

TM 5-4930-226-12&P

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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Operator and Organizational Maintenance Manual  
Including Repair Parts and Special Tools List

NOZZLE ASSEMBLY, CLOSED CIRCUIT  
REFUELING  
WITH STRAINER ASSEMBLY  
(E. B. WIGGINS MODEL CCN 101/14)  
NSN 4930-00-117-4726

This copy is a reprint which includes current  
pages from Change 1. *added 2,3,4,5,6*

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HEADQUARTERS, DEPARTMENT OF THE ARMY  
OCTOBER 1977

## **WARNING**

Smoking is prohibited during all refueling operations. Fire fighting equipment must be available and operable at all times.

Open flames, heating stoves, electrical tools and apparatus, and other flame or spark generating equipment must be prohibited. Only authorized tools, equipment, explosion proof lights and flashlights, and items of clothing may be used. Tools and equipment must be kept in safe and efficient working condition at all times.

All equipment, including nozzles, pumps, tank trucks and storage tanks, used in transfer operations must be bonded and grounded. Grounding and bonding must be accomplished before contact of nozzle to vehicle.

Spills must be avoided or cleaned up immediately when they occur. Drainage tubs or other suitable containers must be placed as needed under hose connections, faucets, and similar locations to collect leakage.

Frequent inspection of equipment, safety devices and working areas must be performed to insure personal and operational safety and to correct potential or actual hazards.

Adequate ventilation must be provided in working and storage areas. Personnel should avoid prolonged exposure to fuel vapors. Gloves and other required protective clothing should be worn to prevent fuels from contacting the skin.

CHANGE

NO. 6

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DEPARTMENT OF THE ARMY  
WASHINGTON, D. C., 29 October 1993

Operator and Organizational Maintenance Manual  
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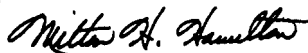
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NO. 5

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Operator's and Organizational Maintenance Manual  
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**NOZZLE ASSEMBLY, CLOSED CIRCUIT REFUELING  
WITH STRAINER ASSEMBLY  
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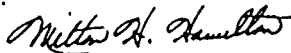
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WITH STRAINER ASSEMBLY  
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Operator and Organizational Maintenance  
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WITH STRAINER ASSEMBLY  
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Washington, D.C., 31 October 1977**

**Operator and Organizational Maintenance Manual  
Including Repair Parts and Special Tools List**

**NOZZLE ASSEMBLY, CLOSED CIRCUIT REFUELING  
WITH STRAINER ASSEMBLY (E. B. WIGGINS MODEL CCN 101/14)  
NSN 4930-00-117-4726**

**Current as of 18 December 1986**

**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 directly to Commander, US Army Aviation and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished directly to you.

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## CHAPTER I.

### INTRODUCTION

#### Section I. GENERAL

##### 1-1. Scope

This manual is for your use in operating and maintaining the closed-circuit refueling nozzle assembly with strainer, Model CCN 101/14. The nozzle can be used with all types of fuel, i.e., JP4, JP5, Mogas, Diesel, etc.

##### 1-2. Maintenance Forms and Records

a. Maintenance forms and records that you are required to use are as follows:

(1) DA Form 2404 (Equipment Inspection and Maintenance Worksheet).

(2) DA Form 2407 (Maintenance Request Used for Requesting Support Maintenance).

(3) DA Form 2407-1 (Continuous Sheet Used for Requesting Support Maintenance).

b. For additional forms and records pertaining to your particular equipment, refer to DA Pam 738-750 (The Army Maintenance Management System (TAMMS)).

##### 1-3. Administrative Storage

a. Placement of equipment in administrative storage should be for short periods of time when a shortage of maintenance effort exists. Items should be in mission readiness within 24 hours or within the time factors as determined by the directing authority. During the storage period appropriate maintenance records will be kept.

b. Before placing equipment in administrative storage, current maintenance services and equipment serviceable criteria (ESC) evaluations should be completed, shortcomings and deficiencies should be corrected, and all modification work orders (MWO's) should be applied.

c. Storage site selection. Inside storage is preferred for items selected for administrative storage. If inside storage is not available, trucks, vans, conex containers and other containers may be used.

d. Store the nozzle so as to provide maximum protection from the elements and to provide access for inspection, maintenance, and exercising. Anticipate removal or deployment problems and take suitable precautions.

e. Take into account environmental conditions such as: extreme heat or cold; high humidity; blowing sand, dust or loose debris; soft ground; mud; heavy snows; or combinations thereof and take adequate precautions.

f. Establish a fire plan and provide for adequate firefighting equipment and personnel.

##### 1-4. Destruction of Army Material to Prevent Enemy Use

a. Using an axe, pick, mattock, sledge, or any other heavy implement, damage the nozzle assembly, strainer assembly and gravity fill adapter.

b. For further instructions and information on destroying this equipment, refer to TM 750-244-3. Procedures for Destruction of Equipment to Prevent Enemy Use.

##### 1-5. Reporting Equipment Improvement Recommendations

EIR's will be prepared on DA Form 2407, Maintenance Request. Instructions for preparing EIR's are provided in DA Pam 738-750, The Army Maintenance Management System. EIR's should be mailed directly to Commander, US Army Aviation and Troop Command, ATTN: AMSAT-I-MDO, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. A reply will be furnished directly to you.

#### Section II. DESCRIPTION AND DATA

##### 1-6. Description

a. The closed-circuit refueling nozzle assembly and a closed-circuit refueling receiver mounted in a vehicle fuel tank comprise a closed-circuit refueling system. It is designed for fueling under pressure with optimum speed, minimum loss of fuel and high safety. The refueling system is grounded and bonded and allows the vehicle to be refueled while engines are in operation without danger.

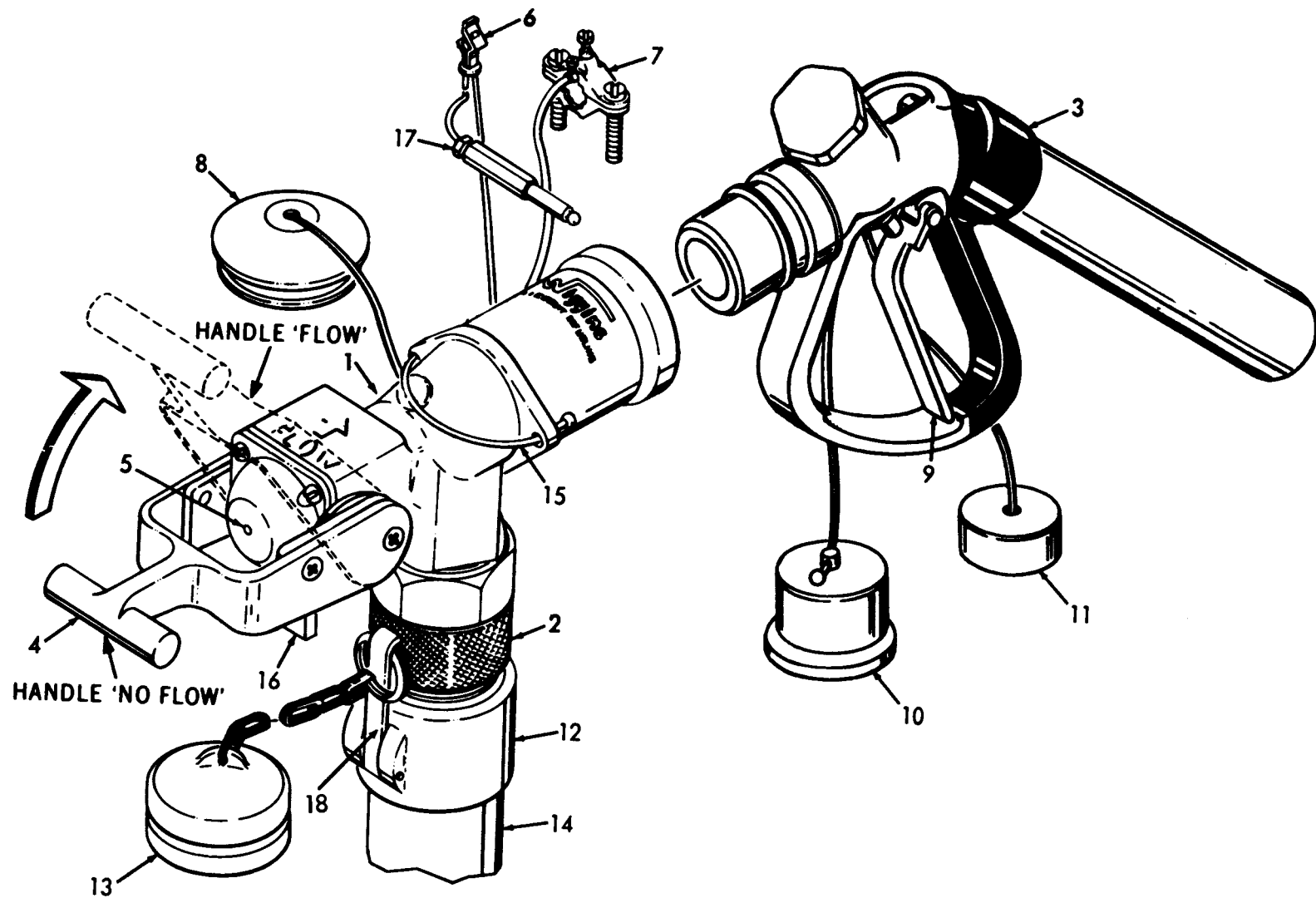
b. The nozzle assembly is capable of functioning as an on-off valve, in addition to its pressure regulator

capabilities. The nozzle pressure regulator device performs in conjunction with a closed-circuit receiver orifice to comprise a flow control unit. This unit allows fuel to enter the vehicle at a specified flow rate. A ground cable assembly is attached to the nozzle assembly (1, fig. 1-1) for discharge of static electric charge. A strainer assembly (2) is coupled to the nozzle assembly. A gravity fill adapter assembly (3) is available for use when the vehicle to be refueled is not equipped for closed circuit refueling. If the using activity does not have a gravity fill adapter, it can requisition one through normal supply channels.

NOTE

The Closed-Circuit Refueling Nozzle (CCRN) (1, fig. 1-1) may be requisitioned without the strainer assembly and gravity fill adapter or with the strainer

assembly (1 and 2, fig. 1-1). The gravity fill adapter (3, fig. 1-1) is not furnished with the CCRN or strainer assembly and will have to be requisitioned separately.



1. NOZZLE ASSEMBLY
2. STRAINER ASSEMBLY
3. GRAVITY FILL ADAPTER
4. CONTROL HANDLE
5. RED INDICATOR PIN
6. ALLIGATOR CLIP
7. GROUND STAKE CLAMP
8. DUST PLUG
9. GRAVITY FILL ADAPTER TRIGGER

10. DUST CAP
11. DUST CAP
12. COUPLER, QUICK DISCONNECT
13. DUST PLUG
14. FUEL HOSE ASSEMBLY
15. ACTUATING RING CABLE LOOP
16. CONTROL HANDLE LATCH
17. GROUND PLUG
18. CAM-LOCK ARM

Figure 1-1. Closed-circuit refueling nozzle assembly.

TS 4930-226-12&P/1-1

1-7. Tabulated Data

Manufacturer . . . . .	E.B. Wiggins, Inc.	Width . . . . .	4 inches (10.16 cm)
Model . . . . .	CCN 101/14	Height:	
Operating Temperature Range . .	25°F to 125°F (32°C to 52°C)	Nozzle only . . . . .	.7 inches (17.78 cm)
Operating Pressure . . . . .	12.5 psig	Nozzle w/strainer assembly . . . .	13 inches (33.02 cm)
Operating Range . . . . .	0 to 150 gpm (0 to 567,75 liters)	Weight:	
		Nozzle only . . . . .	5.2 lb (2.35 kg)
		Nozzle w/strainer and adapter	9.8 lb (4.45 kg)
Length:			
Nozzle only . . . . .	13 inches (33.02 cm)		
Nozzle w/gravity fill adapter .	28 inches 171.12 cm)		

## CHAPTER 2

### OPERATING INSTRUCTIONS

#### WARNING

If equipment fails to operate, refer to troubleshooting procedure in Chapter 3.

### Section I. OPERATING PROCEDURES

#### 2-1. General

**a.** The instructions in this section are for the information and guidance of personnel responsible for operation of the nozzle assembly. The operator must know how to perform every operation of which the nozzle assembly is capable. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit the individual job.

**b.** The control handle (4, fig. 1-11 is a two-position (flow, "up" to no-flow "down") device which controls the flow of fuel through the nozzle. In normal operation, the handle will be in the no-flow (down) position until the nozzle is attached to the receiver vehicle. To commence the actual refueling operation, the control handle latch (16) must be pulled back allowing the control handle to be rotated up to the FLOW position.

**c.** The actuating ring cable loop (15, fig. 1-1) is pulled to disconnect the nozzle from the receiver on the vehicle being refueled. In normal operation this procedure would occur upon completion of fueling operation after the handle (4, fig. 1-1) has been latched in the no-flow (down) position. Emergency disconnect during fueling operation with the handle in flow (up) position may be accomplished in the same manner as normal operation.

**d.** The red indicator pin (5) serves as a visual indication of nozzle opening, closing and shutoff. Complete extension of red indicator pin indicates vehicle receiver shutoff resulting in a no-flow condition. Complete pin extension is indicated by end of pin being flush with rear end of nozzle.

**e.** The gravity fill adapter trigger (9) operates a valve in the gravity fill adapter which permits flow control between full-flow and no-flow positions when the nozzle flow control handle (4) is in the FLOW (up) position.

#### 2-2. Operation Of Equipment for Vehicles Equipped With Closed-Circuit Refueling Receivers

**a.** Insert ground plug (17, fig. 1-1) into vehicle, and/or attach alligator clip (6) to unpainted metal

on vehicle. Do not attach to propeller or radio antenna. Nozzle and vehicle are now bonded and grounded.

#### WARNING

Grounding must be accomplished before making contact of nozzle to vehicle.

**b.** Remove dust plug (8) from nozzle coupling end by pulling actuating ring cable loop (15). The stayback dogs will remain open and the actuating ring will remain in the backward position.

**c.** Make certain handle (4) is latched in no-flow (down) position. If handle is left in flow (up) position, it may be difficult to make connection to vehicle receiver due to line pressure in nozzle. It will also result in immediate fuel flow.

**d.** Attach nozzle assembly to receiver on vehicle with a straight push motion. A positive connection is indicated by the actuating ring moving forward with an audible "click".

**e.** Unlatch handle (4) and rotate up to the flow position to commence normal fueling procedure.

#### NOTE

Completion of fill is controlled by shutoff valves in vehicle. Extension of red indicator pin (5, fig. 1-1) indicates closure of nozzle regulator valve. The nozzle may cut on and off to top off tanks where vehicles use multiple fuel tanks. Return handle (4) to no-flow (down) and latched position.

