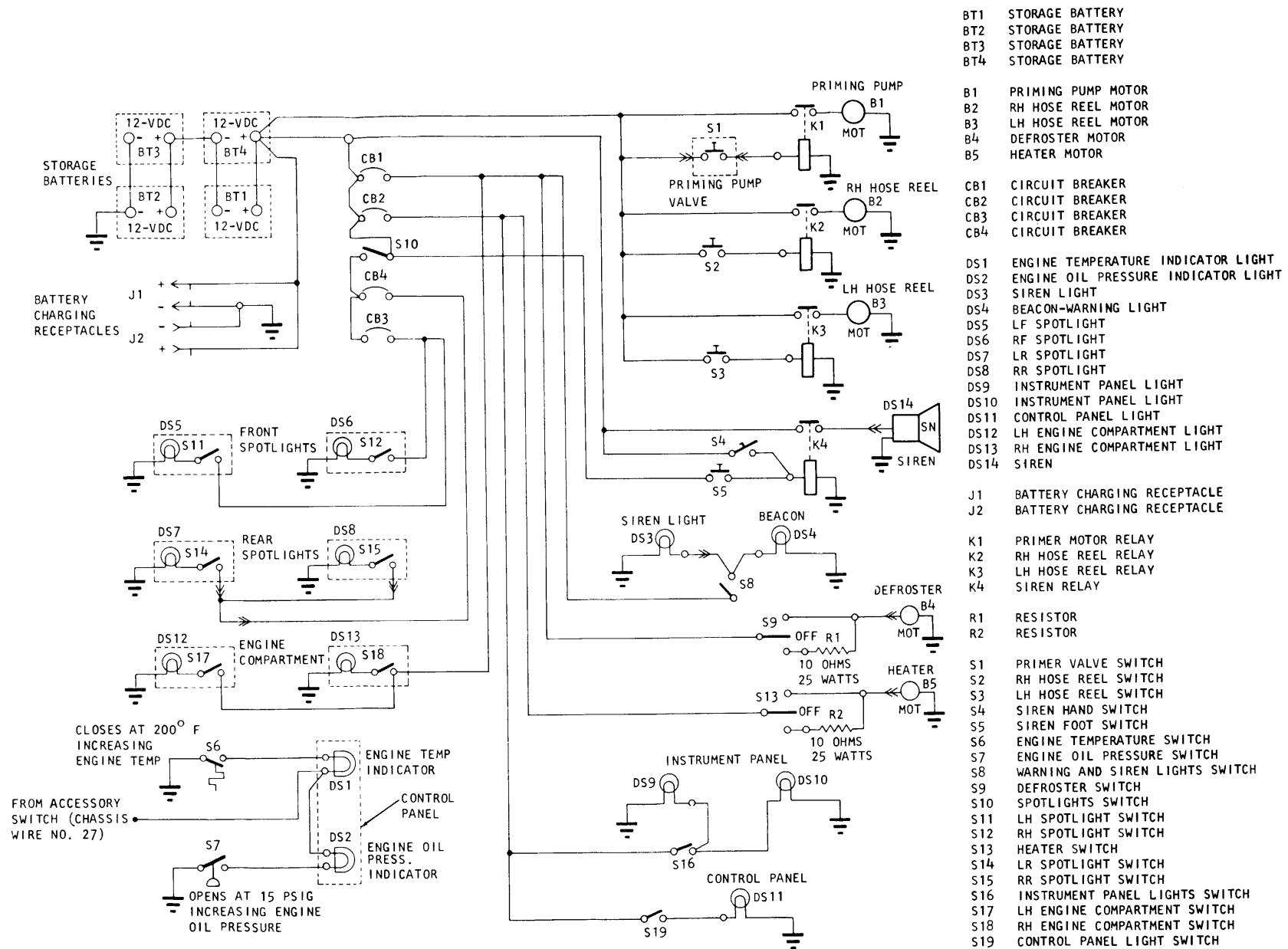
ME 4210-213-35/3-16A C1

Figure .-16A. Water tank and lines, removal and installation for model FT-500.



*Last page, figure 1-1* Change caption to read "Wiring diagram for model M45A2WLF."





ME 4210-213-35/1-2 C1

Figure 1-2. Wiring diagram for model FT-500.



By Order of the Secretary of the Army:

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

Official:

KENNETH G. WICKHAM,  
*Major General, United States Army,  
The Adjutant General.*



**Distribution:**

To be distributed in accordance with DA Form 12-25, Sec I (qty rqr Block No. 123), Direct/General Support requirements for Equipment: Fire Fighting.



TECHNICAL MANUAL

No. 5-4210-213-35

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HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., May 10, 1968

DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT  
MAINTENANCE MANUAL

**TRUCK, FIRE FIGHTING: POWERED PUMPER, FOAM AND WATER,  
500-GALLONS PER MINUTE CAPACITY  
CENTRIFUGAL PUMP, POWER TAKEOFF DRIVEN, 400-GALLON WATER TANK,  
40-GALLON FOAM CHEMICAL TANK, CLASS 530B NONWINTERIZED,  
(WARD LAFRANCE MODEL M45A2WLF)  
FSN 4210-928-3515**

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# CHAPTER 1 INTRODUCTION

## Section I. GENERAL

### 1-1. Scope

a. These instructions are published for the use of direct and general support and depot maintenance personnel maintaining the Model M45A2WLF Ward LaFrance Fire Fighting Truck. They provide information on the maintenance of the equipment, which is beyond the scope of the tools, equipment, personnel, or supplies normally available to the using organizations.

b. Report of errors, omissions, and recommendation for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to Commanding General,

U. S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

c. Report all equipment improvement recommendations as prescribed by TM 38-750.

### 1-2. Record and Report Forms

For other record and report forms applicable to direct and general support, and depot maintenance, refer to TM 38-750.

*Note:* Applicable forms, excluding Standard Form 46 (United States Government Motor Vehicles Operator's Identification Card) which is carried by the operator, will be kept in a canvas bag mounted on the equipment.

## Section II. DESCRIPTION AND TABULATED DATA

### 1-3. Description

A general description of the Ward LaFrance Model M45A2WLF Fire truck, the location and description of the identification and instruction plates, and information on the differences in models are contained in the Operator and Organizational Maintenance Manual. Direct and general support and depot repair and maintenance instructions are described in appropriate sections of this manual. For truck engine and chassis maintenance instructions refer to TM 9-2320-209-35.

### 1-4. Tabulated Data

a. *General* This paragraph contains all the overhaul data pertinent to direct and general support and depot maintenance personnel. A wiring diagram (fig. 1-1) is also included.

#### b. *Primer Pump.*

Suction side pump..... 3/4 in. diameter  
Discharge pipe ..... 1 15/16 in. diameter

#### c. *Fire Pump.*

Relief valve regulator limit 250 psi (pounds per square inch)

Related capacity maximum  
500 gpm (gallons per minute)

Type ..... Centrifugal  
Pump ratio ..... 1 to 2:28  
Shaft diameter ..... 1 1/2 in.  
Taper per foot..... 1 7/8 in.

#### d. *Nut and Bolt Torque Data.*

Size	Torque lb. inch
5/16.....	130
3/8.....	215
7/16.....	375
1/2.....	300



e. *Repair and Replacement Standards* Table 1-1 lists manufacturer's sizes, tolerances, desired clearances, and maximum allowable wear and clearances.

**Figure 1-1. Wiring diagram.**

**(Located in back of manual)**

**Table 1-1. Repair and Replacement Standards**

Component	Tolerance	Wear Limit
Impeller-Clearance Ring-Housing (Outside Diameter)	.010 to .014	.020
Impeller-Clearance Ring-Housing (Inside Diameter)	.010 to .014	.020
Shaft and Bearing	.004 to .007	.010
Drive Shaft (GSA-36)		
End Play	.005 to .020	Loose
Pump Shaft (GS-37)		
End Play	.010 to .030	Loose



## CHAPTER 2 GENERAL MAINTENANCE INSTRUCTIONS

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### Section I. SPECIAL TOOLS AND EQUIPMENT

#### 2-1. Special Tools and Equipment

Excluding the Model M45A2 Truck Chassis, no special tools or test equipment are required by direct and general support and depot maintenance personnel for performing maintenance on the Ward LaFrance Model M46A2WLF Fire Truck.

#### 2-2. Specially Designed Tools

Excluding the Model M45A2 Truck Chassis, no specially designed tools and equipment are required by direct and general support and depot maintenance personnel for performing maintenance on the Ward LaFrance Model M45A2WLF Fire Truck.

### Section II. TROUBLESHOOTING

#### 2-3. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the pumping unit or any

of its components. Each trouble symptom stated is followed by a list of probable causes.

The possible remedy recommended is described opposite the probable cause.

#### 2-4. Fire Pump will not Operate

##### *Probable Cause*

Pump impeller shaft damaged.....	Repair or replace impeller shaft (para 3-16 and table 1-1).
Pump gear box damaged.....	Replace or repair gear box (para 3-14)
Key sheared in pump drive.....	Replace key (para 3-14)

##### *Possible Remedy*

#### 2-5. Fire Pump Fails to Prime or Loses Prime

##### *Probable Cause*

Primer pump defective.....	Replace or repair primer (para 3-11)
Primer valve defective.....	Replace or repair primer valve (para 3-12)
Micro-switch defective.....	Replace micro-switch (TM 54210-213-12)
Air leaks .....	Repair or replace leaking pipes or fittings (para 3-2)

##### *Possible Remedy*

#### 2-6. Fire Pump Fails to Deliver Rated Flow or Develop Desired Pressure

##### *Probable Cause*

Relief valve defective .....	Replace or repair defective relief valve (para 3-15)
Fire pump impeller defective.....	Replace impeller (para 3-16)
Fire pump impeller vanes fouled with foreign matter.....	Clean blades (para 3-14)
Relief valve control defective.....	Replace or repair defective relief valve (para 3-7)

##### *Possible Remedy*

#### 2-7. Pumping Unit will not Produce Foam

##### *Probable Cause*

Metering valve defective.....	Replace or repair foam metering valve (para 3-9)
Defective foam valve .....	Replace or repair foam valve (para 3-8)
Foam lines damaged or broken.....	Replace defective foam lines (para 3-2)

##### *Possible Remedy*



## 2-8. Hose Reel Inoperative

### *Probable Cause*

### *Possible Remedy*

Drum will not turn.....	Replace or repair shaft bearings or defective drum (para 3-18)
Sprocket teeth broken.....	Replace or repair defective sprocket (para 3-18)
Drive motor or chain defective.....	Replace motor or chain (TM 5-4210-213-12)

## 2-9. Water Tank Leaks or Fails to Drain Properly.

### *Probable Cause*

### *Possible Remedy*

Defective drain valve.....	Repair drain valve (para 3-6)
Drain filled with foreign matter.....	Remove cover and clean draining system (para 3-20, 3-21)
Discharge line damaged.....	Remove cover and replace discharge line (para 3-20, 3-21)

## Section III. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS

### 2-10. General

This section provides the information necessary to direct and general support, and depot maintenance personnel for removal of the fire pump from the firetruck.

### 2-11. Fire Pump

#### *a. Removal.*

- (1) Remove the pump suction and discharge heads (para 2-12).
- (2) Disconnect hose reel piping and wiring (TM 5-4210-213-12).
- (3) Remove the drain line valve and lines (TM 5-4210-213-12).
- (4) Remove the pump drive universal joint (TM 5-4210-213-12).
- (5) Remove the primer pump and primer pump motor (TM 5-4210-213-12).
- (6) Remove the foam tank and disconnect the tank fill and tank suction lines (TM 5-4210-213-12).
- (7) Remove the pump compartment assembly by removing the four (4) U bolt assemblies and disconnect the water tank fill line and water tank suction line (TM 5-4210-213-12).
- (8) Refer to figure 3-1 and remove the fire pump from the fire truck.

#### *b. Installation.*

- (1) Refer to figure 3-1 and install the fire pump on the fire truck.
- (2) Install the pump compartment assembly and connect water tank fill line, water tank suction line and U bolt assemblies (TM 5-4210-213-12),

- (3) Install the foam tank and connect the tank fill and tank suction lines (TM 5-4210-213-12).

- (4) Install the primer pump and primer pump motor (TM 5-4210-213-12).

- (5) Install the pump drive universal joint (TM 5-4210-213-12).

- (6) Install the drain line valve and lines (TM 5-4210-213-12).

- (7) Connect hose reel piping and wiring (TM 5-4210-213-12).

- (8) Install the pump suction and discharge heads (para 2-12).

### 2-12. Fire Pump Suction and Discharge Heads

#### *a. Removal.*

- (1) Remove the pump control panels (TM 5-4210-213-12).

- (2) Refer to figure 2-1 and remove the suction heads from the suction and discharge lines.

#### *b. Cleaning, Inspection, and Repair.*

- (1) Clean all parts with an approved cleaning solvent, and dry thoroughly.

- (2) Inspect all parts for damaged or defective condition.

- (3) Replace or repair damaged or defective parts as necessary.

#### *c. Installation.*

- (1) Refer to figure 2-1 and install the suction and discharge heads on the suction and discharge lines.

- (2) Install the pump panels (TM 5-4210-213-12).



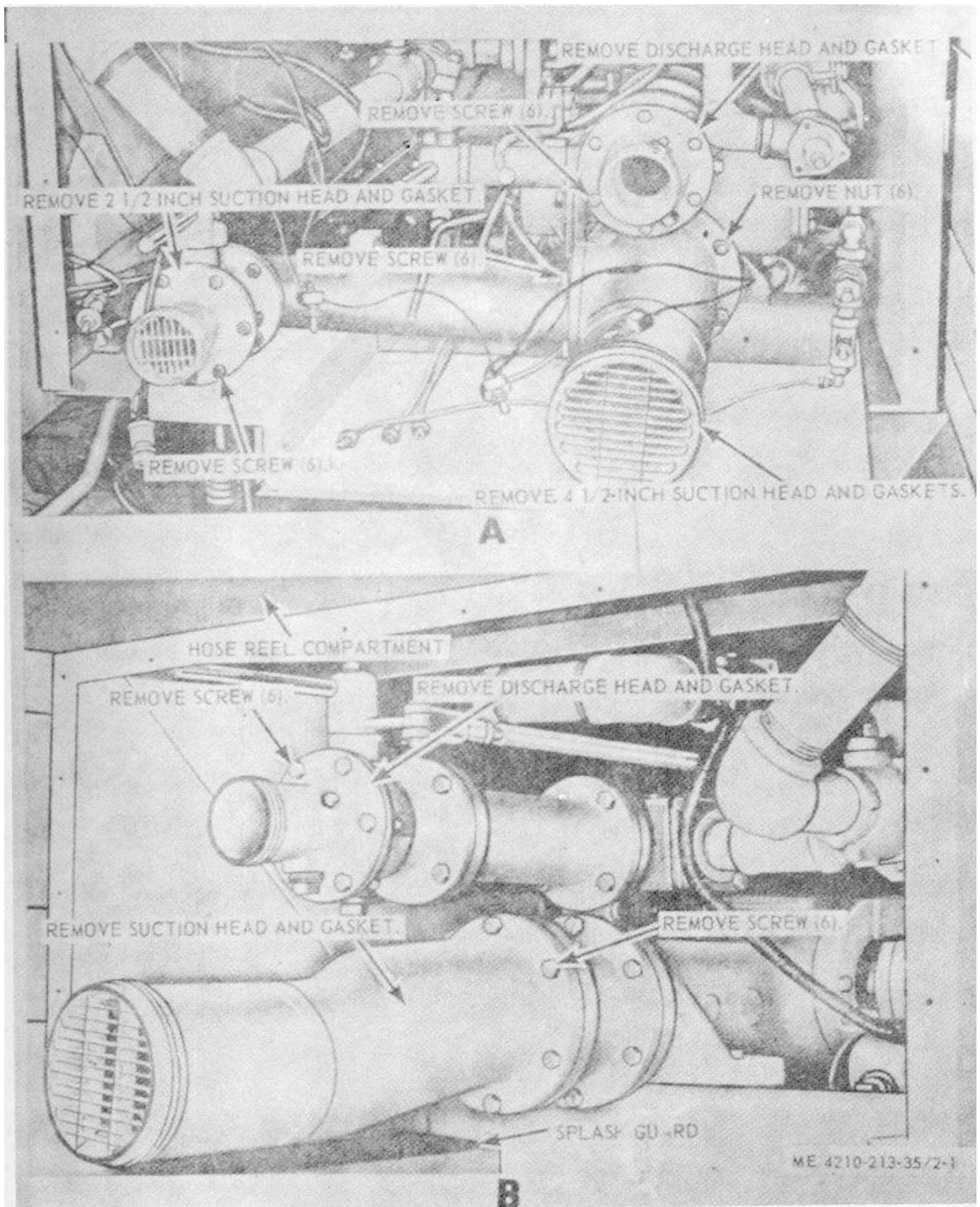


Figure 2-1. Suction and discharge heads and screens, removal and installation.  
2-3



## CHAPTER 3 REPAIR INSTRUCTIONS

---

### Section I. CONTROL VALVES, LINES AND FITTINGS

#### 3-1. General

A series of valves and piping mounted to the fire pump perform such functions as filling the water tank, discharging either water or a water and foam combination, through the reel hose, or draining the fire pump. All operating valves, except the foam proportioning valve and tank drain valve are of the quarter-turn quick opening ball type.

