TECHNICAL MANUAL

OPERATOR'S, UNIT, AND DIRECT

SUPPORT MAINTENANCE MANUAL

INCLUDING REPAIR PARTS AND

SPECIAL TOOLS LIST

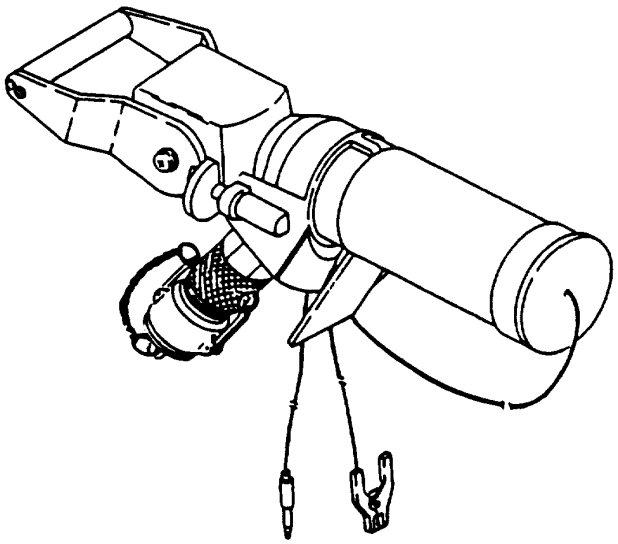
FOR

CLOSED-CIRCUIT REFUELING

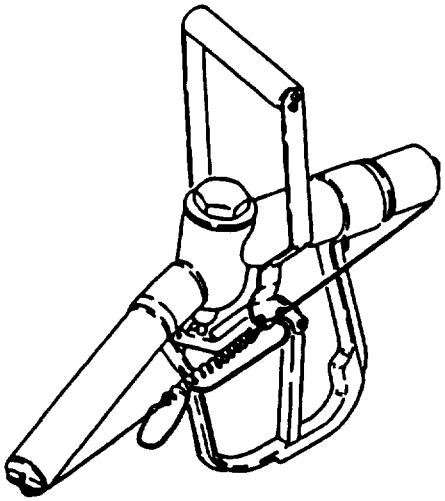
NOZZLE AND GRAVITY

FILL ADAPTER,

ARCTIC SERVICE



CLOSED-CIRCUIT
REFUELING NOZZLE
Model Number 64017Z
NSN: 4930-01-370-3061



GRAVITY FILL ADAPTER
Model Number 64033
NSN: 4930-01-376-7725

HEADQUARTERS, DEPARTMENT OF THE ARMY
31 MARCH 1996

WARNINGS

DEATH or serious injury may result if personnel fail to observe safety precautions.

FLAMMABLE FUEL

Fuels are toxic and flammable. Wear protective goggles and refuel only in well-ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. If you become dizzy, get fresh air immediately, flush with clean water and get medical aid for eyes immediately.

BEFORE OPERATION be certain nozzle is secure to avoid spillage of fuel. Do not allow any smoking within 100 feet of the fuel servicing areas. Post NO SMOKING signs around the areas. Be certain a suitable fire extinguisher is present.

DURING OPERATION avoid spillage of fuel as much as possible. If spillage of fuel occurs, cover the areas with dry soil to reduce its rate of vaporization. Avoid getting fuel on the body or clothing. If clothing becomes saturated with fuel, remove the clothing immediately and wash the body with hot soapy water. Do not allow smoking within 100 feet of the dispensing area. Post NO SMOKING signs around the areas. Be certain the nozzle is properly bonded to the vehicle being filled. The vehicle being filled and the dispensing pump must be grounded. Be certain a suitable fire extinguisher is present and has been properly filled. Never dispense fuel to a vehicle while its engine is operating.

FROSTBITE

Do not touch cold metal parts with bare hands when operating under extreme cold conditions. Frostbite can cause permanent injury.

SOLVENT HAZARD

Dry cleaning solvent, AA 711, Types I and II, used to clean parts, is potentially dangerous to personnel and property. Eye protection required. Avoid repeated and prolonged skin contact by wearing rubber or nonporous gloves when handling solvents or material wet with dry cleaning solvent. Wash hands immediately after exposure with soap and water and use a lanolin based skin cream to prevent skin drying. Do not use near open flame or excessive heat. Flash point of solvent is 138°F. Do not work with solvent in a closed room. Be sure there is good ventilation or the solvent vapors will build up in the air and become a poisonous mixture which can cause physical injury or even death.

FIRST AID instructions are given in FM 21-11, First Aid For Soldiers.

WARNINGS-(continued)

STATIC DISCHARGE

A static discharge between the vehicle and CCR Nozzle could ignite the fuel or cause an explosion of fuel vapors. Do not operate the nozzle until it has first been properly grounded to vehicle.

ARCING

Radio transmitters can cause an arc at antennas. Do Not ground nozzle to a radio antenna.

FUEL SPILLAGE ON PERSONNEL

Fuels are toxic and flammable. Avoid getting fuel on your body or clothing. If clothing becomes saturated with fuel remove clothing immediately and wash your body with hot soapy water.

TECHNICAL MANUAL
NO. 10-4930-243-13&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C. 31 March 1996

OPERATOR'S, UNIT AND DIRECT SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST FOR CLOSED CIRCUIT REFUELING NOZZLE AND GRAVITY FILL ADAPTER, ARCTIC SERVICE

CLOSED-CIRCUIT REFUELING NOZZLE
Model Number 64017Z
NSN 4930-01-370-3061
and
GRAVITY FILL ADAPTER
Model Number 64033
NSN 4930-01-376-7725

(Current as of 3 October 1995)

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 these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, US Army Aviation and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. You may also submit your recommended changes by E-mail directly to <mpmt%avma28@st-louis-emh7.army.mil>. A reply will be furnished directly to you.

Distribution Statement A: Approved for public release; distribution is unlimited.

TABLE OF CONTENTS

TABLE OF CONTENTS-continued

HOW TO USE THIS MANUAL

Be sure to read all Warnings before using your equipment.

This manual contains instructions for operation and maintenance of the Closed-Circuit Refueling (CCR) Nozzle and Gravity Fill Adapter.

MANUAL OVERVIEW

a. Index Tabs.

Notice the front cover index of this manual. It lists the most important areas of the manual and guides you to those sections. Follow the black mark on the cover index edge through the pages to the edge mark on the section you want The subjects on the front cover index are also highlighted in the table of contents by boxes. A detailed alphabetical index is located at the back of this manual.

b. Contents.

The following gives you a summary of each chapter and appendix. Before beginning a maintenance task, you must familiarize yourself with the entire procedure.

- Chapter 1-Introduces you to the equipment and gives you information such as weight, dimensions, abbreviations used and information on how the unit works.
- Chapter 2-Provides information necessary to identify and use the equipment. Operating instructions in this chapter tell you how to use the equipment in both usual and unusual weather conditions.
- Chapter 3-Provides operator troubleshooting procedures for identifying equipment malfunctions and maintenance procedures for performing operator maintenance tasks.
- Chapter 4-Provides unit maintenance personnel with troubleshooting procedures for identifying equipment malfunctions and maintenance procedures for repairing defective equipment
- Chapter 5-Provides direct support maintenance personnel with maintenance instructions for performing repairs on equipment as authorized by the maintenance allocation chart
- Appendix A-Provides a list of frequently used forms and publications referenced or used in this manual.
- Appendix B-The Maintenance Allocation Chart identifies repairable components and the maintenance level authorized to perform the repairs.
- Appendix C-If you find that a part or component is damaged and must be replaced, you can identify the part needed by referring to the illustrations and parts lists found in this Repair Parts and Special Tools List.
- Appendix D-Lists components that are not mounted on the equipment, but are required to make the unit functional.

HOW TO USE THIS MANUAL
continued

- Appendix E-Lists additional equipment authorized for your unit for use with the CCR nozzle, but which are not supplied with the CCR nozzle.
- Appendix F-Provides you with information about expendable supplies such as sealants, lubricants, chemicals, etc., that are used when operating or maintaining equipment.
- Appendix G-Provides Illustrated List of Manufactured Items.
- Appendix H-Mandatory Replacement Parts.
- Glossary.
- Alphabetical Index.

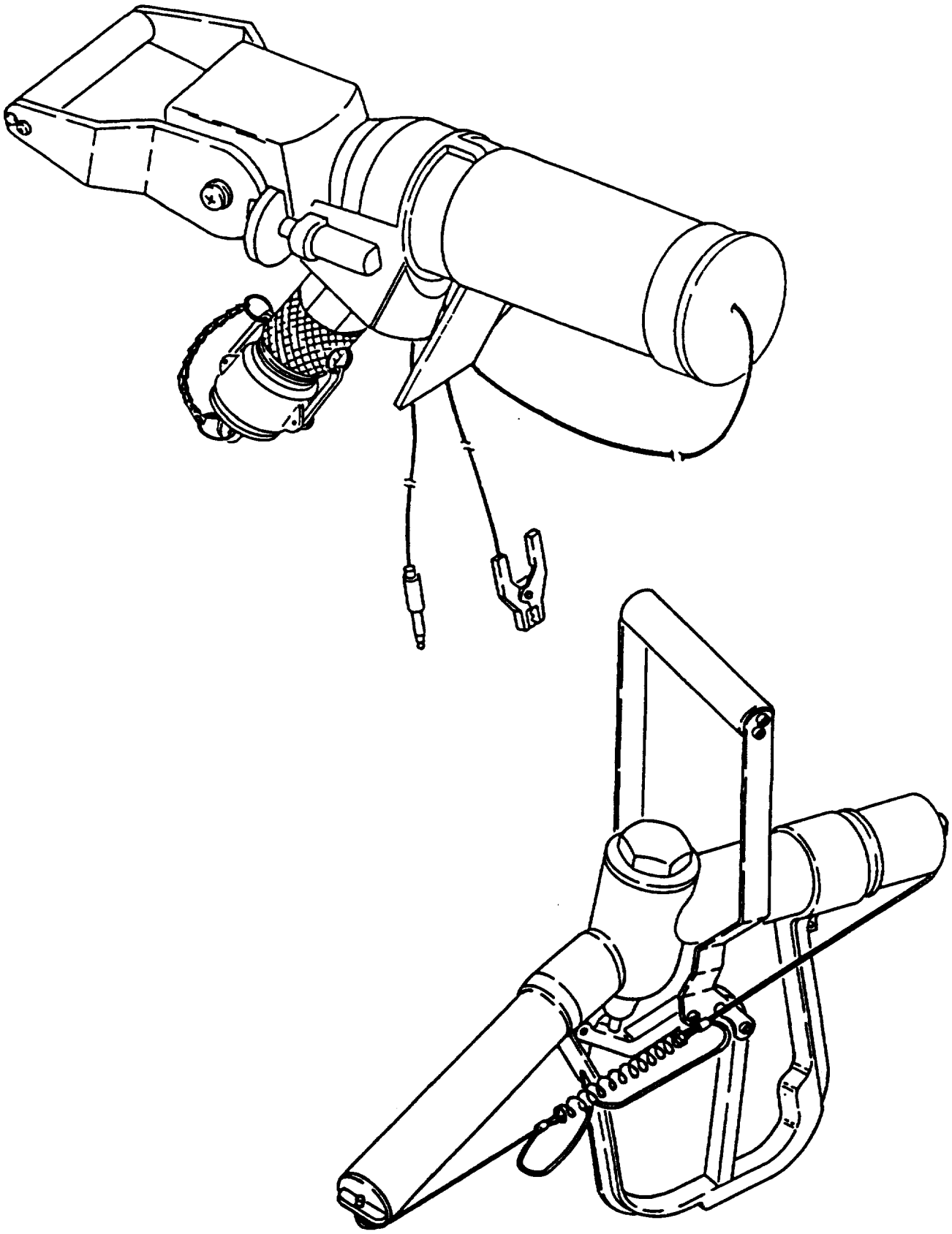


Figure 1-0. Closed-Circuit Refueling Nozzle and Gravity Fill Adapter

CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE.

This manual is for use by personnel responsible for the operation and maintenance of the Arctic CCR Nozzle and Gravity Fill Adapter.

a. Type of Manual. Operator's, Unit and Direct Support Maintenance.

b. Model Number and Equipment Name. Model #64017Z Closed-Circuit Refueling Nozzle and Model #64033 Gravity Fill Adapter, Arctic Service.

c. Purpose of Equipment. To mate with adapters conforming to MIL-N-53093 or equivalent and permit fuel servicing in arctic conditions by one person wearing arctic mittens. The nozzle can be adapted to perform conventional gravity fill dispensing by attaching an adapter nozzle conforming to MIL-N-53043.

1-2. MAINTENANCE FORMS, RECORDS AND REPORTS.

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, The Army Maintenance Management Systems (TAMMS).

1-3. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

Instructions for destruction of the equipment to prevent enemy use are in TM 750-244-3.

1-4. CORROSION PREVENTION AND CONTROL (CPC).

a. Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements made to prevent the problem in future items.

b. While corrosion is typically associated with rusting of metals. it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling or breaking of the materials may be a corrosion problem.

c. If a corrosion problem is identified, it can be reported using Standard Form 368, Product Quality Deficiency Report. Using key words such as "rust", "deterioration", or "cracking" will ensure that the information is identified as a CPC problem. The form should be submitted to the address specified in DA PAM 738-750.

1-5. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs).

If your CCR nozzle or Gravity Fill Adapter needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to us at: Commander, U.S. Army Aviation and Troop Command, ATTN: AMSAT-MDO, 4300 Goodfellow Boulevard, St. Louis. MO 63120-1798. We will send you a reply.

1-6. NOMENCLATURE CROSS REFERENCE LIST.

Common Name	Official Nomenclature
CCR Nozzle	Nozzle Assembly, Closed-Circuit Refueling Arctic Service
GFA	Adapter. Closed-Circuit to Gravity Fill Arctic Service

Section II. EQUIPMENT DESCRIPTION AND DATA

1-7. EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES.

a. Characteristics.

(1) Two-position flow control handle.

(2) Nozzle locks onto vehicle adapter.

(3) Indicator shows when flow stopped.

(4) Adapts for gravity fill dispensing.

b. Capabilities and Features.

(1) Regulates delivery pressure.

(2) Fuel strainer provided.

(3) Control handle latches in closed position.

(4) Grounding cable assembly provided.

(5) Automatic fuel shutoff when removed from vehicle adapter.

(6) Dust cap and plug provided for inlet and outlet.

(7) Gravity fill adapter attaches to CCR Nozzle.

1-8. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

a. Nozzle Housing. The Nozzle housing (1) contains the poppet assembly and pressure regulator.

b. Nozzle Collar. The nozzle collar (2) mates with the vehicle receptacle. The locking lugs are housed and actuated by the collar.

c. Handle Assembly. The handle assembly (3) allows for manual ON/OFF control of the flow rate either no flow or full flow.

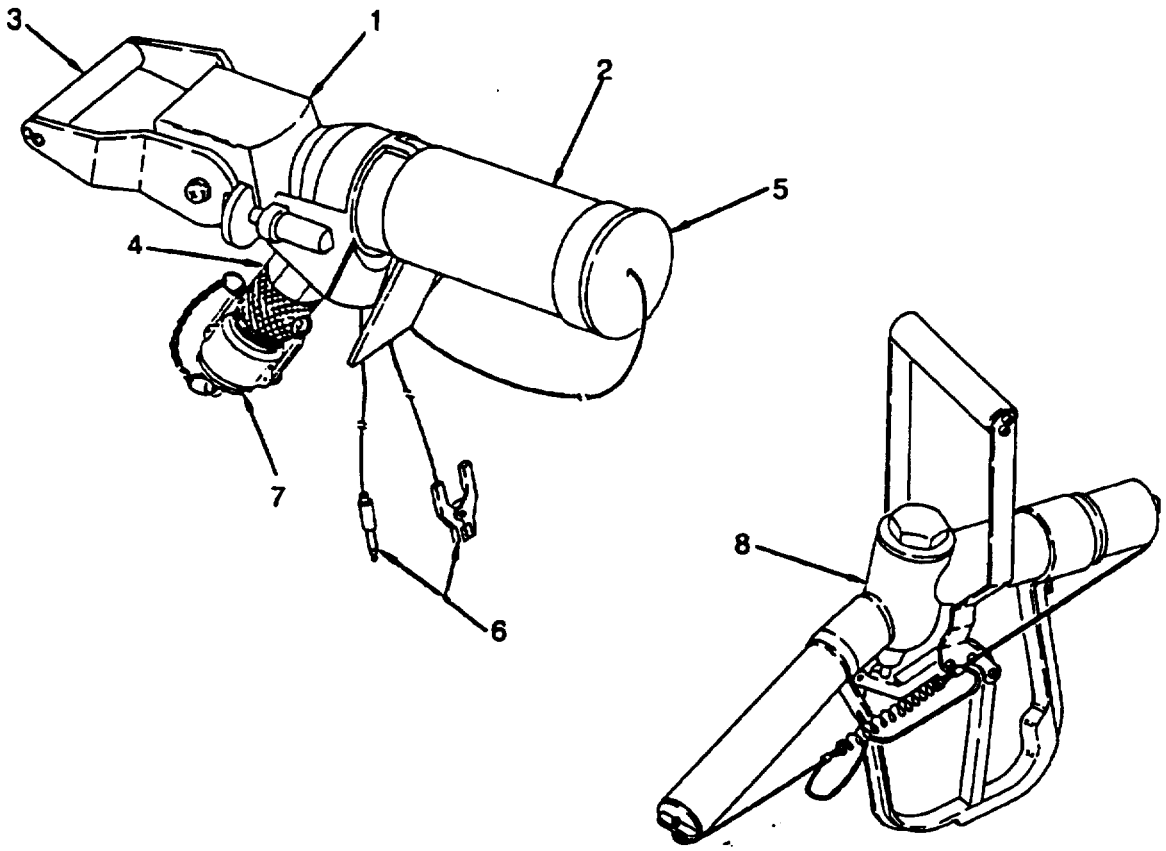
d. Strainer Housing. The strainer housing (4) houses the fuel strainer.

e. Cover. A cover (5) is furnished to cover the nozzle outlet when not connected to a system for servicing.

f. Ground Cable. A ground cable (6) is provided for grounding to the vehicle prior to connection. A ground plug is provided for inserting into the vehicle ground receptacle. A clip-type connector is used where a ground plug receptacle is not available.

g. Coupling Assembly. The coupling assembly (7) allows the nozzle assembly to be connected and disconnected from a fuel servicing source.

h. Gravity Fill Adapter. The gravity fill adapter (8) is attached to the discharge end of the CCR nozzle for servicing vehicles not equipped with CCR adapters.



1-9. EQUIPMENT DATA.

GENERAL

a. CCR Arctic Nozzle

Type:	MIL-N-53094(ME)	Standard Service, with 2 inch quick-disconnect coupler.
Weight:	8 lb (3.7 kg) Maximum	

Dimensions: 21 inches L, 6 inches W, 9 inches H; not including Strainer Assembly and Coupling.

Nozzle Disengagement Force: 10 to 32 lb

b. Gravity Fill Adapter

Type:	MIL-N-53093
Weight:	4.3 lb
Dimensions:	18 inches L,6 inches W, 16 inches H.

Environmental Conditions: CCR Arctic Nozzle and Gravity Fill Adapter.

- Operating Temperature Range: -25°F to +95°F.

Section III. PRINCIPLES OF OPERATION

1-10. SYSTEM TECHNICAL PRINCIPLES OF OPERATION.

The CCR nozzle delivers pressure-regulated fuel to the closed-circuit adapter, the collar moves forward, locking the nozzle in place. The vehicle adapter contains an orifice sized to provide a predetermined fuel flow rate.

In addition to regulating fuel delivery pressure, the CCR nozzle serves as a fuel on-off valve. The valve is operated manually to either the closed or the flow (open) position. The internal poppet is then seated closed, shutting off flow.

Fuel flow is initiated by pushing forward on the handle latch, releasing the handle, then moving the handle up to the flow position. This unlocks the internal valve poppet and diaphragm allowing the fuel regulator to start fuel flow.

The fuel supply pressure exerts a force on the diaphragm assembly at the back of the poppet. This force is balanced by a calibrated regulator spring to maintain a valve opening which provides a nominal discharge pressure of 15 psig from the nozzle.

The nozzle flow indicator, attached to the back end of the poppet, provides a red indicator when the nozzle valve is closed. This indicator is visible to the operator at the center of the end cover.

When the refueled tank is filled, back pressure closes the nozzle poppet and flow ceases. When the nozzle handle is returned to the closed position, the handle latch locks the handle in the closed position. The nozzle is removed from the adapter by pulling the collar away. Before removal from the vehicle adapter, the nozzle handle should be returned to the closed position If, in an emergency situation, the nozzle is not returned to the closed position before removal, the dry quick-disconnect action of the nozzle will close its internal valve automatically.

When servicing a vehicle not equipped with a CCR adapter, the gravity fill adapter is attached to the discharge end of the CCR Nozzle. After attaching the adapter nozzle, the CCR Nozzle handle is moved to the open position. The gravity fill adapter discharge end is inserted into the vehicle and the handle is moved forward to start the fuel flow. Releasing the handle will stop the fuel flow.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2-1. INTRODUCTION.

This section describes the controls and indicators you, as the operator, will be using most often. The following paragraphs will give you a brief description of each control and indicator.

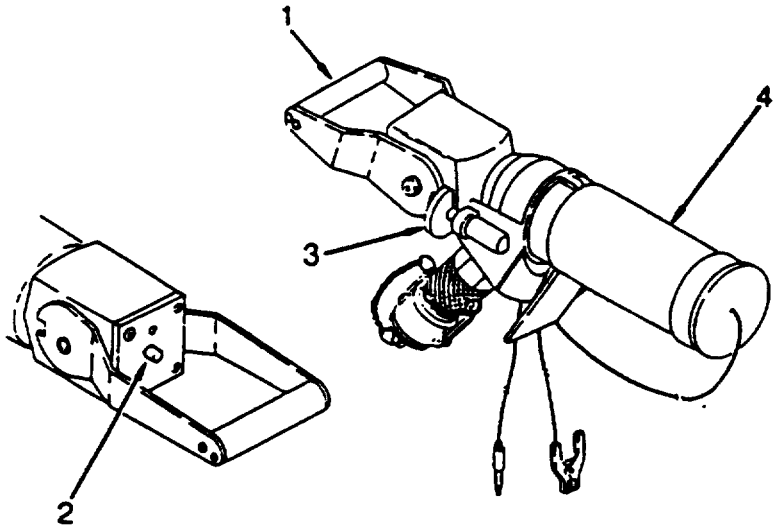
2-2. LOCATION AND USE OF CONTROL AND INDICATORS.

a. Handle (1)-Opens or closes the nozzle flow control valve. Handle shown in the closed position.

b. Flow Indicator (2)-When visible, red indicator shows that nozzle discharge flow is stopped.

c. Latch (3)-Holds nozzle handle in closed position. Latch must be pressed to release for changing position.