**f.** Disconnect nozzle from receiver by pulling actuating ring (15) cable loop. Disconnect vehicle ground cable (6) from vehicle and/or ground plug (17). Replace dust plug assembly (8) in coupling end of nozzle assembly.

#### 2-3. Operation of Equipment for Vehicle Not Equipped for Closed-Circuit Refueling

#### WARNING

Grounding must be accomplished be-

**fore making contact of nozzle to vehicle.**

**a.** Insert ground plug (17, fig. 1-1) into vehicle, and/or attach alligator clip (6) to unpainted metal surface on the vehicle. Do not attach to propeller or radio antenna. Nozzle and vehicle are now bonded and grounded.

**b.** Make certain handle (4) is latched in the down position. If handle is left in up (flow) position, it may be difficult to make connection to gravity fill adapter due to line pressure in nozzle.

**c.** Attach gravity fill adapter (3) to nozzle assembly with a straight push motion. A positive connection is indicated by the actuating ring moving forward with an audible click.

**d.** Unlatch nozzle handle (4) and place in up position. Remove vehicle fuel tank cap and adapter dust cap and insert gravity fill adapter spout into vehicle fuel tank. Start fueling by squeezing trigger

(9) of gravity fill adapter.

NOTE

Completion of fill is not controlled automatically by shutoff valves in vehicle. The trigger of the gravity fill adapter will allow metering flow rate to obtain proper fuel level. Visually check fuel level in tank of vehicle. **Do not overfill.**

**e.** Release gravity fill adapter trigger. Allow sufficient time for fuel to drain from spout before removing from vehicle. Replace cap on vehicle fuel tank and cap adapter. Disconnect ground clip or plug.

**f.** Return nozzle assembly handle to the down (no-flow) position. When fueling operations are finished for the day, disconnect gravity fill adapter from nozzle by pulling actuating ring cable loop (15, fig. 1-1), Replace dust plug (8) in coupling end of nozzle assembly. Install dust caps (10) on gravity fill adapter.

## Section II. OPERATION UNDER UNUSUAL CONDITIONS

### 2-4. Operation in Extreme Cold

The closed-circuit refueling nozzle assembly will operate satisfactorily in temperatures down to -25°F. (-32°C.). Protect the nozzle from ice and snow.

### 245. Operation in Extreme Heat

The closed-circuit refueling nozzle assembly will operate satisfactorily in temperatures up to 125°F. (52°C.) when ordinary precautions are taken.

### 2-6. Operation in Dusty or Sandy Areas

The closed-circuit refueling nozzle assembly is affected by dusty or sandy conditions. The gravity fill adapter spout should be cleaned immediately before starting refueling operations. Keep all dust

caps in place.

### 2-7. Operation Under Rainy or Humid Conditions

Keep gravity fill adapter spout capped except when in use. Dry nozzles thoroughly before refueling vehicles and aircraft.

### 2-8. Operation in Salt Water Areas

Operation in salt water areas presents corrosion problems. Keep exposed metal parts clean by washing with fresh water and drying thoroughly.

### 2-9. Operation at High Altitudes

Operation of the closed-circuit refueling nozzle assembly is not affected by altitude.

## CHAPTER 3

### OPERATOR/CREW MAINTENANCE INSTRUCTIONS

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#### Section I. LUBRICATION INSTRUCTIONS

No lubrication is required for operation of this equipment.

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

##### 3-1. General

To insure that the closed-circuit refueling nozzle assembly is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. Defects discovered during operation of the unit shall be noted for future corrections, to be made as soon as an operation has ceased. Stop operation which would damage the equipment if operation were to continue. All deficiencies and shortcomings shall be recorded together with the corrective action taken on DA Form 404, "Equipment Inspection and Maintenance Worksheet", at the earliest opportunity. When performing your "Before Operation" (B) and "During operation" (D) PMCS, always keep in mind the CAUTIONS and WARNINGS. After operation, be sure to perform your (A) PMCS. If your equipment fails to operate, troubleshoot with proper equipment. Report any deficiencies using the proper forms, see TM 38-750.

##### 3-2. Preventive Maintenance Checks and Services

Refer to Table 3-1 for Preventive Maintenance Checks and Services.

**a. Item Number Column.** Checks and services are numbered in chronological order regardless of interval. This column will be used as a source of item numbers for the "TM [Item Number]" column on DA Form 2404 in recording results of PMCS.

**b. Interval Columns.** The columns headed "B", "D", "A", "W", and "M", will contain a dot (•) opposite the appropriate check indicating it is to be performed Before, During, After, Weekly, or Monthly.

**c. Item to be Inspected Column.** The items listed in this column are divided into groups and identifies the items to be inspected.

**d. Procedures Column.** This column contains a brief description of the procedure by which the check is to be performed.

**e. For Readiness Reporting, Equipment is Not Ready/Available If: Column.** This column will contain the criteria which will cause the equipment to be classified as not Ready/Available because of inability to perform its primary mission.

##### 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 shutdown.

**Table 3-1. OPERATOR/CREW PREVENTIVE MAINTENANCE CHECKS AND SERVICES**

**NOTE:** Within designated interval, these checks are to be performed in the order listed.

B--Before D--During		A--After W--Weekly		M--Monthly	
Item No.	Interval B D A W M	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	For Readiness Reporting, Equipment Is Not Ready/Available If:	
1	• • • • •	Nozzle Assembly	Check for damaged actuating ring. Check dust plug assembly for cracks, chips, and other damage. Check housing subassembly for any signs of damage; check for leaks.		
2	• • • • •	Strainer Assembly	Check for damage and dirty screen. Inspect dust plug.		
3	• • • • •	Ground cable assembly	Check for loose ground clamps or ground plugs, damaged or broken cable.		
4	• • • • •	Gravity Fill Adapter	Check housing assembly for damage. Check dust caps for cracks. Insure dust caps are installed when not in use.		



## Section III. TROUBLESHOOTING

### 3-3. General

*a.* This section contains troubleshooting information for locating and correcting most of the operating troubles which may develop in the closed-circuit refueling nozzle assembly. Each malfunction for an individual component is followed by a list of tests or inspections which will help you to determine corrective actions to take. You should perform the tests/inspections and corrective actions in the order listed.

*b.* 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.

### 3-4. Troubleshooting

Table 3-2 lists the common malfunctions which you may find during the operation or maintenance of the closed-circuit refueling nozzle assembly or its components. You should perform the tests/inspections and corrective actions in the order listed.

#### NOTE

Before you use this table, be sure you have performed all applicable operating checks.

**Table 3-2. Troubleshooting**

---

**Malfunction**

**Test or Inspection**

**Corrective Action**

---

**1. LEAKAGE FROM COUPLING DURING REFUELING**

Place latch handle in no-flow (down) position. Reach inside of body and remove the seal. Inspect wiper seal for damage,  
**Replace seal by making sure the “V” slot is facing towards handle, place seal onto sleeve.**

**2. HANDLE FAILS TO OPERATE SMOOTHLY**

Inspect handle area for signs of dirt or other foreign matter.  
**Clean area around handle.**

**3. NOZZLE FAILS TO MAKE CONNECTION**

*Step 1.* Insure that the actuating ring is in the latched (forward) position.  
**Retract actuating ring by pulling cable loop.**

*Step 2.* Inspect coupling end of nozzle for signs of dirt or other foreign matter.  
**Clean area around coupling end.**

*Step 3.* Check for presence of dirt or other foreign matter around actuating ring and housing.  
**Clean area around actuating ring and housing.**

**4. INADEQUATE FUEL FLOW**

*Step 2.* Check strainer for presence of dirt or other foreign matter.  
**To do this, remove strainer assembly (figs. 3-2 and 3-3) from nozzle assembly. Open cam-lock keeper and remove dust plug. Unscrew body from end; remove gasket (fig. 3-2) or O-ring (fig. 3-3) and remove strainer. Clean strainer by removing all foreign matter or dirt.**

*Step 2.* While the strainer is removed, inspect it for any damage.  
**Replace strainer by replacing gasket (fig. 3-2) or O-ring (fig. 3-3) on strainer. Place body and coupling over strainer and screw into end. Hand tighten only. Replace dust plug on coupling.**

**5. LEAKAGE FROM STRAINER BODY OR AT CAM-LOCK COUPLER**

Remove strainer assembly (fig. 3-2) from nozzle assembly. Open cam-lock keeper and remove dust plug (8). Unscrew body (5) from end (1), remove gasket (4), strainer (3) and gasket (2) from end (1). Remove gasket (7) from coupling (6), Unscrew coupling (6) from body (5) if damaged or leaking. Inspect gaskets for damage.

**Replace any damaged gaskets. Place gasket (7) in coupling (6). Replace end (1) in nozzle assembly. Replace gasket (2) in end (1). Replace gasket (4) on strainer (3). Place body (5) and coupling (6) over strainer (3) and screw into end (1). Hand tighten only. Replace dust plug (8) on coupling (6).**

**6. LEAKAGE FROM STRAINER BODY OR AT CAM-LOCK COUPLER (Serial No. Range 0001 thru 0470)**

Remove strainer assembly (fig. 3-3) from nozzle assembly. Open cam-lock keeper and remove dust plug (7). Unscrew body (4) from end (1); remove strainer (3) and O-ring (2) from end (1). Remove gasket (6) from coupling (5). Unscrew coupling (5) from body (4) if damaged or leaking. Inspect O-ring for damage.

**Replace damaged O-ring. Place gasket (6) in coupling (5). Replace end (1) in nozzle assembly. Replace O. ring (2) in end (1). Place body (4) and coupling (5) over strainer (3) and screw into end (1). Hand tighten only. Replace dust plug (7) on coupling (5).**

## Section IV. MAINTENANCE PROCEDURES

### 3-5. General

This section consists of inspection, service, or replacement of those items which would cause malfunction or hazardous operation of the equipment. Included is information about the maintenance to be performed by operator/crew personnel on the nozzle assembly, ground cable, plug assembly, wiper seal, strainer assembly and the gravity fill adapter.

### 3-6. Nozzle Assembly (fig. 3-1)

#### a. Removal.

(1) Shut off fuel flow at the source, place the control handle in the flow (up) position. Have a suit-

able container available to catch any spillage.

(2) Disconnect nozzle assembly (with s-trainer assembly attached) from hose and remove.

#### b. *Inspection and Servicing.*

(1) Inspect nozzle assembly for any signs of physical damage. Check housing subassembly.

(2) Clean any foreign matter from nozzle assembly using system fluid.

#### c. *Replacement.*

(1) Replace and connect nozzle assembly (with strainer assembly attached) to hose.

(2) Place the control handle in the no-flow (down) position and turn on fuel flow at the source.

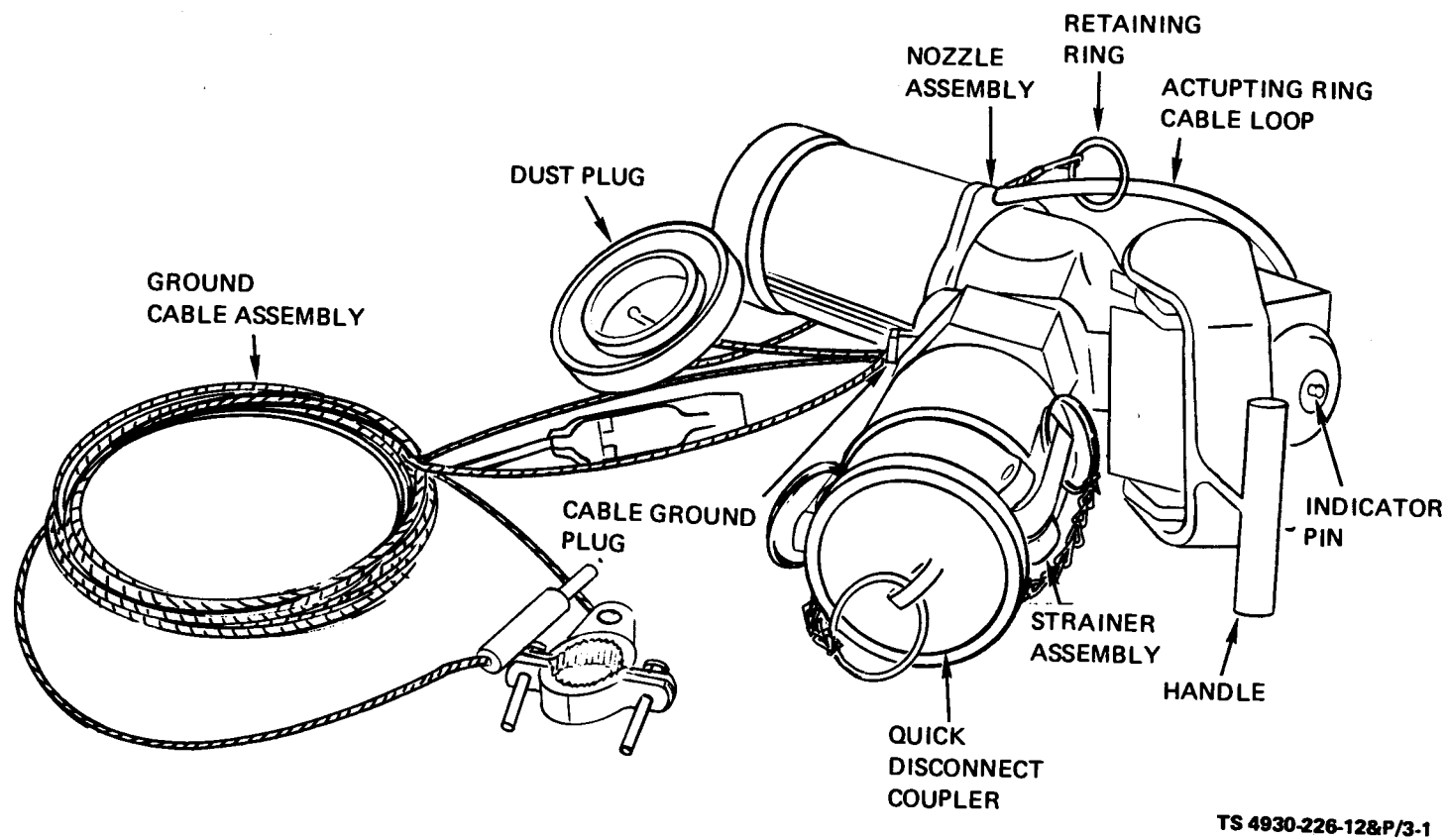


Figure 3-1. Nozzle assembly.

**3-7. Ground Cable (fig. 3-1)**

**a. Removal.** Remove cable mounting plug and remove cable.

**b. Inspection.** Inspect cable for signs of unraveling, wear or other damage.

**c. Replacement.** Replace cable and secure cable mounting plug.

**3-8. Plug Assembly (fig. 3-1)****a. Removal.**

(1) Release plug by pulling back on actuating ring cable loop.