#### 3-2. Water and Foam Pipes and Fittings

*a. General.* The water and foam pipes and fittings provide a water and foam passage from the fire pump to the water and foam tanks.

*b. Removal.* Refer to figure 3-1 and remove the water and foam piping from the pump assembly.

*c. Disassembly.* Separate the pipes, valves and fittings.

*d. Cleaning.* Clean all parts with an approved cleaning solvent and dry thoroughly.

*e. Inspection and Repair.* Inspect all parts for wear, damage, or defects. Replace damaged or defective parts as necessary.

*f. Reassembly.* Connect the pipes, valves and fittings.

*g. Installation.* Refer to figure 3-1 and install the piping assembly on the pump assembly.

#### 3-3. Suction and Discharge Valves

*a. General.* The suction and discharge valves control the intake and outlet of liquid to and from the fire pump.

*b. Removal.* Refer to figure 3-1 and remove the suction and discharge valves from the suction and discharge heads.

*c. Disassembly.* Refer to figure 3-2 and disassemble the suction and discharge valves.

*d. Cleaning.* Clean all parts in an approved cleaning solvent and dry thoroughly.

*e. Inspection and Repair.* Inspect all parts for wear, defects, and damage. Replace or repair worn, defective, or damaged parts as necessary.

*f. Reassembly.* Refer to figure 3-2 and reassemble the suction and discharge valves in the reverse order.

*g. Installations.* Refer to figure 3-1 and install the suction and discharge valves on the suction and discharge head.

#### 3-4. Hose Reel Valves, Tank Fill Valve, and Tank Suction

*a. General.* The hose reel, tank fill, and tank suction valves control the intake and outlet of liquid to the hose reels and tanks.

*b. Removal.* Refer to figure 3-1 and remove the hose reel valves.

*c. Disassembly.* Refer to figure 3-3 and disassemble the hose reel valve, tank fill valve, and tank suction valves.

*d. Cleaning.* Clean all parts in an approved cleaning solvent and dry thoroughly.

*e. Inspection and Repair.* Inspect all parts for wear, defects, and damage. Replace or repair worn, defective, or damaged parts as necessary.

*f. Reassembly.* Refer to figure 3-3 and reassemble the hose reel valves, tank fill valves, and tank suction valve in the reverse order.

*g. Installation.* Refer to figure 3-1 and install the hose reel valves, tank fill valve, and tank suction valve on the pump assembly.

#### 3-5. Water Tank Drain Valve

*a. General.* The water tank drain valves provide a method of draining the water tank.



*b. Removal.* Remove the water tank drain valve (TM 5-4210-213-12).

*c. Disassembly.* Refer to figure 3-4 and disassemble the water tank drain valve.

*d. Cleaning.* Clean all parts in an approved cleaning solvent and dry thoroughly.

*e. Inspection and Repair.* Inspect all parts for wear, defects, and damage. Replace or repair worn, defective, or damaged parts as necessary.

*f. Reassembly.* Refer to figure 3-4 and reassemble water tank drain valve in the reverse order.

*g. Installation.* Install the water tank drain valve (TM 5-4210-213-12).

### **3-6. Drain Line Valve**

*a. General.* The drain line valve provides a method of draining the drain line.

*b. Removal.* Remove the drain line valve (TM 5-4210-213-12).

*c. Disassembly.* Refer to figure 3-5 and disassemble the drain valve.

*d. Cleaning.* Clean all parts in an approved cleaning solvent and dry thoroughly.

*e. Inspection and Repair.* Inspect all parts for wear, defects, and damage. Replace or repair worn, defective, or damaged parts as necessary.

*f. Reassembly.* Refer to figure 3-5 and reassemble the drain line valve in the reverse order.

*g. Installation.* Install the drain line valve (TM 5-4210-213-12).

### **3-7. Relief Valve**

*a. General.* The relief valves regulate the pressure in the system.

*b. Removal.* Remove the relief valve control (TM 5-4210-213-12).

*c. Disassembly.* Refer to figure 3-6 and disassemble the relief valve control.

*d. Cleaning.* Clean all parts in an approved cleaning solvent and dry thoroughly.

**Caution: Do not use abrasives.**

*e. Inspection and Repair.* Inspect piston before placing in body. Inspect all parts for wear, defects, and damage. Replace or repair worn, defective, or damaged parts as necessary.

*f. Reassembly.* Refer to figure 3-6 and reassemble the relief valve control in the reverse order.

*g. Installation.* Install the relief valve control (TM 5-4210-213-12).

### **3-8. Foam Tank Drain Valve and Foam Valve**

*a. General.* The foam tank drain valve provides a method of draining the foam tank. The foam valve allows foam to flow from the tank to the fire pump.

*b. Removal.* Refer to TM 5-4210-213-12 and remove the foam tank drain valve and foam valve from the pump assembly.

*c. Disassembly.* Refer to figure 3-7 and disassemble the foam tank drain valve and foam valve.

*d. Cleaning.* Clean all parts in an approved cleaning solvent, and dry thoroughly.

*e. Inspection and Repair.* Inspect all parts for wear, defects, and damage. Replace or repair worn, defective, or damaged parts as necessary.

*f. Reassembly.* Refer to figure 3-7 and reassemble the foam tank drain valve and foam valve in the reverse order.

*g. Installation.* Refer to TM 5-4210-213-12 and install the foam tank drain valve and foam valve on the pump assembly.

### **3-9. Foam Metering Valve**

*a. General.* The foam metering valve regulates the flow of foam from the fire pump.

*b. Removal.* Refer to figure 3-1 and remove the foam metering valve.

*c. Disassembly.* Refer to figure 3-8 and disassemble the foam metering valve.

*d. Cleaning.* Clean all parts in an approved cleaning solvent and dry thoroughly.

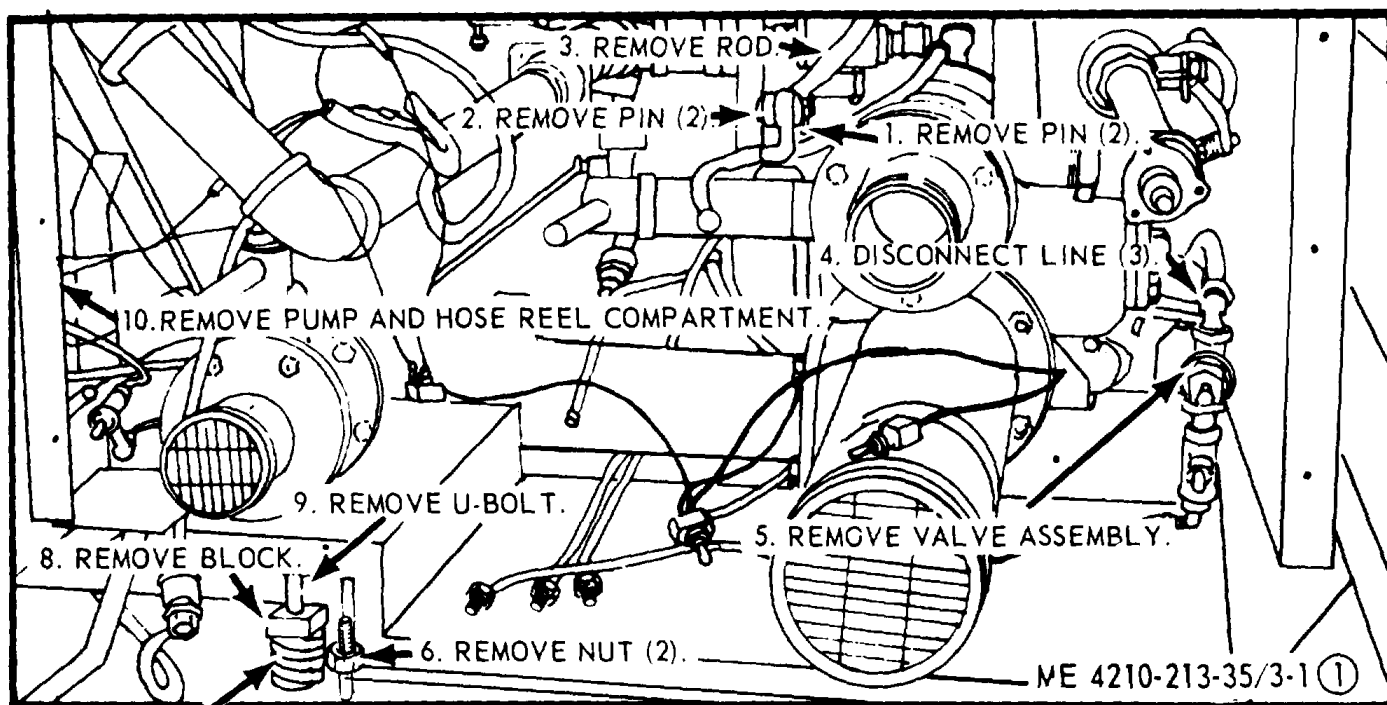
*e. Inspection and Repair.* Inspect all parts for wear, defects, and damage. Replace or repair worn, defective, or damaged parts as necessary.



f. *Reassembly.* Refer to, figure 3-8 and reassemble the foam metering valve in the reverse order.

g. *Installation.* Refer to figure 3-1 and install the foam metering valve.

**NOTE: REMOVE REMAINING CONTROL RODS IN A SIMILAR MANNER.**

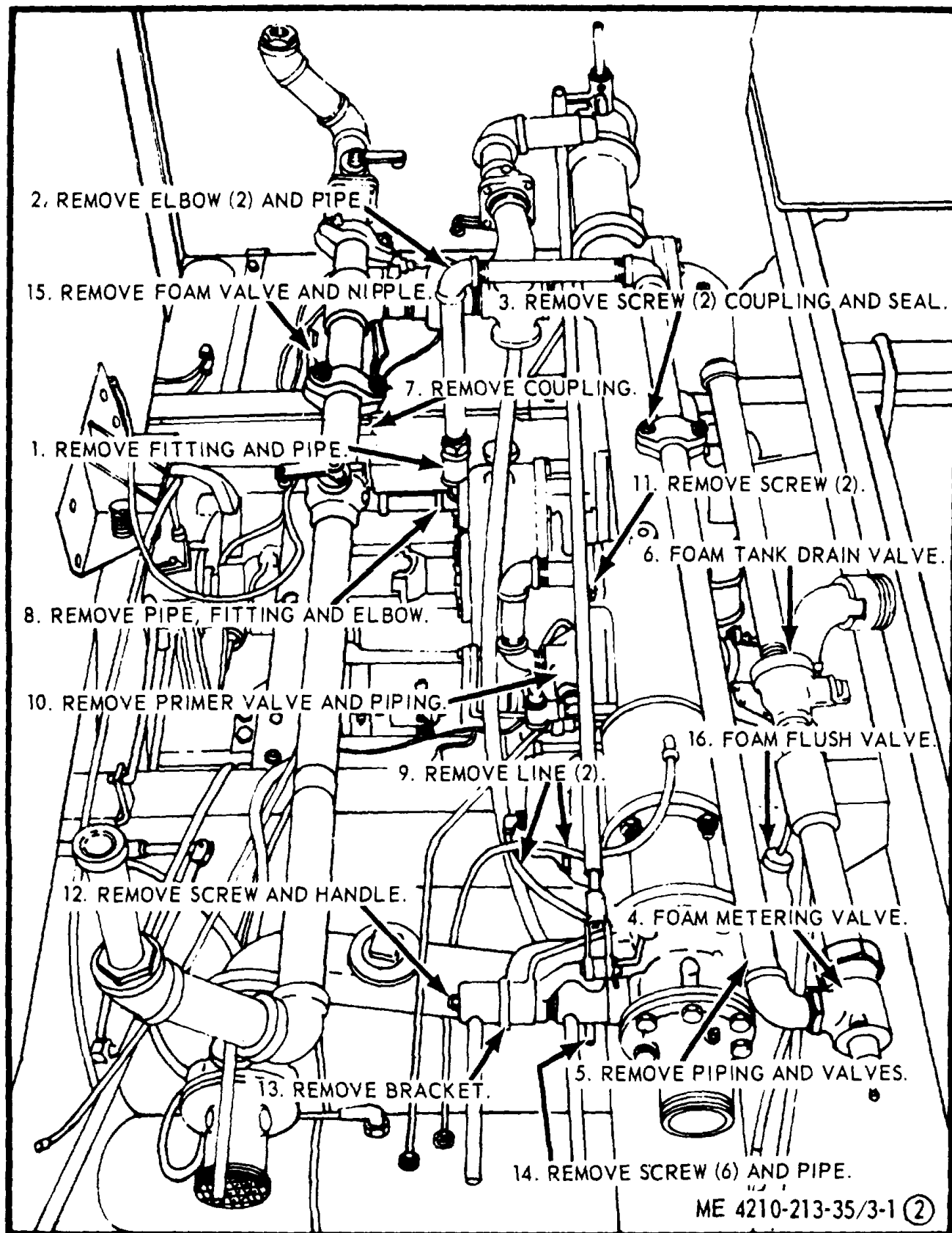


**A. LEFT SIDE VIEW FIRE PUMP**

**NOTE: REMOVE REMAINING U-BOLTS IN A SIMILAR MANNER.**

**Figure 3-1. Water pump, removal and installation.**

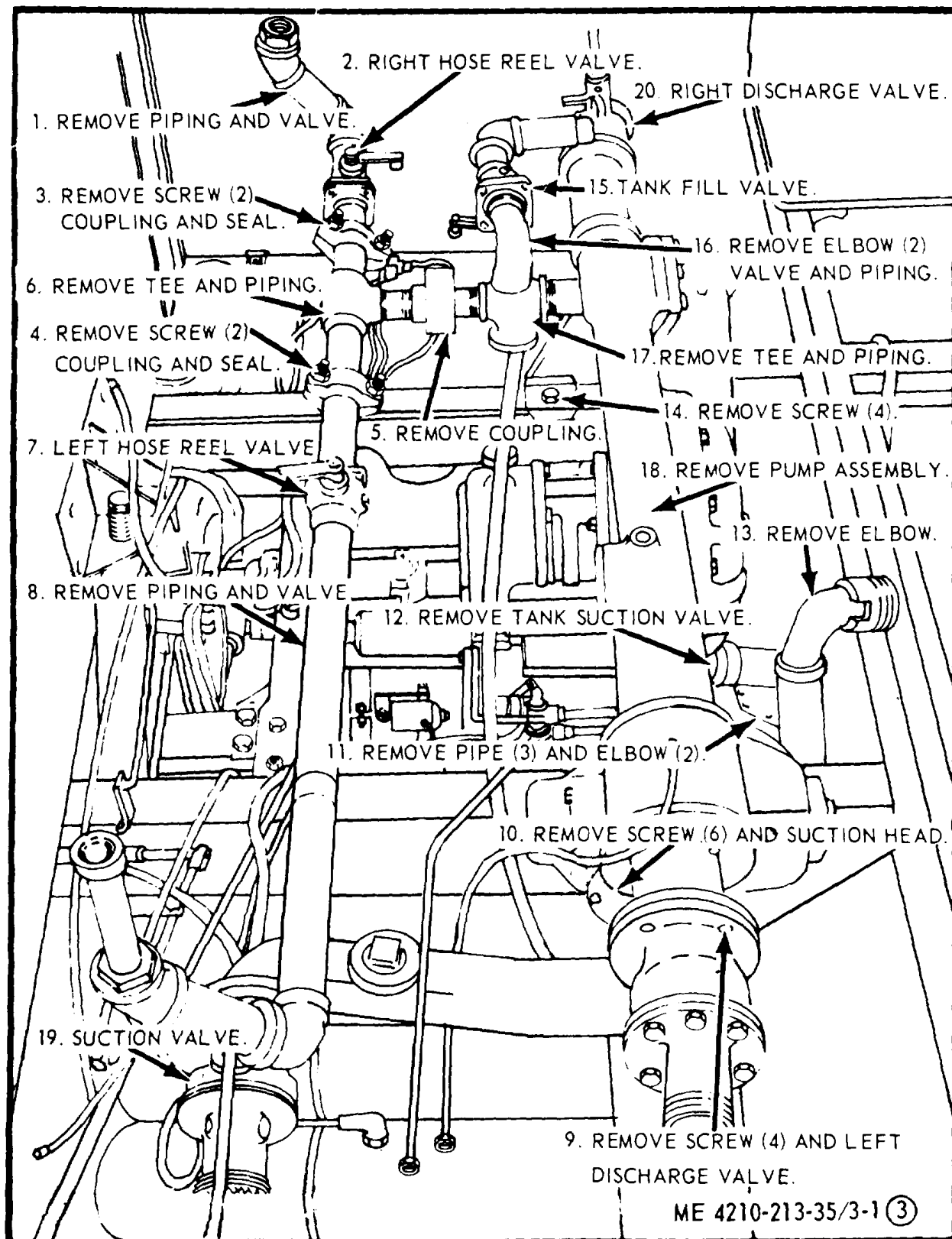




B. TOP VIEW FIRE PUMP AND  
CONNECTING PIPING.

Figure 3-1-Continued.