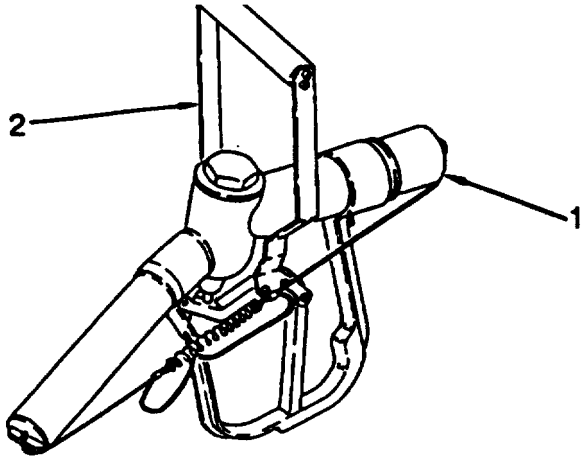
d. Quick-disconnect automatic shutoff coupler (4) connects to vehicle fuel servicing adapter.



2-3. ADAPTER, GRAVITY FILL NOZZLE.

a. Adapter (1)-Connects to discharge end of CCR Nozzle.

b. Handle (2)-Permits operator to wear arctic mittens while opening nozzle valve during gravity fill operations.



Section II. OPERATOR'S PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-4. GENERAL.

Preventive Maintenance Checks and Services (PMCS) means systematic caring, inspecting, and servicing of equipment to keep it in good condition and to prevent breakdowns. As the equipment operator, your mission is to:

a. Be sure to perform your PMCS each time you operate the equipment. Always do your PMCS in the same order, so it gets to be a habit. Once you've had some practice, you'll quickly spot anything wrong.

b. Do your BEFORE (B) PMCS just before you operate the equipment. Pay attention to WARNINGs, CAUTIONs, and NOTEs.

c. Do your DURING (D) PMCS while you operate the equipment. During operation means to monitor the equipment and its related components while it is actually being operated. Pay attention to WARNINGs, CAUTIONs, and NOTEs.

d. Do your AFTER (A) PMCS right after operating the equipment. Pay attention to WARNINGs, CAUTIONs, and NOTEs.

e. Do your WEEKLY (W) PMCS once a week.

f. Do your MONTHLY (M) PMCS once a month.

g. Use DA Form 2404 (Equipment Inspection and Maintenance Worksheet) to record any faults that you discover before, during, or after operation, unless you can fix them. You DO NOT need to record faults that you fix.

h. Be prepared to assist organizational maintenance when they lubricate the equipment. Perform any other services when required by organizational maintenance.

2-5. PMCS PROCEDURES.

a. Your Preventive Maintenance Checks and Services, Table 2-1, lists inspections and care required to keep your equipment in good operating condition. It is set up so you can make your BEFORE (B) OPERATION checks as you walk around the equipment. The "ITEM" column of Table 2-1 relates to the call outs on illustrations and is a numeric listing of the sequence in which the services and inspections are performed.

b. The "INTERVAL" column of Table 2-1 tells you when to do a certain check or service.

c. The "PROCEDURE" column of Table 2-1 tells you how to do required checks and services. Carefully follow these instructions. If you do not have tools, or if the procedure tells you to, notify your supervisor.

2-5. PMCS PROCEDURES- continued.

NOTE

Terms "ready/available" and "mission capable" refer to same status: Equipment is on hand and ready to perform its combat missions. (See DA Pam 738-750).

d. The "EQUIPMENT IS NOT READY/AVAILABLE IF:" column in Table 2-1 tells you when your equipment is non mission capable and why the equipment cannot be used.

e. If the equipment does not perform as required, refer to Chapter 3, Section II, Troubleshooting.

f. If anything looks wrong and you can't fix it, write it on your DA Form 2404. IMMEDIATELY, report it to your supervisor.

g. When you do your PMCS, you will always need a rag or two. Following are checks that are common to the entire nozzle:

(1) Keep It Clean. Dirt, grease, oil, and debris only get in the way and may cover up a serious problem. Clean as you work and as needed. Use dry cleaning solvent (AA-711) on all metal surfaces. Use soap and water when you clean rubber or plastic material.

(2) Rust and Corrosion. Check equipment for rust and corrosion. If any bare metal or corrosion exists, clean, and apply a thin coat of oil. Report it to your supervisor.

(3) Bolts, Nuts, and Screws. Check them all for obvious looseness, missing, bent, or broken condition. You can't try them all with a tool, but look for chipped paint, bare metal, or rust around bolt heads. If you find a bolt, nut or screw you think is loose, tighten it or report it to your supervisor.

(4) Welds. Look for loose or chipped paint, rust, or gaps where parts are welded together. If you find a bad weld, report it to your supervisor.

(5) Electric Wires and Connectors. Look for cracked, frayed, or broken insulation bare wires, and loose or broken connectors. Tighten loose connectors. Report any damaged wires to your supervisor.

(6) Hoses and Fluid Lines. Look for wear, damage, and leaks, and make sure clamps and fittings are tight. Wet spots show leaks, but a stain around a fitting or connector can also mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, report it to your supervisor.

h. When you check for "operating condition", you look at the component to see if it's serviceable.

2-6. CLEANING AGENTS.

WARNINGS

- DO NOT use diesel fuel, gasoline, or genzene (benzol) for cleaning.
- DO NOT SMOKE when using cleaning solvent NEVER USE IT NEAR AN OPEN FLAME. Be sure there is a fire extinguisher nearby and use cleaning solvent only in well-ventilated places. Flash point of solvent is 138°F (60°C).
- USE CAUTION when using cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if solvents contact skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.

Cleaning Rust or Grease. When cleaning grease buildup or rusty places, use a cleaning solvent. Then apply a thin coat of light oil to affected area

2-7. LEAKAGE DEFINITIONS FOR OPERATOR PMCS.

It is necessary for you to know how fluid leakage affects the status of the equipment. Following are types/classes of leakage an operator needs to know to be able to determine the status of the equipment. Learn these leakage definitions and remember-when in doubt, notify your supervisor.

WARNINGS

- Equipment not mission capable if leaks are found.
- Leaks should be reported immediately to your supervisor

a. CLASS I-Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

b. CLASS II-Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked/inspected.

c. CLASS III -Leakage of fluid great enough to form drops that fall from item being checked/inspected.

2-8. EXPLANATION OF TABLE.

Table 2-1 contains a tabulated listing of preventive maintenance checks and services which must be performed by the operator.

Table 2-1. Operator's 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**

ITEM NO.	INTERVAL	LOCATION ITEM TO BE INSPECTED	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
		CL0SED-CIRCUIT REFUELING NOZZLE		
1	Before	Locking Lugs and Stay back Lugs	Remove dust cover. Inspect for missing or damaged lugs. There should be three stay back lugs and nine locking lugs.	Lugs missing or damaged.
2	Before	Nozzle Housing	Inspect for leaks.	Any leak found
3	Before	Handle	Inspect handle action to see that it operates smoothly.	Fails to operate smoothly.
4	Before	Cable Assembly	Inspect cable for loose connection, frayed or damaged cables' bent or damaged plug or clip.	Damaged or frayed cables. Bent or damaged plug or clip.
5	Before	Cap Assembly	Inspect cap assembly cap for cracks, burrs or damage. Inspect cable for breaks, frays and security.	
6	Before	Coupling Assembly	Inspect coupling for leaks.	Any leak found.
7	During	Nozzle Housing	Inspect for leaks.	Any leak found.
8	During	Handle	Inspect handle action to see that it operates smoothly and fuel flows when in the open position.	Fails to operate smoothly or fuel does not flow in open position.
		ADAPTER, GRAVITY ASSEMBLY		
9	During	Gravity Fill Adapter	Inspect Adapter for leaks.	Any leak found

Table 2-1. Operator's Preventive Maintenance Checks and Services.

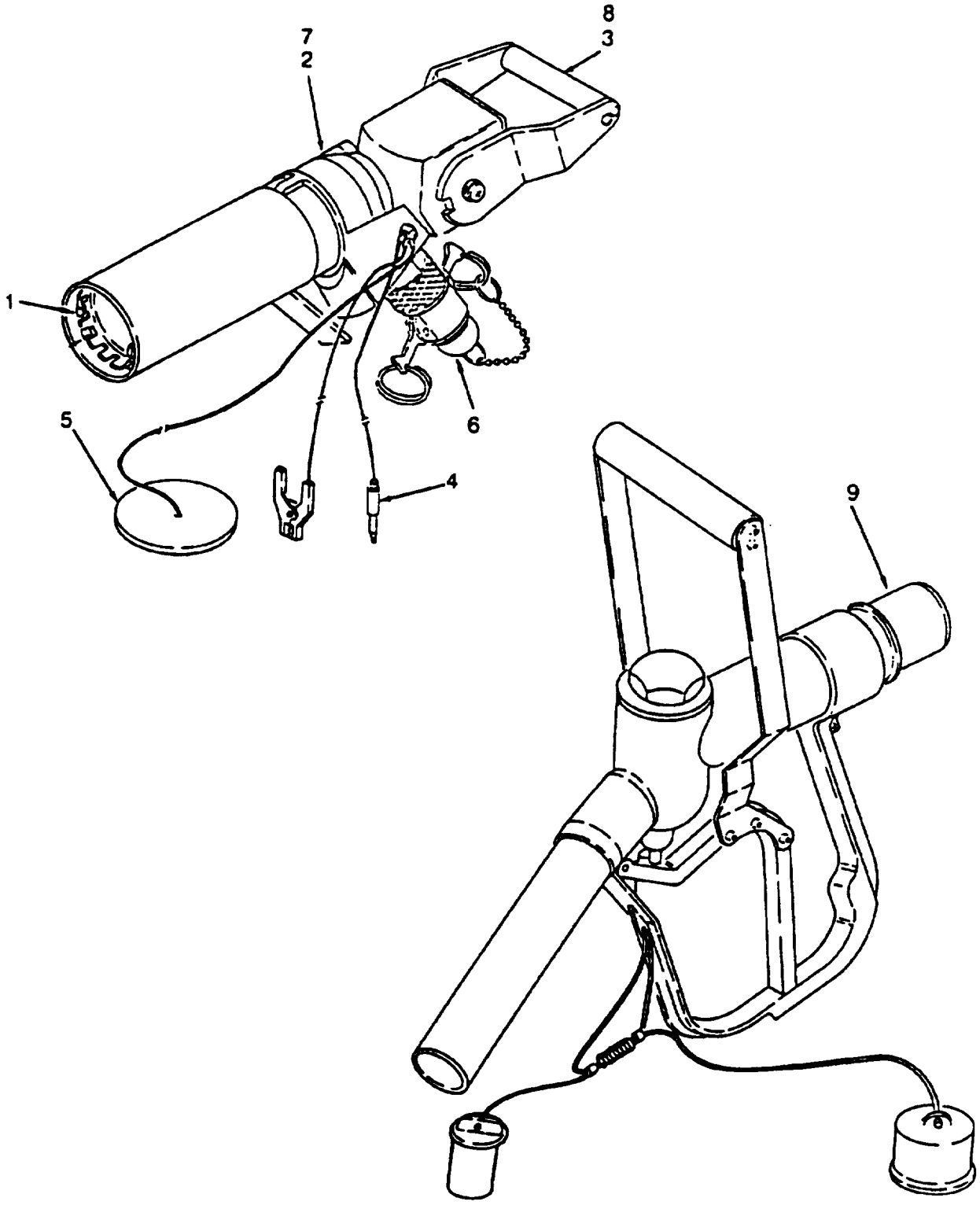


Figure 2-1. Operator PMCS Items.

Table 2-1. Operator's Preventive Maintenance Checks and Services-continued.
B - Before D - During A - After

ITEM NO	INTERVAL	LOCATION ITEM TO CHECK/SERVICE	PROCEDURES	NOT FULLY MISSION CAPABLE IF:
10	During	Gravity Fill Adapter **CLOSED-CIRCUIT REFUELING NOZZLE**	Inspect adapter for leaks, handle for smooth movement and that handle returns to rear when released.	Any leak found. Handle fails to operate smoothly' fails to return to rear when released.
11	After	Locking lugs and stay back lugs	Inspect for missing or damaged lugs. There should be three stay back lugs and nine locking lugs.	Lugs missing or damaged.
12	After	Nozzle Housing	Inspection for leaks.	Any leak found.
13	After	Cable Assembly	Inspect cable for loose connection frayed or damaged cables, bent or damaged plug or clip.	Damaged or frayed cables. Bent or damaged plug or clip.
14	After	Cap Assembly	Inspect cap assembly cap for cracks. burrs or damage. Inspect cable for breaks, frays and security.	Cap cracked or cable broken.
15	After	Coupling Assembly **ADAPTER, GRAVITY FILL ASSEMBLY**	Inspect coupling for leaks.	Any leak found.
16	After	Gravity Fill Adapter, Dust Cap	Inspect for cracks or damage. Inspect cables for fraying or damage and security and spring for damage.	Caps cracked, broken cables or springs.
17	After	Gravity Fill Adapter	Inspect GFA for leaks, handle for smooth movement and that handle returns to rear when released.	Any leak found. Handle fails to operate smoothly, fails to return to rear when released.

Table 2-1. Operator's Preventive Maintenance Checks and Services-continued.

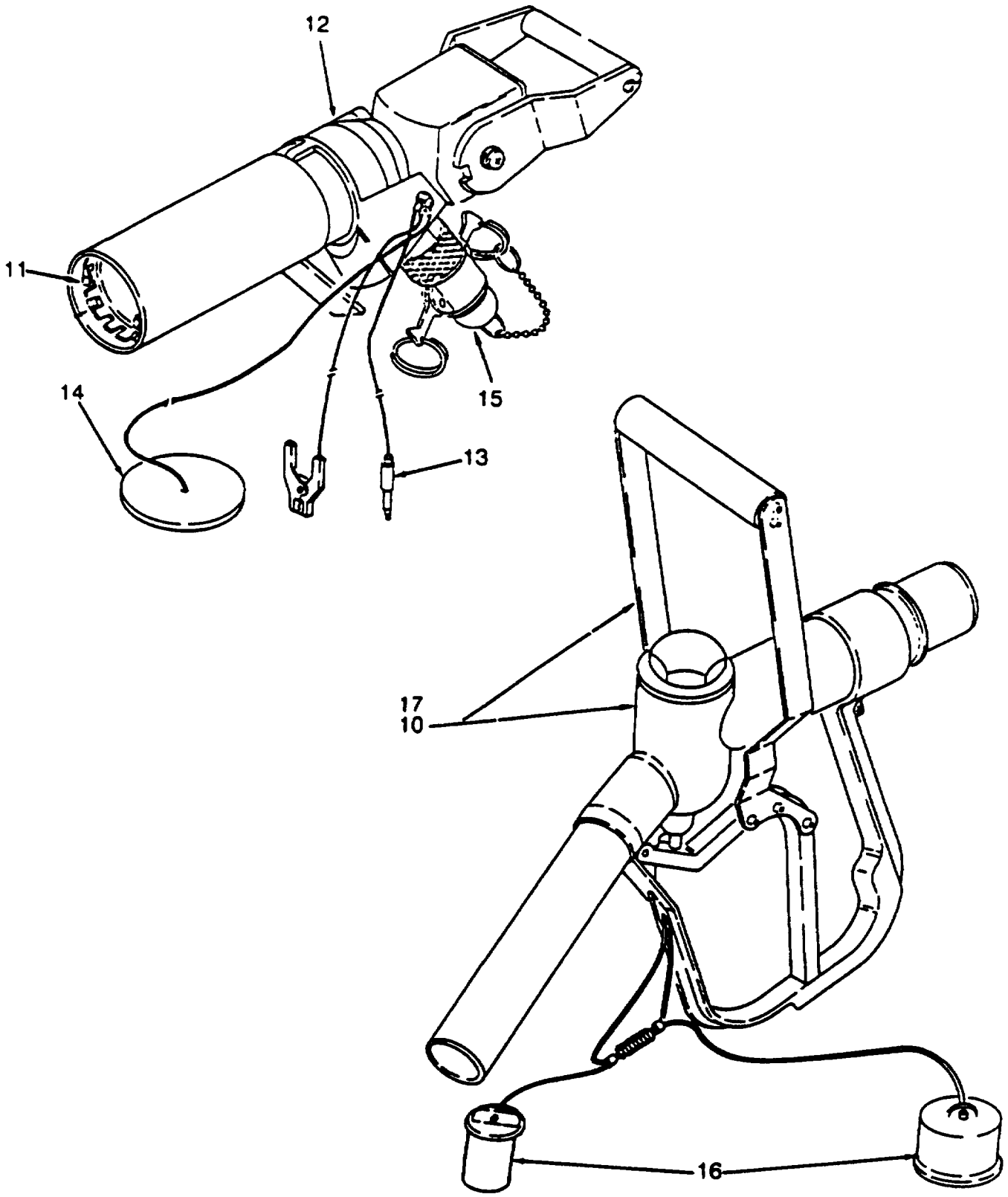


Figure 2-1. Operator PMCS Items.

Section III. OPERATION UNDER USUAL CONDITIONS.

2-9. ASSEMBLY AND PREPARATION FOR USE.

a. CCR Nozzle without adapter.

(1) Position the nozzle handle in the closed (back) position.

(2) Remove the dust cover from the CCR nozzle fuel inlet coupler. Connect the coupler to the fuel supply hose.

(3) Pull the nozzle collar back and remove the discharge end dust cap before using to dispense fuel.

b. CCR Nozzle with gravity fill adapter.

(1) Prepare the CCR Nozzle as per steps a(1), (2), and (3).

(2) Remove the dust cap and plug from the adapter.

(3) Insert the adapter inlet end into the CCR nozzle outlet end until a positive connection is indicated by the collar move forward with an audible click.

2-10. OPERATING PROCEDURES.

a. Operating the CCR nozzle without the GFA. (Refer to Figure 2-1)

(1) Pull collar (1) back and remove dust cap (2).

WARNINGS

- A static discharge between the vehicle and CCR nozzle could ignite the fuel or cause an explosion of fuel vapor. Do not operate the nozzle until it has first been properly grounded to the vehicle.
- Radio transmitters can cause an arc at antennas. Do not ground nozzle to a radio antenna.

NOTE

Additional information on grounding may be obtained from TM 10-68, Aircraft Refueling.

(2) Insert ground plug (3) of nozzle into vehicle grounding jack, or attach nozzle grounding clamp (4) to unpainted metal on the vehicle.

(3) Connect the CCR nozzle (5) to the vehicle fuel servicing adapter and push until seated. A positive connection is indicated by the collar (1) moving forward with an audible click.

(4) Push the latch (6) on the right side of the nozzle forward to release the handle (7), and move the handle to the up (open) position to dispense fuel.

2-10. OPERATING PROCEDURES - continued.

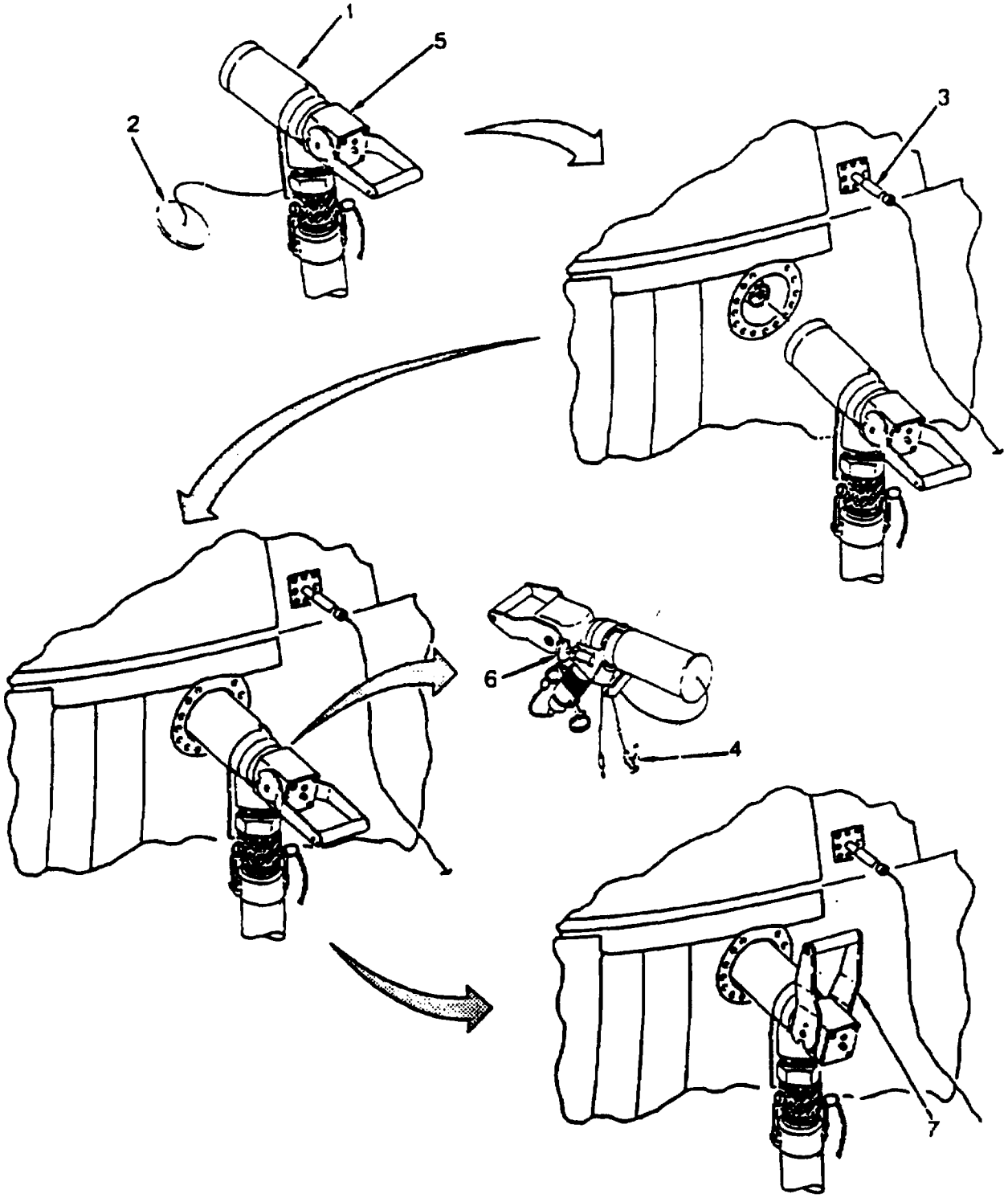


Figure 2-1. Operating Procedures for the CCR Nozzle

2-10. OPERATING PROCEDURES-continued.

NOTE

When fuel flow is stopped, the red end of the position indicator should be visible at the center of the nozzle end.

(5) When refueling is completed, move the handle to the downward (closed) position.

(6) Pull the nozzle collar away from the vehicle fuel servicing adapter to remove the nozzle.

(7) Disconnect ground cable and replace the dust cap on the nozzle.

b. Operating the CCR nozzle with gravity fill adapter (GFA) attached. (Refer to Figure 2-2)

WARNINGS

- Radio transmitters can cause an arc at antennas. Do not ground nozzle to a radio antenna
- A static discharge between the vehicle and CCR nozzle could ignite the fuel or cause an explosion of fuel vapor. Do not operate the nozzle until it has first been properly grounded to the vehicle.

NOTE

Additional information on grounding may be obtained from TM 10-68, Aircraft Refueling.

(1) Insert ground plug (1) of CCR nozzle (2) into vehicle grounding jack, or attach nozzle grounding clamp (3) to unpainted metal or vehicle.

CAUTION

Do not allow full weight of nozzle assemblies to rest on open port refueling receptacle.