(2) Slide dust plug coupling off at ring and remove plug and wire as a unit.

**b. Inspection.** Inspect plug for cracks or other damage. Check wire and ring securing plug to actuating ring cable loop.

**c. Replacement.**

(1) Replace plug and wire as a unit and slide dust plug coupling onto ring.

(2) Secure plug by pushing forward on actuating ring cable loop.

**3-9. Wiper Seal****a. Removal.**

(1) Place latch handle in no-flow (down) position.

(2) Reach inside of body and remove seal.

**b. Inspection.** Inspect wiper seal for any signs of damage.

**c. Replacement.** To replace seal, make sure the "V" slot is facing towards handle, place seal onto

sleeve.

**3-10. Strainer Assembly**

## NOTE

The procedures for strainer assembly serial number range 0001 thru 0470 follows in paragraph **b** below.

**a.** The following procedures apply to strainer assemblies **not** in serial number range 0001 thru 0470.

(1) **Removal.** Remove strainer assembly (fig. 3-2) from nozzle assembly.

**(2) Disassembly.**

(a) Open cam-lock keeper and remove dust plug (8, fig. 3-2).

(b) Unscrew body (5) from end (1), remove gasket (4), strainer (3) and gasket (2) from end (1).

(c) Remove gasket (7) from coupling (6).

(d) Unscrew coupling (6) from body (5) if damaged or leaking.

(3) **Inspection.** Inspect gaskets and strainer for damage, replace as required.

**(4) Reassembly.**

(a) Place gasket (7) in coupling (6).

(b) Replace end (1) in nozzle assembly. Replace gasket (2) in end (1).

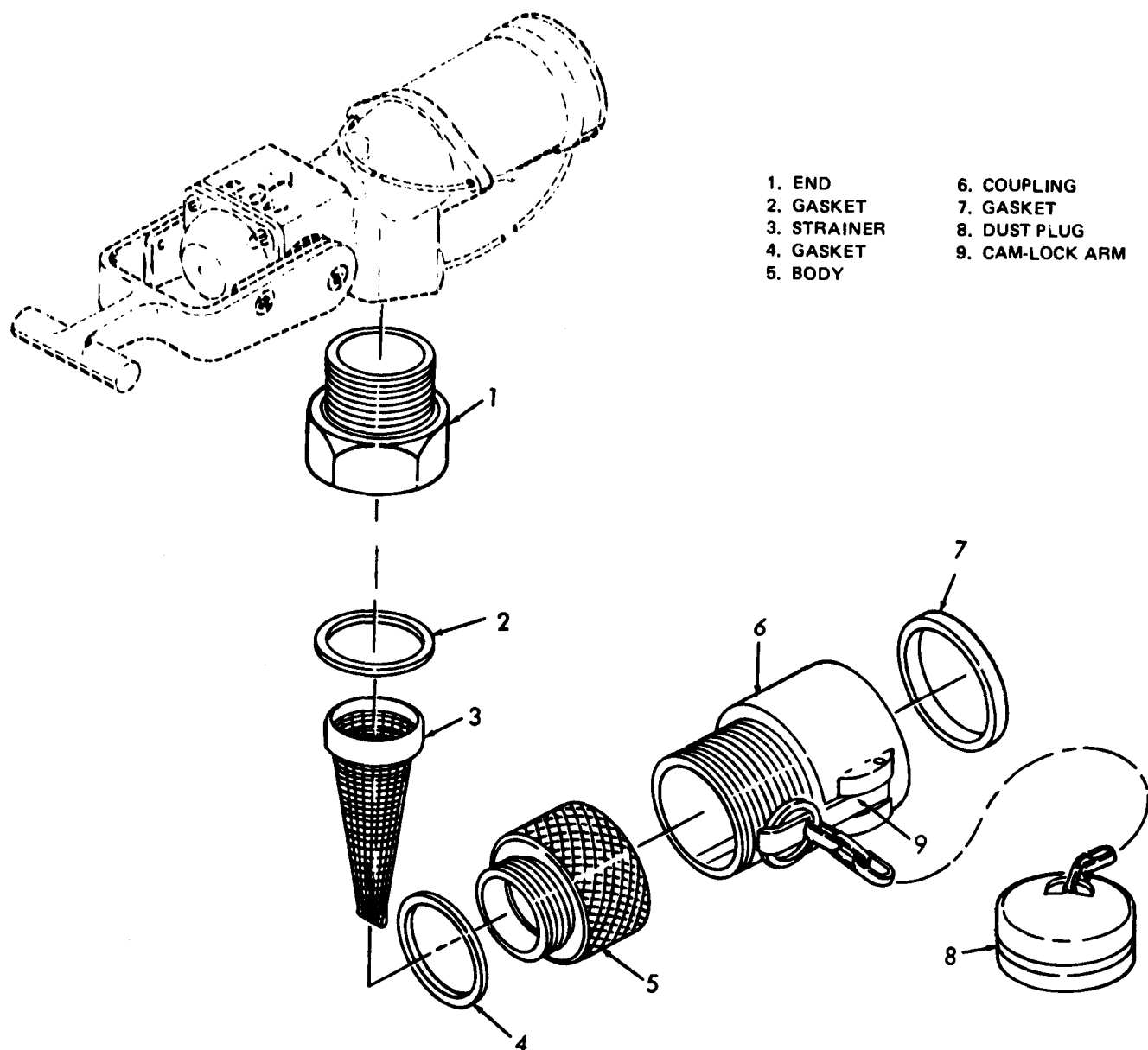
(c) Replace gasket (4) on strainer (3).

(d) Place body (5) and coupling (6) over strainer (3) and screw into end (1). Hand tighten only.

(e) Replace dust plug (8) on coupling (6).

## NOTE

Repair of the strainer assembly is limited to replacement of faulty parts.



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Figure 3-2. Strainer assembly - exploded view.

**b.** The following procedures apply to strainer assemblies in serial number range 0001 thru 0470.

(1) **Removal.** Remove strainer assembly (fig. 3-3) from nozzle assembly.

**(2) Disassembly.**

(a) Open cam-lock keeper and remove dust plug (7, fig. 3-3).

(b) Unscrew body (4) from end (1) remove strainer (3) and O-ring (2) from end (1).

(c) Remove gasket (6) from coupling (5).

(d) Unscrew coupling (5) from body (4) if damaged or leaking.

**(3) Inspection.** Inspect O-ring and strainer

for damage, replace as required.

**(4) Reassembly.**

(a) Place gasket (6) in coupling (5).

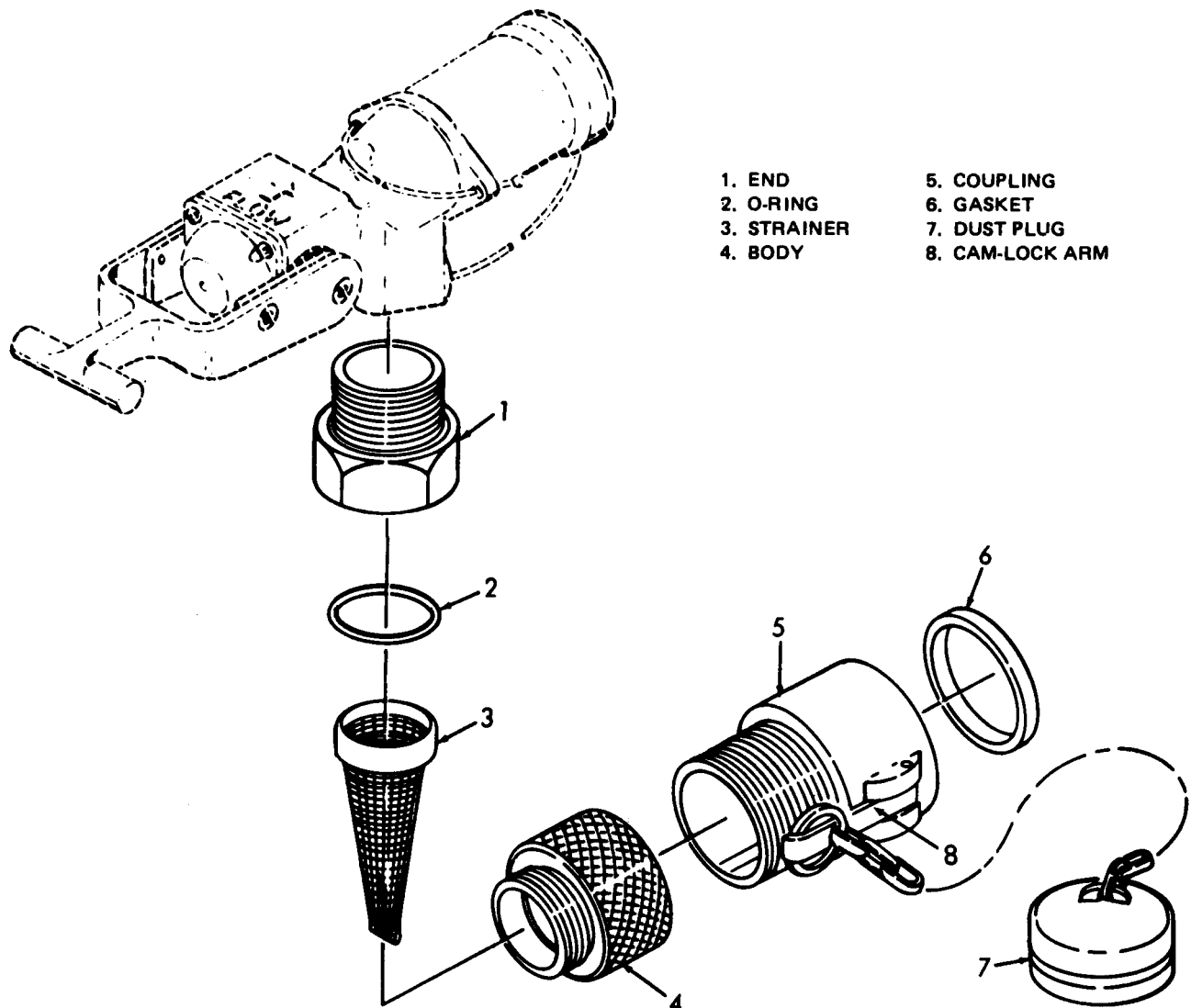
(b) Replace end (1) in nozzle assembly. Replace O-ring (2) in end (1).

(c) Place body (4) and coupling (5) over strainer (3) and screw into end (1). Hand tighten only.

(d) Replace dust plug (7) on coupling (5).

**NOTE**

Repair of the strainer assembly is limited to replacement of faulty parts.



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Figure 3-3. Modified strainer assembly - exploded view.

The following parts are not interchangeable from one strainer assembly to the other: End, O-ring, Gaskets and Body. However, the complete strainer assemblies are interchangeable. See Appendix E for the correct parts for the strainer assembly that is on your nozzle.

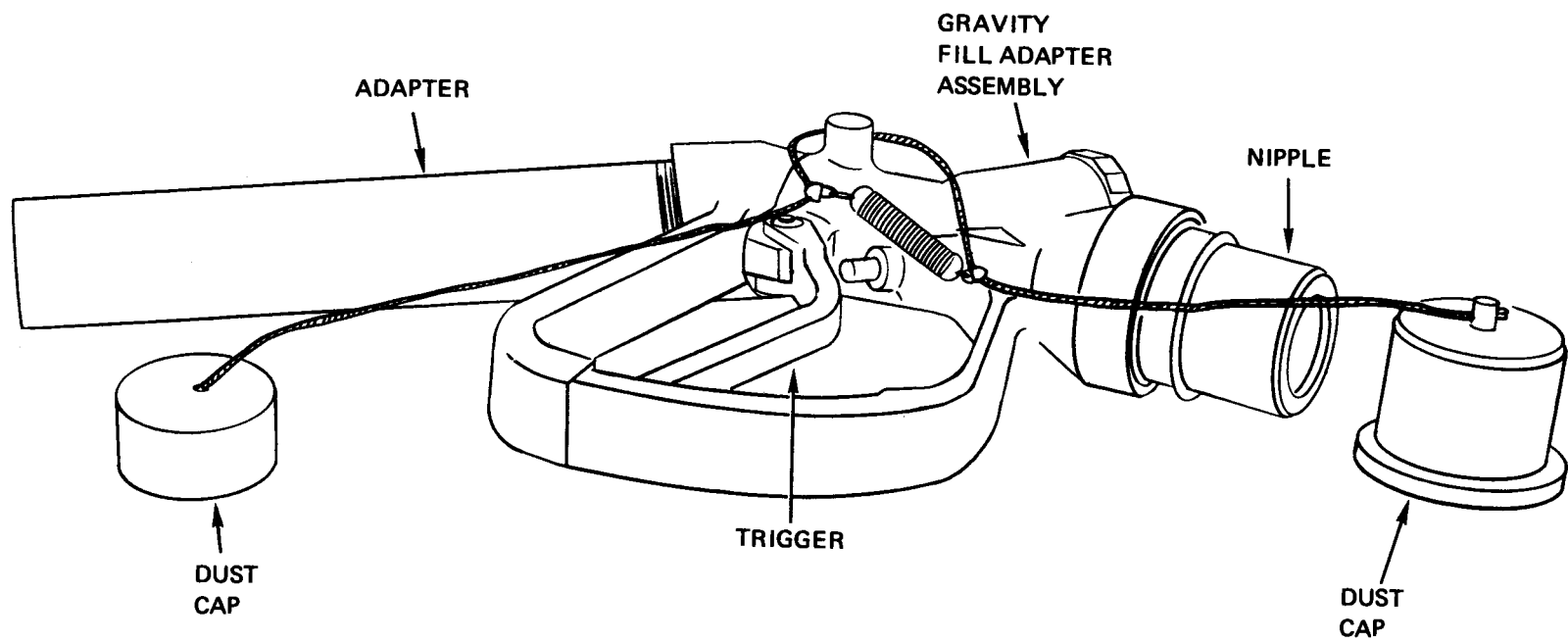
### Gravity Fill Adapter Assembly

**a. Removal.** Release adapter (fig. 3-4) by pull-

ing back on actuating ring cable loop on nozzle assembly.

**b. Inspection.** Inspect nipple dust cap, adapter dust cap, adapter and housing subassembly for damage and cleanliness.

**c. Replacement.** To replace the gravity fill adapter, simply push the nipple end of the assembly into the nozzle assembly until an audible click is heard.



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Figure 3-4. Gravity fill adapter assembly.



## CHAPTER 4

### ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

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#### Section I. SERVICE UPON RECEIPT OF MATERIEL

##### 4-1. Inspecting and Servicing the Equipment

###### *a. Inspection.*

(1) Inspect the identification plate mounted on the body subassembly for positive identification of the closed-circuit refueling nozzle assembly.