NOTE: REMOVE SUCTION AND RIGHT DISCHARGE VALVES IN A SIMILAR MANNER.

C. TOP VIEW FIRE PUMP AND CONNECTING PIPING.

Figure 3-1-Continued.



NOTE: DISASSEMBLE AND ADJUST DISCHARGE VALVES IN A SIMILAR MANNER.



- ME 4210-213-35/3-2

**3-6**



1	Pipe plug	11	Stop
2	Pipe plug	12	Pin
3	Packing	13	Retainer (2)
4	Screw, cap 3/8-24 x 1 in. (6)	14	Stem
5	Cover	15	Packing
6	Gasket (3 rqr)	16	Nut, 7/16-20
7	Packing	17	Ball
8	Nut, 3/8-24	18	Pivot
9	Setscrew, 5/16-24 x 3/8 in.	19	Spring
10	Handle	20	Body

**Figure 3-2-Continued.**

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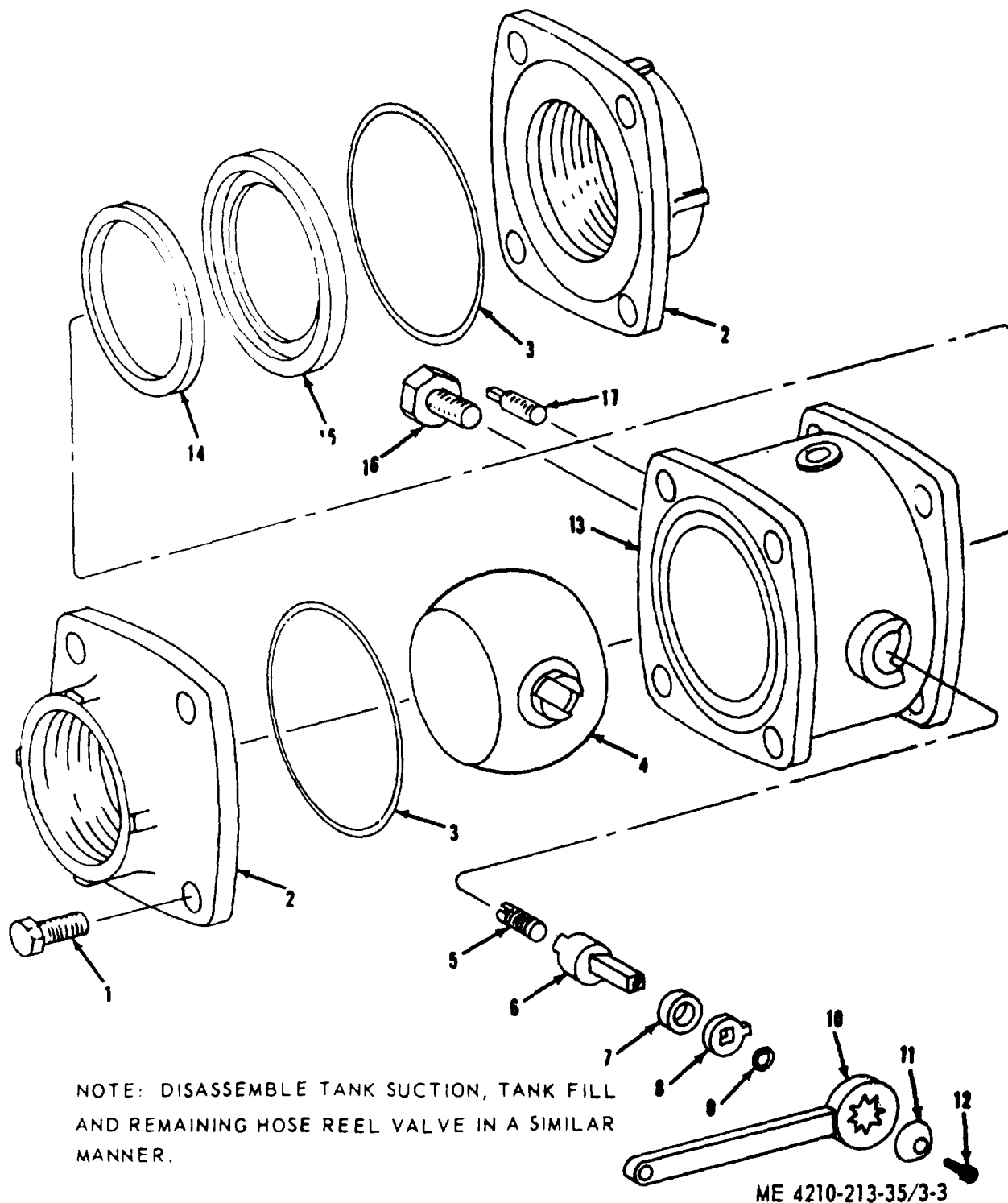


Figure 3-3. Hose reel valves, tank fill valve, and tank suction valve, (exploded view).



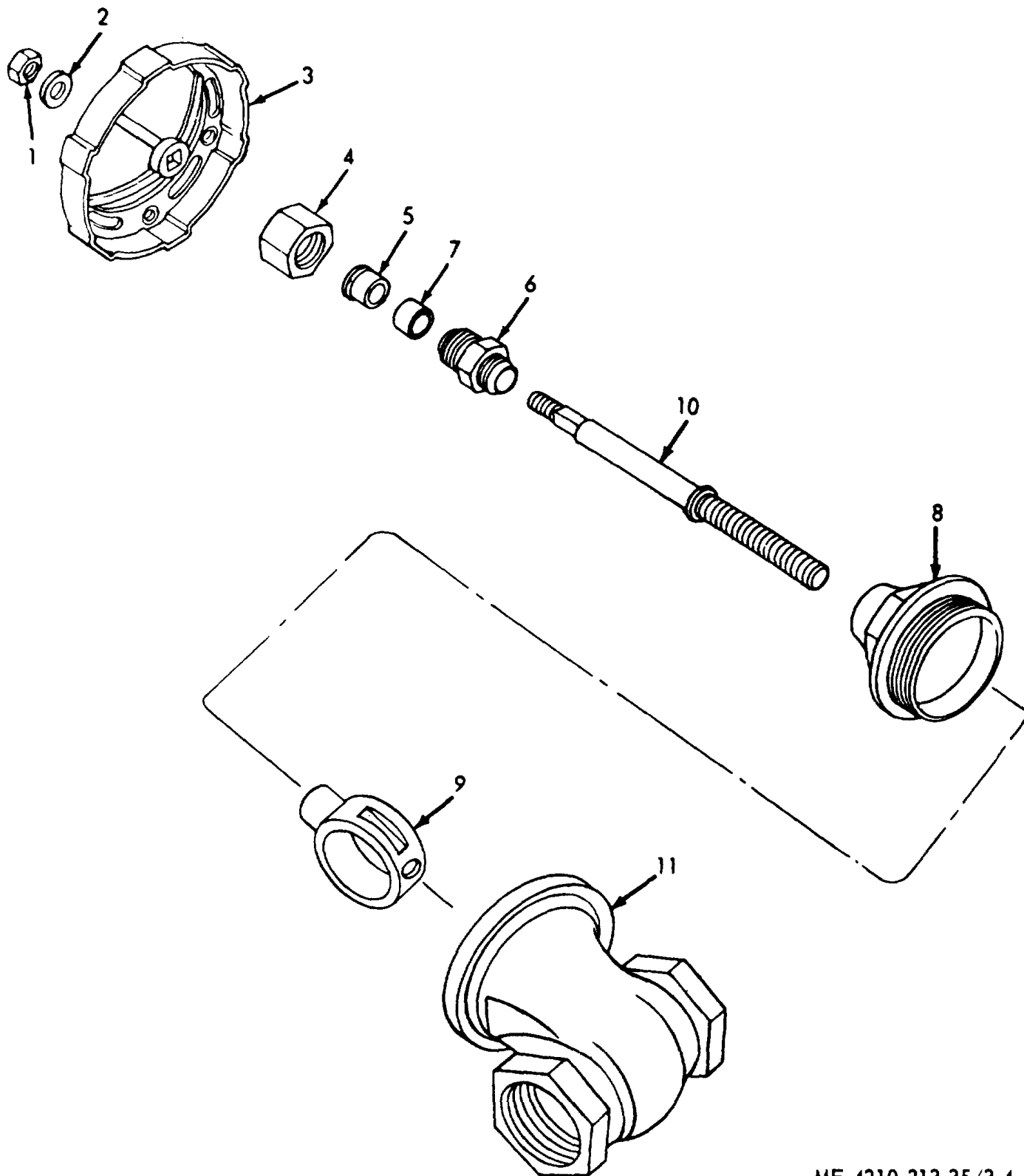
1	Bolt
2	Cap
3	O Ring
4	Ball
5	Screw
6	Shaft
7	Seal
8	Lock
9	Washer

10	Handle
11	Cap
12	Screw
13	Body
14	Seat
15	Seal
16	Bolt
17	Plug

**Figure 3-3-Continued.**

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ME 4210-213-35/3-4

Figure 3-4. Water- tank drain valve, exploded view.

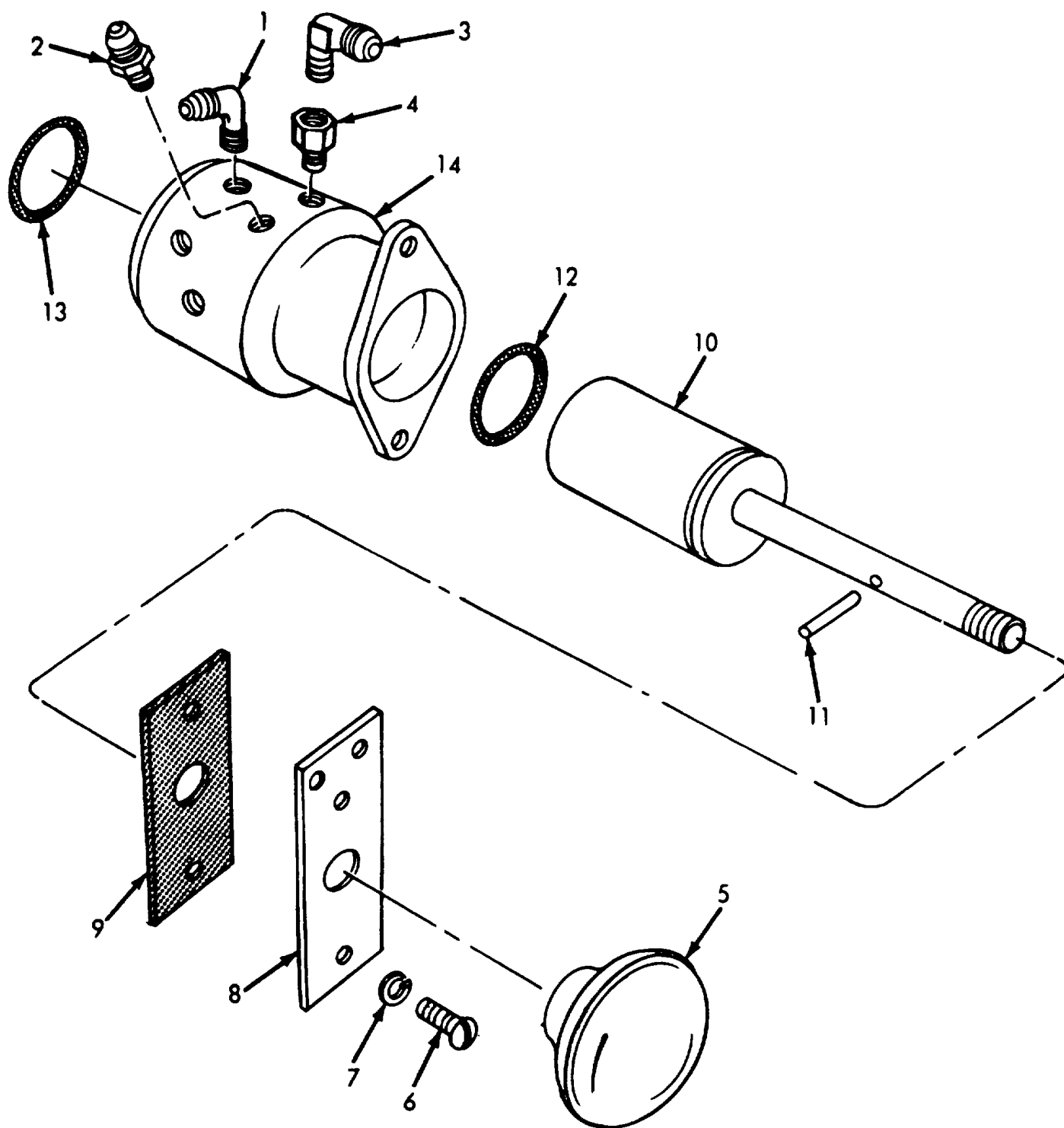


1	Nut, 5/16-18	7	Packing
2	Special Washer	8	Bonnet
3	Handle	9	Ball
4	Nut	10	Stem
5	Bushing	11	Body
6	Fitting		

**Figure 3-4-Continued.**

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ME 4210-213-35/3-5

Figure 3-5. Drain line valve, exploded view.



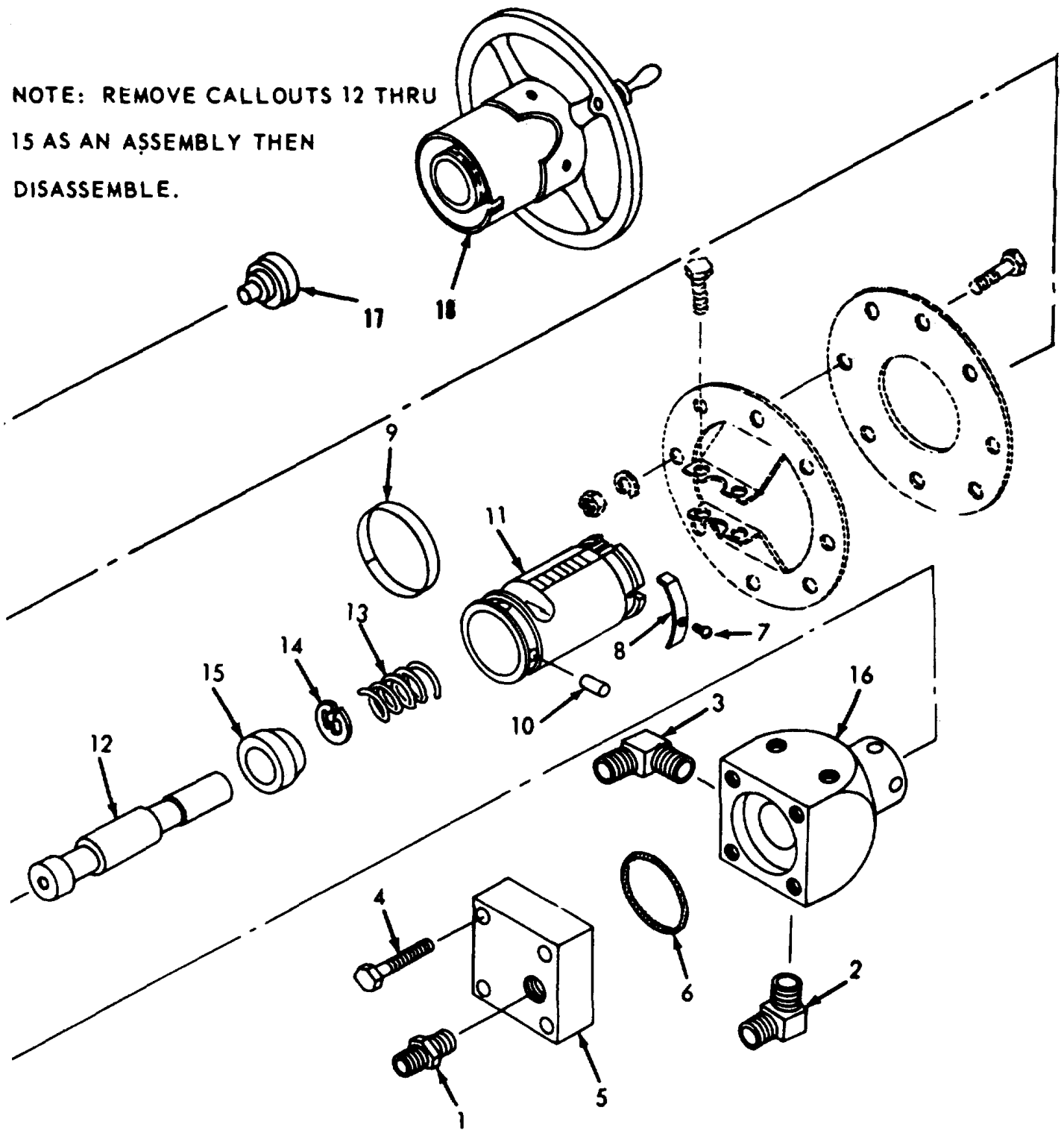
1	Elbow	8	Stop plate
2	Fitting	9	Piston
3	Elbow	10	Pin
4	Adapter	11	Packing
5	Knob	12	Packing
6	Screw, 1/4-20 x 5/8 in. (2)	13	Body
7	Name plate		

**Figure -5--Continued.**

---



NOTE: REMOVE CALLOUTS 12 THRU  
15 AS AN ASSEMBLY THEN  
DISASSEMBLE.