(2) Insert GFA (4) into vehicle fuel tank opening.

(3) Push the latch (5) on the right side of CCR nozzle forward to release the handle (6), and move the handle to the upward (open) position.

(4) Move the handle (7) on the GFA forward to start dispensing fuel.

(5) When fueling is completed, move the GFA handle to the rear (closed) position.

(6) Move the CCR Nozzle handle downward to the closed position.

(7) Remove GFA from the vehicle and disconnect ground cable.

(8) Place the dust cap on the GFA (not shown)

2-10. OPERATING PROCEDURES-continued.

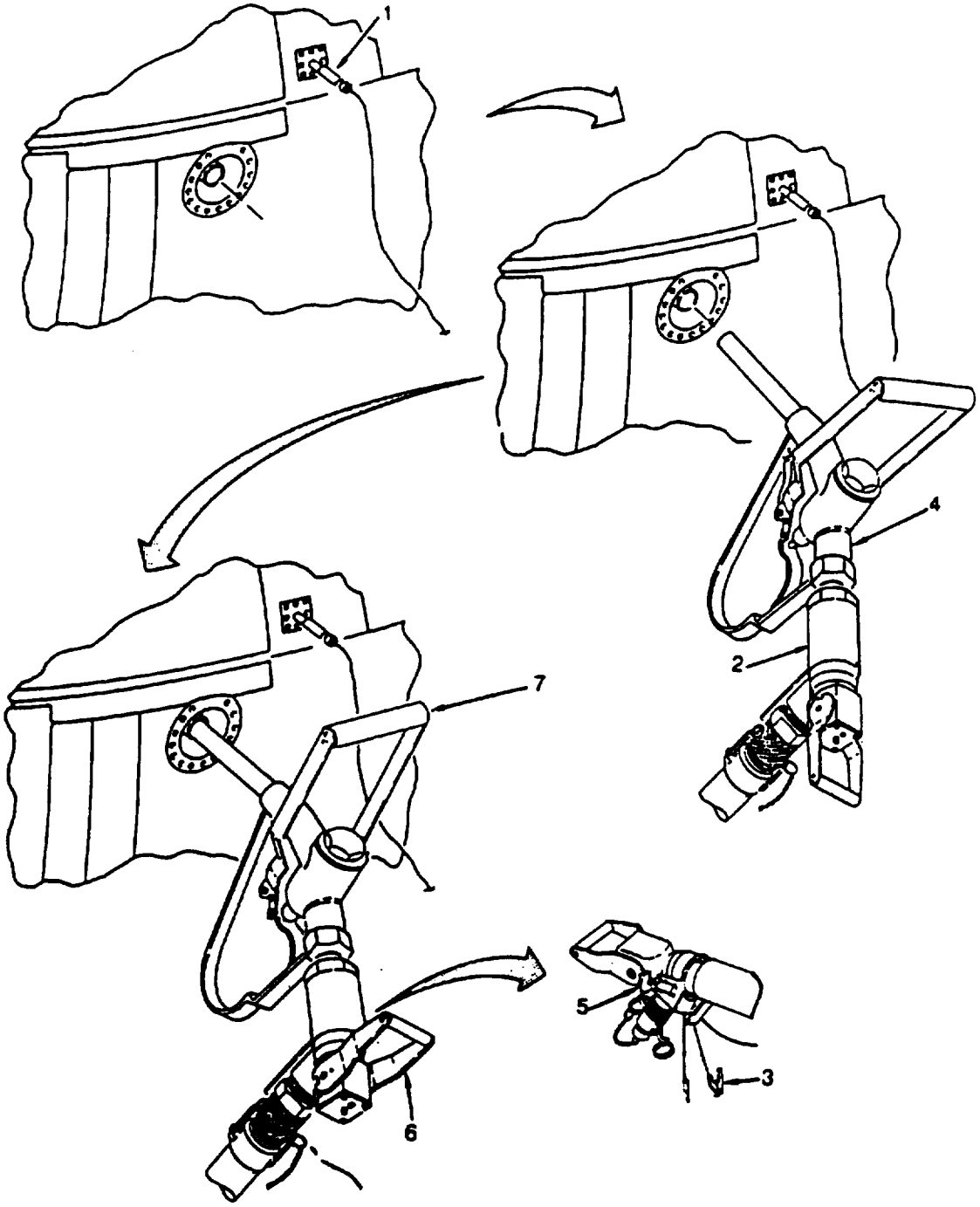
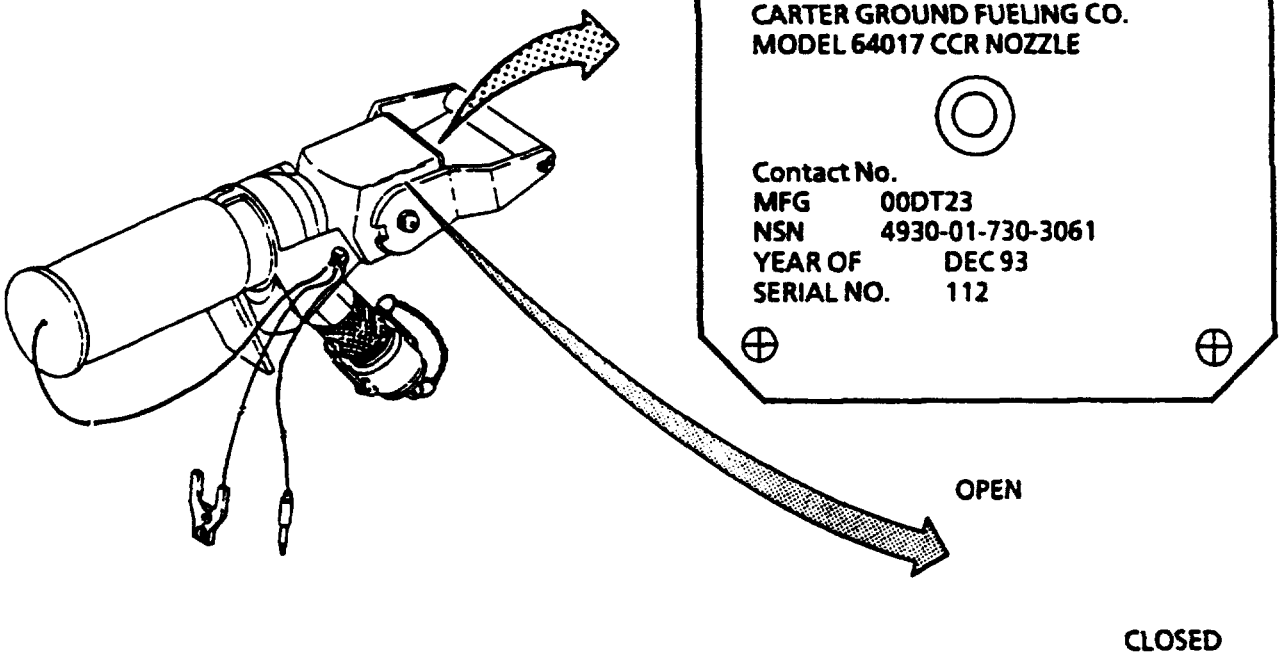


Figure 2-2. Operating Procedures for the Gravity Fill Adapter.

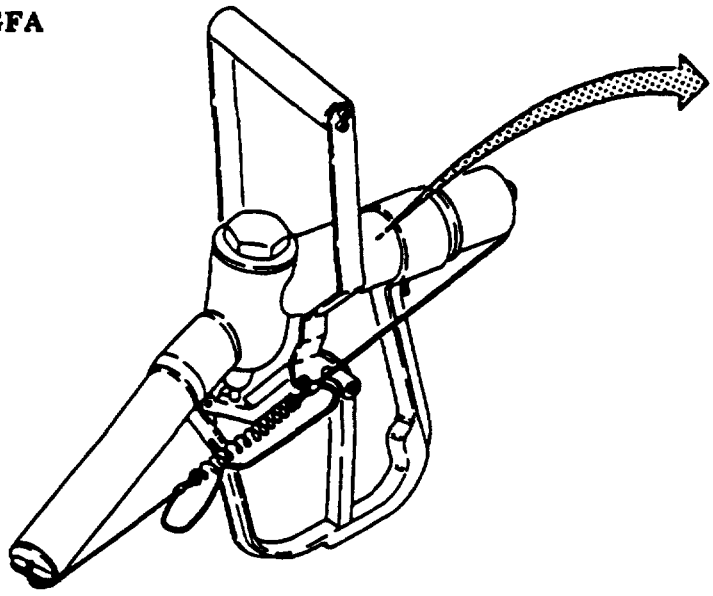
2-11. DECALS AND INSTRUCTION PLATES.

Decals and Instruction plates used on the CCR nozzle and GFA are shown below.

CCR NOZZLE



GFA



Section IV. OPERATION UNDER UNUSUAL CONDITIONS.

2-12. UNUSUAL ENVIRONMENTAL/WEATHER.

a. Operating the CCR Nozzle and Adapter In Extreme Cold Conditions. Observe the following precautions when operating the CCR Nozzle in extreme cold conditions.

WARNING

Do not touch cold metal parts with bare hands when operating under extreme cold conditions. Frostbite can cause permanent injury.

(1) Always wear arctic mittens when handling nozzle and other equipment.

(2) Be careful when handling nozzle and hose assembly to avoid cracking hose.

CAUTION

Accumulated ice and snow can cause damage to the nozzle assembly.

(3) Remove snow, sleet or ice from nozzle before refueling.

(4) Always keep cap on the CCR nozzle and adapter when not in use.

(5) Perform operating procedure according to paragraph 2-10.

b. Operating the CCR Nozzle and Adapter in Strong Winds and Sandy or Dusty Conditions.

(1) Strong Winds.

(a) Should not affect the performance or handling of the nozzle.

(b) Perform operating procedures according to paragraph 2-10.

(2) Sandy or Dusty Conditions.

(a) Remove any sand or dust from the nozzle before installing to either hose or adapter.

(b) Keep the protective cap installed when not in use.

(3) Perform operating procedure according to paragraph 2-10.

c. Operating the CCR Nozzle and Adapter In Extreme Heat Conditions.

(1) This equipment should not be operated when the ambient temperature is above 95°F.

(2) Perform operating procedure according to paragraph 2-10.

2-13. EMERGENCY PROCEDURES.

WARNINGS

- Spilled fuel creates a flammable. vapor-air mixture and fire can take place. Stop refueling immediately if fuel spill occurs. Refer to FM 10-68, Petroleum Supply Point Equipment and Operations.

- Fuel on clothing can be fatal if ignited by a static discharge. If fuel gets on your clothes, leave the refueling area as soon as possible and wet clothes with water before taking them off. In extreme cold conditions, clothes should not be wet; instead ground yourself to a piece of grounded equipment by taking hold of it before taking off the clothes. Wash skin with warm soapy water.

a. If spillage of fuel occurs, immediately stop fuel servicing operations.

b. On improved (hard) surfaces, call for a wash down truck to reduce the rate of vaporization.

c. On unimproved (soft) surfaces, cover the areas with dry soil to reduce its rate of vaporization.

d. Notify your supervisor.

e. Avoid getting fuel on the body or clothing If clothing becomes saturated with fuel, remove the clothing and wash body with hot soapy water.

2-14. NUCLEAR, BIOLOGICAL, AND CHEMICAL (NBC) DECONTAMINATION PROCEDURES.

NOTE

Detailed decontamination procedures can be found in FM 3-3, FM 3-4, and FM 3-5.

a. General. The following emergency procedures can be followed until field NBC Decontamination Facilities are available. Assigned operators will assist the supporting NBC unit.

b. Emergency Procedure. If NBC attack is known or suspected, mask at once and perform the following:

(1) Stop dispensing fuel.

(2) Do not disconnect the CCR nozzle.

(3) Have decontamination done on the equipment before resuming operation.

CHAPTER 3

OPERATOR MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION INSTRUCTIONS

Lubrication is not required for the arctic CCR nozzle and adapter.

Section II. OPERATOR TROUBLESHOOTING

3-1. INTRODUCTION.

a. This section contains troubleshooting information for locating and correcting most of the operating trouble which may develop in the arctic CCR nozzle, adapter and their components. You should perform the tests/inspections and corrective actions in the order listed.

b. Table 3-1, Malfunction Index, lists the common malfunctions which you may find during operation or maintenance of the arctic CCR nozzle and adapter or components. Table 3-2. Troubleshooting Procedures lists the most common malfunctions and each malfunction is followed by a list of tests or inspections which will help you determine probable causes and corrective actions.

3-2. MALFUNCTION INDEX.

Refer to Table 3-1. Any malfunction requiring repair beyond the scope of the operator should be referred to Unit Maintenance.

Table 3-1. Malfunction Index

3-3. TROUBLESHOOTING

Troubleshooting procedures for these malfunctions are given in Table 3-2. Notify Unit Maintenance for other malfunctions observed.

Table 3-2. Troubleshooting Table.

MALFUNCTION 1. Leakage At Discharge End of Nozzle During Refueling

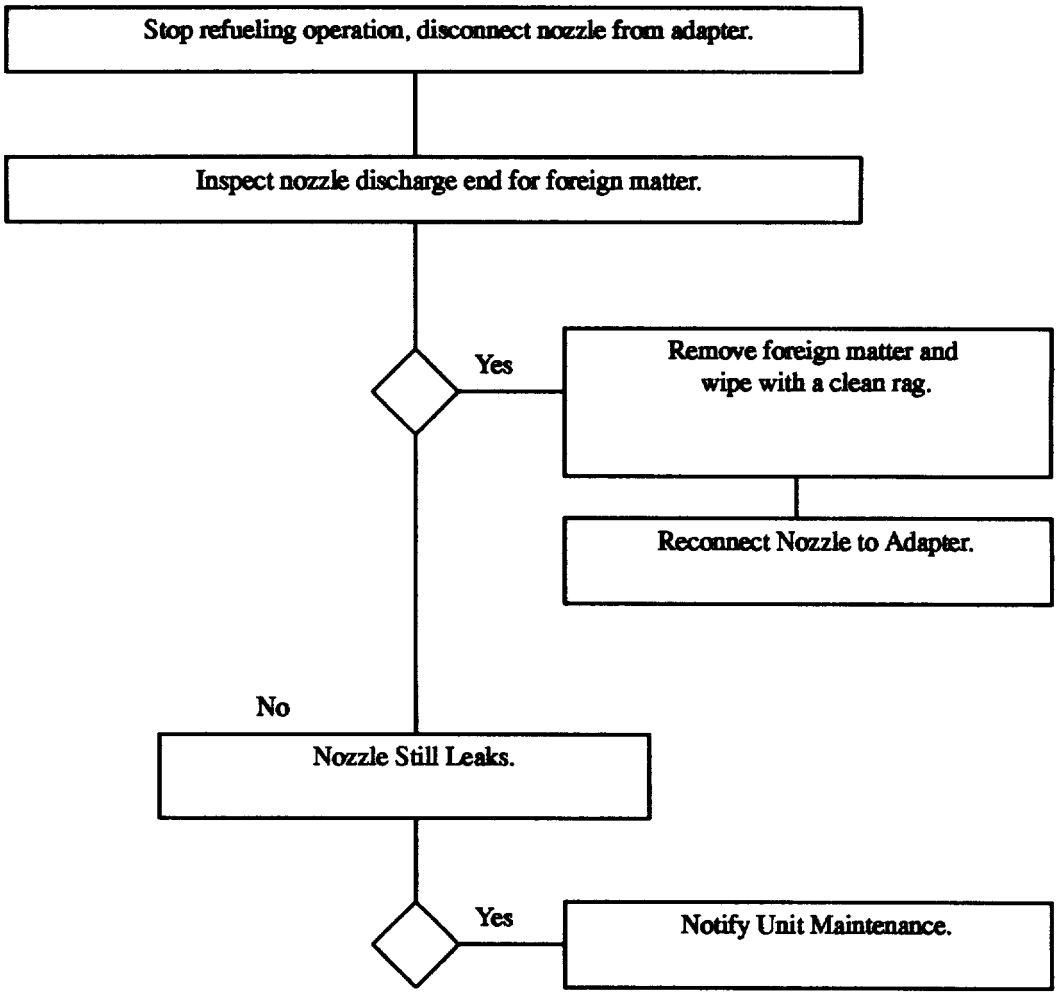


Table 3-2. Troubleshooting Table-continued.

MALFUNCTION 2. Leakage Between Nozzle Inlet Coupling and Hose Coupling.

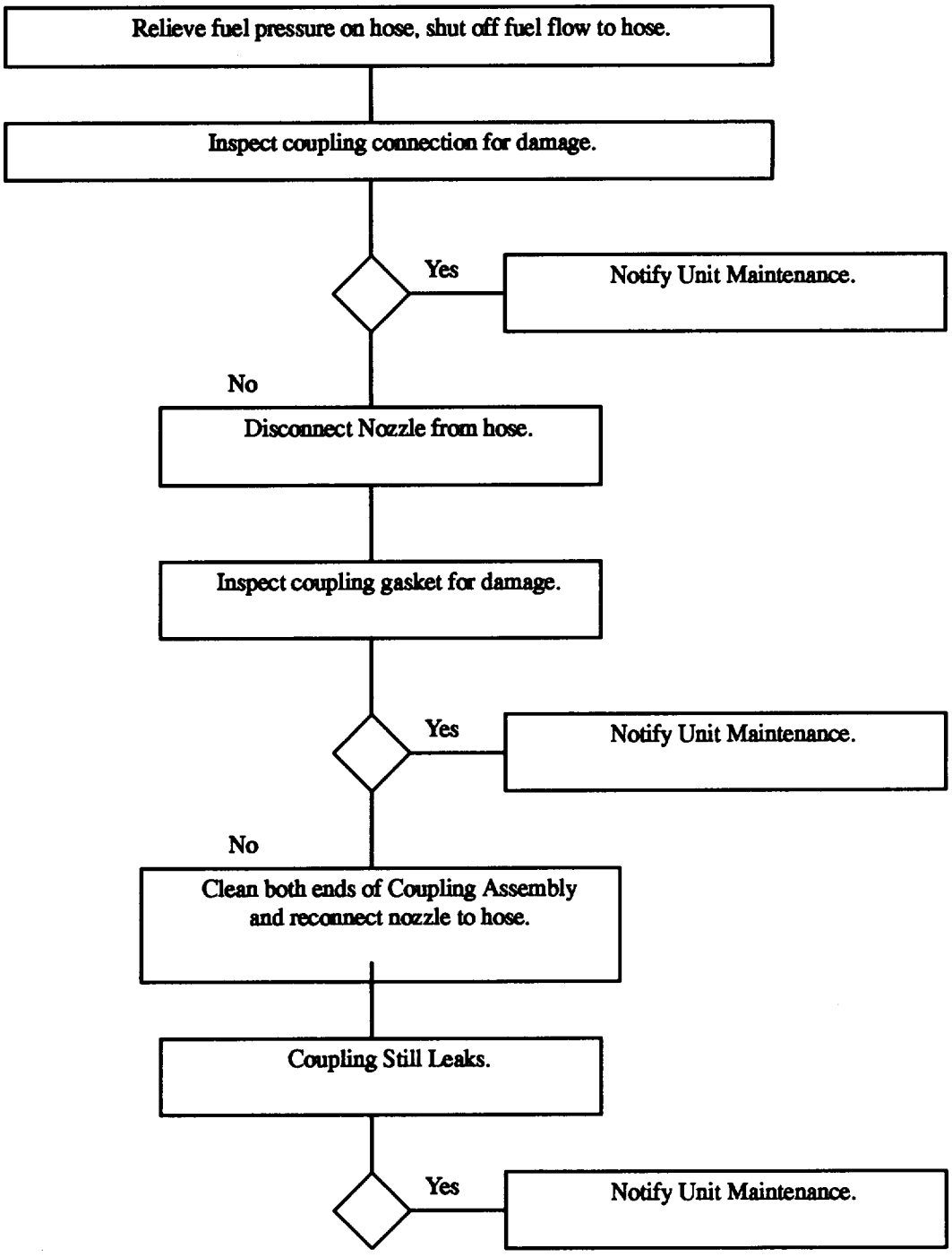


Table 3-2. Troubleshooting Table.

MALFUNCTION 3. Leakage Between GFA and CCR Nozzle.

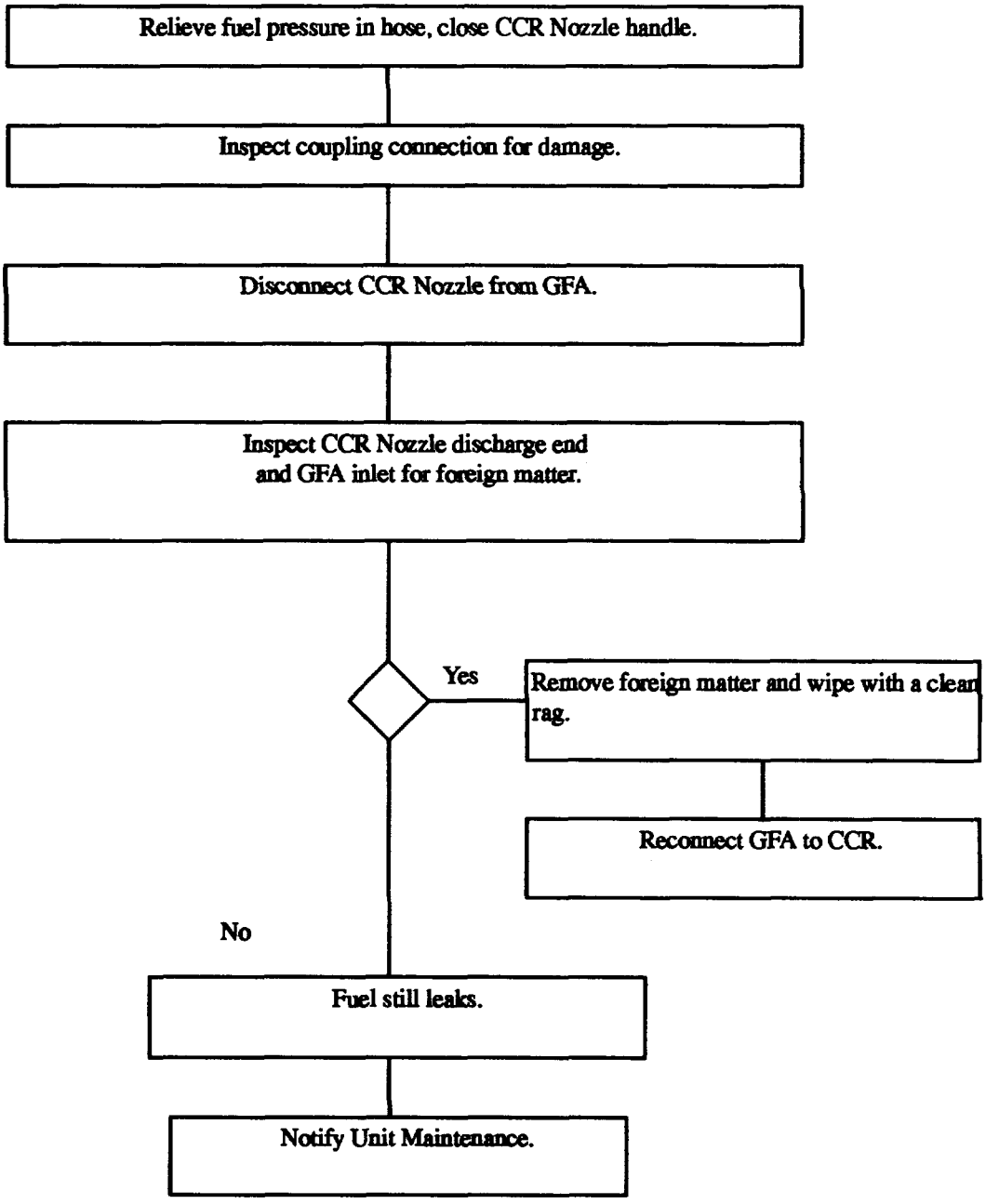


Table 3-2. Troubleshooting Table-continued.