(2) Make a thorough inspection of the nozzle assembly for damage that may have occurred during shipment.

(3) Check the equipment against the packing list, make certain that all items are accounted for and are in serviceable condition.

###### *b. Servicing.*

(1) Perform preventive maintenance checks and services (Table 3-1).

(2) Correct all deficiencies.

##### 4-2. Installation

*a.* Remove dust plug (13, fig. 1-1).

*b.* Attach closed-circuit refueling nozzle assembly to hose.

*c.* Attach ground stake clamp (7, fig. 1-1) to a suitable ground fixture.

##### 4-3. Equipment Conversion

*a.* Conversion of the nozzle from a closed-circuit system to a gravity-fill system shall be accomplished by the following steps. This conversion will be required when the vehicle to be fueled is not equipped with a closed-circuit refueling receiver.

*b.* Remove dust plug (8, fig. 1-1) from nozzle coupling end by pushing back on the actuating ring cable loop (15).

*c.* Make certain that the control handle (4) is latched in the no-flow (down) position. If the control handle is left in the flow (up) position, it may be difficult to make connection to the gravity fill adapter due to line pressure in the nozzle.

*d.* Remove dust cap (10, fig. 1-1) from gravity fill adapter (3). Insert gravity fill adapter into nozzle assembly until the actuating ring (15) moves forward and locks into position.

#### Section II. MOVEMENT TO A NEW WORKSITE

##### 4-4. Dismantling for Movement

*a.* Disconnect nozzle ground stake clamp (7, fig. 1-1).

*b.* Disconnect nozzle assembly (1) from fuel hose assembly (14).

*c.* Attach dust plug (13).

##### 4-5. Reinstallation After Movement

*a.* Remove dust plug (13, fig. 1-1).

*b.* Attach nozzle assembly (1) to fuel hose assembly (14) at quick disconnect coupler (12).

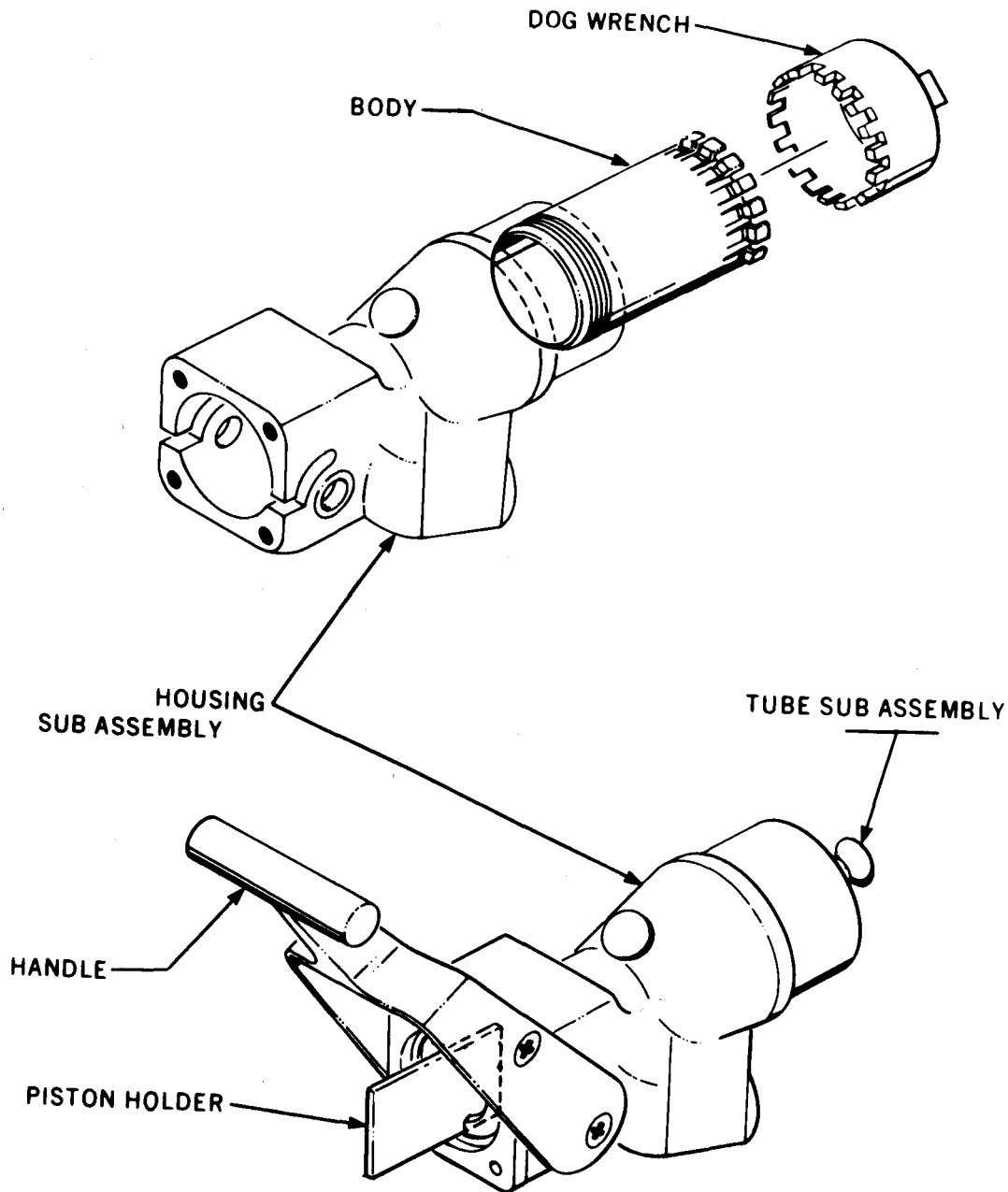
*c.* Attach ground stake clamp (7) to a suitable ground fixture.

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

##### 4-6. Special Tools and Equipment

Special tools issued with or authorized for use with the nozzle assembly are the dog wrench and the piston holder. The dog wrench (fig. 4-1) is used

to remove the body from the nozzle assembly (para 4-11). The piston holder (fig. 4-1) is used to remove the tube assembly from the nozzle assembly (para 4-12). These tools are also listed in Appendix D.



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Figure 4-1. Use of special tools.

## 4-7. Repair Parts

Repair parts are listed and illustrated in the repair parts and special tools list, Appendix E of this

manual covering organizational maintenance for the nozzle assembly.

## Section IV. TROUBLESHOOTING

### 4-8. General

**a.** This section contains troubleshooting information for locating and correcting most of the operating troubles which may develop in the closed-circuit refueling nozzle assembly. Each malfunction

for an individual component is followed by a list of tests or inspections which will help you to determine corrective actions to take. You should perform the tests/inspections and corrective actions in the order listed.

**b.** 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.

## 4-9. Troubleshooting

Table 4-1 lists the common malfunctions which

you may find during the operation or maintenance of the closed-circuit refueling nozzle assembly or its components. You should perform the tests/inspections and corrective actions in the order listed.

### NOTE

Before you use this table, be sure you have performed all applicable operating checks.

**Table 4-1. Troubleshooting**

---

**Malfunction**

**Test or Inspection**

**Corrective Action**

---

**1. LEAKAGE AROUND ACTUATING RING**

Disassemble coupling end assembly (para 4-11) and check for damaged packing.

**Replace damaged packing and reassemble coupling end assembly (para 4-11).**

**2. FAILURE OF HANDLE TO OPERATE PROPERLY**

Inspect all handle components for damage or wear.

**Disassemble handle to find unserviceable component(s). Replace components as required (para 4-12).**

**3. LEAKAGE FROM HANDLE AREA**

*Step 1.* Disassemble handle (para 4-12) and check for damaged packing.

**Replace damaged packing.**

*Step 2.* While the handle is disassembled check the cartridge assembly for freedom of piston movement. Visually inspect the diaphragm for damage. **DO NOT DISASSEMBLE THE CARTRIDGE ASSEMBLY.**

**Replace an unserviceable piston cartridge assembly and reassemble handle (para 4-12).**

**4. LEAKAGE FROM COUPLING END**

*Step 1.* Disassemble handle and valve assembly (para 4-12) and check for damaged packing.

**Replace damaged packing.**

*Step 2.* While the handle and valve assembly (para 4-12) is disassembled inspect the sleeve assembly for damage.

**Replace an unserviceable sleeve assembly and reassemble the handle and valve assembly.**

**5. SLEEVE ASSEMBLY FAILS TO CLOSE OFF**

*Step 1.* Disassemble handle and valve assembly (para 4-12) and inspect for damaged packing

**Replace damaged packing.**

*Step 2.* While the handle and valve assembly (para 4-12) is disassembled check for a missing valve spring.

**Replace spring (para 4-12).**

*Step 3.* Inspect for presence of foreign matter between sleeve and body.

**Remove sleeve, clean and replace wiper seal and packing (para 4-12). Reassemble handle and valve assembly.**

## Section V. RADIO INTERFERENCE SUPPRESSION

This section is not applicable to this equipment.

## Section VI. MAINTENANCE OF NOZZLE ASSEMBLY

### 4-10. General

This section provides information on maintaining the nozzle assembly. The nozzle assembly may be disassembled as three separate subassemblies; the coupling end, the handle and valve and the latch subassemblies. Each may be repaired without disassembly of the other. The ground cable is also covered in this section. Disassembly and reassembly must be in proper sequence.

### 4-11. Coupling End Assembly

#### a. Disassembly.

- (1) Latch handle in no-flow (down) position.
- (2) Release dust plug (1, fig. 4-2) by pulling back on actuating ring (7) and remove pull ring (2).
- (3) Remove wiper seal (3).
- (4) Trip the latching mechanism by depressing stayback rods (12). Failure to do so will result in damage to the rods.
- (5) Use dog wrench (fig. 4-1) to remove body (4, fig. 4.2) from housing (45). Maintain pressure to prevent force of actuating spring(s) from causing a sudden separation of parts when the threads of the body are disengaged from the housing threads.
- (6) Remove actuating spring (5) and ring (6) from inside of body (4).
- (7) Remove actuating ring (7), stayback spring (8), stayback ring (9) and stayback dogs (10) from body (4). Release of the compression force on

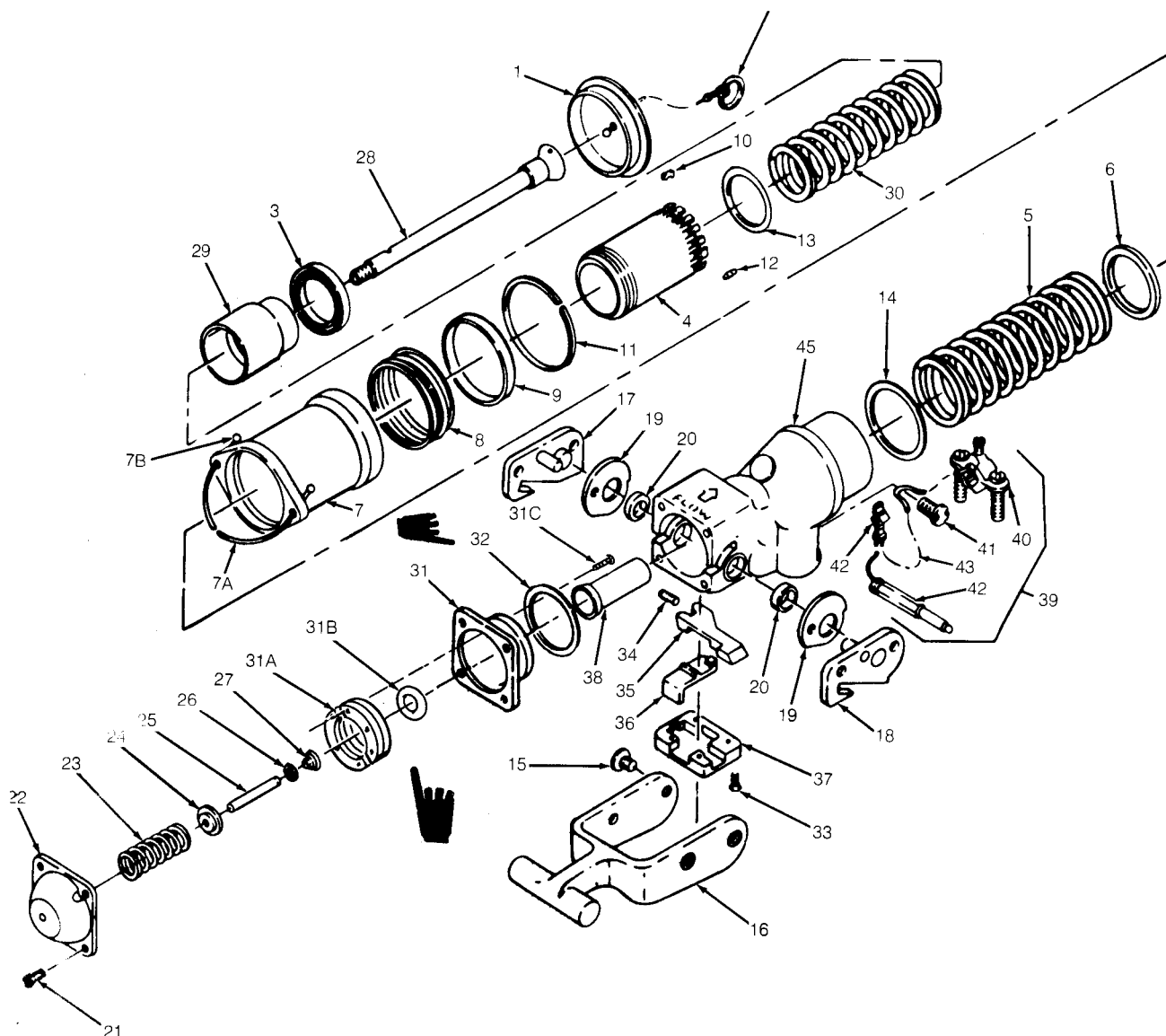
the stayback spring will release the stayback dogs. Exercise care to prevent loss of the stayback dogs.

(8) Remove dog ring (11), stayback rods (12), packing (13) from body (4). Remove packing (14) from housing (45).

**b. Repair.** Repair is limited to replacement of unserviceable components discovered during disassembly. Preformed packing tends to swell after exposure to fuel; therefore, it is recommended that new packing be installed when the nozzle is disassembled.

#### c. Reassembly.

- (1) Replace packing (14, fig. 4-2) in housing (45) and packing (13) in body (4).
- (2) Install dog ring (11) and stayback rods (12) in body with three blank slots between each rod. Shoulder of rods will rest on dog ring.
- (3) Install stayback ring (9) and stayback spring (8) on body (4).
- (4) Compress the stayback spring slightly and insert stayback dogs (10) in slots of the body and under stayback ring.
- (5) Place assembled parts on a flat surface with the dogs down. Slide actuating ring (7) over the assembled parts. Complete assembly maintaining slight compression force on stayback spring (8) until body (4) is screwed into housing (45) using dog wrench (fig. 4-1 ).