NOTE: OIL CLOSE FIT IN BODY (16) AND PISTON (12).

ME 4210-213-35/3-6

Figure 3-6. Relief valve control, exploded view.



1	Fitting	10	Pin (4)
2	Elbow	11	Cover
3	Elbow	12	Piston
4	Screw, cap 5/16-24 x 1 1/4 in. (4)	13	Spring
5	Bonnet	14	Ring
6	Packing	15	Retainer
7	Special screw	16	Body
8	Stop	17	Retainer
9	Clip	18	Control handle

**Figure 3-6-Continued.**

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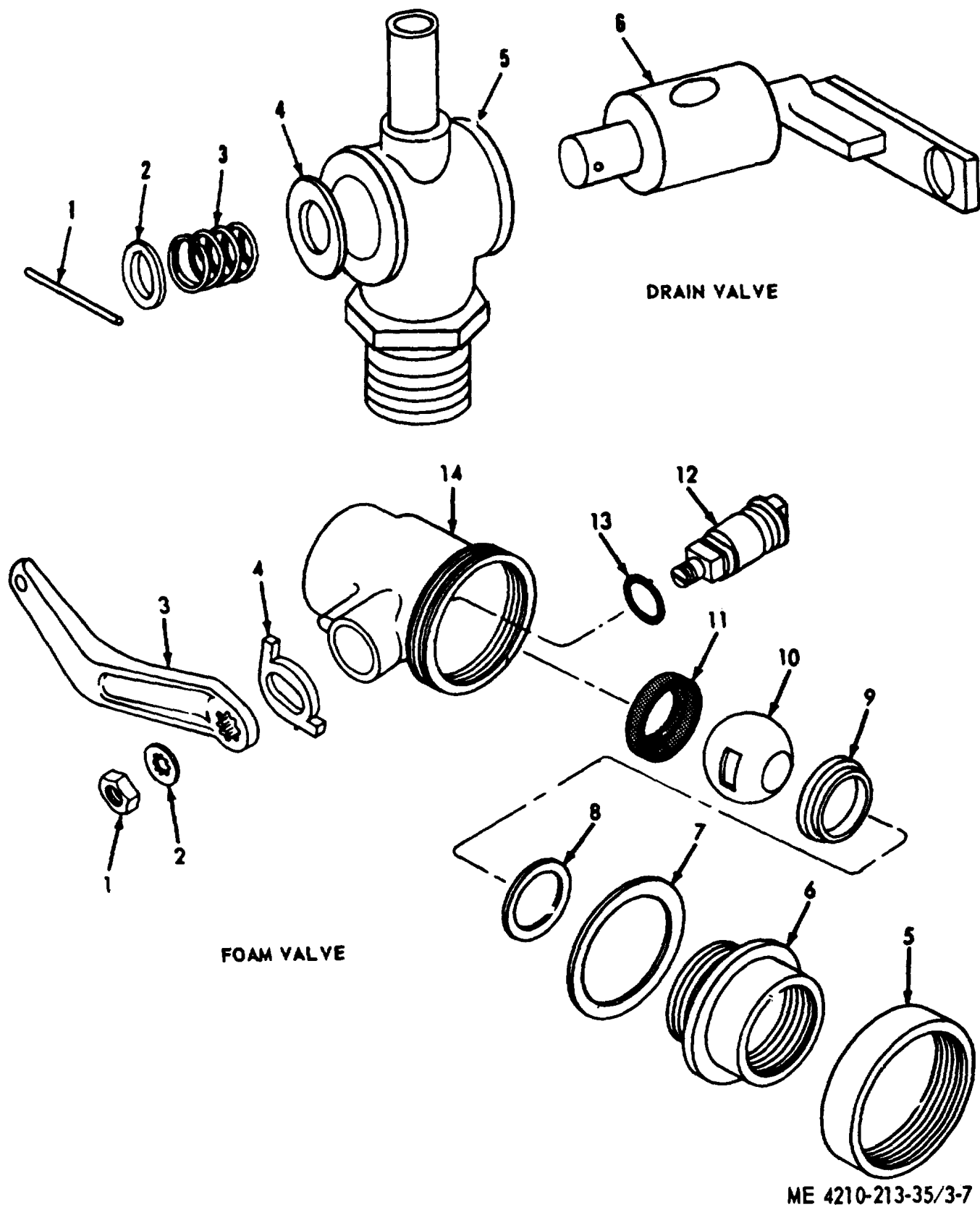


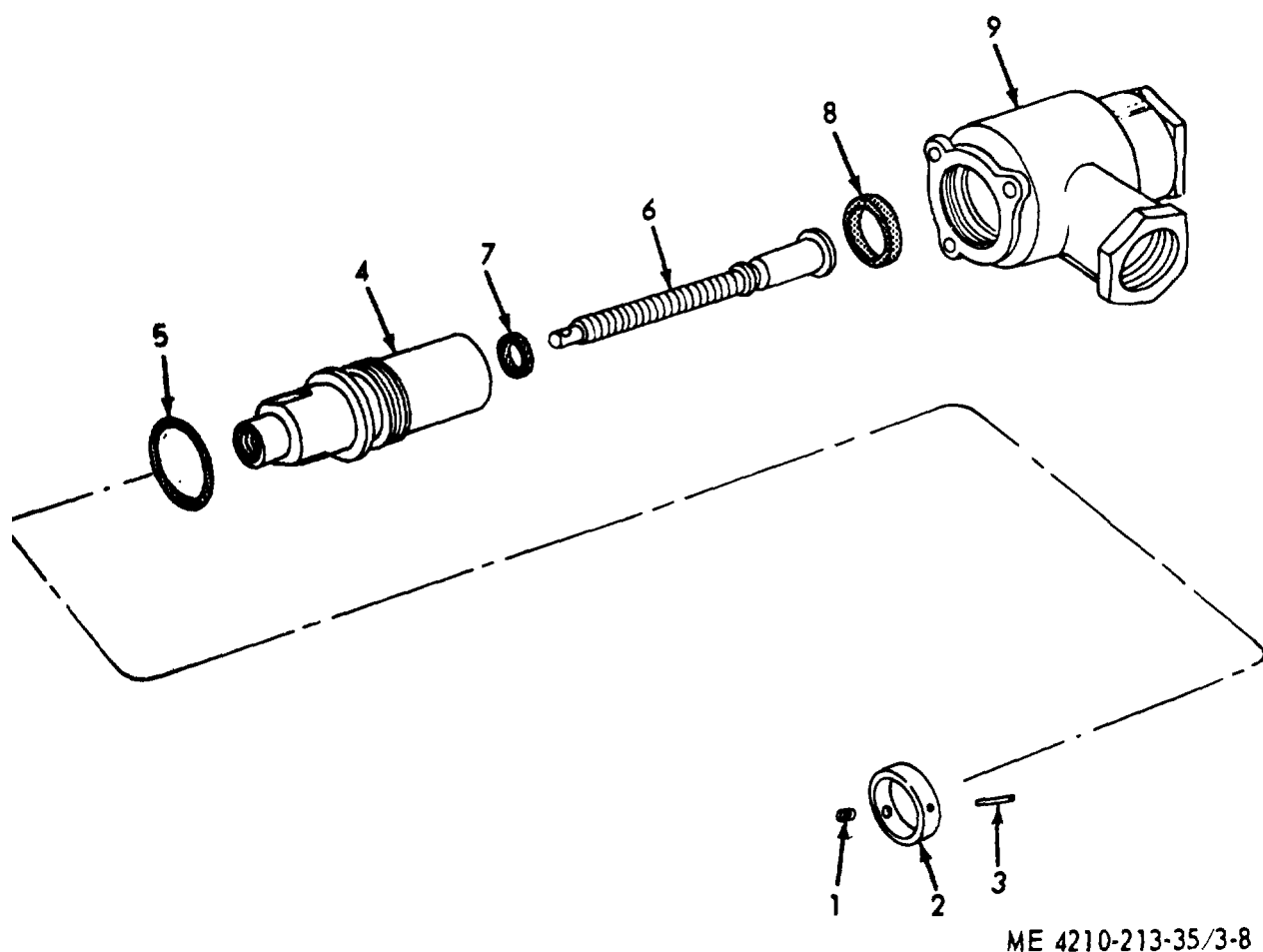
Figure 3-7. Foam tank drain valve and foam valve, exploded view.



FOAM VALVE	
KEY	NAME
1	Nut, 7/16-20
2	Washer, 7/16 in.
3	Handle
4	Stop
5	Special nut
6	Adapter
7	Gasket
8	Gasket
9	Retainer
10	Ball
11	Seal
12	Pivot
13	Packing
14	Body

DRAIN VALVE	
KEY	NAME
1	Pin
2	Washer
3	Spring
4	Washer
5	Body
6	Handle

Figure 3-7-Continued.



1 Setscrew  
2 Ring  
3 Pin

4 Body  
5 Packing  
6 Piston

7 Packing  
8 Packing  
9 Valve body

Figure 3-8. Foam metering valve, exploded view.



## Section II. PRIMER PUMP ASSEMBLY

### 3-10. General

The priming system consists of a rotary vacuum pump operated by a 24-volt electric motor controlled through a priming pump valve mounted in the pump compartment, a microswitch mounted on the priming pump valve, and a master control switch mounted on the pump control panel. As the priming valve is actuated the microswitch starts the priming pump motor. The priming pump motor drives the primer pump which sucks water into the centrifugal type fire pump suction lines, priming the pump. After both the suction and discharge casings have been completely filled, water is then discharged through the bottom of the primer pump, and the primer pump must be manually shut off.

### 3-11. Primer Pump Assembly

- a. *General.* The primer pump primes the fire pump.
- b. *Removal.* Remove the primer pump assembly (TM 5-4210-213-12).
- c. *Disassembly.* Refer to figure 3-9 and disassemble the primer pump assembly.
- d. *Cleaning.* Clean all parts in an approved cleaning solvent and dry thoroughly.

e. *Inspection and Repair.* Inspect all parts for wear, defects, and damage. Replace or repair worn, defective, or damaged parts as necessary.

f. *Reassembly.* Refer to figure 3-9 and reassemble the primer pump assembly in the reverse order.

g. *Installation.* Install the primer pump assembly (TM 5-4210-213-12).

### 3-12. Primer Valve

- a. *General.* The primer valve controls the primer pump.
- b. *Removal.* Refer to figure 3-1 and remove the primer valve from the pump assembly.
- c. *Disassembly.* Refer to figure 3-10 and disassemble the primer valve.
- d. *Cleaning.* Clean all parts in an approved cleaning solvent and dry thoroughly.
- e. *Inspection and Repair.* Inspect all parts for wear, defects, and damage. Replace or repair worn, defective, or damaged parts as necessary.
- f. *Reassembly.* Refer to figure 3-10 and reassemble the primer valve in reverse order.
- g. *Installation.* Refer to figure 3-1 and install the primer valve on the pump assembly.

## Section III. FIRE PUMP ASSEMBLY

### 3-13. General

The fire pump assembly consists of a main pump, drive unit and relief valve. The main pump includes the impeller, main shaft, main bearings and head, suction and discharge pipes, and volute case. The drive unit contains driving gears and bearings for the main pump, which is driven by the power takeoff unit on the truck transmission. A series of vanes on the rapidly rotating impeller produce centrifugal force, which forces the water through the inside of the impeller, this increases the pressure of the water and creates a vacuum which draws more water into the impeller. The relief valve bypasses water within the pump to prevent pressure rise when the hose lines are shut off.

### 3-14. Pump Gearbox

a. *General.* The fire pump gearbox contains driving gears and bearings to transmit power to the fire pump.

b. *Removal.*

(1) Remove universal drive shaft (TM 5-4210-213-12).

(2) Refer to figure 3-11 and remove the pump gearbox from the pump assembly.

c. *Disassembly.* Refer to figure 3-12 and disassemble the pump gearbox.

d. *Cleaning.* Clean all parts in an approved cleaning solvent and dry thoroughly.

e. *Inspection and Repair.* Inspect all parts for wear, defects, and damage. Replace or repair worn, defective, or damaged parts as necessary.



*f. Reassembly.* Refer to figure 3-12 and reassemble the pump gearbox in the reverse order.

*g. Installation.*

(1) Refer to figure 3-11 and install the pump gearbox on the pump assembly.

(2) Install universal drive shaft (TM 5-4210-213-12).

### **3-15. Relief Valve and Adapters**

*a. General.* The relief valve bypasses water within the pump to prevent pressure rises. The adapters will allow various size connections.

*b. Removal.* Refer to figure 3-13 and remove the relief valve and adapters.

*c. Disassembly.* Refer to figure 3-13 and disassemble the relief valve and adapters.

*d. Cleaning.* Clean all parts in an approved cleaning solvent and dry thoroughly.

*e. Inspection and Repair.* Inspect all parts for wear, defects and damage. Replace or repair worn, defective, or damaged parts as necessary.

*f. Testing* Test valve for movement as follows:

(1) Remove bonnet (13) and move valve (17) in and out.

(2) If packing (16) sticks in cylinder remove cover (11) and lightly grease the cylinder wall in path of packing.

(3) Install bonnet (13) and cover (11).

*g. Reassembly.* Refer to figure 3-13 and reassemble the relief valve and adapters in the reverse order.

### **3-16. Pump Head and Body**

*a. General.* The pump head and body are the basic assemblies of the fire pump.

*b. Removal.*

(1) Remove the pump assembly (para 2-11).

(2) Remove the pump gearbox (para 3-14).

(3) Remove the relief valve and adapters (para 3-15).

(4) Refer to figure 3-14 and remove and disassemble the pump head and body.

*c. Cleaning.* Clean all parts in an approved cleaning solvent and dry thoroughly.

*d. Inspection and Repair.* Inspect all parts for wear, defects, and damage (table 1-1). Replace or repair worn, defective or damaged parts as necessary.

*e. Reassembly.* Refer to figure 3-14 and reassemble the pump head and body in the reverse order.