MALFUNCTION 4. Inadequate Fuel Flow From GFA.

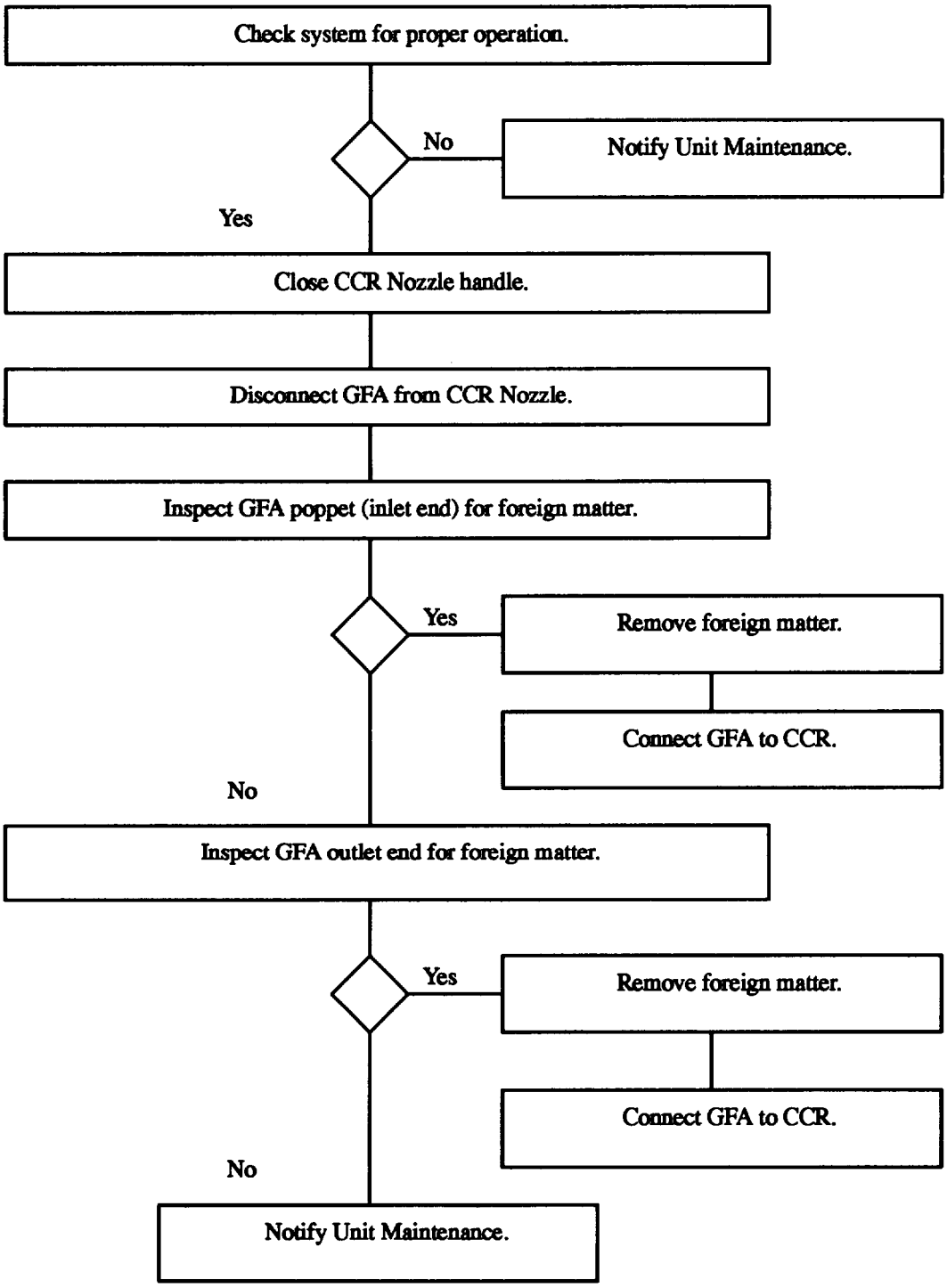
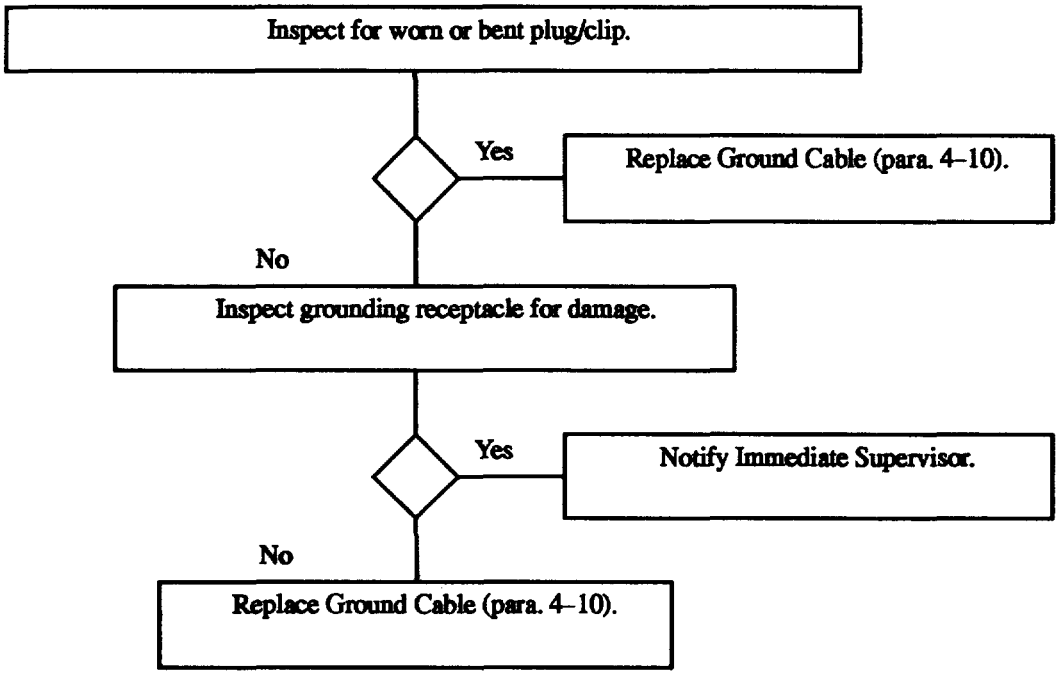


Table 3-2. Troubleshooting Table-continued.

MALFUNCTION 5. Ground Cable Fails to Connect to Grounding Receptacle.



Section III. OPERATOR MAINTENANCE PROCEDURES

Operator maintenance consists of inspection of components (see Table 2-1).

CHAPTER 4

UNIT MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS AND SPECIAL TOOLS LIST

4-1. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

4-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT.

Refer to the Maintenance Allocation Chart contained in Appendix B for maintenance tasks authorized at unit level and for the TMDE and support equipment required to perform these tasks.

4-3. REPAIR PARTS.

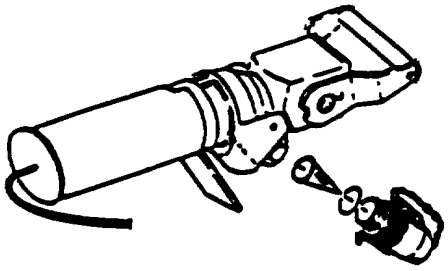
Repair parts are listed and illustrated in the Appendix C of this technical manual.

Section II. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-4. GENERAL.

To ensure that the CCR Nozzle and Adapter are ready for use at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or equipment failure. The necessary preventive maintenance services to be performed are accomplished at the operator level. Defects discovered during operation of the unit should be corrected as soon as possible. All deficiencies and shortcomings will be recorded together with the corrective actions taken, on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

Table 4-1. Unit Preventive Maintenance Checks and Services.

Item No.	Item to be Inspected	Interval	Procedures: Check for and have Repaired as Necessary	For Readiness Reporting Equipment is Not Ready/Available if:
1	Strainer	Every 2 weeks	Check for foreign matter, and holes. Clean and/or replace as required (para. 4-10). 	Holes in strainer.

Section III. UNIT TROUBLESHOOTING PROCEDURES

4-5. INTRODUCTION.

This section provides troubleshooting information for the CCR Nozzle and the Gravity Fill Adapter (GFA) at the unit level of maintenance. It consists of the malfunction index, table 4-1, listing the most common malfunctions, and troubleshooting table, table 4-2. The troubleshooting table is presented as flow diagrams for each malfunction listed in the malfunction index. Each diagram provides the procedure and corrective actions to return the CCR Nozzle and GFA to operational readiness.

4-6. TROUBLESHOOTING.

The troubleshooting table lists the common malfunctions which can occur in operation of the CCR Nozzle and GFA. The tests, inspections and corrective actions should be performed in the order given.

Table 4-1. Malfunction Index.

Table 4-2. Troubleshooting Table.

MALFUNCTION 1. Leakage Between Strainer Body and Strainer Housing, CCR Nozzle

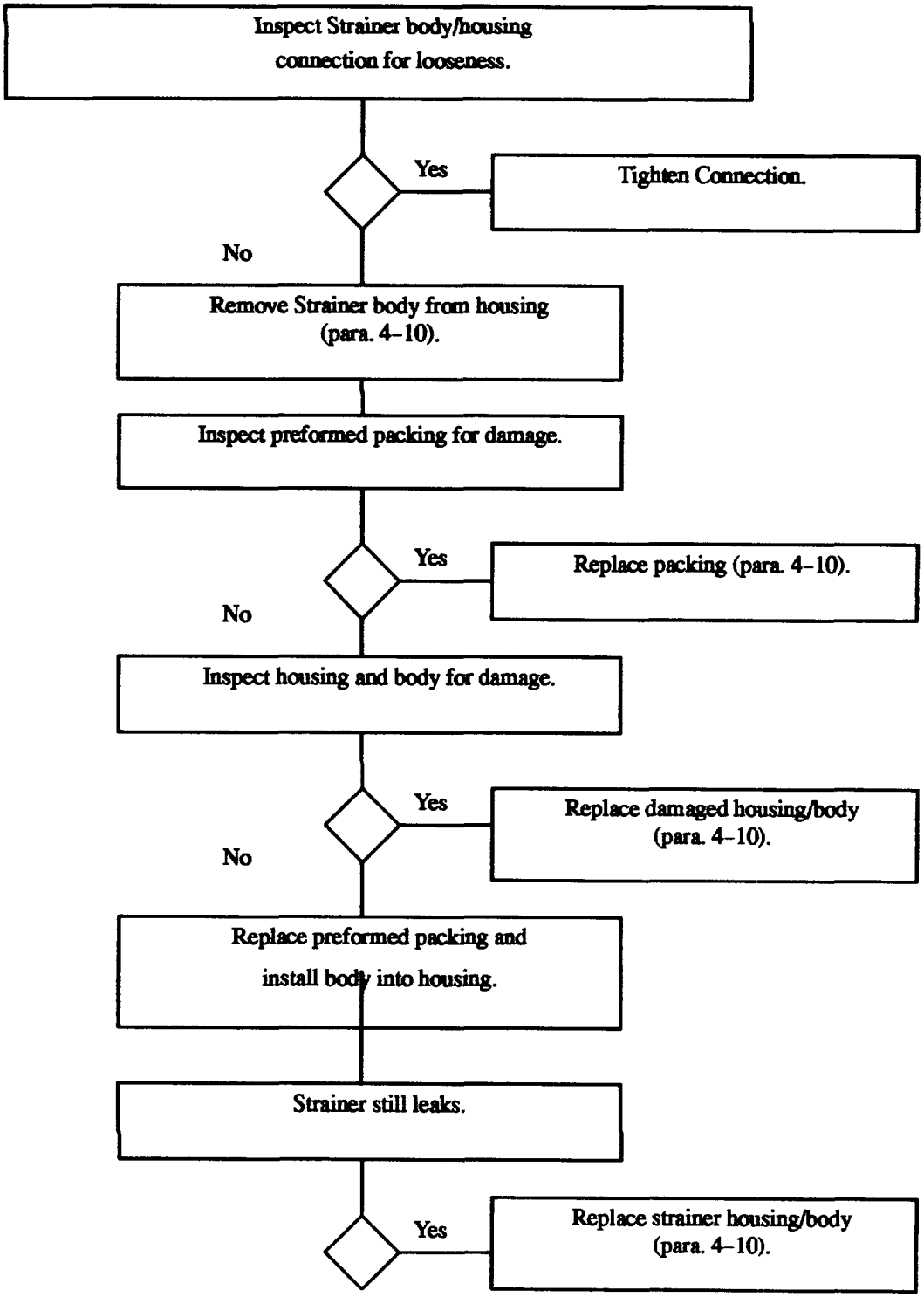


Table 4-2. Troubleshooting Table - continued.

MALFUNCTION 2. Leakage Between Nozzle Inlet Coupling and Hose

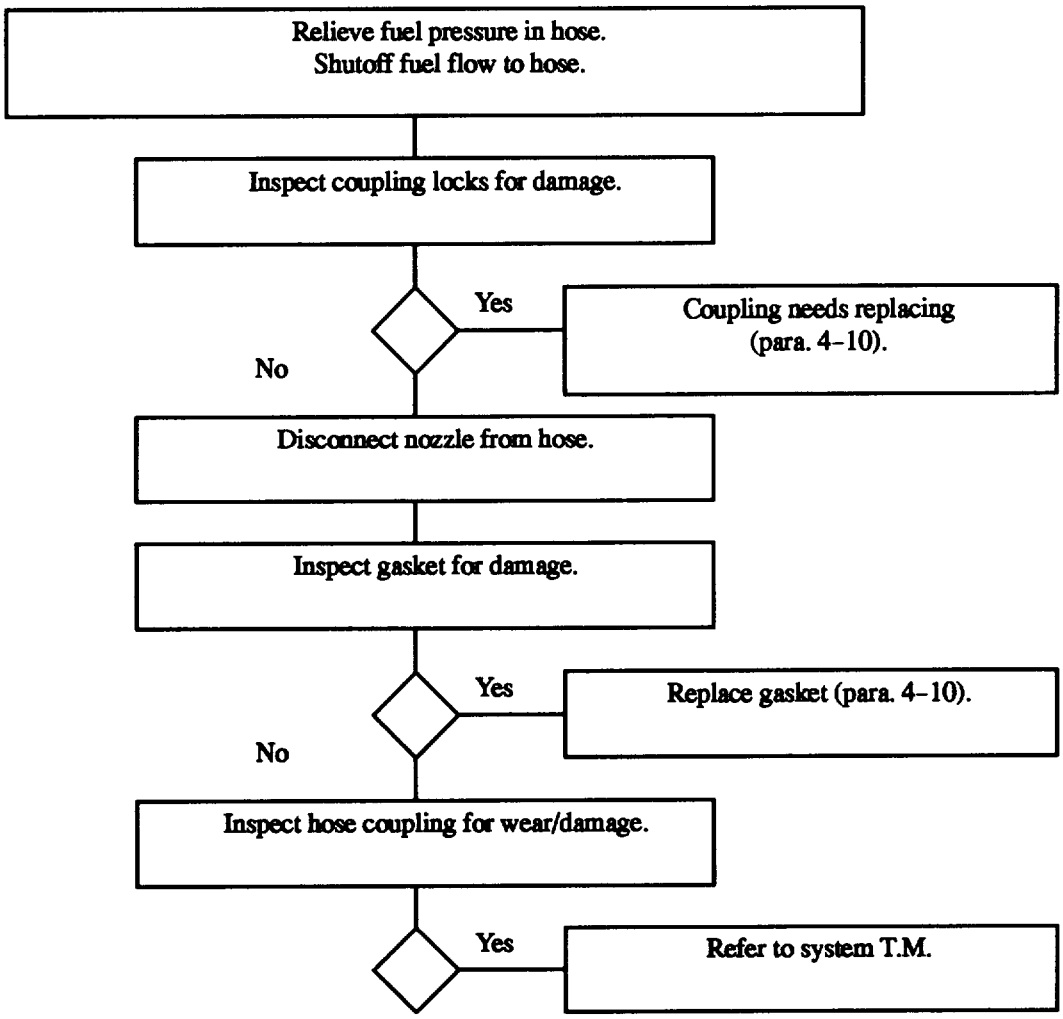


Table 4-2. Troubleshooting Table - continued.

MALFUNCTION 3. Inadequate Fuel Flow From CCR Nozzle

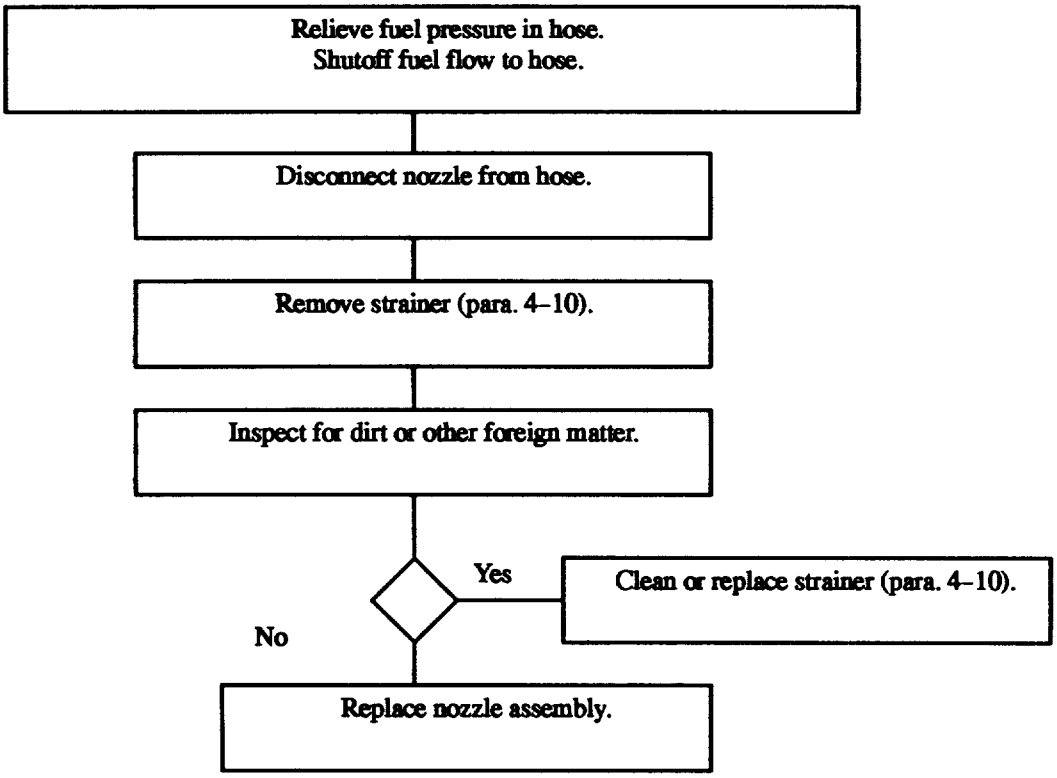


Table 4-2. Troubleshooting Table - continued.