1. PULL SUBASSEMBLY
2. PULL RING
3. WIPER SEAL
4. BODY
5. ACTUATING SPRING
6. RING
7. ACTUATING RING SUBASSEMBLY
8. STAYBACK SPRING
9. STAYBACK RING
10. STAYBACK ROD (3)
11. DOG RING
12. STAYBACK ROD (3)
13. PREFORMED PACKING
14. PREFORMED PACKING
15. SCREW (4)
16. HANDLE

17. HUB (LEFT)
18. HUB (RIGHT)
19. WASHER (2)
20. BUSHING (2)
21. SCREW (4)
22. END
23. REDUCER SPRING
24. GLAND
25. INDICATOR PIN
26. E-RING
27. SPRING
28. TUBE
29. SLEEVE
30. VALVE SPRING
31. CARTRIDGE ASSEMBLY
- 31A. SPIR-O-LOCK RING

- 31B. DIAPHRAGM SEAL
- 31C. CAPSCREW
32. PREFORMED PACKING
33. SCREW (3)
34. LATCH SPRING
35. LATCH
36. LATCH RELEASE
37. LATCH BRACKET
38. BEARING
39. GROUND CABLE ASSEMBLY
40. CLAMP
41. PLUG
42. CLIP
43. GROUND CABLE
44. PLUG
45. HOUSING

Figure 4-2. Nozzle Assembly, Exploded View

## 4-12. Handle and Valve Assembly

### a. Disassembly.

- (1) Latch handle (16, fig. 4-2) in no-flow (down) position. Remove wiper seal (3) from body (4).
- (2) Release latch (16, fig. 1-1) and place handle in flow (up) position.
- (3) Remove handle mounting screws (15, fig. 4-2).
- (4) Slide handle (16) upward to remove. Remove hubs (17 and 18), washers (19) and bushings (20). Mark hubs (17 and 18) so as to ensure that they are replaced in correct positions.
- (5) Remove screws (21) from end (22) and back of housing (45). Remove end (22), reducer spring (23), gland (24), indicator pin (25), retaining E-ring (26) and spring (27).
- (6) Using a wide, thick bladed screwdriver, remove tube (28), using piston holder (fig. 4-1) to keep cartridge assembly (31, fig. 4-2) from rotating.

### CAUTION

The sleeve (29) is under spring tension.

- (7) Remove sleeve (29), valve spring (30) and packing (13). Remove cartridge assembly (31) and packing (32). **DO NOT REMOVE BEARING (38) FROM HOUSING (45) at this time.**
- (8) Check the cartridge assembly (31) for freedom of piston movement. Visually inspect the spir-o-lock ring (31B) for damage.
- (9) Remove six capscrews (31C) from flange on bearing (38) and spir-o-lock ring (31B).
- (10) Remove spir-o-lock ring (31B) and diaphragm seal (31B) from against bearing (38).
- (11) Remove bearing (38) from end of tube (28) and housing (45).

### b. Reassembly.

- (1) Position bearing (38, fig. 4-2) over end of tube (28), and loosely install six capscrews (31C) in fange of bearing (38).
- (2) Apply adhesive spray lightly on fuel side (only) of diaphragm seal (31A) and position seal against bearing (38) and spir-o-lock ring (31 B) surfaces.

- (3) Replace packing (32) and cartridge assembly (31) in housing (45).
- (4) Replace packing (13), valve spring (30) and sleeve (29) in housing (45).
- (5) Tighten down six capscrews (31C) to secure bearing (38) flange to spir-o-lock ring (31B).
- (6) Using the piston holder (fig. 4-1) to keep the cartridge assembly from rotating and a wide, thick bladed screwdriver, install tube (28, fig. 4-2).
- (7) Replace spring (27); place gland (24) on indicator pin (25) and secure with E-ring (26) and place in back of housing.
- (8) Install reducer spring (23) and end (22) on housing using four screws (21).
- (9) Replace bushing (20), washer (19) and hubs (17 and 18) being careful to replace in the same position as in disassembly.
- (10) Replace handle (16) and secure with handle mounting screws (15).

## 4-13. Latch Assembly

### a. Disassembly.

- (1) Remove strainer assembly, remove latch mounting screws (33, fig. 4-2) and latch assembly.
- (2) Remove latch spring (34), latch (35) and latch release (36) from latch bracket (37).

### b. Reassembly.

- (1) Assemble latch release (36, fig. 4-2), latch (35) and latch spring (34) on latch bracket (37).
- (2) Attach latch assembly to housing (45) using latch mounting screws (33). Replace strainer assembly.

## 4-14. Ground Cable Assembly.

- a. Repair of the ground cable assembly is restricted to replacing the alligator clip, ground clamp, ground plug, and cable.
- b. Manufacture Cable Assy by cutting bulk cable to length, 12 inches. Place cable ends through holes in housing, coupling, attach ball ends to cable ends by swedging shanks.

## Section VII. MAINTENANCE OF THE GRAVITY FILL ADAPTER

### 4-15. General

This section provides information on maintaining the gravity fill adapter. Disassembly and reassembly must be in proper sequence.

### 4-16. Gravity Fill Adapter

#### a. Disassembly.

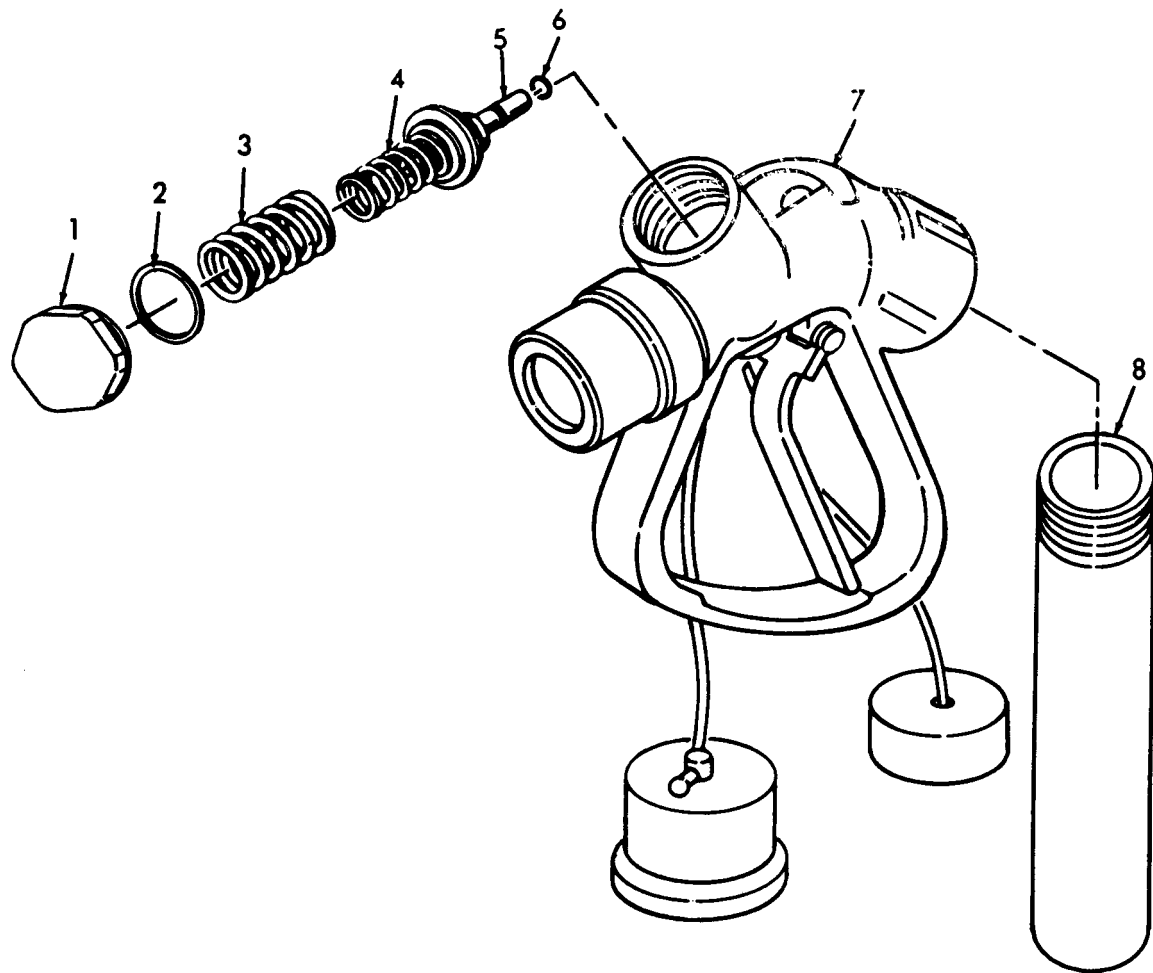
- (1) Remove end cap (1, fig. 4-3), seal (2) and valve spring (3) from housing (7).
- (2) Remove spring (4), valve (5) and seal (6). Remove

adapter (8). Use proper tool to remove adapter so as not to damage.

c. **Repair.** Repair is limited to replacement of unserviceable components discovered during disassembly.

#### c. Reassembly.

- (1) Replace adapter (8, fig. 4-3) in housing (7).
- (2) Replace seal (6) on valve (5); replace spring (4) on valve and insert valve assembly in housing (7).
- (3) Replace valve spring (3) in housing and replace end cap (1) and seal (2).



- 1. END CAP
- 2. SEAL
- 3. VALVE SPRING
- 4. SPRING

- 5. VALVE
- 6. SEAL
- 7. HOUSING
- 8. ADAPTER

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Figure 4-3. Gravity fill adapter, exploded view.



## APPENDIX A REFERENCES

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### -1. Fire Protection

TB 5-4200-200-10

Hand Portable Fire Extinguishers Approved for Army Users

### A-2. Operation

TM 10-1101

Petroleum Handling Equipment and Operation

### A-3. Maintenance

DA Pam 738-750

The Army Maintenance Management System (TAMMS)

### A-4. Shipment and Storage

TM 740-90.1

Administrative Storage of Equipment

### A-5. Destruction

TM 750-244-3

Procedures for Destruction of Equipment to Prevent Enemy Use.



## APPENDIX B

### COMPONENTS OF END ITEMS LIST

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#### Section I. INTRODUCTION

##### B-1. Scope

This appendix lists integral components of and basic issue items for the nozzle assembly to help you inventory items required for life and efficient operation.

##### B-2. General

The Components of End Item List is divided into the following sections:

**a. Section II, Integral Components of the End Item.** These items, when assembled, comprise the nozzle assembly and must accompany it whenever it is transferred or turned in. These illustrations will help you identify these items.

**b. Section III, Basic Issue Items.** These are minimum essential items required to place the nozzle assembly in operation, to operate it, and to perform emergency repairs. Although shipped separately packed they must accompany the nozzle assembly during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement BII, based on Table(s) of Organization and Equipment (TOE)/Modification Table of Organization and Equipment (MTOE) authorization of the end item.

##### B-3. Explanation of Columns

**a. Illustration.** This column is divided as follows:

**(1) Figure Number.** Indicates the figure number of the illustration on which the item is shown (if applicable).

**(2) Item Number.** The number used to identify item called out in the illustration.

**b. National Stock Number (NSN).** Indicates the National stock number assigned to the item and which will be used for requisitioning.

**c. Part Number (P/N).** Indicates the primary number used by the manufacturer, 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.

**d. Description.** Indicates the Federal item name and, if required, a minimum description to identify the item.

**e. Location.** The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

**f. Usable on Code.** "USABLE ON" codes are included to help you identify which component items are used on the different models.

##### NOTE

When this column is blank the item required is applicable to all items.

**g. Quantity Required (Qty Reqd).** This column lists the quantity of each item required for a complete major item.

**h. Quantity.** This column is left blank for use during inventory. Under the Rcv'd column, list the quantity you actually receive on your major item. The Date columns are for use when you inventory the major item at a later date; such as for shipment to another site.

## SECTION II. INTEGRAL COMPONENTS OF END ITEM

(1) ILLUSTRATION	(2) NATIONAL STOCK NO.	(3) PART NO. & FSCM	(4) DESCRIPTION	(5) LOCATION	(6) USABLE ON CODE	(7) QTY REQD	(8) QUANTITY RCVD	DATE
E-1			THE CLOSED CIRCUIT REFUELING NOZZLE DOES NOT HAVE TO BE DISASSEMBLED , OR ANY COMPONENTS REMOVED FROM THE END ITEM FOR TRANSPORTATION OR BEFORE, DURING, OR AFTER OPERATION					

## SECTION III. BASIC ISSUE ITEMS

(1) ILLUSTRATION	(2) NATIONAL STOCK NO.	(3) PART NO. & FSCM	(4) DESCRIPTION	(5) LOCATION	(6) USABLE ON CODE	(7) QTY REQD	(8) QUANTITY RCVD	DATE
			TM 5-4930-226-12&P			1		
4-1		WW69 (79326)	PISTON, HOLDER			1		
4-1		WW66 (79326)	DOG, WRENCH			1		

APPENDIX C  
ADDITIONAL AUTHORIZATION LIST

Section 1. INTRODUCTION

C-1. Scope

This appendix lists additional items you are authorized for the support of the nozzle assembly.

C-2. General

This list identifies items that do not have to accompany the nozzle assembly and that do not have to be turned in with it. These items are authorized to you by CTA, MTOE, TDA or JTA.

C-3. Explanation of Listing

National stock number, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment.

NOTE

When this column is blank the item required is applicable to all items.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) NATIONAL STOCK NUMBER	PART NUMBER & FSCM	(2) DESCRIPTION	USABLE ON CODE	(3) U/M	(4) QTY AUTH
		K30270 (79326) Kit, Repair		EA	1



## APPENDIX D

### MAINTENANCE ALLOCATION CHART

#### Section I. INTRODUCTION

##### D-1. Maintenance Allocation Chart (MAC)

**a. General.** This MAC assigns maintenance functions in accordance with the Three Level Maintenance concept. The three levels are depicted on the MAC as:

UNIT level—corresponds to an O code in the Repair Parts and Special Tools List (RPSTL). A C code entry under UNIT denotes maintenance performed by the crew or operator within UNIT maintenance.

INTERMEDIATE level—corresponds to an F or H code in the RPSTL.

DEPOT level—corresponds to a D code in the RPSTL.

**b. Unit Maintenance.** Maintenance to be performed in the Unit level is described as follows:

(1) Unit Maintenance activities are staffed and equipped to perform high frequency on-equipment maintenance tasks required to retain or return equipment to a serviceable condition. These tasks include preventive maintenance and repair and replace functions associated with a high level of mission capability.