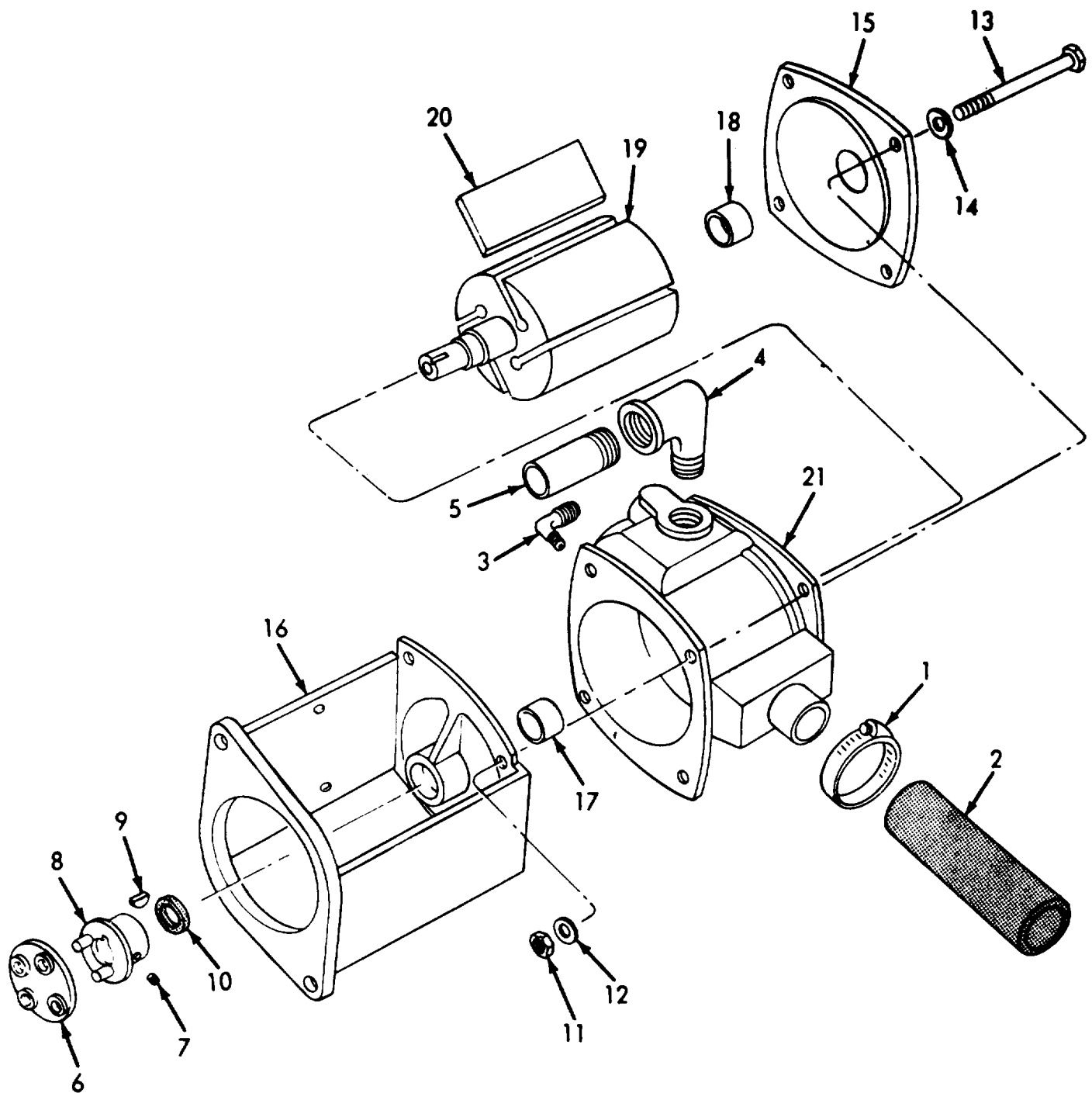
*f. Installation.* Refer to figure 3-14 and install the pump head and body in the reverse order.

(1) Install the relief valve and adapters (para 3-15).

(2) Install the pump gearbox (para 3-14).

(3) Install the pump assembly (para 2-11).





ME 4210-213-35/3-9

Figure 3-9. Primer pump assembly, exploded view.



1	Clamp	12	Washer, flat, 5/16 in. (4)
2	Hose	13	Screw, cap 5/16-18 x 4 1/2 in. (4)
3	Elbow	14	Washer, flat, 5/16 in. (4)
4	Street ell	15	Head
5	Nipple	16	Mounting
6	Coupling	17	Bushing
7	Setscrew	18	Bushing
8	Drive coupling	19	Rotor
9	Key	20	Vane
10	Seal	21	Body
11	Nut, 5/16 in. (4)		

**Figure 3-9--Continued.**

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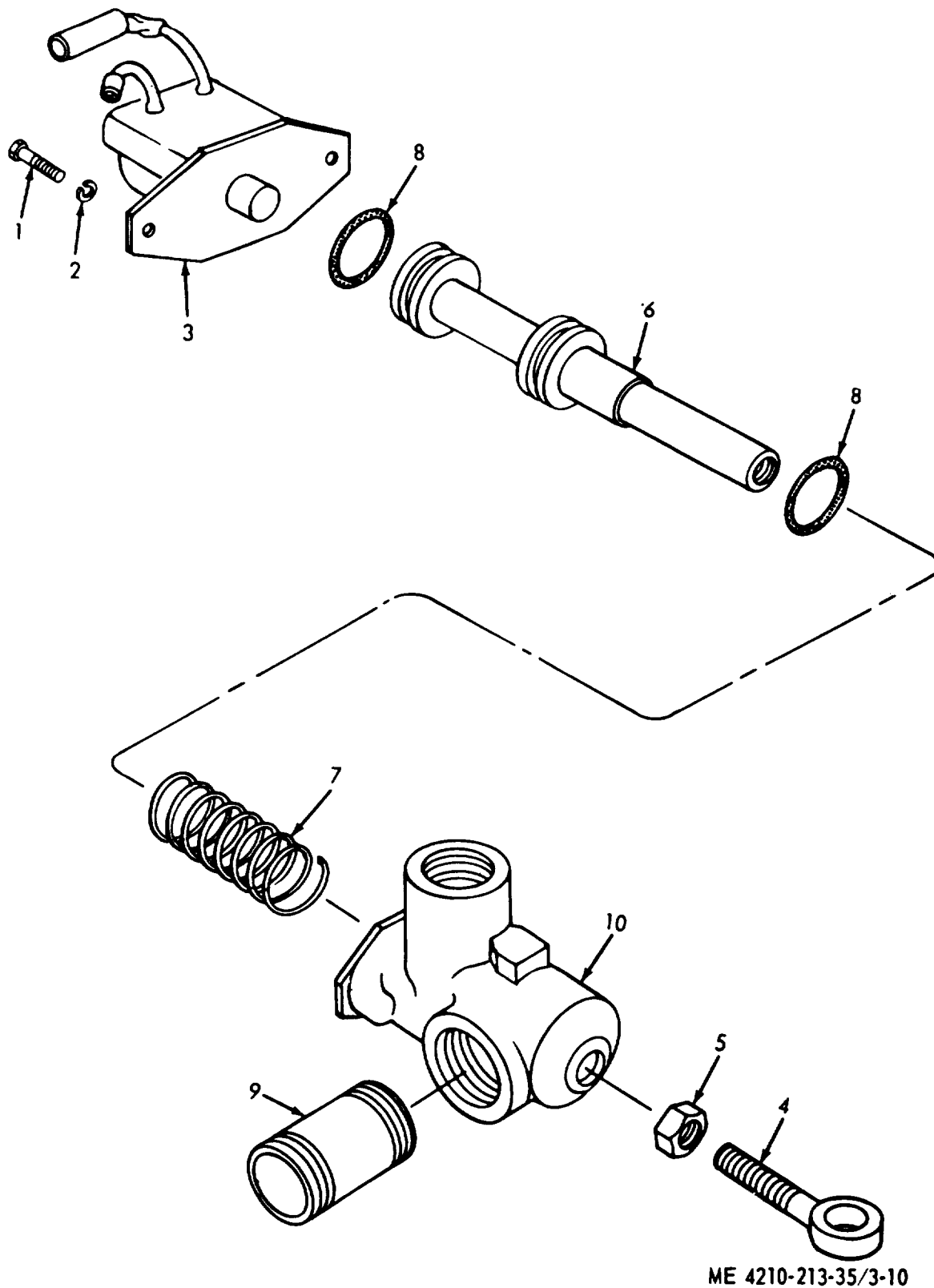


Figure 3-10. Primer valve, exploded view.



- |   |                                     |    |             |
|---|-------------------------------------|----|-------------|
| 1 | Screw, machine, 10-32 x 3/8 in. (2) | 6  | Piston      |
| 2 | Washer, lock No. 10 (2)             | 7  | Spring      |
| 3 | Switch                              | 8  | Packing (2) |
| 4 | Rod end                             | 9  | Nipple      |
| 5 | Nut, 3/8-16                         | 10 | Body        |

Figure 3-10--Continued.

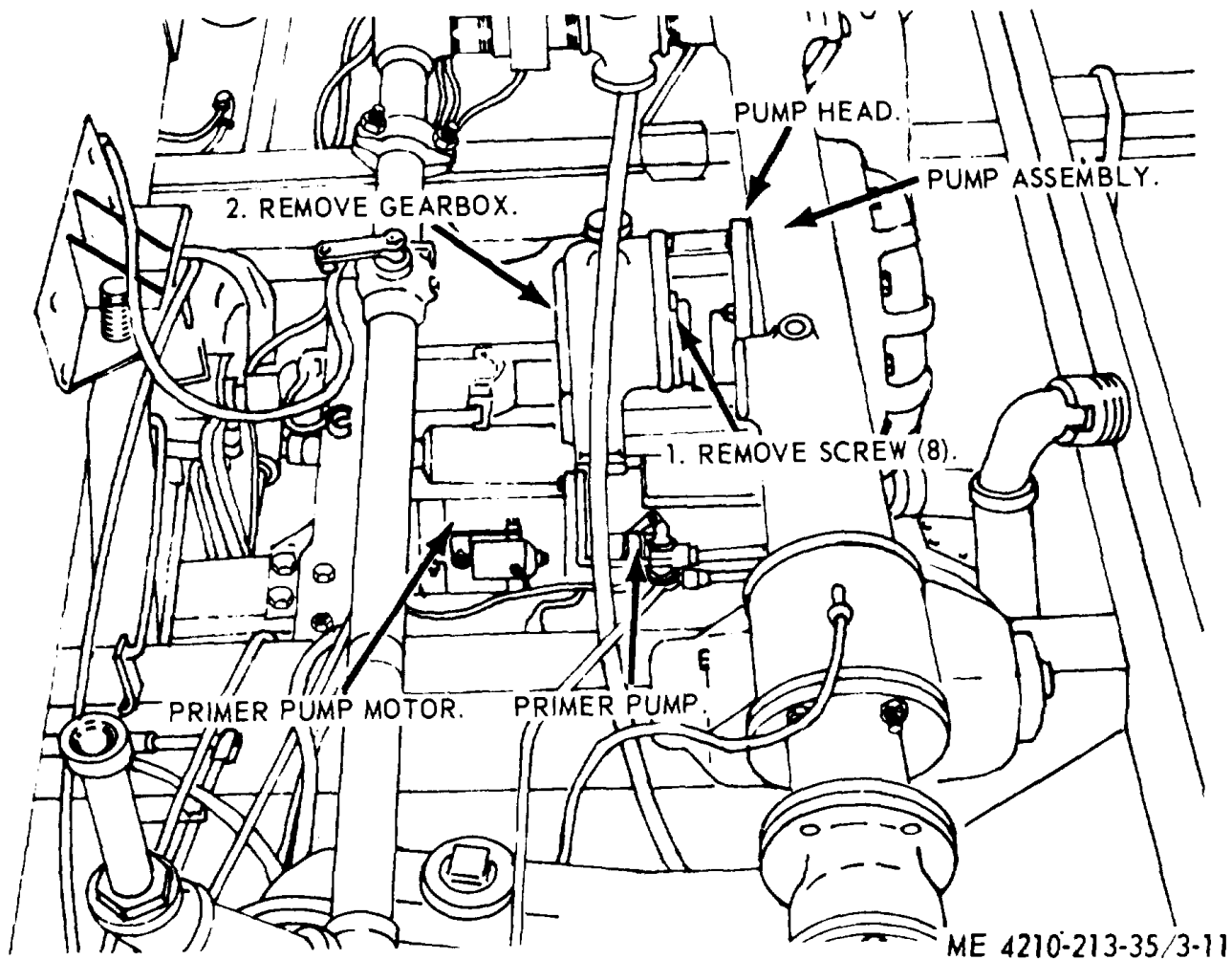
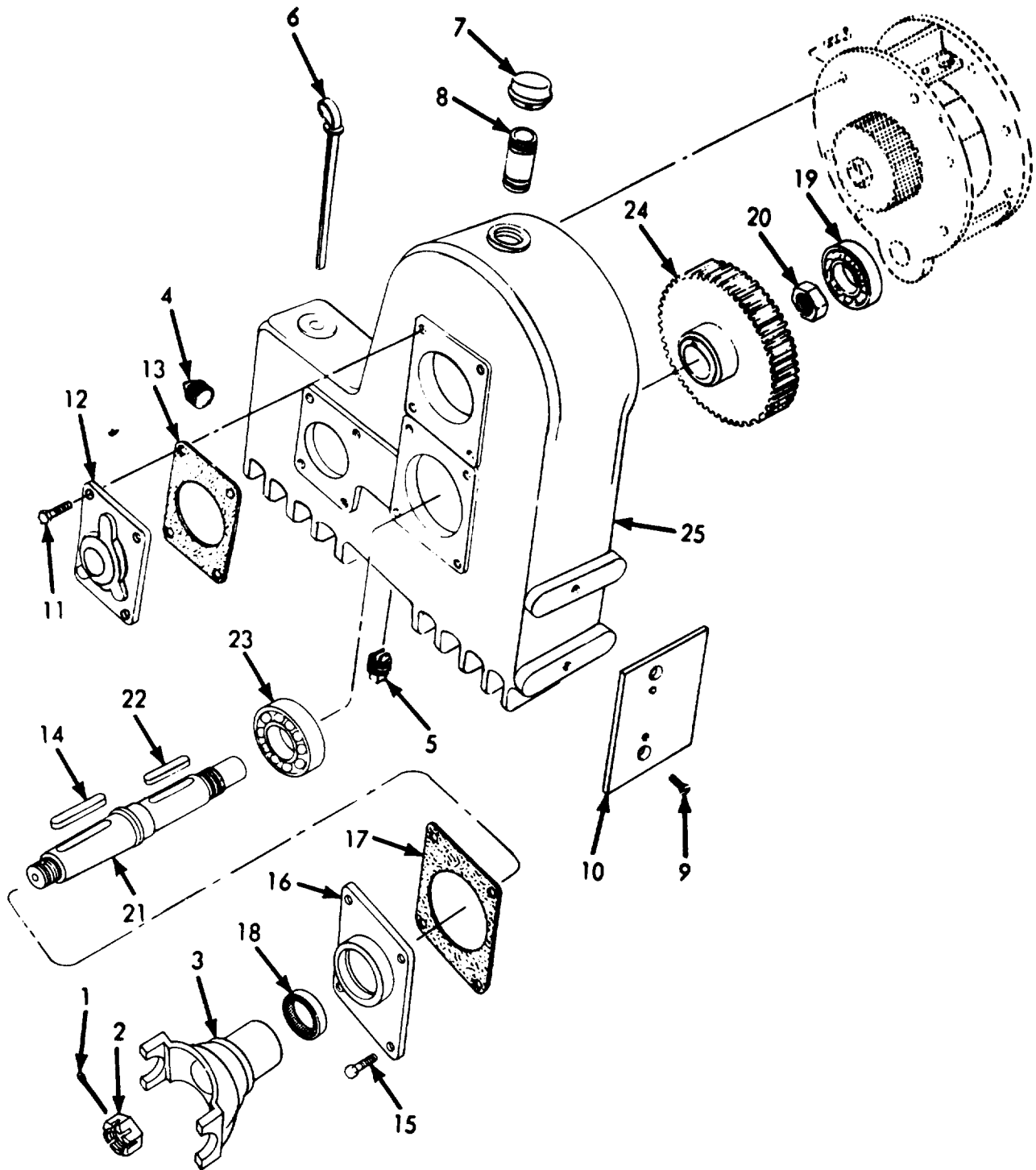


Figure 3-11. Pump gearbox, removal and installation.





ME 4210-213-35/3-12

Figure 3-12. Pump gearbox exploded view.