MALFUNCTION 4. Leakage Between GFA and CCR Nozzle

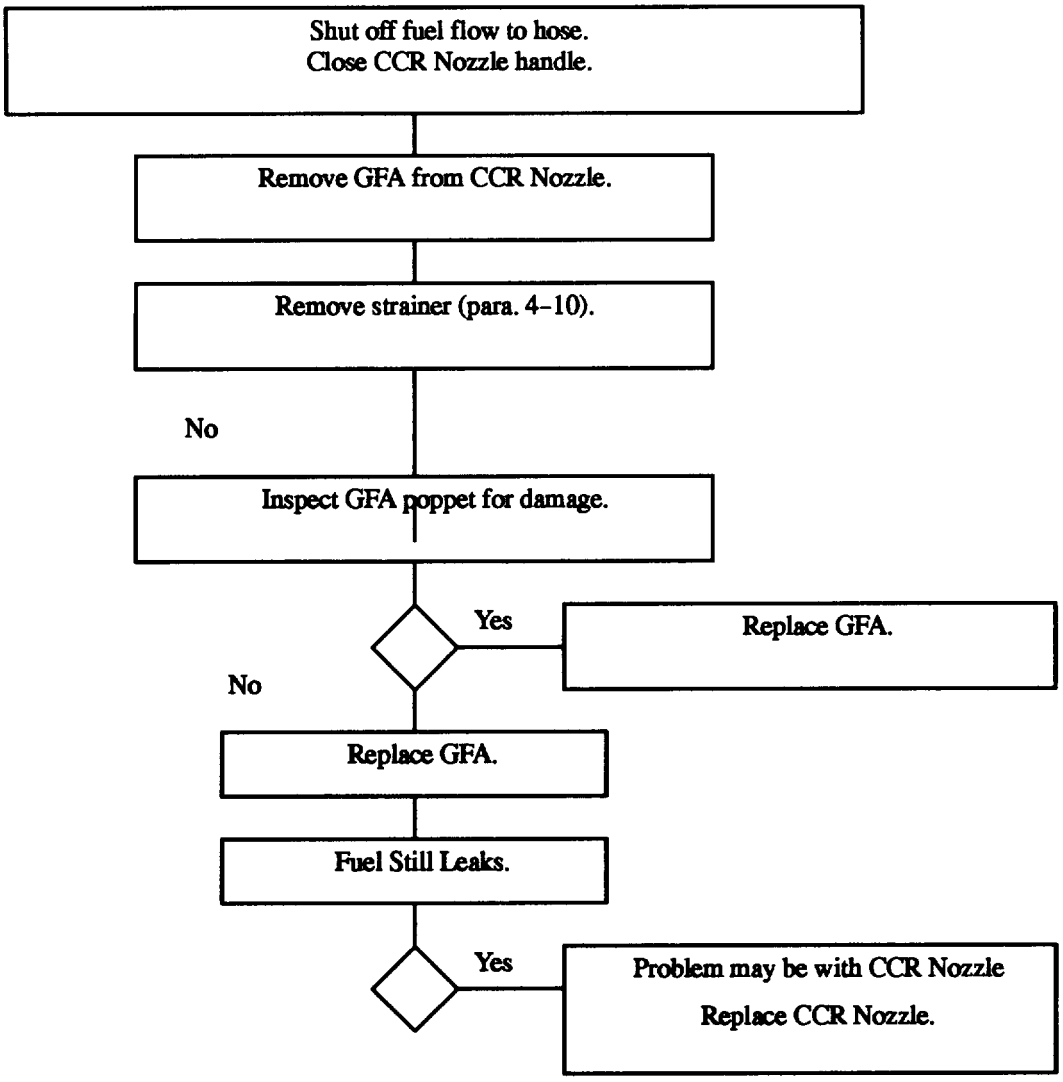
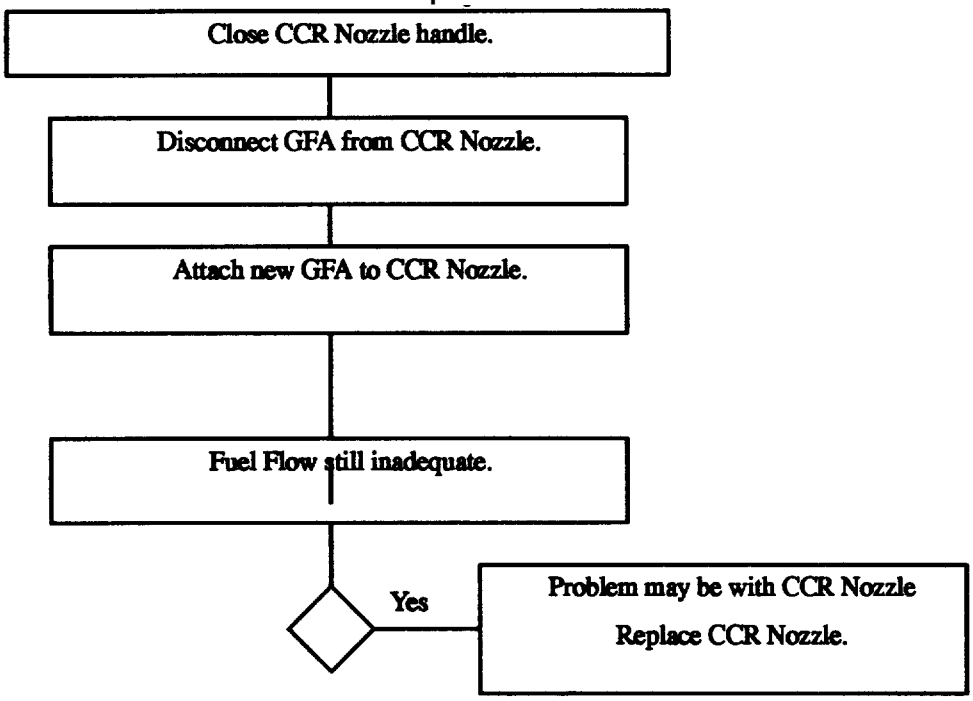
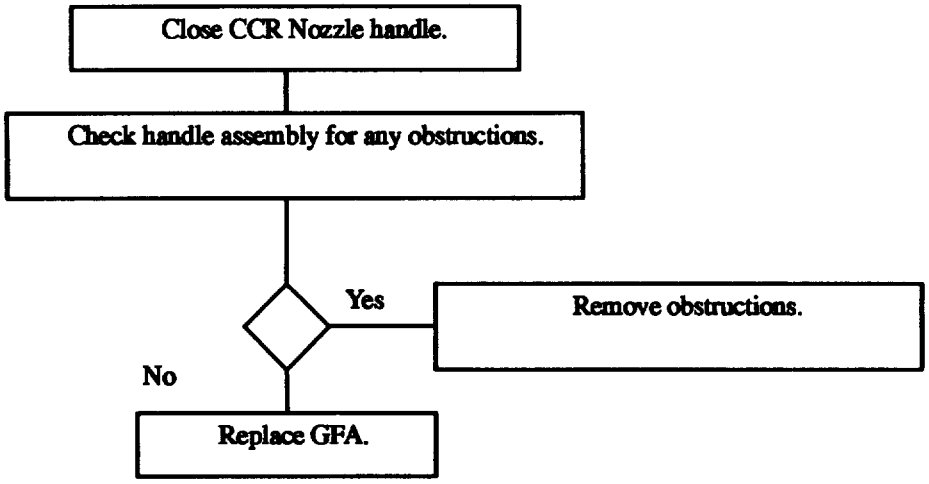


Table 4-2. Troubleshooting Table - continued.

MALFUNCTION 5. Inadequate Fuel Flow From GFA Nozzle



MALFUNCTION 6. GFA Handle Fails to Return to Closed Position



Section IV. UNIT MAINTENANCE PROCEDURES

4-7. GENERAL.

This section contains instructions for performing unit level maintenance on the CCR Arctic Nozzle and Adapter.

4-8. PERSONNEL SAFETY.

Personnel must remove all items of jewelry (rings, bracelets, watches, necklaces, etc.) and loose clothing before working on equipment. Jewelry and loose fitting clothing can get caught in moving equipment and result in injury to personnel.

When performing maintenance of the CCR Arctic Nozzle and Adapter, keep in mind the purpose of the equipment is to distribute fuel. Cleaning fluids, lubricants, preservatives, paint or other chemicals must not be allowed to contaminate the fuel.

Operate the equipment after performing maintenance to ensure repairs have been performed correctly and equipment can be returned to service.

4-9. PROPER EQUIPMENT.

Obtain proper equipment before starting maintenance. This includes hand tools and/or special tools, receptacles for storing small parts and expendable materials required by the maintenance task.

4-10. CCR NOZZLE ASSEMBLY REPAIR

This task consists of: a. Disassembly b. Repair c. Assembly

INITIAL SETUP:

Tools:
Tool kit, General Mechanics (Item 1, Appendix B)
Vise (Item 2, Appendix B)

Equipment Condition:
CCR Nozzle removed from fuel system.
(Reference Applicable System TM)

General Safety Requirements:

WARNINGS

- Fuels are toxic and flammable. Do not get on person or clothing. Do not use near open flame. Area should be well-ventilated.
- Using dry cleaning solvents incorrectly can cause injury or even death.
- Fuels Flammable/No Smoking

Materials/Parts Required:
Solvent (Item 1, Appendix E)
Wiping Rag (Item 2, Appendix E)
Silicone Compound (Item 3, Appendix E)
Sealing Compound (Item 4, Appendix E)
Packing. Preformed (Item 1, Appendix G)

a. Disassembly.

(1) Pull the nozzle collar (1) back to release the cap (2) from the discharge end of the nozzle. Remove the cap assembly (2).

(2) Remove screw (3) holding the ground cable assembly (4) and cap assembly cable (2) to the nozzle housing (5).

(3) Remove strainer body (6) with coupling assembly (10) attached, by hand from strainer housing (7).

(4) Remove strainer (8) and preformed packing (9) from strainer housing (7). Discard packing.

(5) Place strainer body (6) into a soft face vise.

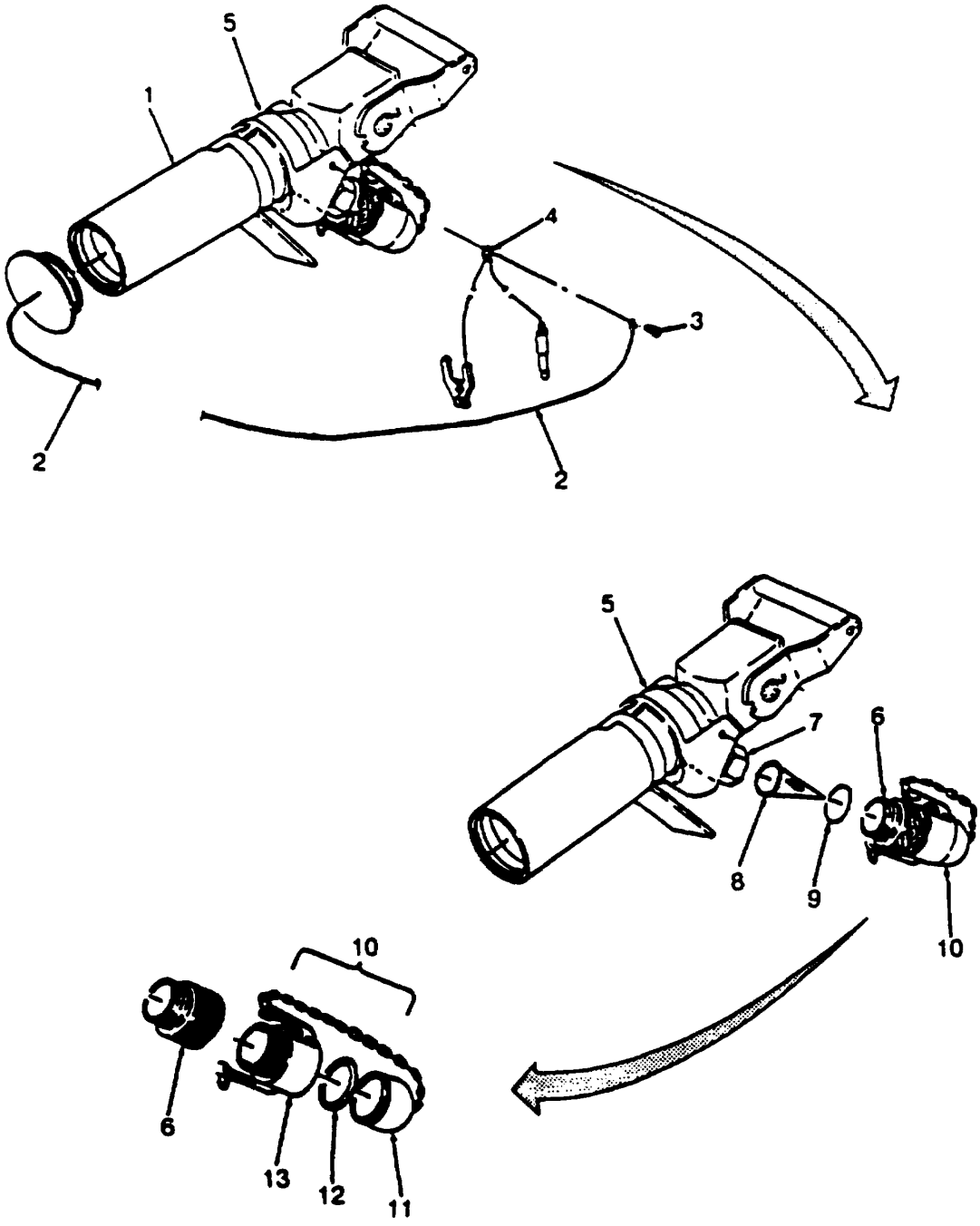
(6) Unscrew coupling assembly (10) from strainer body (6).

(7) Remove plug (11) from coupling half (13).

(8) Remove gasket (12) from coupling half (13).

4-10. CCR NOZZLE ASSEMBLY REPAIR - continued.

a. Disassembly - continued.



WARNING

Dry cleaning solvent, AA 711 Types I and II, used to clean parts is potentially dangerous to personnel and property. Use in a well-ventilated area as the fumes are dangerous if inhaled. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 138°F. on the discharge end of the nozzle.

b. Repair

(1) Clean parts with dry cleaning solvent. Dry with clean wiping rag.

(2) Inspect all parts for damage. Look for damage threads, worn, scored, or deformed parts, cracks or corrosion.

(3) Replace any damaged parts found by inspection

c. Assembly.

(1) Install gasket (12) in coupling half (13).

(2) Install plug (11) in coupling half (13) and lock in place.

(3) Coat threads of coupling half (13) with anti-seize compound. Wipe off any excess with clean, dry wiping rag.

(4) Clamp strainer body (6) in a soft face vise and screw coupling half (13) into strainer body (6). Remove from vise.

(5) Install strainer (8) into strainer housing (7).

(6) Coat preformed packing (9) with silicone compound and install into groove at end of strainer housing (7) over strainer (8) lip.

(7) Install strainer body (6) into strainer housing (7) and hand tighten.

NOTE

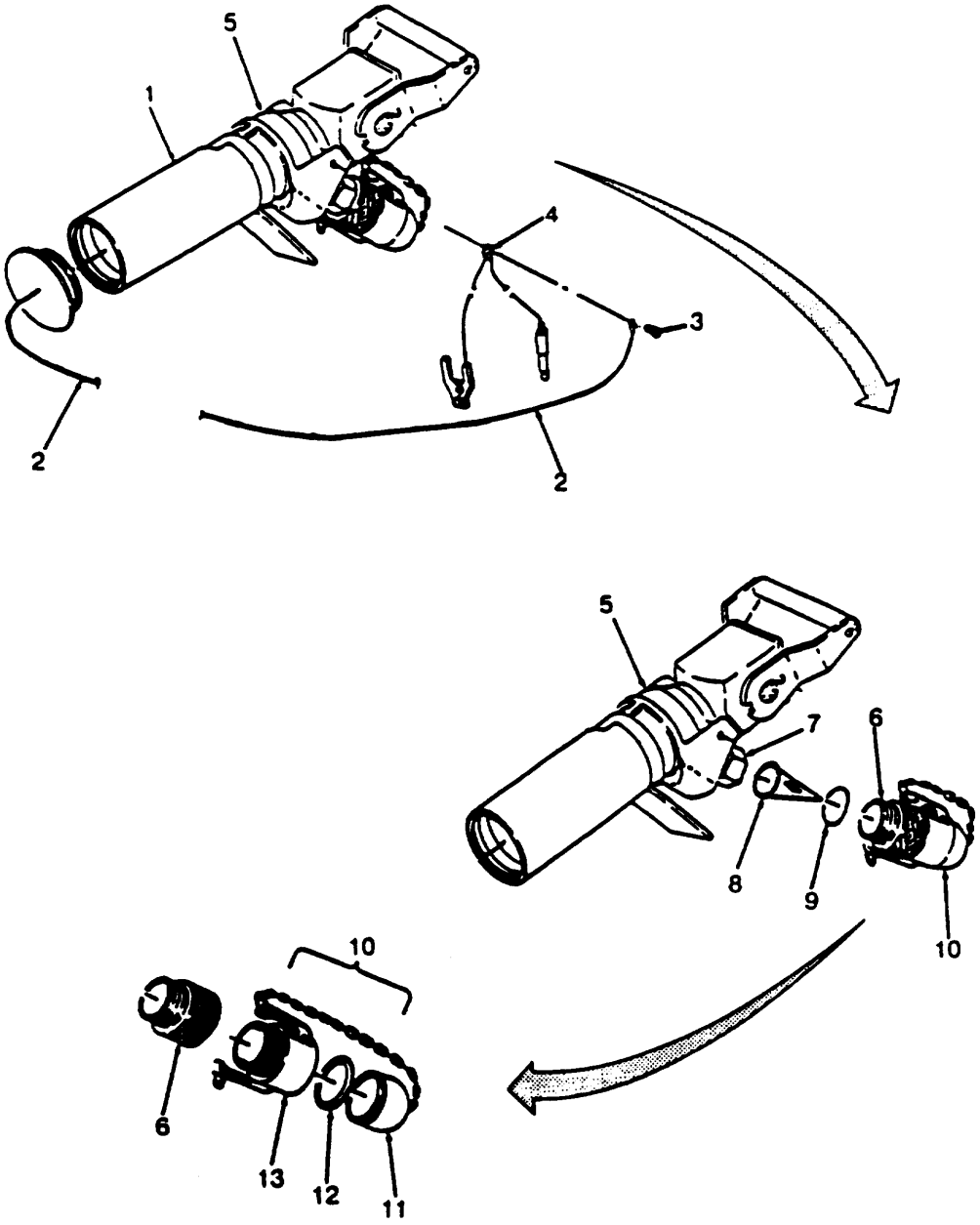
The two grounding cable lugs should be closest to the housing.

(8) Attach the two lugs on ground assembly cable (4) and lug on cap assembly cable (2) to housing (5) with screw (3).

(9) Push dust cap (2) on collar (1).

4-10. CCR NOZZLE ASSEMBLY REPAIR - continued.

c. Assembly - continued.



4-11. GFA REPAIR.

This task consists of: a. Disassembly b. Repair c. Assembly

INITIAL SETUP:

Tools:
Tool Kit, General Mechanics (Item 1, Appendix B)
Crimping Tool (Item 2, Appendix B)

Equipment Condition:
GFA Nozzle removed from CCR Nozzle
(refer to system T.M.)

General Safety Requirements:

WARNINGS

- Fuels are toxic and flammable. Do not get on person or clothing. Do not use near open flame. Area should be well-ventilated.
- Using dry cleaning solvents incorrectly can cause injury or even death.
- Fuels Flammable No Smoking

a. Disassembly

NOTE

The dust cap assembly should not be removed from the nozzle body unless replacement is required.

(1) Remove dust cap (1) from inlet end of body (5).

(2) Remove plug (2) from discharge end of body (5).

(3) Push cables (3) through handle of body (5) to expose the crimp fitting (4) on end of cables.

(4) Cut cables (3) to remove crimp (4)

(5) Pull cables (3) back through handle of the body.

b. Repair. Replace defective parts.

c. Assembly

(1) Insert the two loose ends of cable (3) through the hole in the handle of body (5) from right to left.

NOTE

Ends of cable should not protrude more than 1/8 in past end of crimp before crimping.

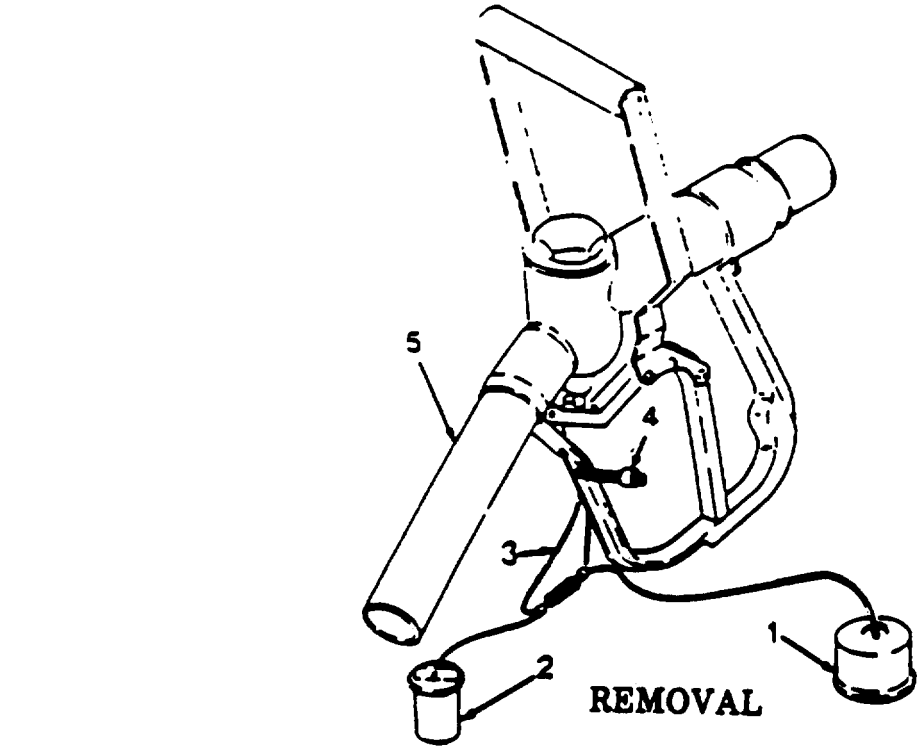
(2) Insert the two loose ends of cable (3) through crimp fitting (4) and crimp the fitting

(3) Pull cables (3) back through body (5) until crimp fitting (4) rests against inside lip side of body (5).

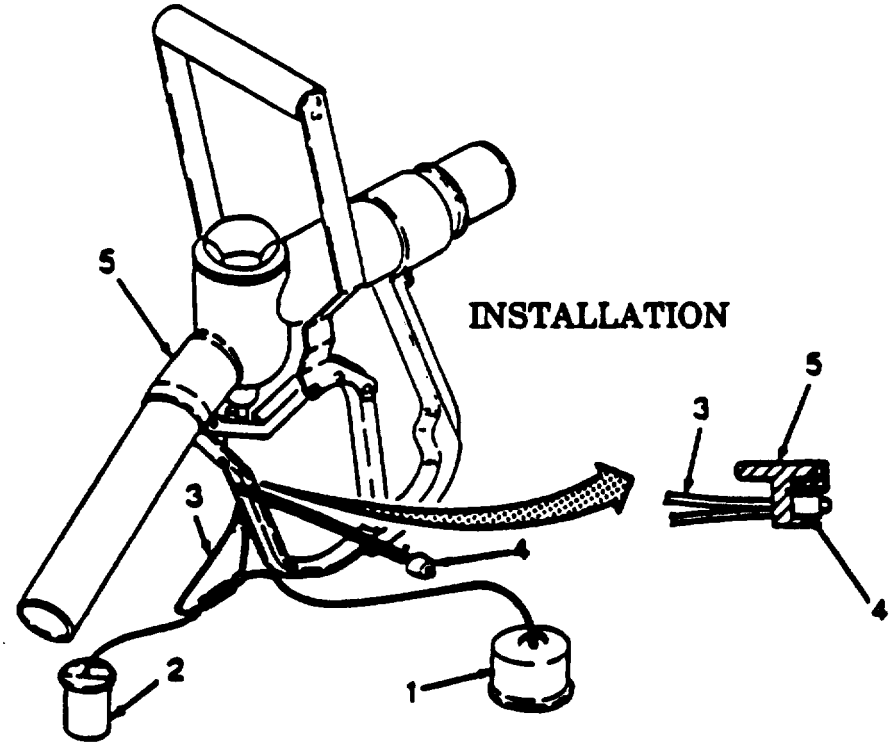
(4) Install plug (2) over outlet end of body (5).

(5) Install cap (1) into inlet end of body (5).

4-11. GFA REPAIR - continued.



REMOVAL



INSTALLATION

Section V. PREPARATION FOR STORAGE OR SHIPMENT

4-12. SECURITY PROCEDURES.

Refer to AR 190-11 or AR 190-13.

4-13. PREPARATION FOR MOVEMENT.

NOTE

For disposal of contaminated fuel, refer to FM 10-20, Organizational Maintenance of Military Petroleum Pipelines, Tanks and Related Equipment

a. Drain residual fuel from CCR Nozzle and GFA.

b. CCR Nozzle.

(1) Install cover on CCR Nozzle outlet

(2) Install plug in coupling assembly.

c. GFA.

(1) If connected to CCR Nozzle, pull CCR Nozzle collar back and disconnect GFA.

(2) Install cap and plug on GFA .

d. The CCR Nozzle and GFA are now ready to be placed in a suitable container. For additional information on Packaging of Army Material for Shipment and Storage, refer to AR 746-1.

4-14. ADMINISTRATIVE STORAGE.

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.

Before placing the equipment in administrative storage, current preventive maintenance checks and services should be completed, shortcomings and deficiencies should be corrected, and all Modification Work Orders (MWO) should be applied.

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.

CHAPTER 5

DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

Section I. TROUBLESHOOTING

Troubleshooting is not required on the CCR Nozzle and GFA at Direct Support level of maintenance.

Section II. MAINTENANCE INSTRUCTIONS

5-1. INTRODUCTION

This section contains procedures for Direct Support level maintenance on the CCR Nozzle and Gravity Fill Adapter.

Maintenance consists of repair by replacement of defective components, then testing to ensure correction of malfunction.

5-2. CCR NOZZLE ASSEMBLY REPAIR.