(2) Unit Maintenance inspection and servicing include daily (usually performed by operator or crew), periodic, and special inspections, as authorized by the MAC or higher headquarters.

(3) Unit level maintains a Combat Prescribed Load List (PLL) which consists of items on the Mandatory Parts List (MPL) and items which are demand supported.

(4) Unit level performs troubleshooting, replace, and limited repair functions as authorized by the MAC, RPSTL, and applicable technical manuals.

**c. Intermediate Maintenance.** Maintenance to be performed in the Intermediate level is described as follows:

(1) One stop maintenance support through use of mobile weapon system oriented maintenance teams to perform authorized maintenance (that exceeds Unit level capability) to effect quick repair and return to user capabilities.

(2) Maintains a Combat Authorized Stockage List (ASL), Mandatory Parts List (MPL), Direct. Exchange (DX), and provides limited Operational Readiness Float (ORF) for supported units.

(3) Provides collection, classification, and recovery services for serviceable and unserviceable materiel and maintains a Battle Damage Assessment (BDA) capability.

(4) Provides maintenance support for the theater supply system through repair of components and DX items.

(5) Provides maintenance units composed of commodity oriented platoons which may be augmented by support teams that deploy forward if the tactical situation permits.

(6) Maintains Operational Readiness Float (ORF) stocks in support of the theater.

**d. Depot Maintenance.** Depot level functions are authorized as indicated by entries in the Depot (D) Maintenance level column (4) in the MAC.

## D-2. Use of the Maintenance Allocation Chart, Section II

a. The MAC assigns maintenance functions based on the following considerations:

(1) Skills available.

(2) Work time required.

(3) Tools and test equipment required and/or available.

b. If a lower level of maintenance identified in column (4) of the MAC cannot perform all tasks of a single maintenance function (e.g., test, repair), then the higher level that can perform other tasks of that function is also indicated.

c. Higher maintenance levels are automatically authorized to perform maintenance functions assigned to a lower maintenance level.

d. Higher maintenance levels will perform the maintenance functions of lower maintenance levels when required or directed by the Commander who has authority to direct such tasking.

e. Assignment of a maintenance function in the MAC does not carry automatic authorization to carry the related spare or repair parts in stock. Information to requisition or secure parts will be as specified in the associated RPSTL.

f. Normally, there will be no deviation from the assigned level of maintenance. However, in cases of operational necessity, maintenance functions assigned a higher level may, at the request of the lower level, be assigned to the lower level on a one-time basis, if specifically authorized by the maintenance officer of the higher level to which the function is assigned. In such a case, the special tools, equipment, etc., required by the lower level to perform this function will be furnished by the higher level assigned the function. Also, transfer of a function to a lower level does not relieve the higher level of responsibility for the function, so the higher level will provide technical supervision and inspection of the function being performed at the lower level.

## D-3. Maintenance Functions

Maintenance functions will be limited to and defined as follows:

a. *Inspect.* Two levels of inspect are covered in the MAC.

(1) When prescribed at the C or O element of Unit Maintenance level, inspect means to determine serviceability by comparing an item's physical, mechanical, and/or electrical characteristics with established standards through examination (i.e., by sight, sound, or feel). These inspections are included in preventive maintenance (PM) checks and services, such as PMCS, PMD.

(2) When prescribed at the intermediate (F) or Depot (D) maintenance level, inspect refers to an initial inspection which is conducted prior to scheduling any repair on repairable items evacuated to this level. This inspection is made to determine whether an item qualifies for repair or discard.

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 (includes decontaminate), to preserve, to drain, 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 the specified parameters.

e. *Align.* To adjust specified variable elements of an item to bring about optimum or desired performance.

f. *Calibrate.* To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipment used in precision measurement. Consists of comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. *Install.* The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. *Replace.* The act of substituting a serviceable like type part, a 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, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. *Overhaul.* That maintenance effort (service/action) necessary to restore an item to a completely serviceable operational condition as prescribed by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to a 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 equipment/components.

#### D-4. Explanation of Columns in the MAC, Section H

a. *Column (1), Group Number*. Column 1 lists functional group code numbers which are assigned to identify maintenance significant components, assemblies, subassemblies, and modules to their next higher assembly.

b. *Column (2), Component/Assembly*. Column 2 contains the item names of components, assemblies, subassemblies, and modules for which group numbers (column 1) are assigned and for which maintenance is authorized.

c. *Column (3), Maintenance Function*. Column 3 lists the functions to be performed on items listed in column 2. (Function definitions are contained in paragraph D-3.)

d. *Column (4), Maintenance Level*. The maintenance levels, Unit, Intermediate, and Depot, are allotted separate subcolumns within column 4. Entry of a work time figure (such as 1.0, 0.2) in a subcolumn indicates that that level is authorized to perform the function listed in column 3, and the average time required to do the function is the work time figure. If the number or complexity of tasks within a maintenance function varies from one maintenance level to another, the applicable work time figure for each level will be entered for that function. The work time figure represents the average time it takes to restore a component/assembly to a serviceable condition under a typical field operating environment.

e. *Column (5), Tools and Equipment*. Column 5 specifies, by code, common tool sets (not individual tools from those sets), common TMDE, and special tools, TMDE, and support equipment required to perform a designated function. The code in Column 5 keys to the listing in Section III of the MAC.

f. *Column (6), Remarks*. This column, when applicable, contains a letter code which is keyed to an explanation of the code contained in Section IV of the MAC.

#### D-5. Explanation of Columns in the MAC, Section III

a. *Column (1), Tool or Test Equipment Reference Code*. The tool or test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. *Column (2), Maintenance Category*. The lowest category of maintenance authorized to use the tool or test equipment.

c. *Column (3), Nomenclature*. Name or identification of the tool or test equipment.

d. *Column (4), National/NATO Stock Number*. The national stock number of the tool or test equipment.

e. *Column (5), Tool Number*. The manufacturer's part number.

#### D-6. Explanation of Columns in the MAC, Section IV

a. *Column (1), Reference Code*. The code recorded in Column 6, Section II.

b. *Column (2), Remarks*. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

### Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			UNIT		INTERMEDIATE		DEPOT		
			C	O	F	H	D		
01	Nozzle Assy	Inspect Replace Repair	0.1 0.2	1.5				1 2	A B
0101	Ground Cable	Inspect Replace Repair	0.1 0.1	0.2					A A B
0102	Plug Assy	Inspect Replace Repair	0.1 0.1	0.1					A B B
0103	Seal Wiper	Inspect Replace	0.1 0.1						B
02	Strainer Assy	Inspect Service Replace Repair	0.1 0.1 0.1 0.1						C A B
03	Gravity Fill Adapter	Inspect Replace Repair	0.1 0.1	0.2					A

## SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS

(1)	(2)	(3)	(4)	(5)
REFERENCE CODE	MAINTENANCE LEVEL	NOMENCLATURE	NATIONAL STOCK NO.	TOOL NUMBER
1	O	DOG WRENCH FOR REMOVING THE BODY FROM THE NOZZLE HOUSING ASSEMBLY.	6250-08-169-0795	WW66
2	O	PISTON HOLDER, FOR HOLDING THE NOZZLE PISTON WHILE REMOVING THE TUBE ASSEMBLY.	6250-08-169-0796	WW69



## APPENDIX E

### REPAIR PARTS AND SPECIAL TOOLS LIST

#### Section I. INTRODUCTION

##### E-1. Scope

This manual lists spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE), and other special support equipment required for performance of organizational, direct support, and general support maintenance of the FARE. It authorizes the requisitioning and issue of spares and repair parts as indicated by the source and maintenance codes.

##### E-2. General

This Repair Parts and Special Tools List is divided into the following sections:

**a. Section II, Repair Parts List.** A list of spares and repair parts authorized 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. Bulk materials are listed in NSN sequence.

**b. Section III, Special Tools List.** A list of special tools, special TMDE, and other special support equipment authorized for the performance of maintenance.

**c. 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.

##### E-3. Explanation of Columns

**a. Illustration.** This column is divided as follows:

**(1) Figure Number.** Indicates the figure number of the illustration on 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:

<i>Code</i>	<i>Definition</i>
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 outfitting. Not subject to automatic replenishment.
PE	Support equipment procured and stocked for initial issue or outfitting to specified maintenance repair activities.
PF	Support equipment which will not be stocked but which will be centrally procured on demand.
PG	Item procured and stocked to provide for sustained support for the life of the equipment. It is applied to an item peculiar to the equipment which, because of probable discontinuance or shutdown of production facilities, would prove uneconomical to produce 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.
MO	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.

<i>Code</i>	<i>Definition</i>
AF	Item to be assembled at direct support maintenance level.
A}{	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.
<del>XB</del>	Item is not procured or stocked. If not available through salvage, requisition.
XC	Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number.
XD	A support item that is not stocked. When required, item will be procured through normal supply channels.

## NOTE

Cannibalization or salvage may be used as a source of supply for any items coded above except those coded XA and aircraft 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:

<i>Code</i>	<i>Application/Explanation</i>
C	Crew or operator maintenance performed within organizational maintenance.
O	Support item is removed, replaced, used at the organizational level.
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.

**(b)** The maintenance code entered in the fourth position indicates whether the item is to be repaired and identifies the lowest maintenance level with the capability to perform complete repair (i.e., all authorized maintenance functions). This position will contain one of the following maintenance codes,

<i>Code</i>	<i>Application/Explanation</i>
O	The lowest maintenance level capable of complete repair of the support item is the organizational level.
F	The lowest maintenance level capable of complete repair of the support item is the

<i>Code</i>	<i>Application/Explanation</i>
	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 (enter applicable designated specialized repair activity), 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:

<i>Recoverability Code</i>	<i>Definition</i>
Z	Nonreparable item. When unserviceable, condemn and dispose at the level indicated in position <b>3</b> .
O	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.
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.

**e. 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 item. 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. When the part to be used differs between serial numbers of the same model, the effective serial numbers are shown as the last line of the description. In the Special Tools List, the initial basis of issue (BOI) appears as the last line in the entry for each special tool, special TM DE, and other special support equipment. When density of equipments supported exceeds density spread indicated in the basis of issue, the total authorization is increased accordingly.

**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 a functional group, sub functional group, or an assem-

bly. A "V" appearing in this column in lieu of a quantity indicates that no specific quantity is applicable (e.g., shims, spacers, etc.).

## E-4. How to Locate Repair Parts

**a.** When National Stock Number or Part Number is Unknown:

(1) **First.** Using the table of contents, determine the functional group within which the item belongs. This is necessary since illustrations are prepared for functional groups and listings are divided into the same groups.

(2) **Second.** Find the illustration covering the functional group to which the item belongs.

(3) **Third.** Identify the item on the illustration and note the illustration figure and item number of the item.

(4) **Fourth.** Using the Repair Parts Listing, find the figure and item number noted on the illustration.