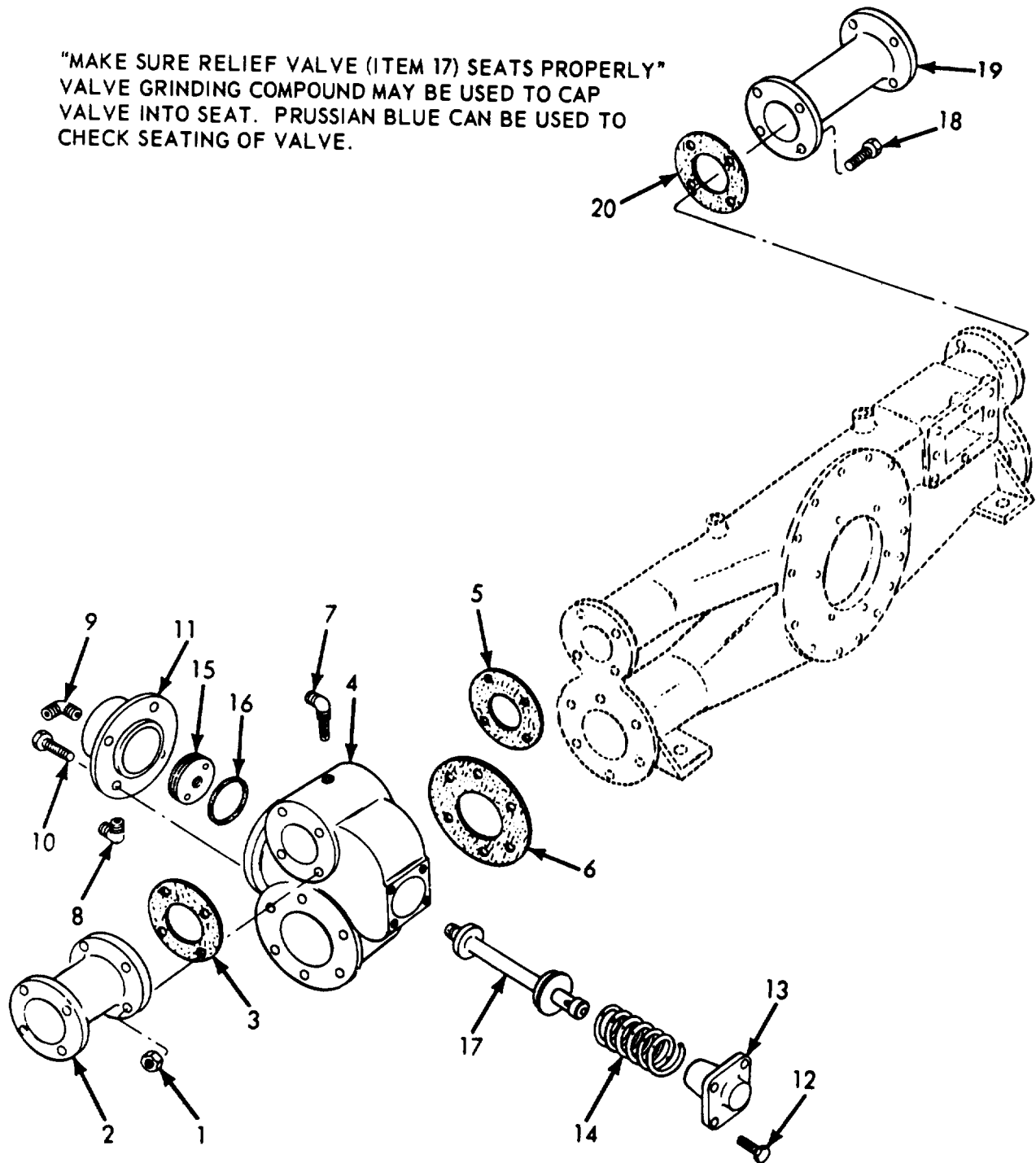
1	Cotter pin	14	Key
2	Nut, special	15	Screw, cap, 7/16-20 x 1 1/4 in. (4)
3	Yoke	16	Cap
4	Pipe plug	17	Gasket
5	Pipe plug	18	Seal
6	Bayonet gage	19	Bearing
7	Air vent	20	Nut, special
8	Nipple	21	Shaft
9	Screw, 7/16-20 x 1 in. (2)	22	Key
10	Plate	23	Bearing
11	Screw, cap, 7/16-20 x 1 1/4 in. (4)	24	Gear
12	Plate	25	Housing
13	Gasket		

**Figure 3-12-Continued.**

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"MAKE SURE RELIEF VALVE (ITEM 17) SEATS PROPERLY"  
 VALVE GRINDING COMPOUND MAY BE USED TO CAP  
 VALVE INTO SEAT. PRUSSIAN BLUE CAN BE USED TO  
 CHECK SEATING OF VALVE.



ME 4210-213-35/3-13

Figure 3-13. Relief valve and adapter, exploded view.

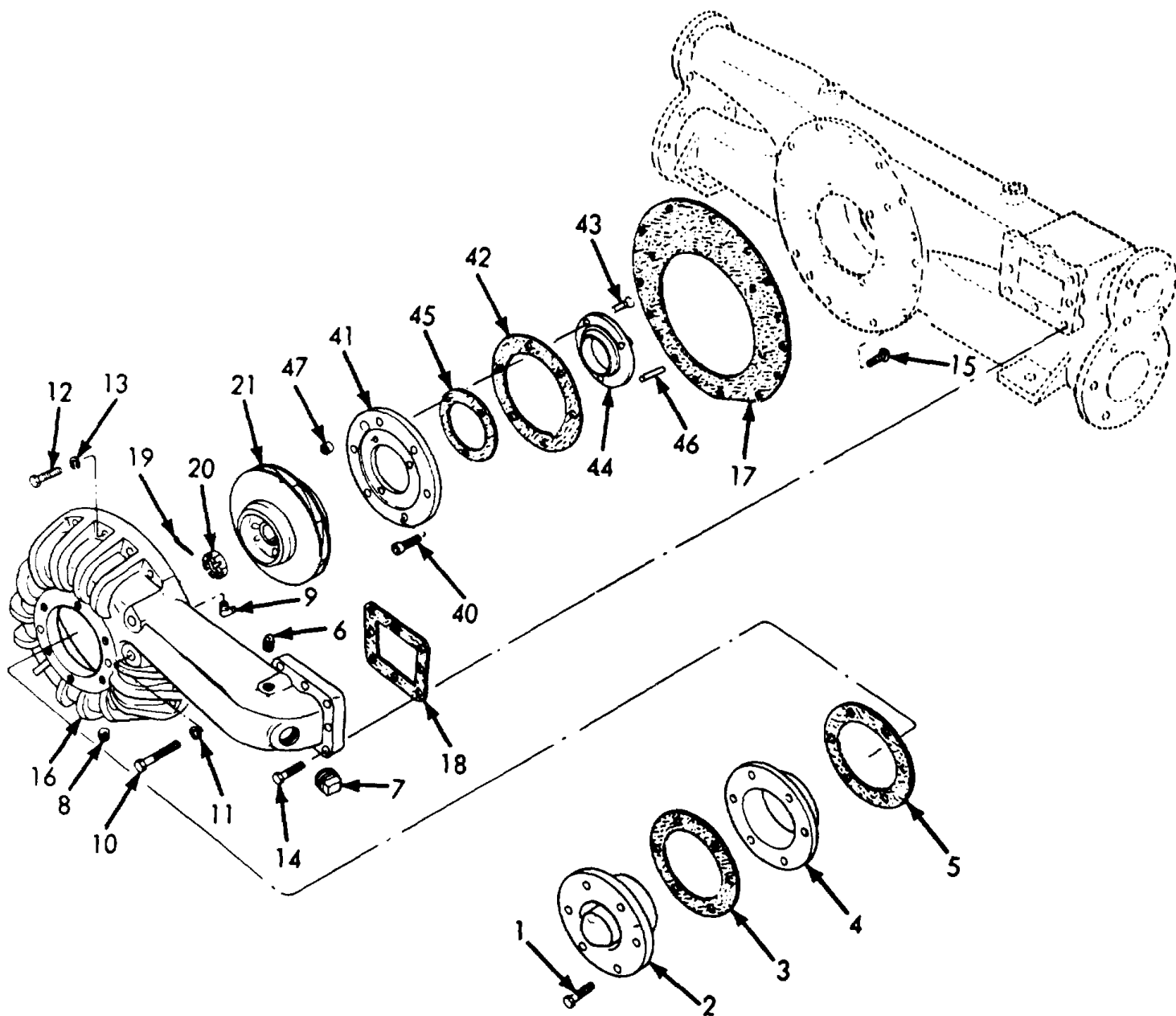


1 Nut, 7/16-20 (4)  
2 Discharge adapter  
3 Gasket  
4 Body  
5 Gasket  
6 Gasket  
7 Screen and elbow  
8 Elbow  
9 Elbow  
10 Screw, cap, 7/16-20 x 11 in. (4)

11 Cover  
12 Screw, cap, 7/16-20 x 1 in. (4)  
13 Bonnet  
14 Spring  
15 Piston  
16 Packing  
17 Valve  
18 Screw, cap 7/16-20 x 1/4 in. (4)  
19 Discharge adapter  
20 Gasket

**Figure 3-13-Continued.**





ME 4210-213-35/3-14 ①

Figure 3-14. Pump head and body, exploded view.

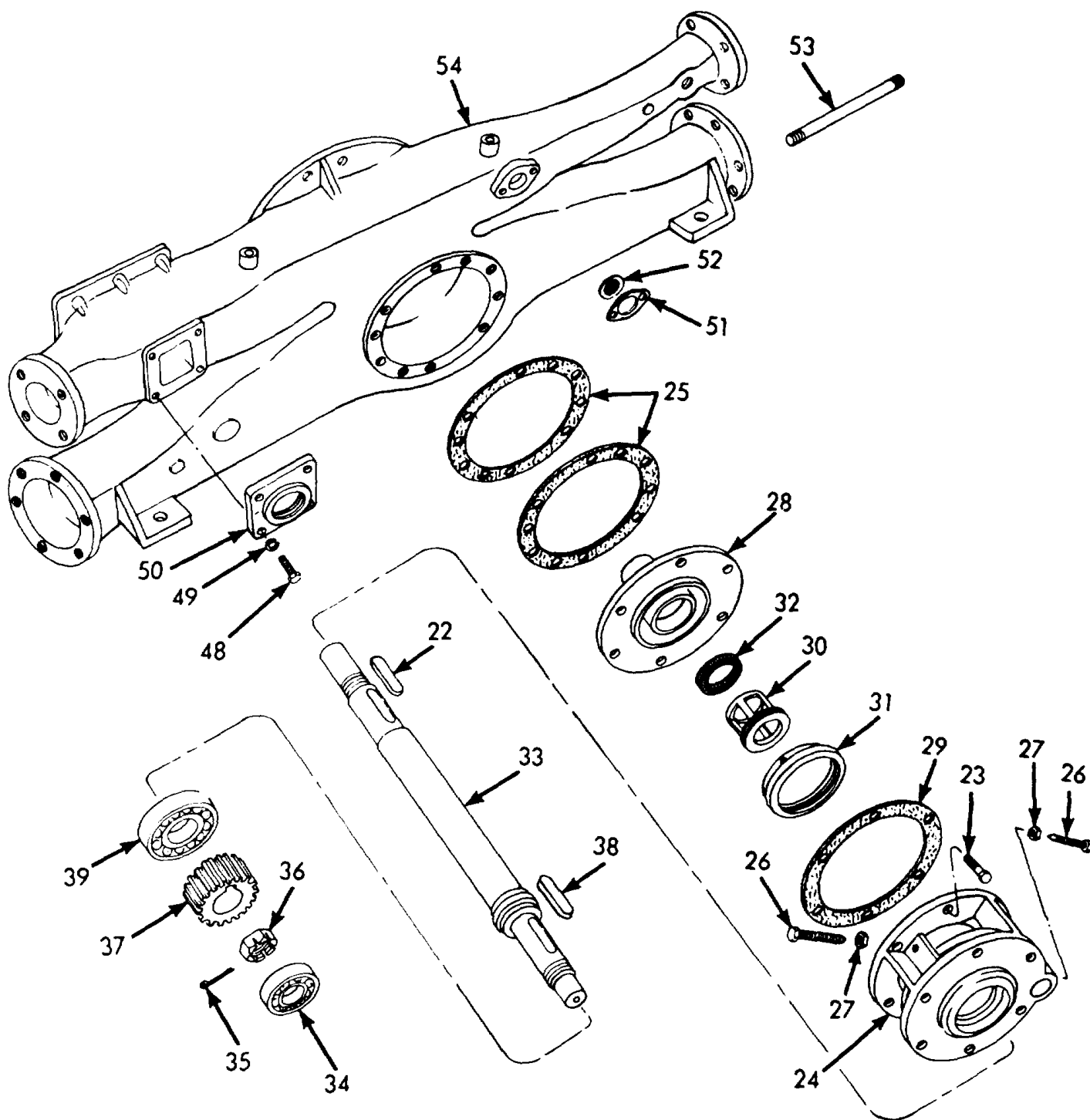


1	Screw, cap, 7/16-20 x 1 1/2 in. (6)	16	Volute body
2	Housing	17	Gasket
3	Gasket	18	Gasket
4	Ring	19	Cotter pin
5	Gasket	20	Nut, special
6	Pipe plug (3)	21	Impeller
7	Pipe plug		
8	Pipe plug	40	Screw, socket head, 3/8-16 x 3/4 in. (6)
9	Elbow	41	Housing
10	Screw, cap, 7/16-20 x 4 in. (2)	42	Gasket
11	Washer, flat, (2)	43	Screw, flat head, 3/8-16 x 1 3/4 in. (3)
12	Screw, cap, 7/16-20 x 1 1/2 in. (11)	44	Ring
13	Washer, flat, 7/16; in. (11)	45	Gasket
14	Screw, cap, 7/16-20 x 1 1/2 in. (7)	46	Tube
15	Screw, cap, 7/16-20 x 1 1/2 in. (4)	47	Check valve

**Figure 3-14-Continued.**

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NOTE: REMOVE PARTS 24 THRU 39 ASSEMBLED, THEN DISASSEMBLE.

CAUTION: SHAFT (33) MUST BE REMOVED FROM FRONT SIDE OF HEAD (24) AS SHOWN  
ME 4210-213-35/3-14 ②

Figure 3-14-Continued.



22 Key  
 23 Screw, cap, 7/16-20 x 2 in. (6)  
 24 Pump head  
 25 Gasket  
 26 Screw, special  
 27 Nut, 5/16-18 (2)  
 28 Housing  
 29 Gasket  
 30 Gland  
 31 Sleeve  
 32 Packing (as)  
 33 Shaft  
 34 Bearing

35 Cotter pin  
 36 Nut, special  
 37 Gear  
 38 Key  
 39 Bearing  
  
 48 Screw, cap, 7/16-20 x 1 1/4 in. (4)  
 49 Washer, flat, 7/16 in. (4)  
 50 Plate  
 51 Gasket  
 52 Strainer  
 53 Stud, 7/16-20 x 6 1/2 in. (9)  
 54 Body

**Figure 3-1 4-Continued.**

## **Section IV. HOSE REEL ASSEMBLY**

### **3-17. General**

Two electric motor driven hose reels are mounted in the reel compartments behind the cab. An electric rewind button is installed on each pump control panel to permit automatic rewinding of the hose on each reel. A reel handcrank provides a means of rewinding the hose, in the event of failure in the electrical system. Each reel is chain driven by a 1/t horsepower electric motor, or handcrank by a pinion gear working on the reel ring gear.

### **3-18. Hose Reel Assembly**

- a. *General* Refer to paragraph 3-17.
- b. *Removal*. Remove the hose reel assembly (TM 5-4210-213-12).
- c. *Disassembly*. Refer to figure 3-15 and disassemble the hose reel assembly.
- d. *Cleaning* Clean all parts in an approved cleaning solvent and dry thoroughly.

e. *Inspection and Repair*. Inspect all parts for wear, defects, and damage. Replace or repair worn, defective, or damaged parts as necessary.

f. *Reassembly* Refer to figure 3-15 and reassemble the hose reel assembly in the reverse order.

g. *Installations* Install the hose reel assembly (TM 5-4210-213-12).

### **3-19. Hose Reel Motor**

a. *General* The hose reel motor supplies power to the hose reel.

b. *Removal*. Refer to TM 5-4210-213-12.

c. *Disassembly*. Refer to figure 3-15A.