This task consists of: a. Disassembly b. Repair c. Assembly d. Testing

INITIAL SETUP:

Tools:
Tool Kit, General Mechanics (Item 3, Appendix B)
Body Wench (Item 5, Appendix B)
Diaphragm Carrier Wrench (Item 6, Appendix B)
Piston Compression Tool (Item 7, Appendix B)
Locking Lug Assembly Tool (Item 8, Appendix B)
Poppet wench (Item 9, Appendix B)
Dial Caliper (Item 4, Appendix B)
Wrench 2 1/2" (Item 4, Appendix B)
Vise (with soft faced jaws) (Item 4, Appendix B)
Wrench, torque 0-150 in-lb (Item 4, Appendix B)
Wrench torque 0-300 in-lb (Item 4, Appendix B)

Materials/Parts Required:
Rags (Item 2. Appendix E)
Solvent (Item 1, Appendix E)
Bushing (Item 2. Appendix G)
Diaphragm Assembly (Item 3, Appendix G)
Sleeve Seal (Item 4, Appendix G)
Seal, wiper (2 each) (Item 5, Appendix G)
Packing (Item 6, Appendix G)
Alcohol, Rubbing (Item 5, Appendix E)
Silicone Compound (Item 4, Appendix E)

Equipment Condition:
CCR Nozzle removed from fuel system (refer to system T.M.)

General Safety Requirements:

WARNINGS

- Fuels are toxic and flammable. Do not set on person or clothing. Do not use near open flame. Area should be well-ventilated. Do not smoke.
- Using dry cleaning solvents incorrectly can cause injury or even death.

a. Disassembly.

(1) Push the piston compression tool into the nozzle discharge end until it latches in place.

(2) Compress valve latch actuator (15) and move handle (8) to OPEN position.

WARNING

End cover is under spring pressure. Keep pressure on end cover while removing screws.

(3) Carefully remove four screws (1) and remove end cover (2).

(4) Screw (3) and lockpin (4) should not be removed unless damaged. If damaged, use a soft jaw chuck or vise to hold locking pin (4) in place and remove screw (3).

(5) Remove spring retainer (5) and spring (6).

(6) Remove four handle screws (7) and handle (8).

(7) On the nozzle left side, remove screw (9), one washer (10), bushing (11) and side plate (12). Remove bushing (11) and washer (10) from screw (9). Remove second washer (10) from hosing (17).

5-2. CCR NOZZLE ASSEMBLY REPAIR - continued.

a. Disassembly - continued.

(8) On the right side of nozzle loosen screw (9) only.

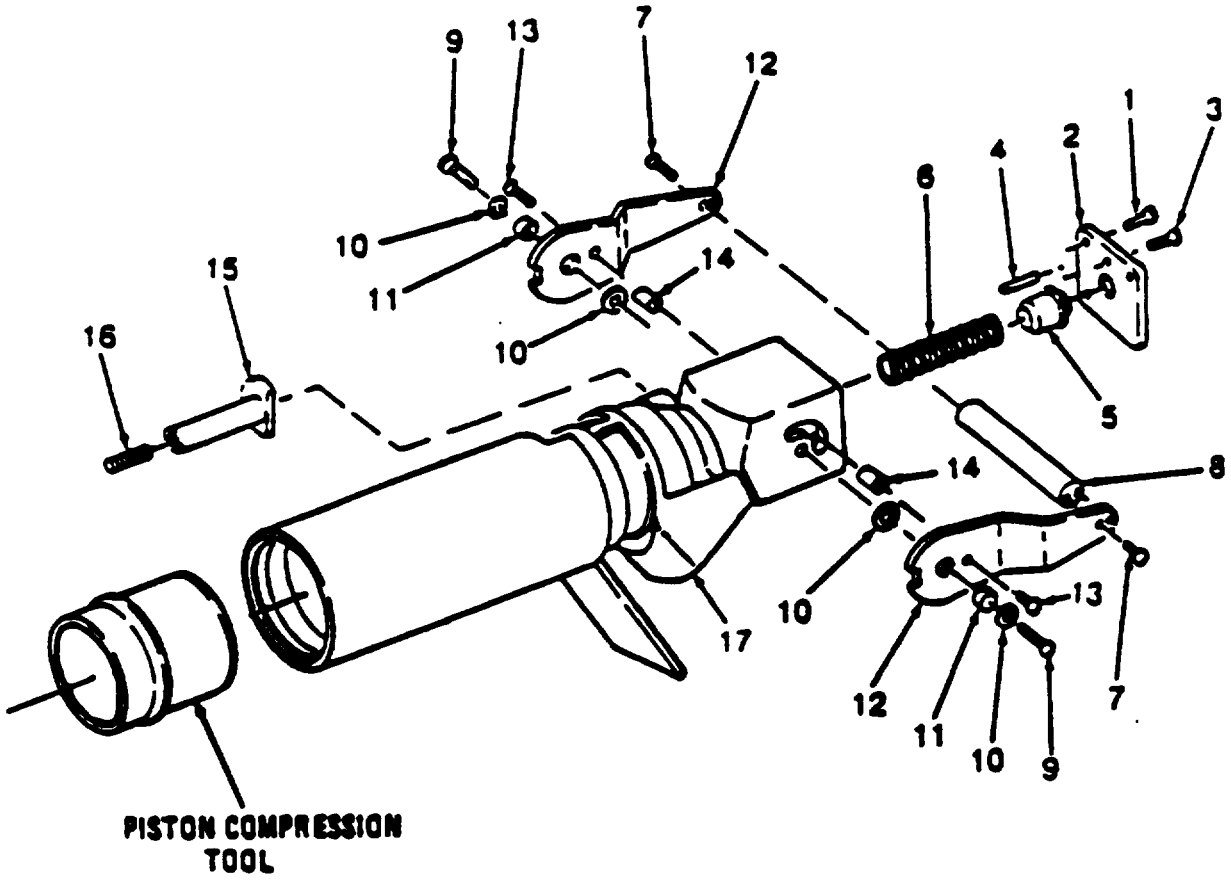
(9) While compressing valve latch actuator (15) on right side of nozzle, remove screw (9), one washer (10), bushing (11) and side plate (12). Remove bushing (11) and washer (10) from screw (9). Remove second washer (10) from housing (17).

(10) Slowly release valve latch actuator (15) and remove along with spring (16) from housing (17).

NOTE

Do not remove screw and actuating cam from side plate unless damaged and replacement is required.

(11) Hold the actuating cam (14) in place with a soft jaw chuck or vise and remove screw (13) from side plate.



5-2. CCR NOZZLE ASSEMBLY REPAIR - continued.

a. Disassembly - continued.

(12) Unscrew valve actuating ring (18) from diaphragm assembly (20) and remove.

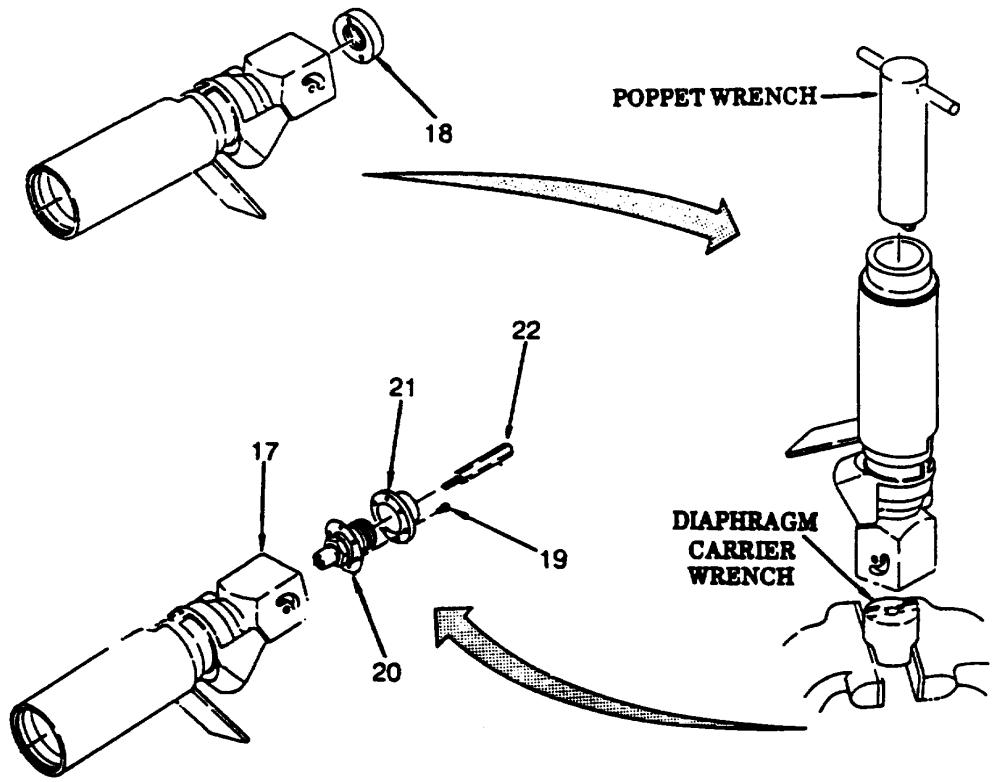
(13) Secure diaphragm carrier wrench in a vise. Position nozzle on carrier wrench and slowly turn until the nozzle seats itself. Using the poppet wrench at the front of the nozzle, unscrew poppet (20). Remove poppet wrench from nozzle, nozzle from diaphragm carrier wrench and wrench from vise.

(14) Remove six screws (19) from housing (17) that secure the diaphragm retainer (21).

(15) Remove the diaphragm assembly (20) together with diaphragm retainer (21) and the flow indicator (22).

(16) Remove the diaphragm retainer (21).

(17) Unscrew and remove the flow indicator (22) from the diaphragm assembly (20). Discard diaphragm assembly.



5-2. CCR NOZZLE ASSEMBLY REPAIR - continued.

a. Disassembly - continued.

(18) While holding the piston compression tool, slowly pull back the collar (28). Spring (25) will push the piston compression tool poppet (23) and sleeve seal (24) out of body (27).

(19) Remove spring (25) and flow guide (26) from the nozzle discharge end.

(20) Apply alcohol around collar (28) and body (29).

(21) Place housing (17) into a soft face vise with discharge end facing up, and tighten only enough to prevent housing from turning or falling from vise.

CAUTION

Failure to trip the latch mechanism will result in damage to the stay back detents during following steps.

(22) Align the body wrench with the nine locking lugs (35) and press until the collar (28) trips in the forward position

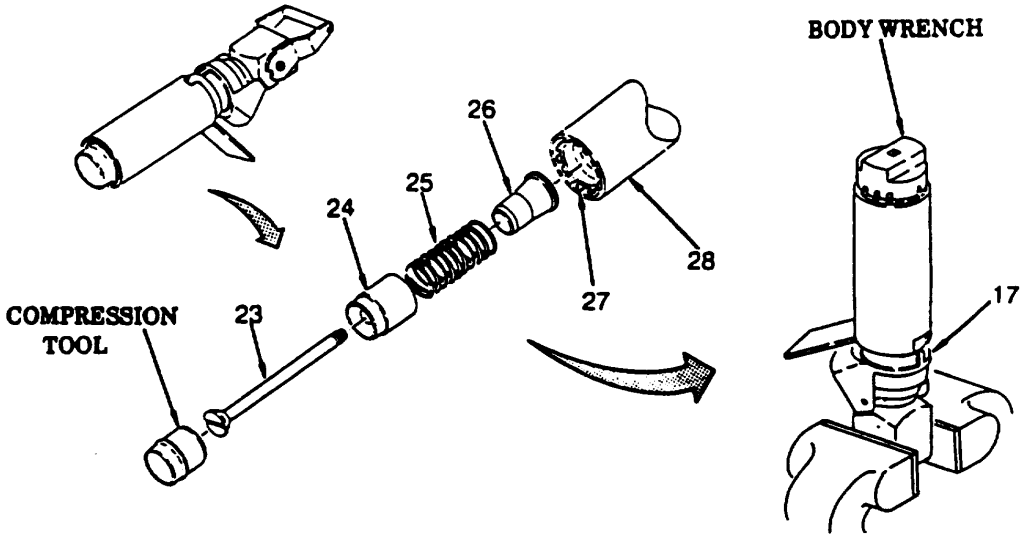
WARNING

Body is under spring pressure. Keep pressure on body wrench to prevent sudden separation.

CAUTION

To reduce the friction between the locking lugs and the collar. slightly pull back on the collar.

(23) Turn the body wrench and loosen body (27) from the housing (17).



5-2. CCR NOZZLE ASSEMBLY REPAIR - continued.

a. Disassembly - continued.

(24) While holding collar spring (29) and collar (28) together, remove collar (28) and collar spring (29) from housing (17).

(25) Carefully place collar (28), with body wrench still attached, on a workbench with discharge end down.

(26) Remove collar spring (29).

(27) Remove collar (28).

(28) Remove spring retainer (30) and stay back spring (31) from collar (28)

(29) Remove lug retaining ring (32), nine locking lugs (33), three stay back detents (34) and lug wire (35) from body (27).

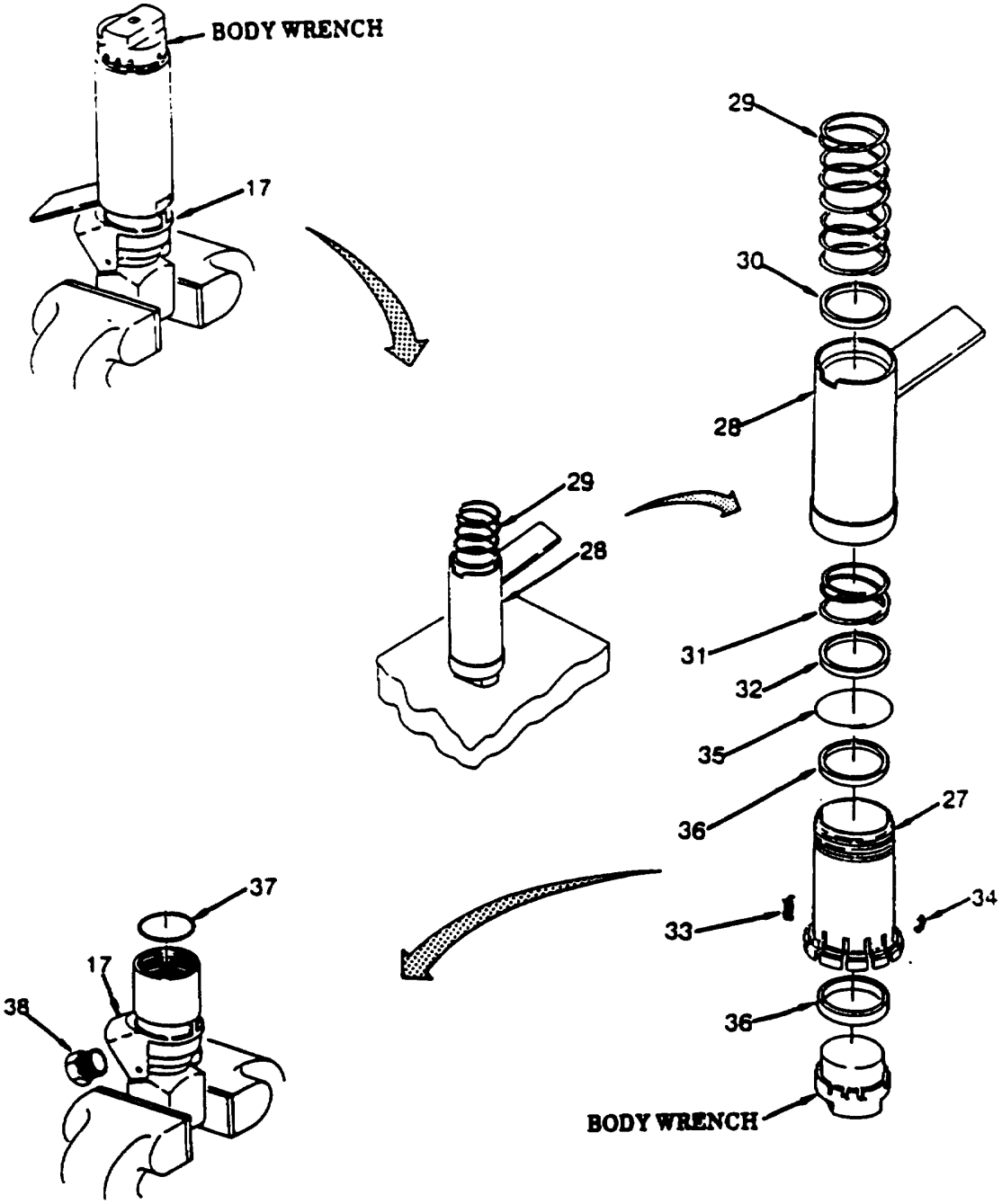
(30) Remove two wiper seals (36) from body (27). Discard wiper seals.

(31) Remove packing (37) from housing (17). Discard packing.

(32) Unscrew strainer housing (38) from housing (17).

5-2. CCR NOZZLE ASSEMBLY REPAIR - continued.

a. Disassembly - continued.



5-2. CCR NOZZLE ASSEMBLY REPAIR - continued.

WARNING

Dry cleaning solvent, AA 711 Types I and II used to clean parts is potentially dangerous to personnel and property. Use in a well-ventilated area as the fumes are dangerous if inhaled. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 130°F.

b. Repair

(1) Clean all components removed using a wiping rag moistened with dry cleaning solvent. Dry with a clean. dry wiping rag.

(2) Inspect all parts for damage. Look for damaged threads, broken, worn, scored, or deformed parts, cracks or corrosion.

(3) Replace any damaged parts found by inspection.

c. Assembly

(1) Place lug assembly tool in vise.

(2) Lubricate two wiper seals (36) with silicone compound and install into nozzle body (27) in the two internal grooves. Make sure the seals are fully seated toward the slotted end and the open end of the U shape is facing out toward the threaded end of body (27).

CAUTION

Locking lugs may fail to operate properly and jam if lug wire is improperly installed. Lug wire must be positioned so split is not over one of the slots in body.

(3) Install lug wire (35) into the lower groove on body (27) and insert body onto the lug assembly tool

NOTE

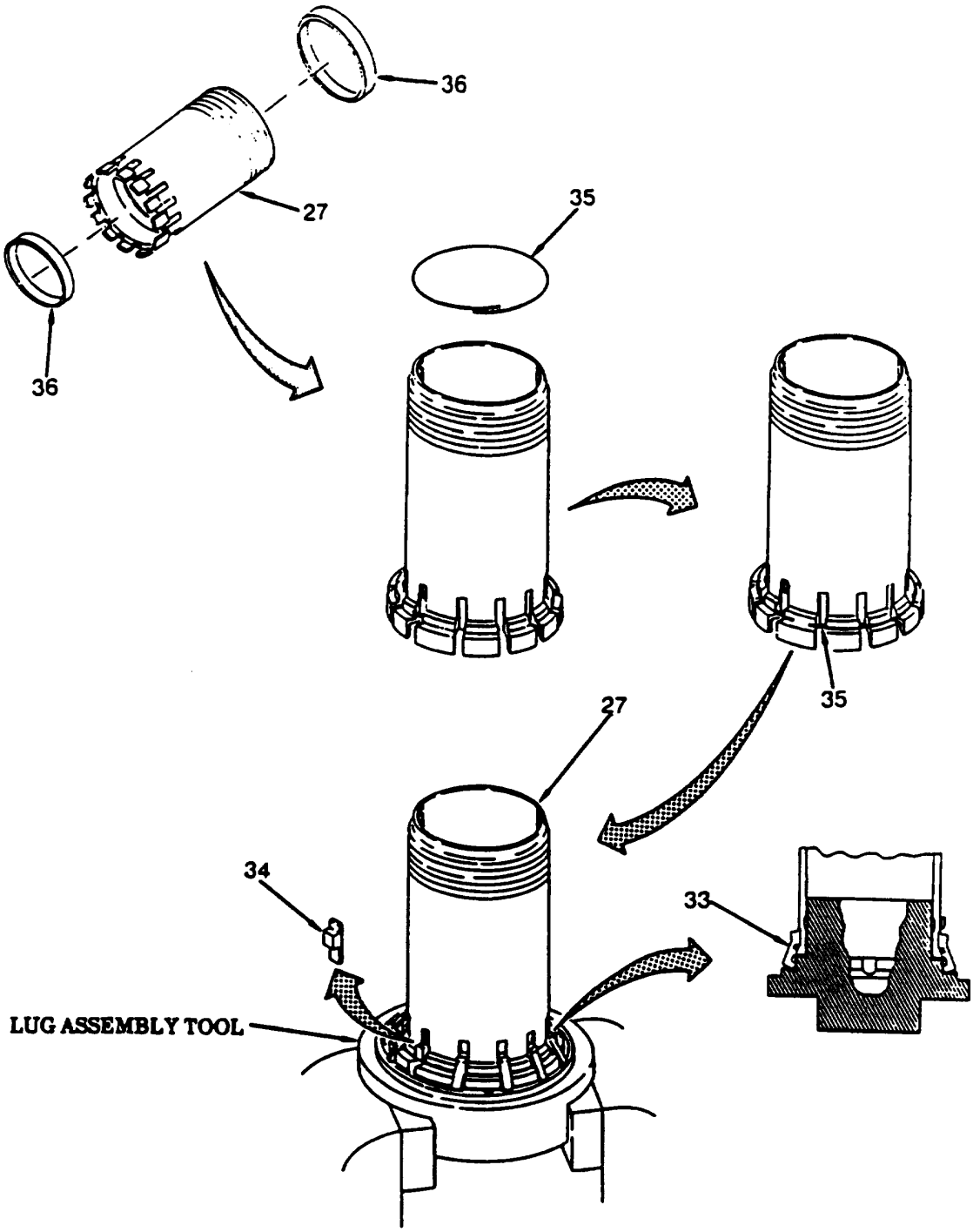
Stay back detents align with grooves in body and the three slots in the lug assembly tool. The detents are placed behind lug wire.

(4) Install three stay back detents (34) on body (27).

(5) Insert nine locking lugs (33) onto lug wire (35). Align locking lugs (33) with remaining grooves in body (27).

5-2. CCR NOZZLE ASSEMBLY REPAIR - continued.

c. Assembly.



5-2. CCR NOZZLE ASSEMBLY REPAIR - continued.

c. Assembly - continued.

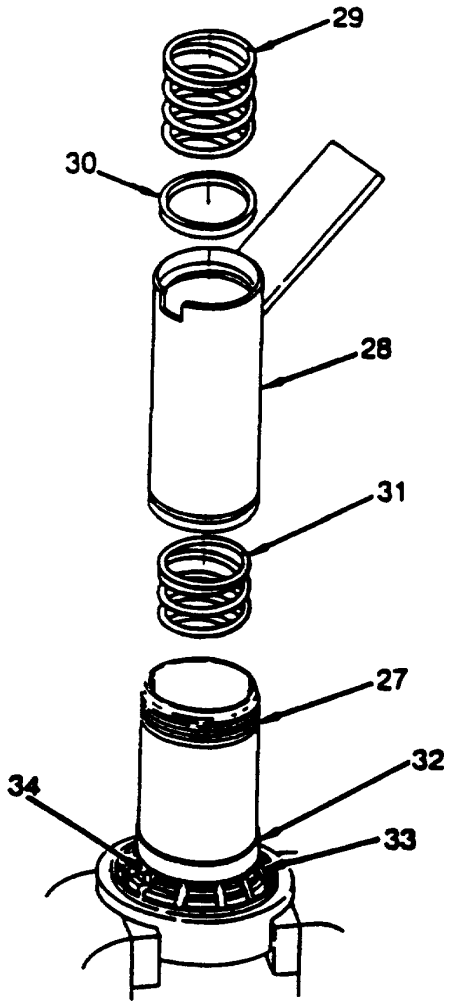
(6) Install lug retainer ring (32) onto body (27) with beveled end of ring facing locking lugs (33).