**b.** When National Stock Number or 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,

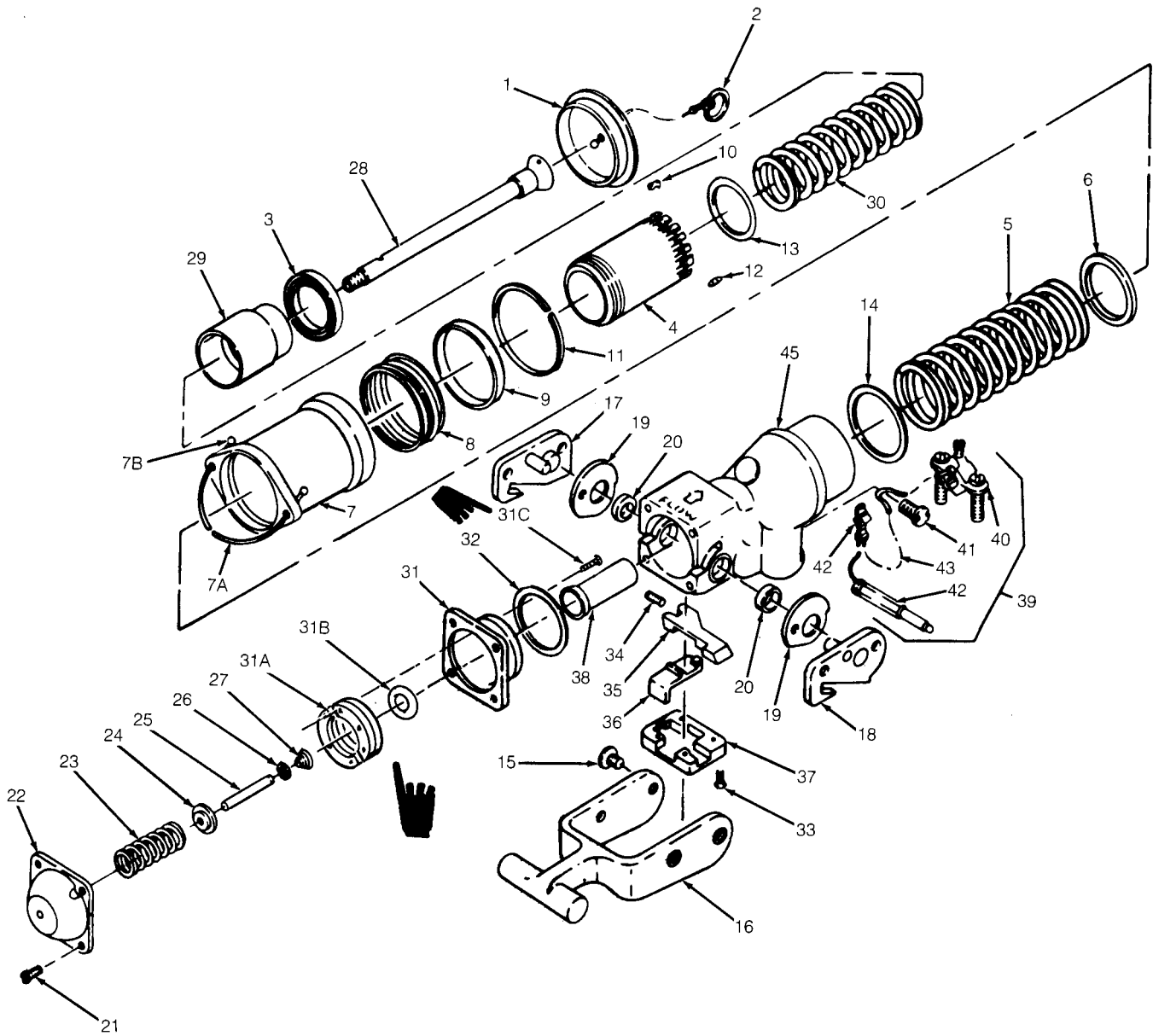


Figure E-1. Nozzle Assembly



SECTION II		(2)	(3)	(4)	(5)	(6)	(7)	(8)
ILLUSTRATION								QTY
(A)	(B)	FEDERAL				DESCRIPTION		INC
FIG	ITEM	SMR	STOCK	PART				IN
NO.	NO.	CODE	NUMBER	NUMBER	FSCM	USABLE ON CODE	U/M	UNIT
GROUP 01 NOZZLE ASSEMBLY								
E-1		PAOOO	4930-00-204-9452	13219E0494	97403	NOZZLE ASSEMBLY	EA	1
E-1	1	PAOZZ		CCN101-03-099	79326	PLUG,SUB-ASSY	EA	1
E-1	2	PAOZZ	4930-01-022-0655	WS118-2	79326	RING,PULL	EA	1
E-1	3	PAOZZ	5330-01-147-1135	CCN101-31B	79326	PACKING PREFORMED	EA	1
E-1	4	XAOZZ		CCN101-1	79326	BODY	EA	1
E-1	5	PAOZZ	5360-00-007-6929	CCN101-4	79326	SPRING,AUTUATION	EA	1
E-1	6	XBOZZ		CCN101-24	79326	RING	EA	1
E-1	7	PBOZZ		CCN101-14	79326	HOUSING,COUPLING	EA	1
E-1	7A	PAOZZ		3691T420	39428	CABLE ASSY	EA	1
E-1	7B	PAOZZ		MS2066402	96906	BALL,END	EA	1
E-1	8	PAOZZ	5360-01-011-7884	CCN101-44	79326	SPRING,STAYBACK	EA	1
E-1	9	XBOZZ		CCN101-58	79326	RING,STAYBACK	EA	1
E-1	10	PAOZZ	4930-01-009-3816	WS5-10L	79326	DIG,DOOR CATCH	EA	9
E-1	11	XBOZZ		DG270-20-6	79326	RING,DOG	EA	1
E-1	12	PAOZZ	4930-01-009-4113	201-5-78A	79326	ROD,STAYBACK	EA	3
E-1	13	APOZZ	5330-01-011-9655	2A13-133	79326	PACKING,PREFORMED PART OF KIT P/N K30270	EA	1
E-1	14	PAOZZ	5330-00-291-7295	MS29513-136	96906	PACKING,PREFORMED PART OF KIT P/N K30270	EA	1
E-1	15	PAOZZ	5305-00-701-5228	MS51959-79	96906	SCREW,MACHINE	EA	4
E-1	16	XBOZZ		CCN101-03-81	79326	HANDLE	EA	1
E-1	17	XBOZZ		CCN101-03-028L	79326	HUB,SUB-ASSEMBLY	EA	1
E-1	18	XBOZZ		CCN101-03-028R	79326	HUB,SUB-ASSEMBLY	EA	1
E-1	19	PAOZZ	5635-01-008-5358	CCN101-03-25	79326	WASHER	EA	2
E-1	20	APOZZ	4930-01-010-0963	CCN101-27	79326	BUSHING	EA	2
E-1	21	PAOZZ	5305-00-082-6721	MS51957-81	96906	SCREW,MACHINE	EA	4
E-1	22	XBOZZ		CCN101-15A	79326	END	EA	1
E-1	23	PAOZZ	5360-01-007-6930	CCN101-43	79326	SPRING,REDUCER	EA	1
E-1	24	PAOZZ	4930-01-009-4114	CCN101-42	79326	GLAND	EA	1
E-1	25	XBOZZ		CCN101-52	79326	PIN,INDICATOR	EA	1
E-1	26	PAOZZ	5365-00-928-2562	X5133-18	79136	E-RING,RETAINING	EA	1
E-1	27	PAOZZ	5360-01-013-3530	CCN101-76	79326	SPRING,HELICAL,COMP	EA	1
E-1	28	XBOZZ		CCN101-063	79326	TUBE,SUB-ASSEMBLY	EA	1
E-1	29	PAOZZ	4730-01-010-1699	CCN101-045A	79326	SLEEVE,SUB-ASSEMBLY	EA	1
E-1	30	PAOZZ	5360-01-007-6931	CCN101-11	79326	SPRING,VALVE	EA	1
E-1	31	PAOZZ	4930-01-010-0964	CCN101-03-049	79326	CARTRIDGE,SUB-ASSEMBLY	EA	1
E-1	31A	XDFZZ		UR-1935	79326	SEAL,DIAPHRAGM	EA	1
E-1	31B	PAFZZ		CCN101-38A	79326	RING,SPIR-O-LOCK	EA	1
E-1	31C	XDFZZ		6-32UNC-1/4LG	79326	CAPSCREW SOCKET HD	EA	6
E-1	32	PAOZZ	5330-00-265-1095	MS29513-128	96906	PACKING,PREFORMED PART OF KIT P/N K30270	EA	1
E-1	33	PAOZZ	5305-00-764-0068	MS35200-42	96906	SCREW,MACHINE	EA	1
E-1	34	PAOZZ	5360-01-007-6939	CCN101-03-47	79326	SPRING, LATCH	EA	1
E-1	35	XBOZZ		CCN101-03-0060	79326	LATCH	EA	1
E-1	36	XBOZZ		CCN101-03-0068	79326	LATCH,RELEASE	EA	1
E-1	37	XBOZZ		CCN101-03-69	79326	LATCH,BRACKET	EA	1
E-1	38	PAOZZ	3120-01-010-3713	CCN101-16	79326	BEARING	EA	1
E-1	39	PAOZZ	4930-01-009-5440	CCN101-082	79326	CABLE,ASSEMBLY	EA	1
E-1	40	PAOZZ	5999-01-010-1082	GC-003	40342	CLAMP,GROUND	EA	1
E-1	41	PAOZZ	5935-00-503-8979	MS3493-2	96906	CAP,CABLE,MOUNTING	EA	1

SECTION II								
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
ILLUSTRATION								
(A)	(B)	FEDERAL		DESCRIPTION				
FIG	ITEM	SMR	STOCK	PART			QTY	INC
NO.	NO.	CODE	NUMBER	NUMBER	FSCM	USABLE ON CODE	U/M	IN
								UNIT
E-1	42	PAOZZ	5999-01-012-3118	25CPC4	76545	CLIP,ELECTRICAL	EA	1
E-1	43	PAOZZ	4010-00-222-4494	MILW83420TYPE1	81349	WIRE,STEEL	FT	30
E-1	44	PAOZZ	5935-00-007-9202	MS3493-1	96906	PLUG,TIP	EA	1
E-1	45	XAOZZ		CCN101-03-026	79326	HOUSING	EA	1



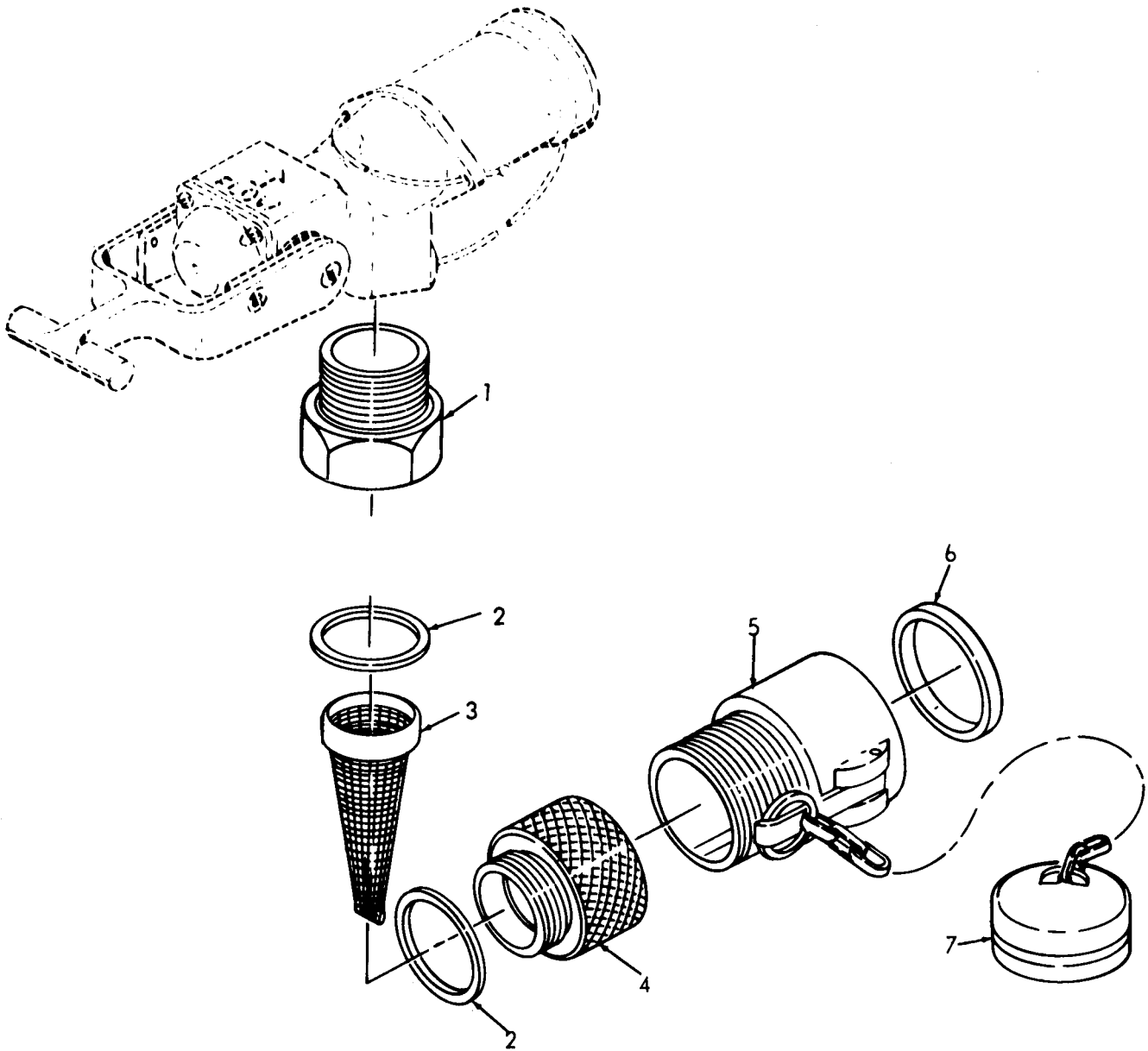
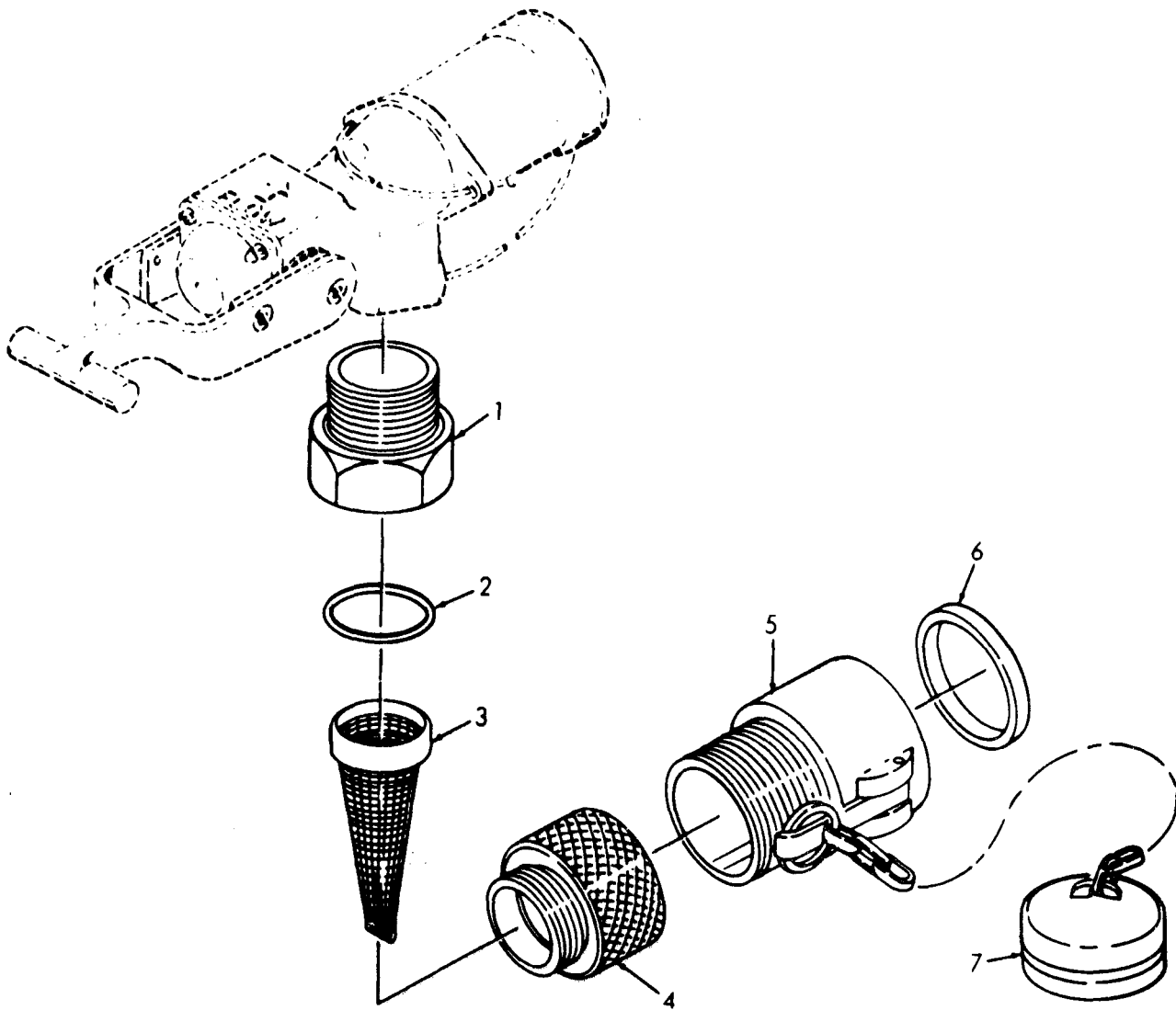


Figure E-2. Strainer Assembly





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Figure E-3. Modified Strainer Assembly

PIN: 034231 - 002

SECTION II							
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ILLUSTRATION							
(A)	(B)	FEDERAL		DESCRIPTION			
FIG	ITEM	SMR	STOCK	PART			
NO.	NO.	CODE	NUMBER	NUMBER	FSCM	USABLE ON CODE	U/M
E-3		PAOZZ		CCS101-02	79326	STRAINER ASSEMBLY, MODIFIED	EA 1
E-3	1	XBOZZ		CCS101-15	79326	END	EA 1
E-3	2	PAOZZ	5330-00-263-5173	MS29513-226	96906	ORING,PART OF KIT P/N K30270	EA 1
E-3	3	PAOZZ	4730-01-009-3868	CCS102-49	79326	STRAINER,PART OF KIT P/N K30270	EA 1
E-3	4	XBOZZ		CCS101-1	79326	BODY	EA 1
E-3	5	PAOZZ	4730-00-088-9285	MS27026-11	96906	COUPLING, HALF TYPE	EA 1
E-3	6	PAOZZ	5310-00-612-2414	MS27030-6	96906	GASKET,PART OF KIT P/N K32070	EA 1
E-3	7	PAOZZ	4730-00-915-5127	MS27029-11	96906	PLUG,QUICK	EA 1