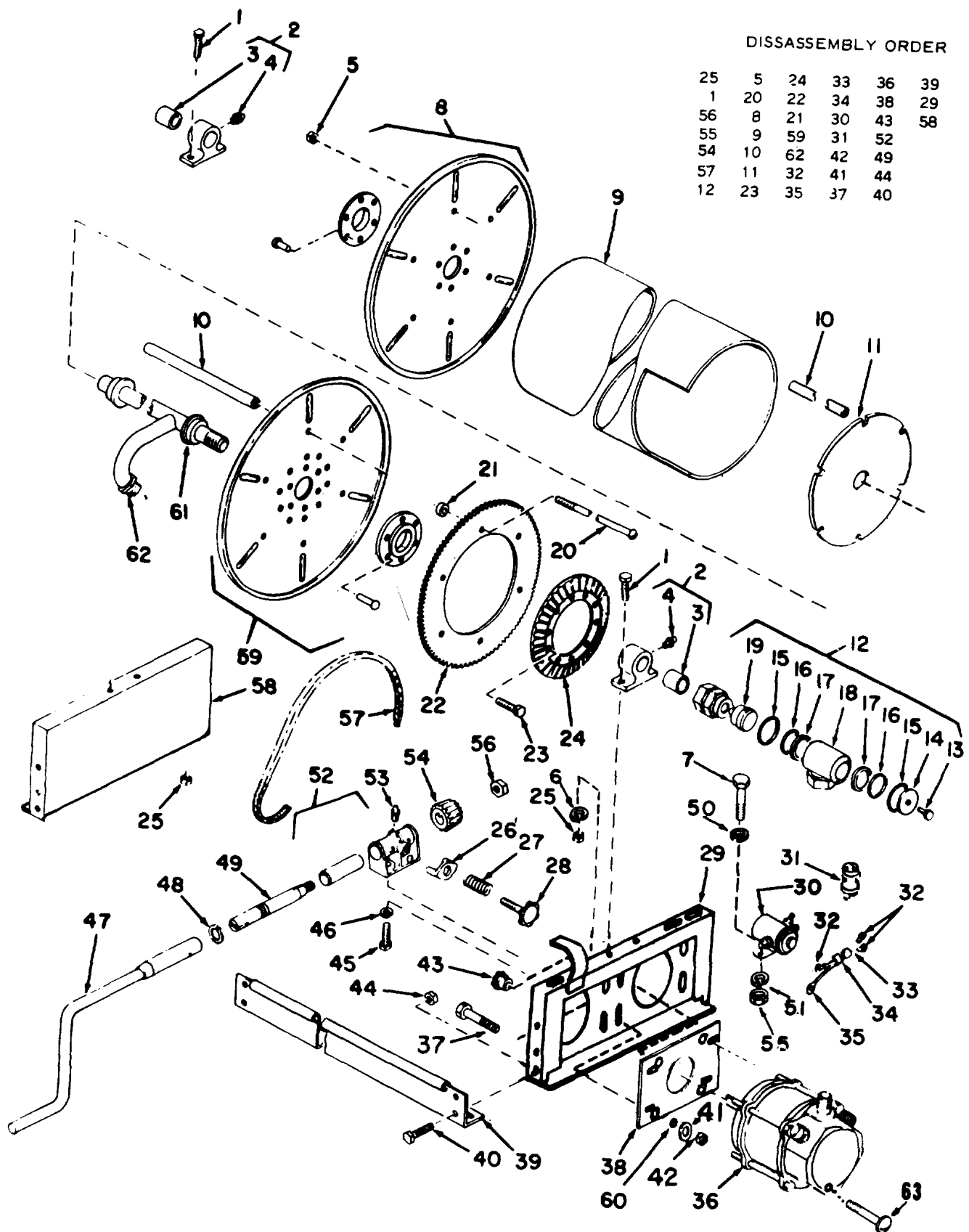
d. *Cleaning*. Clean all parts with an approved cleaning solvent, and dry thoroughly.

e. *Inspection and Repair* Inspect all parts for damaged or defective condition.

f. *Reassembly*. Replace or repair damaged or defective parts as necessary. Refer to figure 3-15A.

g. *Installation*. Refer to TM 5-4210-213-12.





ME 4210-213-35/3-15

Figure 3-15. Hose reel assembly, exploded view.

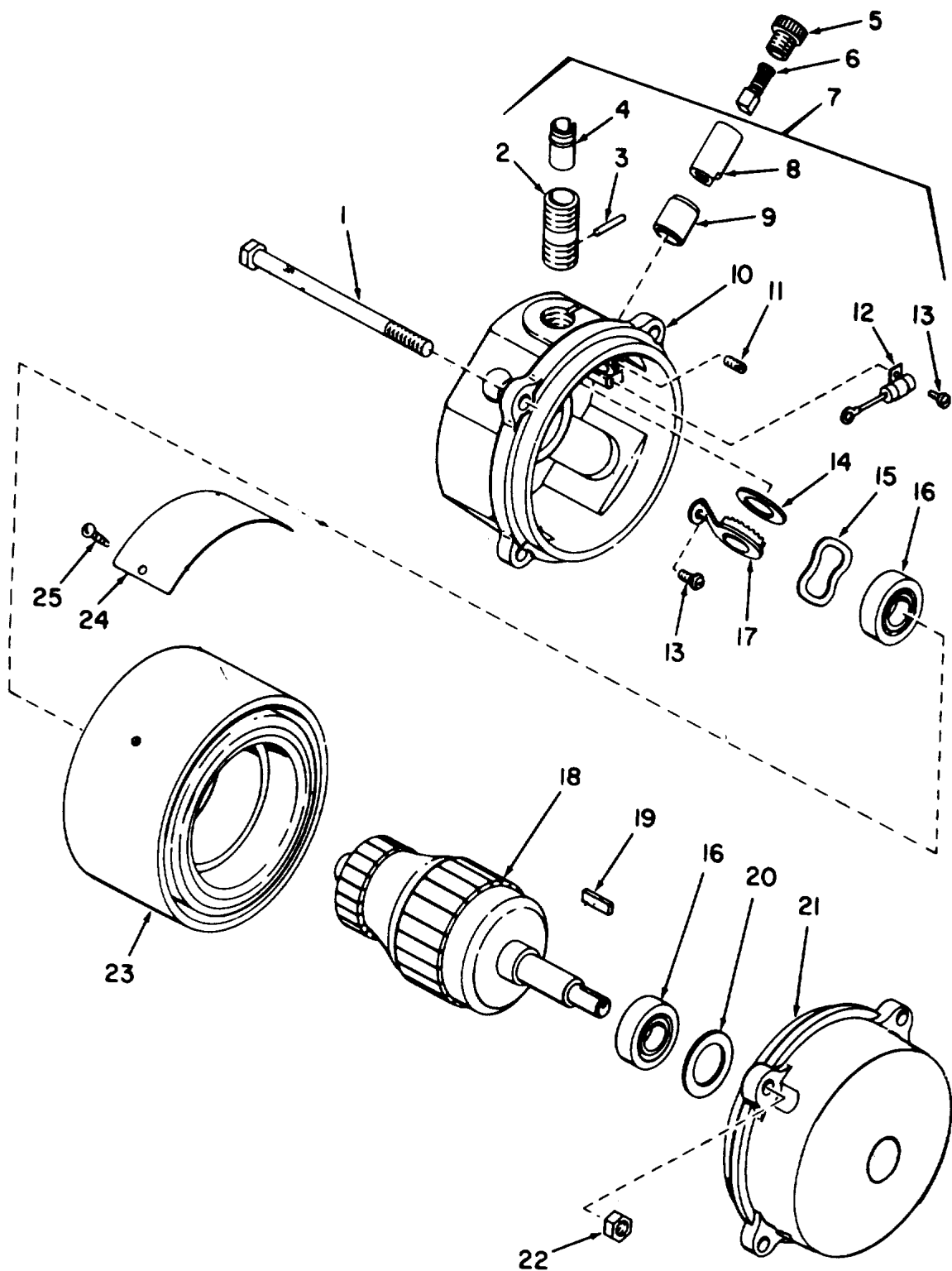


1	Screw, cap	32	Terminal lug
2	Bearing unit	33	Lead, elec.
3	Bearing sleeve	34	Loom, 5/16 I.D..
4	Fitting, lube	35	Terminal, lug
6	Nut, hex	36	Motor
6	Rivet	37	Screw
7	Washer	38	Support, motor
8	Disc assembly	39	Frame, base
9	Drum, reel	40	Screw, self locking
10	Spacer, pipe	41	Washer, lock
11	Disc, drum reinforcement	42	Nut, hex
12	Swivel joint, pipe	43	Sprocket
13	Screw, cap	44	Nut, external
14	Cap, grit	45	Screw, cap
15	Packing	46	Washer, lock
16	Packing	47	Crank, hand
17	Retainer	48	Ring
18	Sleeve	49	Shaft, gear
19	Stem	50	Bearing, sleeve
20	Bolt, carriage	51	Bearing unit
21	Spacer	52	Bearing unit
22	Sprocket	53	Fitting lub
23	Screw, self-locking	54	Gear, bevel
24	Gear bevel	55	Washer, lock
25	Nut, caged	56	Nut, hex
26	Pad, brake	57	Chain, roller
27	Spring	58	Frame, rear
28	Wheel, brake	59	Disc assembly, front
29	Frame	60	Rivet
30	Switch, solenoid	61	Washer
31	Switch, push	62	Gooseneck and adapter

**Figure 3-15-Continued.**

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ME 4210-213-35/3-15 A

Figure 3-15A. Hose reel motor, exploded view.



- 1 Bolt
- 2 Nipple
- 3 Pin
- 4 Insuliner
- 5 Brush cap
- 6 Brush
- 7 End bell
- 8 Brush holder
- 9 Insulator
- 10 Shield
- 11 Set screw
- 12 Capacitator
- 13 Screw

- 14 Washer
- 15 Spring
- 16 Bearing
- 17 Brush arm
- 18 Armature
- 19 Key
- 20 Washer
- 21 Shield
- 22 Nut
- 23 Stator
- 24 Plate
- 25 Screw

**Figure 3-15A-Continued.**

## **Section V. WATER TANK**

### **3-20. General**

The water tank is made from fabricated welded stainless steel panels, and has a capacity of 400 gallons. The tank is fully insulated and equipped with four lifting eyes for removal.

An over-flow pipe is mounted on the left front side of the tank. The tank is mounted directly on the carrier chassis.

### **3-21. Water Tank**

*a. General.* Refer to paragraph 3-20.

*b. Removal.*

(1) Drain the watertank (TM 5-4210-213-12).

(2) Remove the foam tank and ladder support assemblies (TM 5-4210-213-12).

(3) Refer to figure 3-16 and remove the water tank from the special purpose body.

*c. Disassembly.* Refer to figure 3-17 and disassemble the water tank.

*d. Cleaning* Clean all parts in an approved cleaning solvent and dry thoroughly.

*e. Inspection and Repair.*

(1) Inspect all parts for wear, defects and damage.

(2) Replace or repair worn, defective and damaged parts as necessary.

(3) For welding purposes to repair leaks, the water tank is fabricated from 12 gage ASTM A167 Grade 3 steel.

*f. Reassembly.* Refer to figure 3-17 and reassemble the water tank in reverse order.

*g. Installation.*

(1) Refer to figure 3-16 and install the water tank and lines on special purpose body.

(2) Install the foam tank and ladder support assemblies (TM 5-4210-213-12).

(3) Fill the water tank (TM 5-4210-213-12).



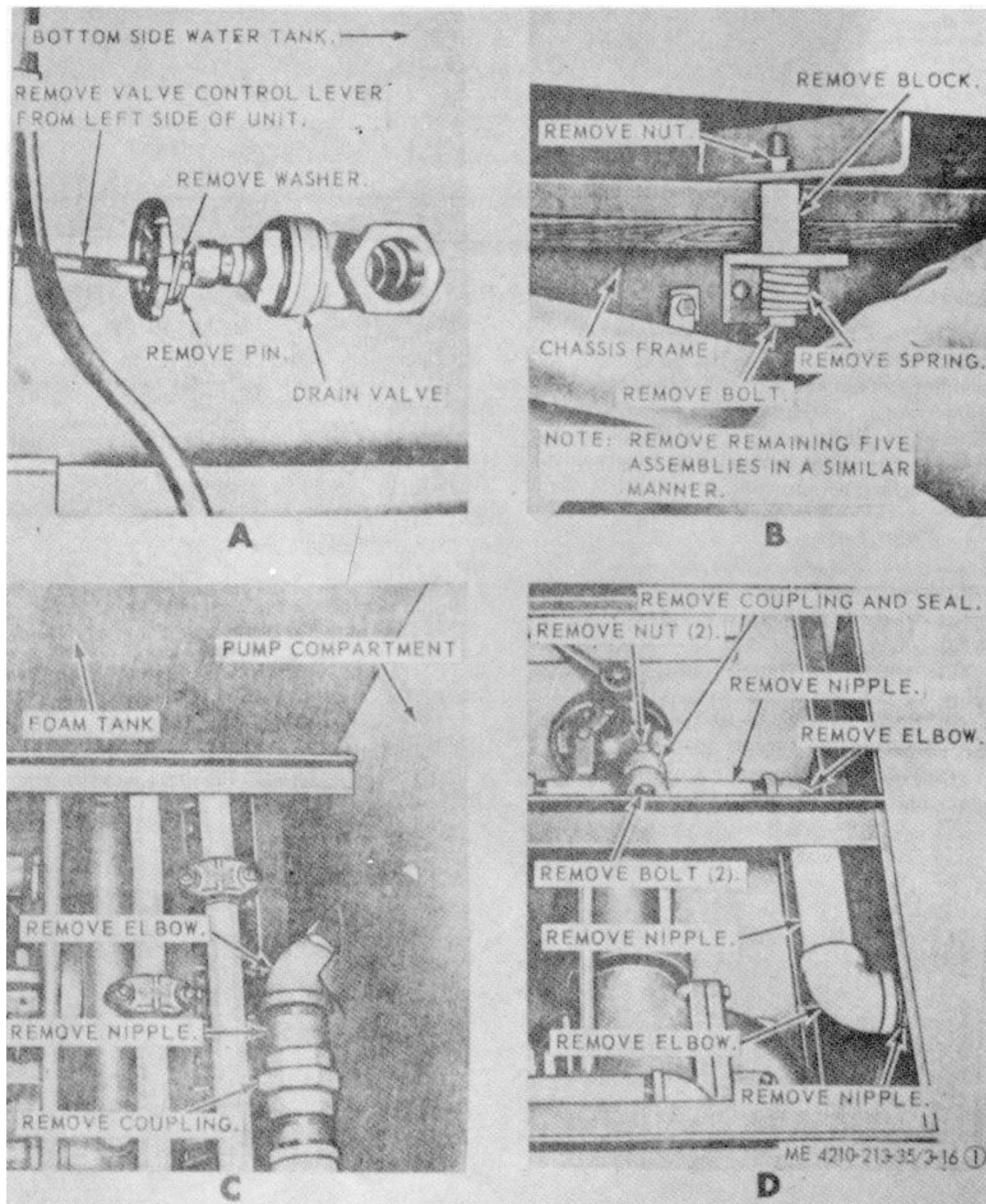


Figure 3-16. Water tank and lines, removal and installation.