(7) Lubricate threads on body (27) with silicone compound.

(8) Install stay back spring (31) onto body (27).

(9) Install collar (28) over body (27), down over the locking lugs (33) and stay back detents (34).

(10) Install spring retainer (30) with groove facing down and collar spring (29) on body (27).



5-2. CCR NOZZLE ASSEMBLY REPAIR - continued.

c. Assembly - continued.

(11) Lubricate packing (37) with silicone compound and install into housing (17).

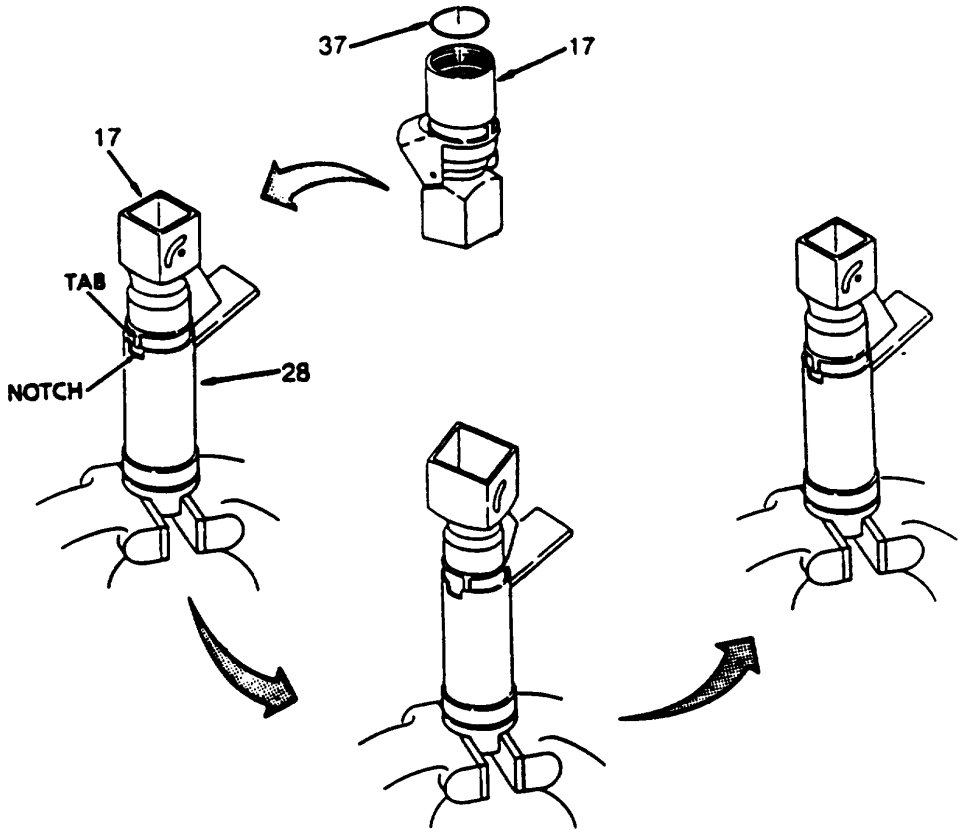
(12) Slide housing (17) into collar (28). Align the notch on the collar with the tap on top of housing.

CAUTION

Using the lug assembly tool to tighten body and housing can cause damage to locking lugs. Do not use lug assembly tool to tighten. Use the body wrench to complete the tightening process.

(13) Push down on housing (17) and rotate clockwise until tab contacts the collar (28). Rotate hosing (17) counterclockwise until notch and tab are aligned.

(14) Remove the assembled components from lug assembly tool and remove tool from vise.



5-2. CCR NOZZLE ASSEMBLY REPAIR - continued.

c. Assembly - continued

(15) Place housing (17), with discharge end facing up, into a soft face vise and tighten only enough to prevent housing from turning or falling from vise.

(16) Align body wrench with nine locking lugs and press down until the collar (28) trips in the forward position.

CAUTION

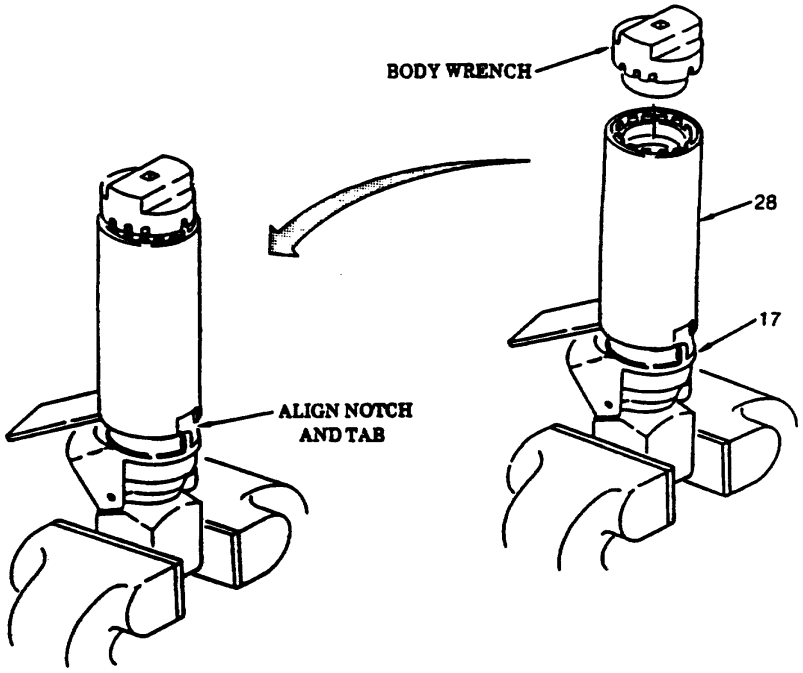
To reduce the friction between the locking lugs and the collar, slightly pull back on the collar

NOTE

Always align the slot in the collar and the tab on the housing

(17) Tighten the assembly to 300 in-lb.

(18) Pull back on collar (28) to release the body wrench, remove body wrench. Remove nozzle assembly from vise.



5-2. CCR NOZZLE ASSEMBLY REPAIR - continued.

c. Assembly - continued.

(19) Install the flow indicator (22) onto diaphragm assembly (20).

(20) Prepare diaphragm assembly (20) for installation by rolling the diaphragm until flange is Aligned with brass ring.

(21) Position diaphragm retainer (21) over the diaphragm assembly (20) and insert into housing (17).

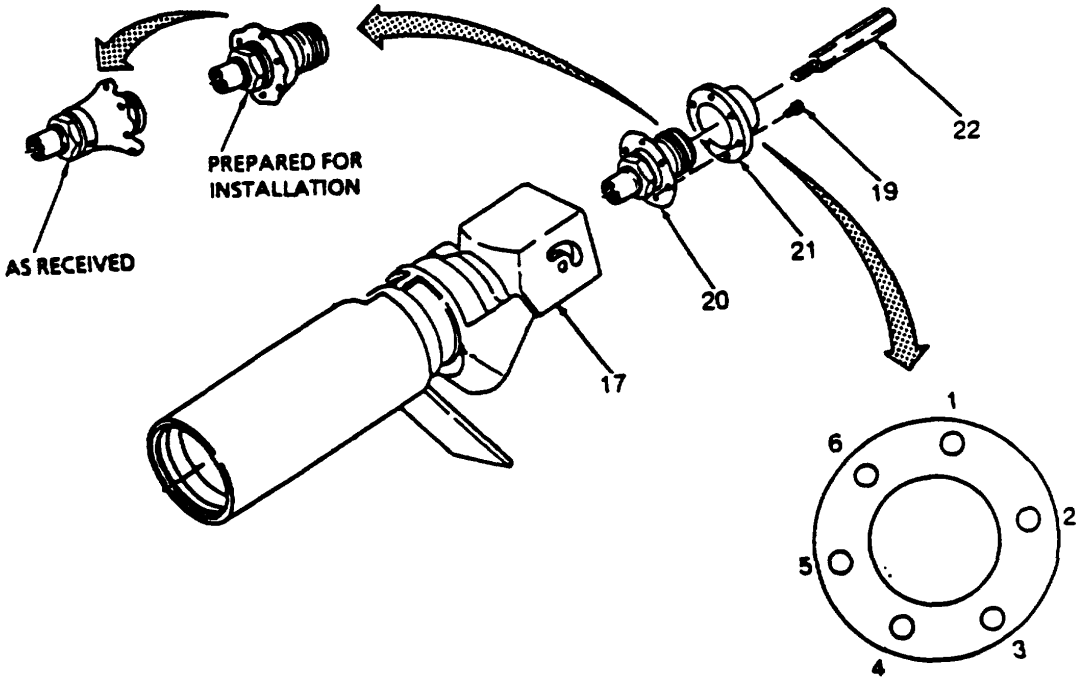
(22) Secure diaphragm retainer (21) to housing (17) using six screws (19) as follows:

(a) Tighten six screws (19) in the sequence shown.

(b) Using a torque wrench .tighten screw 1 to 15 in-lb. Repeat in order for screws 5, 3, 6, 4, and 2.

(c) Repeat step (b), tightening to a torque of 20 in-lb.

(d) Repeat step (b) tightening to a torque of 25 in-lb.



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5-2. CCR NOZZLE ASSEMBLY REPAIR - continued.

c. Assembly - continued.

(23) Insert flow guide (26), valve spring (25) and sleeve seal (24) into housing (17). Push sleeve seal and valve spring down with compression tool until the tool locks onto the collar (28).

WARNING

Assembly under spring pressure, injury possible. If collar is push/pulled to the rear piston tool and sleeve seal will be discharged under pressure. Do not removed piston compression tool until assembly is complete.

(24) Install diaphragm carrier wrench into vise. Position square end of housing (17) on carrier wrench and slowly turn until housing seats itself.

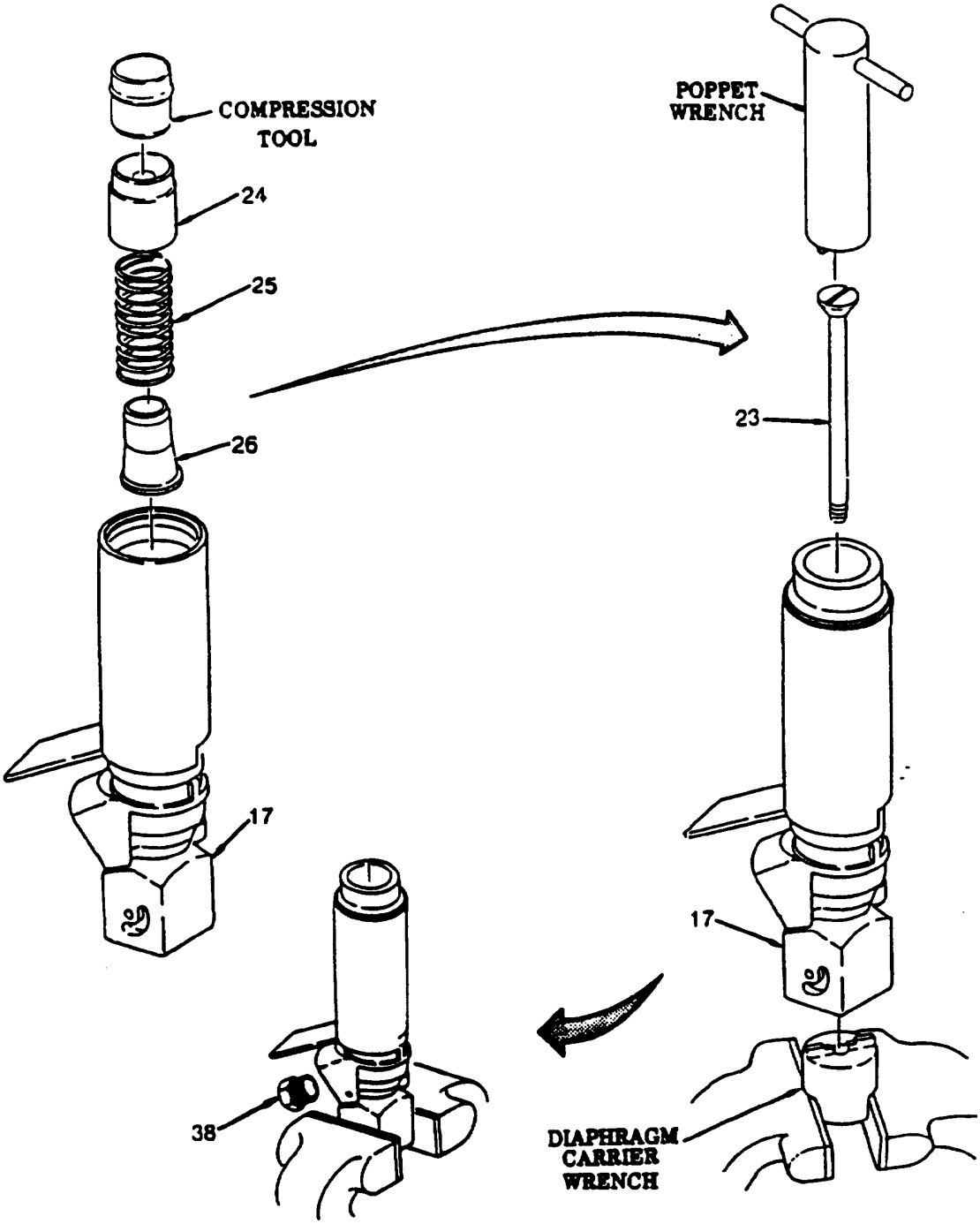
(25) Install poppet (23) through compression tool and tighten with the poppet wrench. Remove poppet wrench; and remove nozzle assembly from diaphragm carrier wrench; remove carrier wrench from vice.

(26) Check diaphragm assembly (20) for movement by gently pulling flow indicator (22) until it stops, then release.

(27) Install strainer housing (38) into housing (17).

5-2. CCR NOZZLE ASSEMBLY REPAIR - continued.

c. Assembly - continued.



5-2. CCR NOZZLE ASSEMBLY REPAIR - continued.

c. Assembly - continued.

(28) Using a soft jaw chuck or vise, assemble actuating cam (14) on the right handle side plate (12) with screws (13) torque to 150 in-lb. Repeat for remaining side plate (12).

NOTE

Actuating cam must be behind diaphragm retainer .

(29) Place nozzle assembly into soft faced vise and position one washer (10) on housing (17) and insert the left side actuating cam (14) into the curved slot on housing (17) with the handle side plate (12) in the OPEN (up) position.

(30) Insert bushing (11) into handle side plate (12); place second washer (10) on outside of handle side plate and secure to housing (17) with screw (9). Tighten screw (9) to 135 - 150 in-lb torque.

(31) Insert spring (16) and valve latch actuator (15) into housing (17) latch cavity (right side). Attach the right side handle side plate and parts as described in steps 30 and 31 while holding the valve latch actuator (15).

(32) Mount the handle (8) between the two handle side plates (12) and secure with four screws (7). Tighten four screws (7) to 50±5 in-lbs torque.

(33) Install valve actuating ring (18) into housing (17) by screwing it onto the diaphragm assembly (21) until .105 - .135 inch of diaphragm assembly (21) shows past the valve actuating ring (18). Use dial caliper to verify the .105 - .135 inch requirement. Holes in valve actuating ring should be in the OPEN/CLOSED position.

(34) Install regulator spring (6) and spring retainer (5) into housing (17) over flow indicator.

NOTE
Position lockpin at the top or bottom of housing.

(35) Carefully install lockpin (4) on end plate (2) using a soft jaw chuck or vise with screw (3).

(36) Position end plate (2) on housing (17). Ensure lockpin (4) is in valve actuating ring (18) and the spring retainer (5) is positioned in the center hold.

WARNING
End cover is under spring pressure. Keep pressure on end cover while installing screws.

(37) Secure end plate (2) to housing (17) with four screws (1).

(38) Place handle (8) in the CLOSED position and pull collar (28) to remove piston compression tool.

NOTE
If strainer components and ground cables were removed, assemble (ref. 4-10).

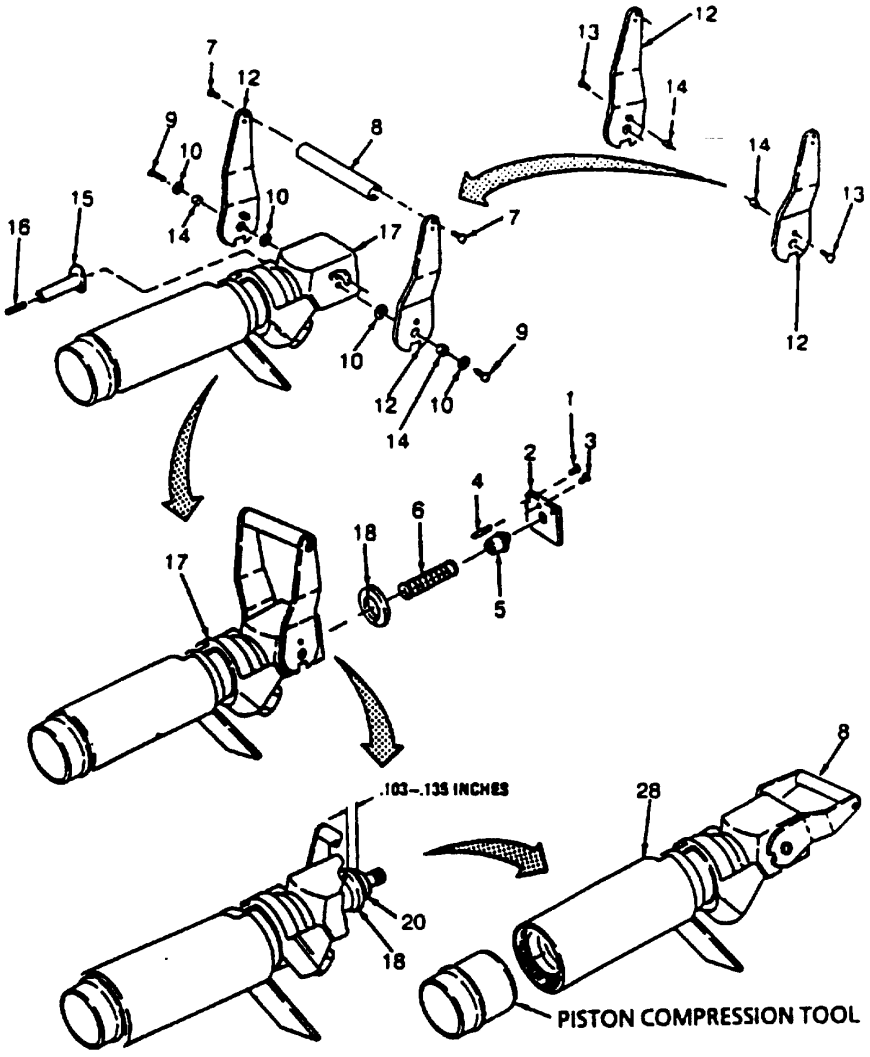
5-2. CCR NOZZLE ASSEMBLY REPAIR - continued.

CAUTIONS

Failure of any test is cause for rejection of nozzle assembly until fault is corrected.

If strainer housing or coupling threads leak, tighten one thread. Do not over tighten. Failure to comply can result in damage to parts.

d. Test. After repair and prior to release for aircraft refueling, test nozzle in an operating, pressurized refueling system to ensure no leakage occurs.



5-3. GFA ASSEMBLY REPAIR

This task consists of: a. Disassembly b. Repair c. Assembly

INITIAL SETUP:

Tools:
Tool Kit, General Mechanics (Item 3, Appendix B)
Adapter Tool (Item 10, Appendix B)
Stem Guide Tool (Item 11, Appendix B)
Stem Packing Tool (Item 12, Appendix B)
Vise (with soft face jaws) (Item 4, Appendix B)
Wrench, 1-1/2 inch box (Item 4, Appendix B)
Wrench, 0-150 in-lb (Item 4, Appendix B)

General Safety Requirement:

WARNINGS

- Fuels are toxic and flammable. Do not get fuel on person or clothing. Do not use near open flame. Area should be well ventilated. DO NOT SMOKE.
- Using dry cleaning solvent incorrectly can cause injury or even death.

Materials/Part Required:
Rags (Item 2, Appendix E)
Solvent (Item 1, Appendix E)
Seal, Molded (Item 7, Appendix G)
Packing (Item 8, Appendix G)
Packing (Item 9, Appendix G)
Preformed Packing (Item 10, Appendix G)
Retaining Ring (Item 11, Appendix G)
Lock washer (Item 12, Appendix G)
Poppet, Molded Seal (Item 13, Appendix G)

Equipment Condition:
GFA removed from CCR Nozzle (refer to system T.M.).

a. Disassembly.

(1) Remove dust cap and plug (1) from body (28).

(2) Place body (29) into vise and insert adapter tool into inlet end of adapter (2) and remove adapter (2) from body (29). Remove adapter tool

(3) Remove poppet (3), poppet spring (4) and poppet guide (5) from body (29).

(4) Remove preformed packing (6) from inlet end of body (29). Discard packing.

(5) Remove valve cap (7) and packing (8) from body (29). Discard packing.

(6) Remove valve spring (9)and lift cap (10) from body (29).

(7) Remove valve stem (11) from body (29) with snap rings (12) and molded seal (13) attached.