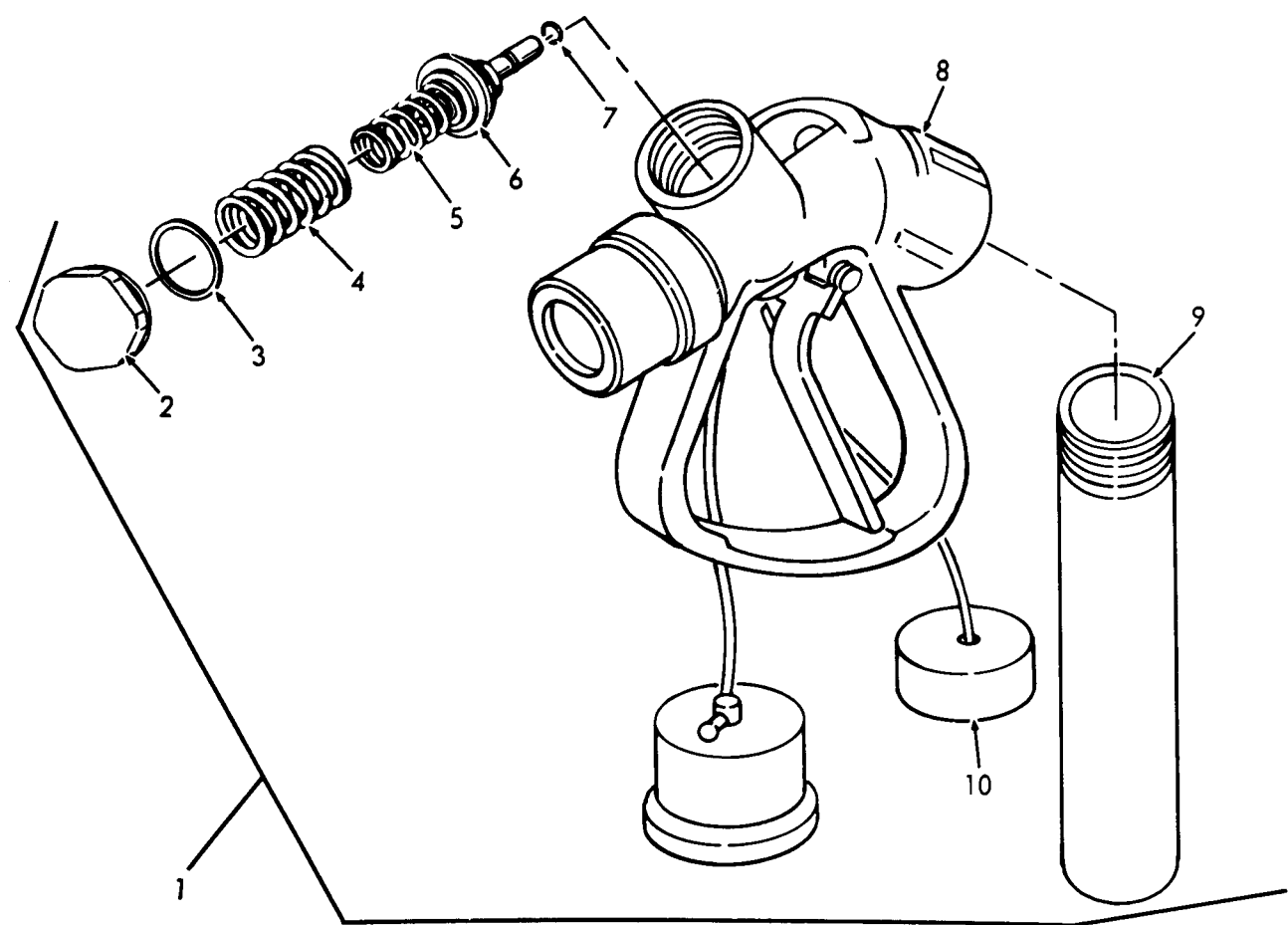


Figure E-4. Adapter Assembly



SECTION II		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)								QTY
ILLUSTRATION								INC
(A)	(B)		FEDERAL			DESCRIPTION		IN
FIG	ITEM	SMR	STOCK	PART				UNIT
NO.	NO.	CODE	NUMBER	NUMBER	FSCM		USABLE ON CODE U/M	
GROUP 03 GRAVITY FILL ADAPTER								
E-4	1	PAOZZ	4930-00-516-0839	CCA101/02	79326	NOZZLE AND ADAPTER ASSEMBLY	EA	1
E-4	2	XBOZZ		CCA101-15	79326	CAP, END	EA	1
E-4	3	PAOZZ	5330-01-007-6940	3Y13-130	79326	SEAL PART OF KIT P/N K30270	EA	1
E-4	4	PAOZZ	5360-01-007-6932	YN35-12-11	79326	SPIRNG, VALVE	EA	1
E-4	5	PAOZZ	5360-01-013-5502	CCR101-11	79326	SPINRG, VALVE	EA	1
E-4	6	PAOZZ	4930-01-010-6050	CCA101-8	79326	VALVE, SUB-ASSEMBLY	EA	1
E-4	7	APOZZ	5330-00-584-0266	3Y13-10	79326	SEAL	EA	1
E-4	8	XBOZZ		CCA101-01	79326	HOUSING	EA	1
E-4	9	PAOZZ	4730-01-022-3961	CCA101-26	79326	ADAPTER	EA	1
E-4	10	PAOZZ		13219E0499	97403	CAP, DUST ASSEMBLY	EA	1
E-4		PAOZZ	4930-01-021-4737	K30270	79326	KIT, REPAIR PARTS	EA	1
E-1	3					PACKING, PREFORMED	EA	1
E-1	13					PACKING, PREFORMED	EA	1
E-1	14					PACKING, PREFORMED	EA	1
E-1	32					PACKING, PREFORMED	EA	1
E-2	2					ORING	EA	2
E-2	3					STRAINER	EA	1
E-2	6					GASKET	EA	1
E-3	2					ORING	EA	1
E-3	3					STRAINER	EA	1
E-3	6					GASKET	EA	1
E-4	3					SEAL	EA	1



Figure E-5. Special Tools

SECTION III									
(1)	(2)	(3)	(4)	(5)	(6)		(7)	(8)	
ILLUSTRATION								QTY	
(A)	(B)		FEDERAL			DESCRIPTION		INC	
FIG	ITEM	SMR	STOCK	PART				IN	
NO.	NO.	CODE	NUMBER	NUMBER	FSCM		USABLE ON CODE	U/M	UNIT
GROUP 04 SPECIAL TOOLS									
E-5	1	PAOZZ	4940-01-031-9427	WW66	79326	WRENCH, DOG		EA	1
E-5	2	PAOZZ	4940-01-032-5573	WW69	79326	HOLDER PISTON		EA	1



SECTION IV

NATIONAL STOCK NUMBER AND REFERENCE NUMBER				SUPPLIMENTAL INDICES			
STOCK NUMBER	FIGURE NO.	ITEM NO.	STOCK NUMBER	FIGURE NO.	ITEM NO.		
5935-00-007-9202	E-1	44	5365-01-008-5358	E-1	19		
5305-00-082-6721	E-1	21	4930-01-009-3816	E-1	10		
4730-00-088-9285	E-2	5	4730-01-009-3868	E-2	3		
4730-00-088-9285	E-3	5	4730-01-009-3868	E-3	3		
4930-00-117-4726	E-1	7	4930-01-009-4113	E-1	12		
4010-00-222-4494	E-1	3	4930-01-009-4114	E-1	24		
5330-00-263-5173	E-3	2	4930-01-009-5440	E-1	39		
5330-00-265-1095	E-1	32	4930-01-010-0963	E-1	20		
5330-00-291-1295	E-1	14	4930-01-010-0964	E-1	31		
5935-00-503-8979	E-1	41	5999-01-010-1082	E-1	40		
4930-00-516-0839	E-4	1	4730-01-010-1699	E-1	29		
5330-00-584-0266	E-4	7	3120-01-010-3713	E-1	38		
5310-00-612-2414	E-2	6	4930-01-010-6050	E-4	6		
5310-00-612-2414	E-3	6	5360-01-011-7884	E-1	8		
5305-00-701-5228	E-1	15	5330-01-011-9655	E-1	13		
5305-00-764-0068	E-1	33	5999-01-012-3118	E-1	42		
4730-00-915-5127	E-2	7	5360-01-013-3530	E-1	27		
4730-00-915-5127	E-3	7	5360-01-013-5502	E-4	5		
5365-00-928-2562	E-1	26	4930-01-021-4737	E-4			
5360-01-007-6929	E-1	5	4930-01-022-0655	E-1	2		
5360-01-007-6930	E-1	23	4730-01-022-3961	E-4	9		
5360-01-007-6931	E-1	30	4940-01-031-9427	E-5	1		
5360-01-007-6932	E-4	4	4940-01-032-5573	E-5	2		
5360-01-007-6939	E-1	34	5330-01-147-1135	E-1	3		
5330-01-007-6940	E-4	3					
PART NUMBER	FSCM	FIGURE NO.	ITEM NO.	PART NUMBER	FSCM	FIGURE NO.	ITEM NO.
CCA101-01	79326	E-4	8	CCS102/01	79326	E-2	
CCA101/02	79326	E-4	1	CCS102-1	79326	E-2	
CCN101-14	79326	E-1	7	CCS102-15	79326	E-2	1
CCA101-15	79326	E-4	2	CCS102-36	79326	E-2	2
CCA101-26	79326	E-4	9	CCS102-49	79326	E-2	3
CCA101-8	79326	E-4	6	CCS102-49	79326	E-3	3
CCN101-03-0060	79326	E-1	35	DG270-20-6	79326	E-1	11
CCN101-03-0068	79326	E-1	36	GC-003	40342	E-1	40
CCN101-03-026	79326	E-1	45	K30270	79326	E-4	
CCN101-03-028L	79326	E-1	17	MILW83420TYPE1	81349	E-1	43
CCN101-03-028R	79326	E-1	18	MS27026-11	96906	C-2	5
CCN101-03-049	79326	E-1	31	MS27026-11	96906	E-3	5
CCN101-03-099	79326	E-1	1	MS27029-11	96906	E-2	7
CCN101-03-25	79326	E-1	19	MS27029-11	96906	E-3	7
CCN101-03-47	79326	E-1	364	MS27030-6	96906	E-2	6
CCN101-03-69	79326	E-1	37	MS27030-6	96906	E-3	6
CCN101-03-81	79326	E-1	16	MS29513-128	96906	E-1	32
CCN101-045A	79326	E-1	29	MS29513-136	96906	E-1	14
CCN101-063	79326	E-1	28	MS29513-226	96906	E-3	2
CCN101-082	79326	E-1	39	MS3493-1	96906	E-1	44
CCN101-1	79326	E-1	4	MS3493-2	96906	E-1	41
CCN101-11	79326	E-1	30	MS35200-42	96906	E-1	33
CCN101-15A	79326	E-1	22	MS51957-81	96906	E-1	21
CCN101-16	79326	E-1	38	MS51959-79	96906	E-1	15
CCN101-24	79326	E-1	6	UR-1935	79326	E-1	31A
CCN101-27	79326	E-1	20	WS118-2	79326	E-1	2
CCN101-31B	79326	E-1	3	WS5-10L	79326	E-1	10
CCN101-38A	79326	E-1	31B	WW66	79326	E-5	1
CCN101-4	79326	E-1	5	WW69	79326	E-5	2
CCN101-42	79326	E-1	24	X5133-18	79136	E-1	26
CCN101-43	79326	E-1	23	YN35-12-11	79326	E-4	4
CCN101-44	79326	E-1	8	13219E0494	97403	E-1	
CCN101-52	79326	E-1	25	13219E0499	97403	E-4	10
CCN101-58	79326	E-1	9	2A13-133	79326	E-1	13
CCN101-76	79326	E-1	27	201-5-78A	79326	E-1	2
CCR101-11	79326	E-4	5	25CPC4	76545	E-1	42
CS101-02	79326	E-3		3Y13-10	79326	E-4	7
CCS101-1	79326	E-3	4	3Y13-130	79326	E-4	3
CCS101-15	79326	E-3	1	6-32 UNC-1/4LG	79326	E-1	31C



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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 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 = 38.82 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	3.94
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	1,365	metric tons	short tons	1.102
pound-inches	newton-meters	.11375			

## Temperature (Exact)

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



By Order of the Secretary of the Army:

Official:

*BERNARD W. ROGERS*  
*General, United States Army*  
*Chief of Staff*

*J. C. PENNINGTON*  
*Brigadier General, United States Army*  
*The Adjutant General*

**Distribution:**

To be distributed in accordance with DA Form 12-25A, Operator's maintenance requirements for Petroleum Distribution.





# SOMETHING WRONG WITH THIS MANUAL?

THEN... JOT DOWN THE DOPE ABOUT IT ON THIS FORM, TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (YOUR UNIT'S COMPLETE ADDRESS)

PFC JOHN DOE  
CoA, 3<sup>d</sup> ENGINEER BN  
FT. LEONARD WOOD MO 63108

DATE 16 DEC 74

PUBLICATION NUMBER

TM 5-6115-200-20 AND P

DATE

1 APR 72

TITLE

GENERATOR SET 10 KW  
NSN 6115-00-231-7296

BE EXACT... PIN-POINT WHERE IT IS

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PAGE NO.

6

PARA-GRAPH

2-1  
a

FIGURE NO.

4-3

TABLE NO.

In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders.

Callout 16 on figure 4-3 is pointing at a bolt. In the key to fig. 4-3, item 16 is called a shim. Please correct one or the other.

125 line 20

I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. 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 good NSN.

TYPED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

JOHN DOE, PFC (268) 317-7111

SIGN HERE:

John Doe

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TM 5-4930-226-12&P

PUBLICATION DATE

31 Oct 77

PUBLICATION TITLE

Nozzle Assembly

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PAGE  
NO.

PARA-  
GRAPH

FIGURE  
NO.

TABLE  
NO.

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TM 5-4930-226-129P					
LOCATION	QUANTITY	UNIT OF ISSUE	ACTION	RON DATE	
H4544	2	EA		7335	
PKG SIZE	ITEM NO.	BULK/RCPT DATE	SLAGPC CONTROL NO.		
	357044	BLK7335	7336 07255		

ZONE 4

APC FORM 4-26S (10 Sep 86)

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