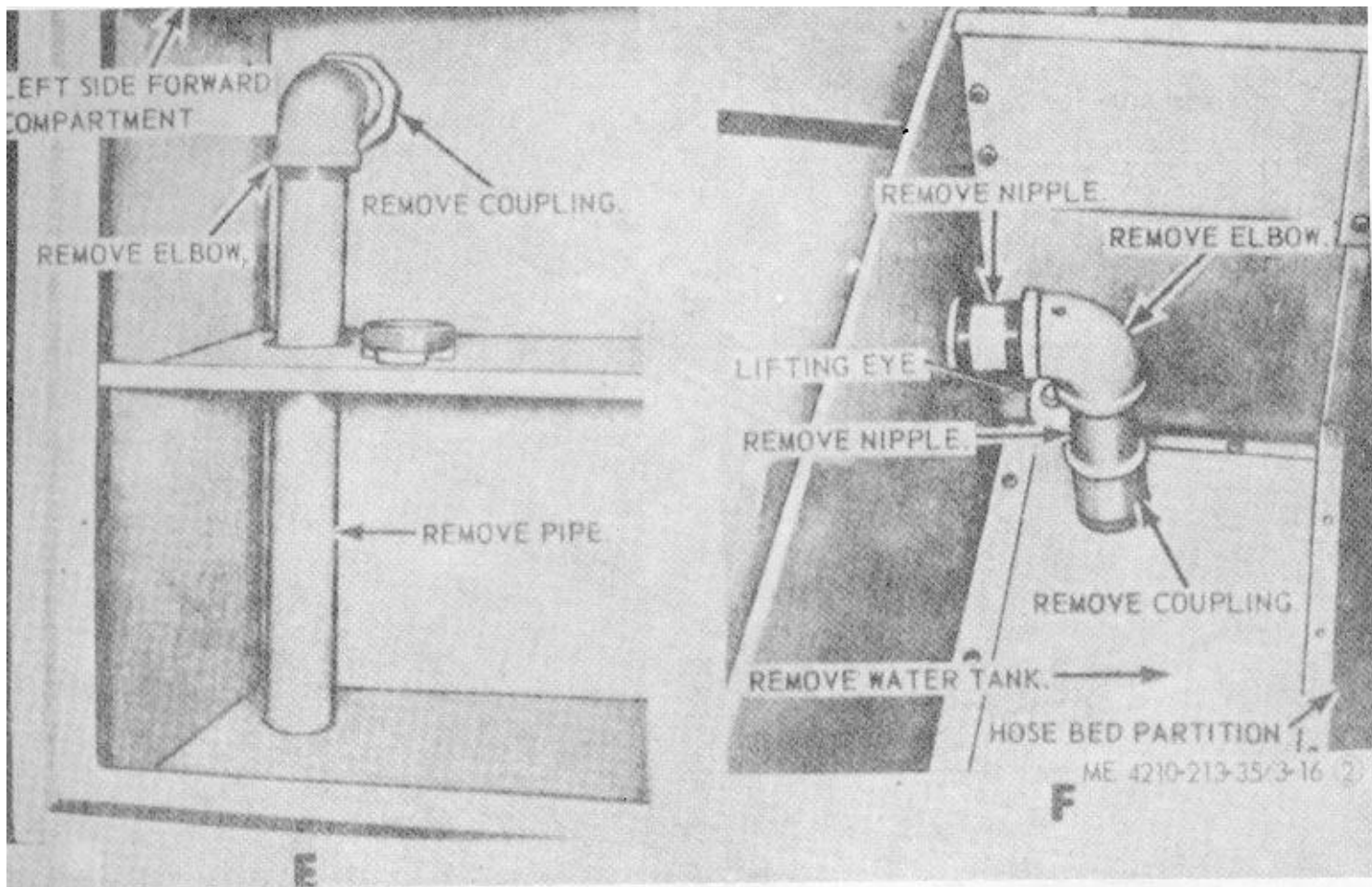
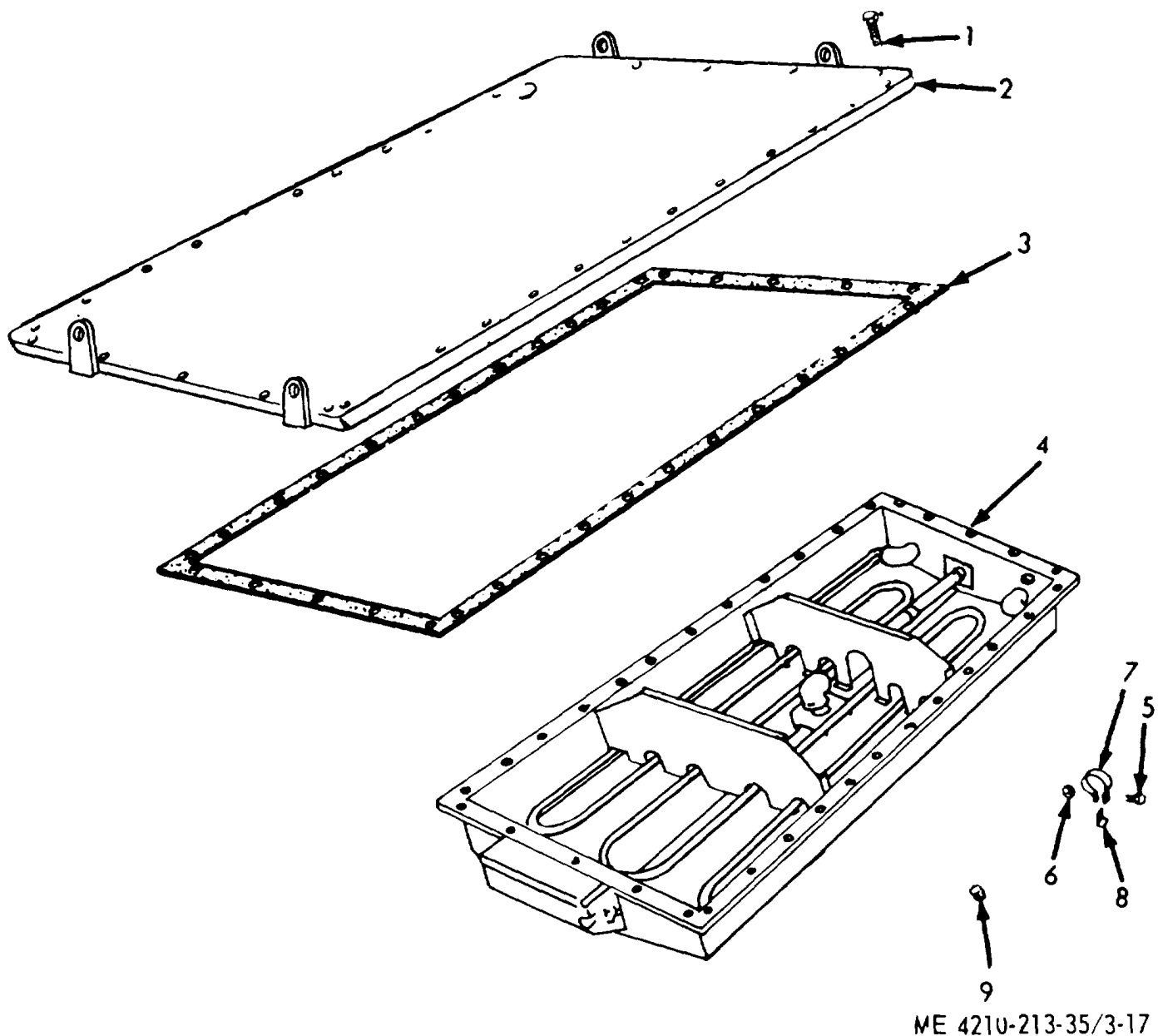


Figure 3-16-Continued.





- 1 Screw, cap,  $\frac{3}{8}$ -16 x 1 in. (42)
- 2 Cover
- 3 Gasket
- 4 Tank
- 5 Screw, cap,  $\frac{3}{8}$ -16 x  $\frac{1}{2}$  in. (2)

- 6 Nut,  $\frac{3}{8}$  in. (2)
- 7 Ring (2)
- 8 Retainer (2)
- 9 Nipple

Figure 3-17. Water tank, exploded view.

## Section VI. SPECIAL PURPOSE BODY, WIRING AND DATA PLATES

### 3-22. General

The special purpose body includes the right, left, and pump compartments. The compartment mounting frame assembly is attached to the chassis by U bolt assemblies. The right and left compartments rest on the

compartment mounting frame assembly. The pump data plates are mounted on the special purpose body. The wiring diagram includes only those items pertaining to the firefighting equipment and/or accessories.



### 3-23. Special Purpose Body Compartment

a. *General.* Refer to paragraph 3-22.

b. *Removal.*

(1) Remove ladder support assemblies and hose beds (TM 5-4210-213-12).

(2) Remove rear step assembly and apron (TM 5-4210-213-12).

(3) Remove water tank assembly (TM 5-4210-213-12).

(4) Disconnect and remove rear spotlight wiring from compartments.

(5) Refer to figure 3-18 and remove compartment assemblies.

c. *Cleaning.* Clean all parts in an approved cleaning solvent and dry thoroughly.

d. *Inspection and Repair.* Inspect all parts for wear, defects, and damage. Replace or repair worn, defective, or damaged parts as necessary.

e. *Installation.*

(1) Refer to figure 3-18 and install the left and right-hand compartments on the chassis.

(2) Reverse removal procedure (para 323).

### 3-24. Control Panel Testing and Wiring, Replacement

a. *Testing.* Refer to wiring diagram (TM 5-4210-213-12) and test a wire for continuity by disconnecting each end from the component or components to which it is connected. With a multimeter set on the ohms scale, touch the test probe to each end of the wire. If continuity is not indicated, the wire is defective and must be repaired or replaced.

b. *Replacement.* Replace a wire by disconnecting it from the component or components and remove the wire. Install a new wire and

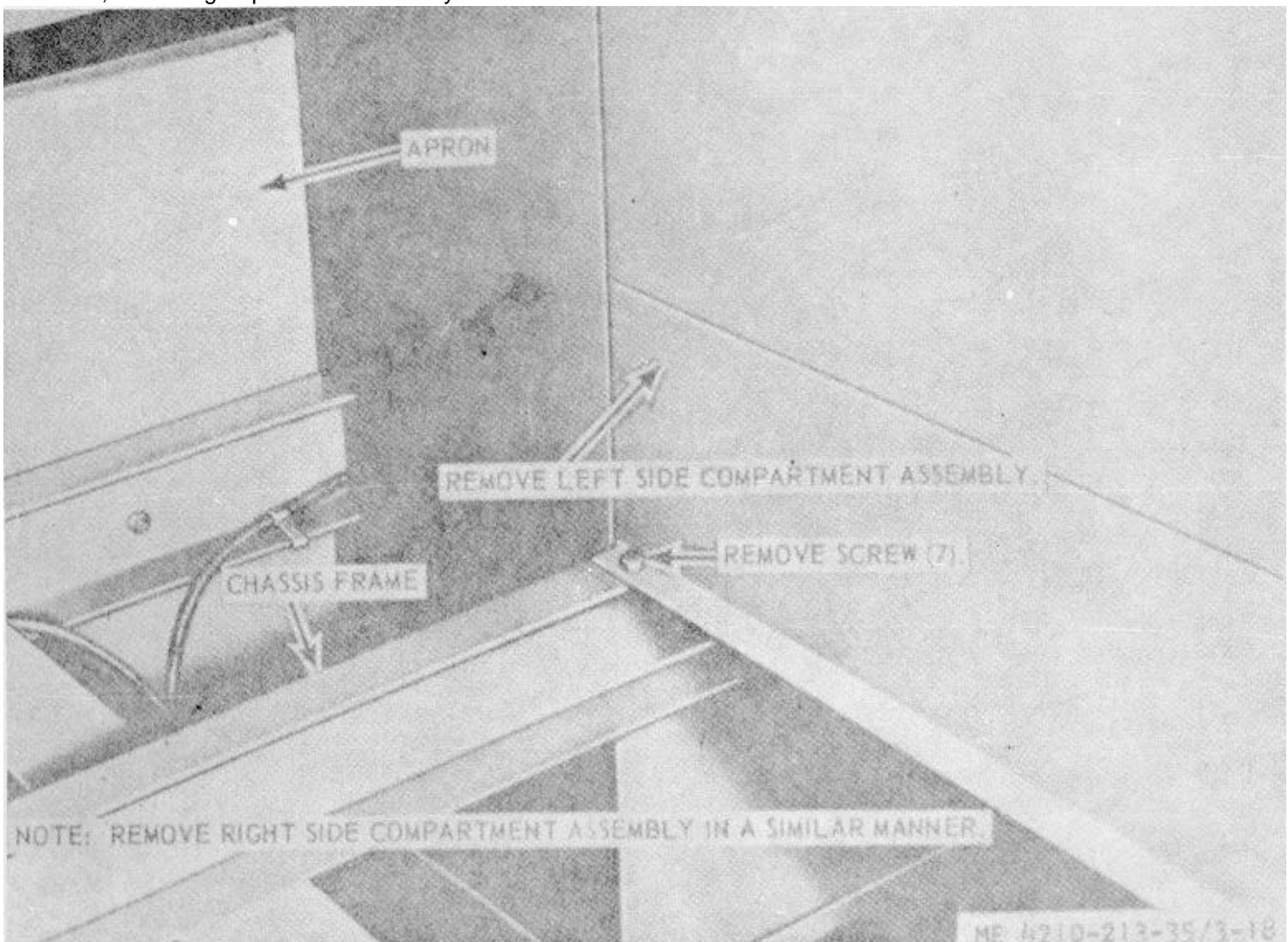


Figure 3-18. Special purpose body compartments, removal and installation.



connect it. If a broken wire is part of a wiring harness, disconnect the wire and tape the ends. Install a new wire by attaching it to the outside of the wiring harness.

**3-25. Chassis Wiring Harness, Replacement**

Refer to chassis wiring diagram (TM 9-2320 209-35) and fire fighting equipment and/or accessories wiring

diagram (TM 5-4210-213-12), for removal and installation.

**3-26. Data Plates, Replacement**

Remove necessary screws, replace data plates as required.



## APPENDIX A REFERENCES

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### A-1 Lubrication

C9100-IL	Petroleum.
	Petroleum base products and related materials.
LO 5-4210-213-12	Lubrication Order.

### A-2 Painting

TM 9-213	Painting instructions for field use.
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### A-3 Preventive Maintenance

TM 9-6140-200-15	Storage Batteries, Lead and acid type.
TM 38-750	Army Equipment Record Procedures.
TM 9-1870-1	Care an(d maintenance of pneumatic tires.
TB ENG 347	techniques for Engineer Equipment.
TM 9-2320-209-35	DS, GS an(d depot maintenance for cab, chassis and body components for chassis truck.
TM 9-2320-209-35P	Field and depot maintenance repair part. and( special tools for cab, chassis and body components.
TM 9-2920-214-35	Field and depot maintenance manual (including field and depot maintenance repair parts generator assembly).
TM 9-2520-246-35	DS, GS and depot maintenance.
TM 9-2520-246-35P	Field and depot maintenance repair parts and special tool lists.
TM 9-2815-210-35	DS, GS and depot maintenance.
TM 9-2815-210-35P	DS, GS and depot maintenance.
TM 9-2910-226-35	DS, GS and depot maintenance manual (includes repair parts and special tools list).
TM 9-2920-20-35	Field and depot maintenance manual (includes field and depot maintenance repair parts).
TM 9-2920-210-34	DS, GS maintenance manual.
TM 9-2920-242-35	Direct support, general support and, depot maintenance manual (includes repair parts).
TM 9-2920-243-35	DS, GS and depot maintenance manual (including repair parts and special tool lists).
TB 746-93-1	Color and marking of military vehicles.



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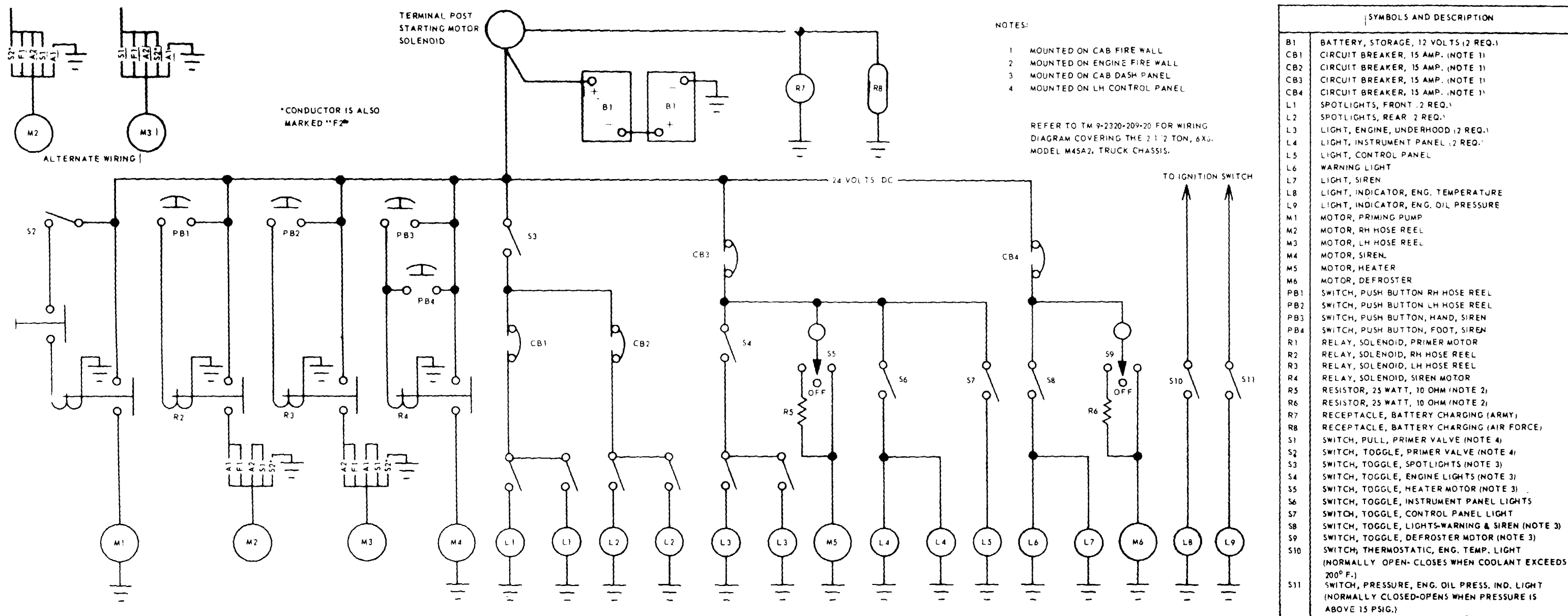


Figure 1-1. Wiring diagram

Figure 1-1



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## 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 decigrams = .035 ounce  
 1 decagram = 10 grams = .35 ounce  
 1 hectogram = 10 decagrams = 3.52 ounces  
 1 kilogram = 10 hectograms = 2.2 pounds  
 1 quintal = 100 kilograms = 220.46 pounds  
 1 metric ton = 10 quintals = 1.1 short tons

### *Liquid Measure*

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

### *Square Measure*

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch  
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches  
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet  
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet  
 1 sq. hecrometer (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

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

## Temperature (Exact)

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