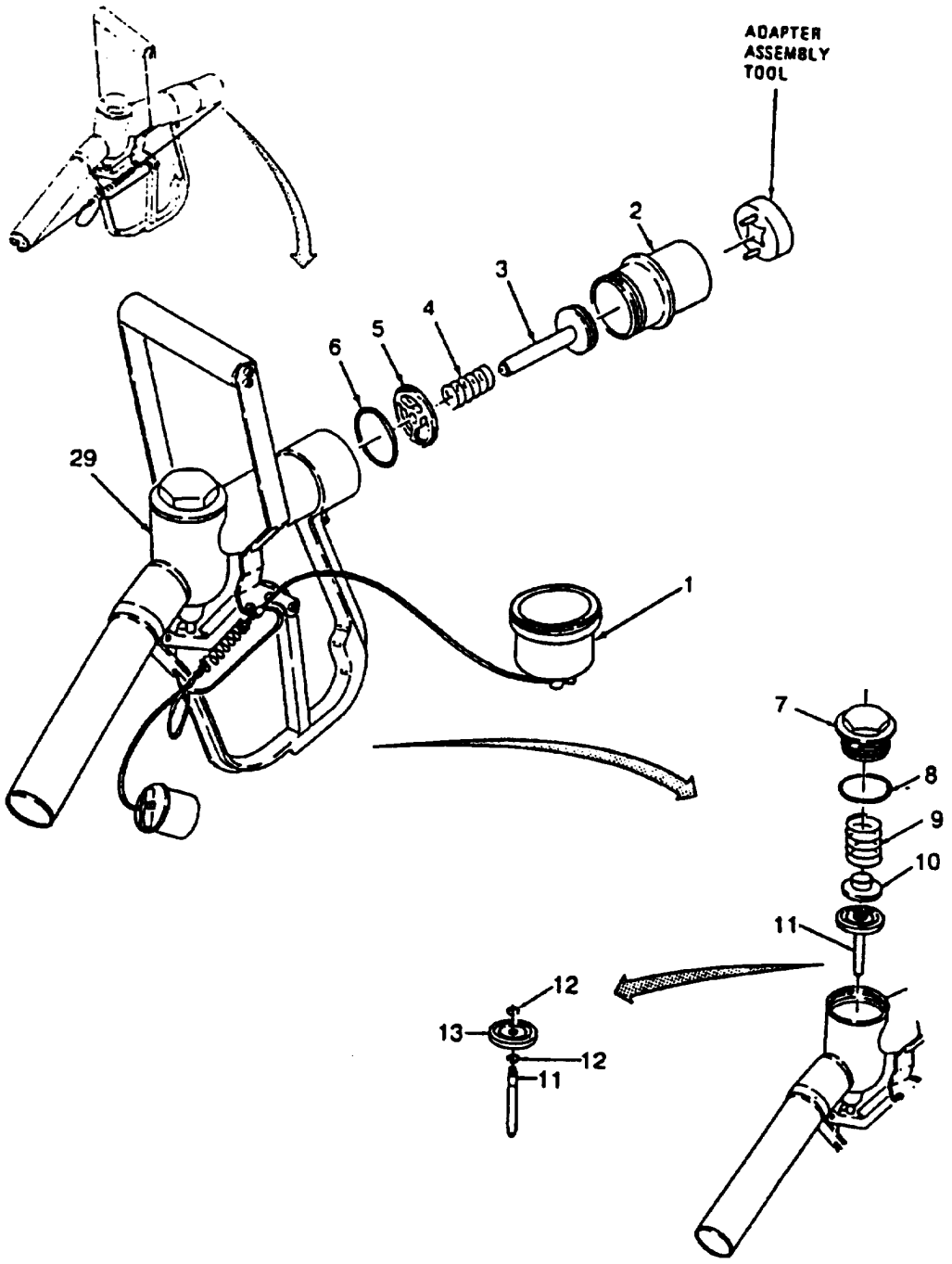
(8) Remove top snap ring (12) from valve stem (11).

(9) Remove molded seal (13) from valve stem (11). Discard molded seal.

(10) Remove remaining snap ring (12) from lower position on valve stem (11).

5-3. GFA ASSEMBLY REPAIR - continued.

a. Disassembly - continued



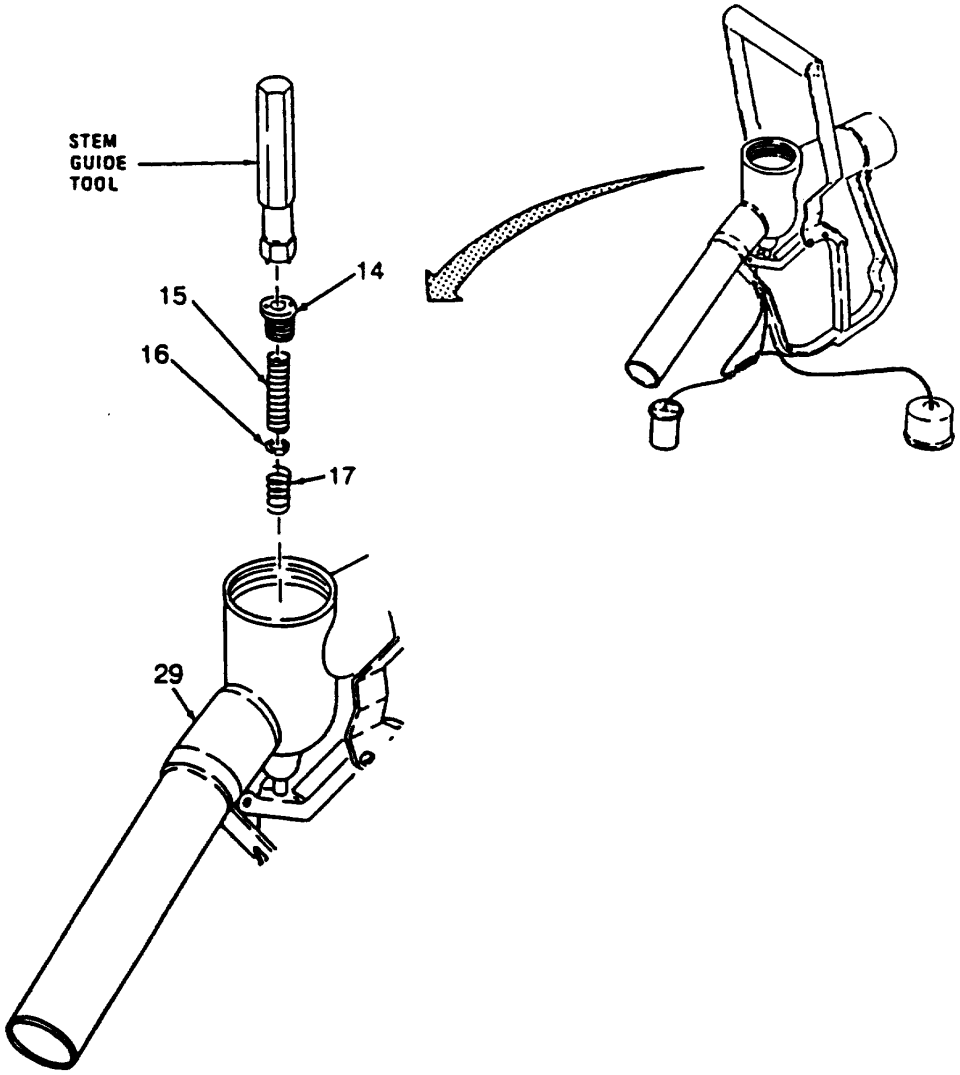
5-3. GFA ASSEMBLY REPAIR - continued.

a. Disassembly - continued

(12) Unscrew stem guide (14) from body (29) using stem guide tool.

(13) Remove stem packing spring (15) and packing cap (16) from body (29).

(14) Remove packing (17) from body (29).



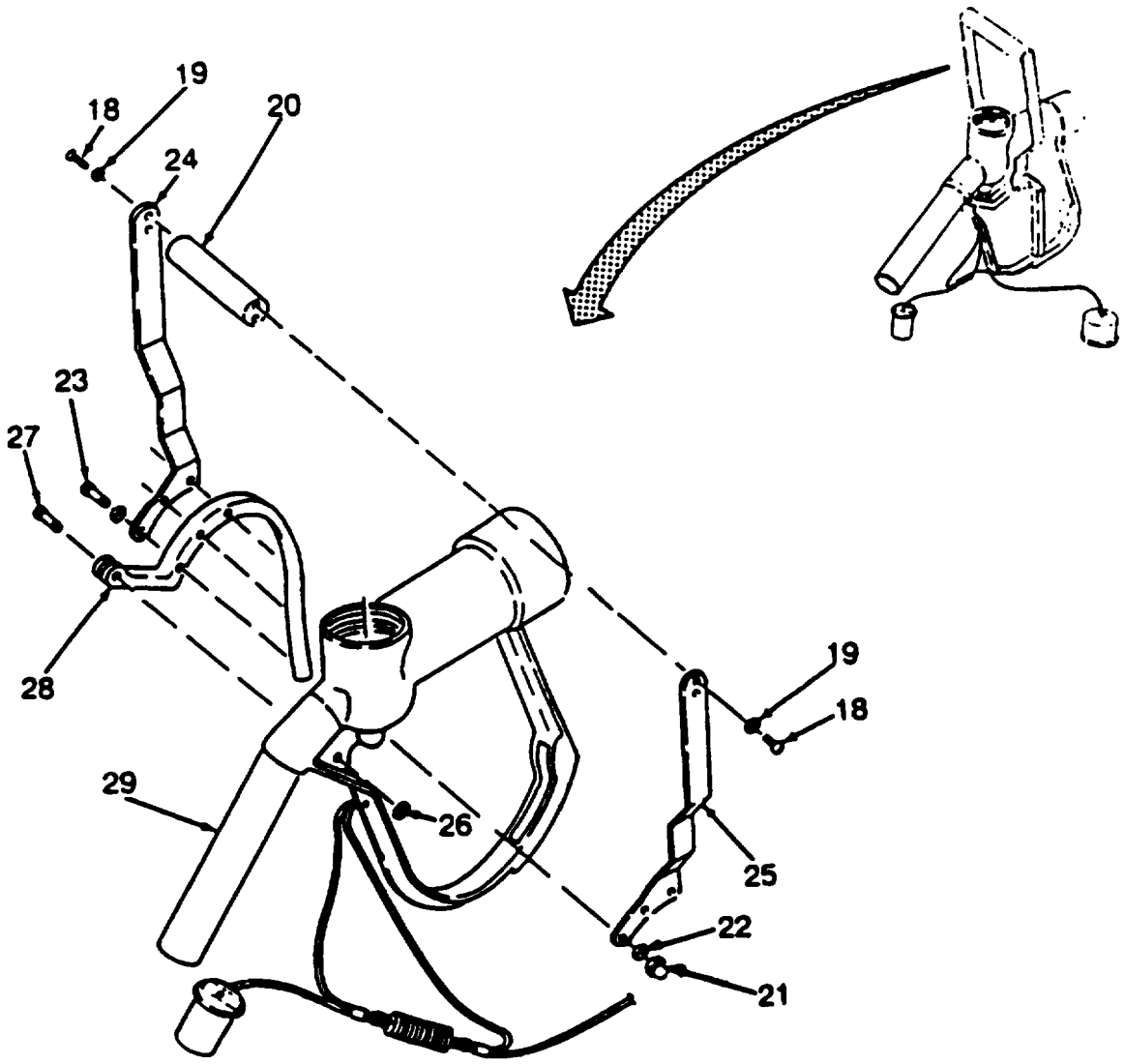
5-3. GFA ASSEMBLY REPAIR - continued.

a. Disassembly - continued.

(15) Remove four screws (18), four lock washers (19), and actuating handle (20) from operating levers (23)(24). Discard lock washers.

(16) Remove three cap nuts (21), six flat washers (22) and three screws (23) and remove actuating levers (24)(25).

(17) Remove retaining ring (26) and lever pin (27) and remove actuator lever (28) from body (29). Discard retaining ring.



5-3. GFA ASSEMBLY REPAIR - continued.

a. Disassembly - continued.

WARNING

Dry cleaning solvent, AA-711-Types I and II used to clean parts is potentially dangerous to personnel and property. Use in a well-ventilated area as the fumes are dangerous if inhaled. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 138°F.

b. Repair.

(1) Clean all parts in dry cleaning solvent

(2) Inspect all parts for damage. Look for damaged threads, broken, worn, scored, or deformed parts, cracks or corrosion.

(3) Replace any damaged parts found during inspection.

c. Assembly.

(1) Position actuator lever (28) on body (29) and secure with lever pin (27) and retaining ring (26).

(2) Align the three holes in the right operating lever (24) and left operating lever (25) with the three holes in actuator lever (28).

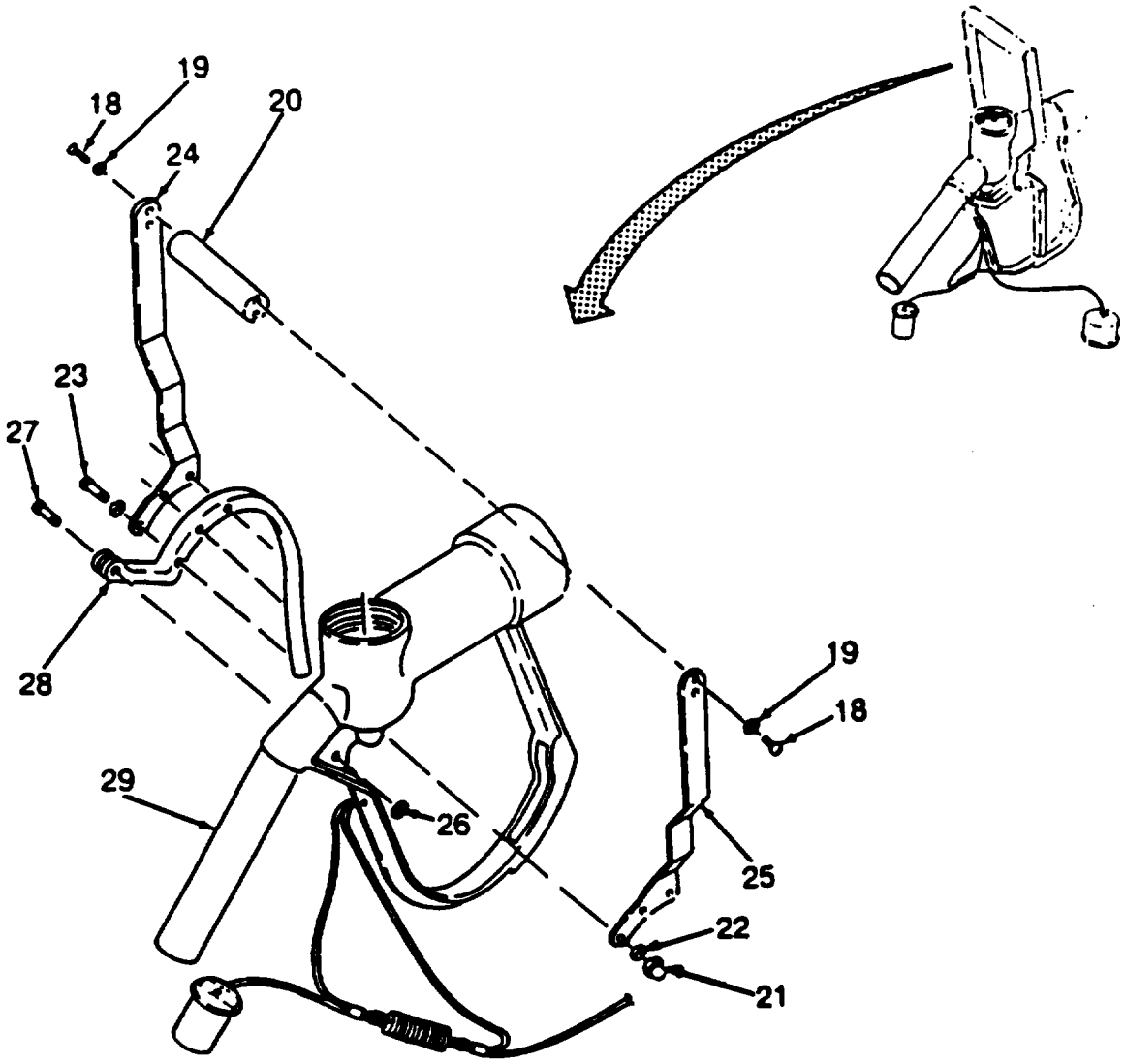
(3) Install three screws (23), six flat washers (22) and three lock nuts (21), tighten hand tight only.

(4) Install the valve actuating handle (20) between the two operating levers (24) and (25) and install four lock washers (19) and four screws (18).

(5) Tighten the three nuts (21) and three screws (23) installed in Step (3).

5-3. GFA ASSEMBLY REPAIR-continued.

c. Assembly-continued



5-3. GFA ASSEMBLY REPAIR-continued.

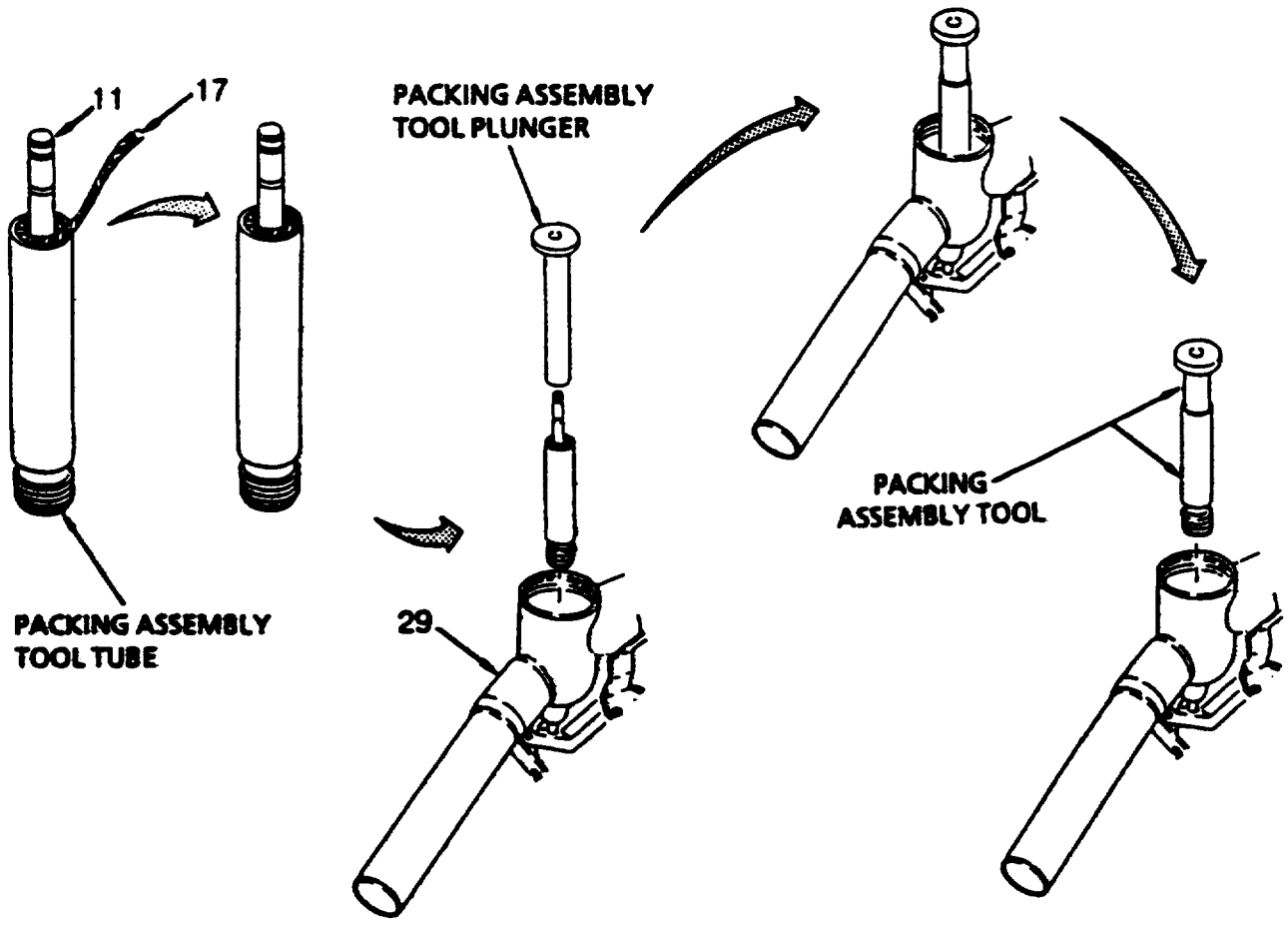
c. Assembly-continued.

(6) Apply silicone compound on valve stem (11).
(7) Insert valve stem (11) into packing assembly tool tube with grooves facing up.
(8) Apply silicone compound stem packing (17) and wrap around valve stem (11) while pushing the packing into the packing assembly tool tube.
(9) Place body (29) in soft face vise.
(10) Screw packing assembly tool tube into body (29), hand tight only.
(11) Insert packing assembly tool plunger into tube until plunger bottoms out. Lightly tap plunger with soft face hammer.

CAUTION

Damage to packing may result if valve stem is removed. Do not remove valve stem from body after packing has been installed.

(12) Remove packing assembly tool from body (29).



5-3. GFA ASSEMBLY REPAIR-Continued

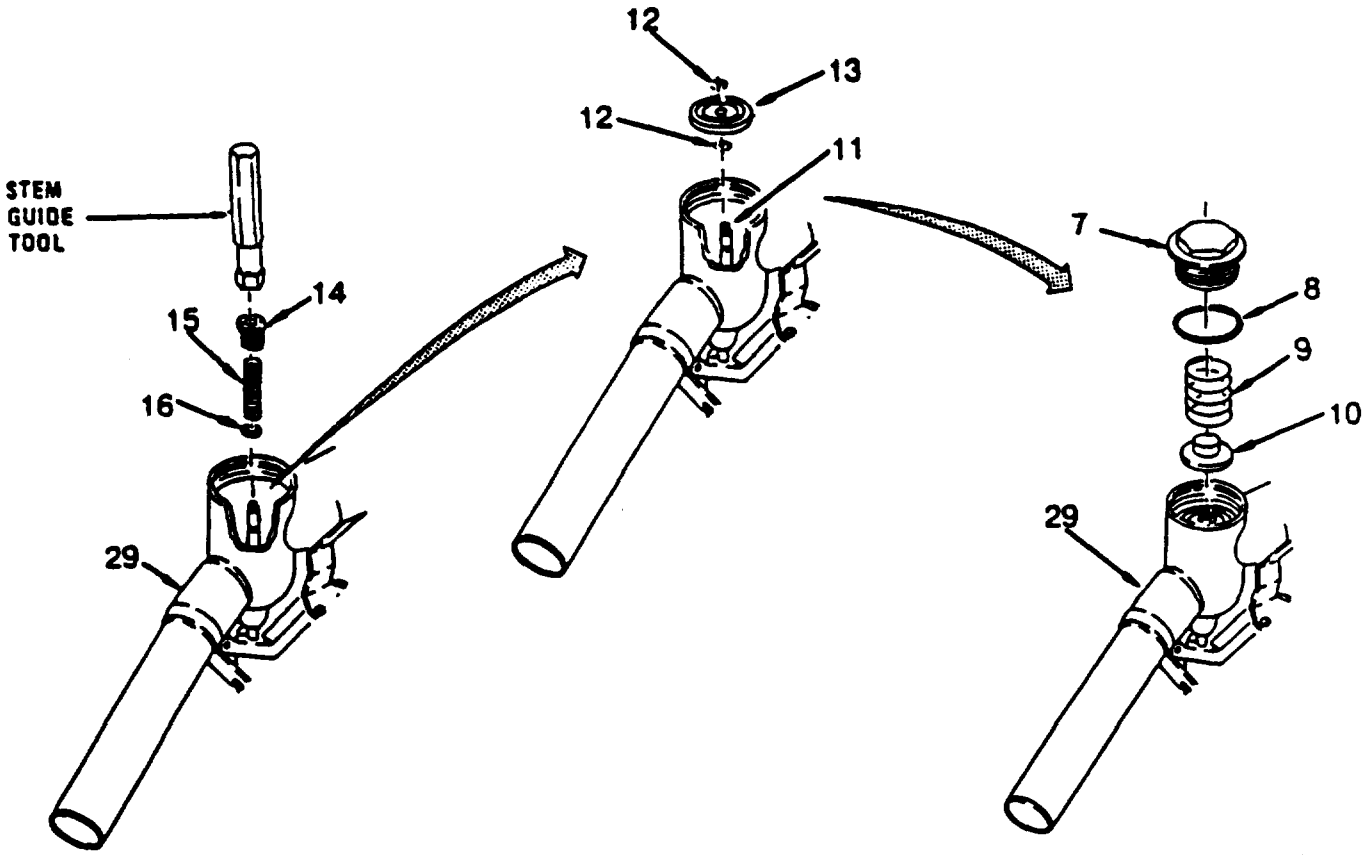
c. Assembly-continued.

(13) Install packing cap (16) with bevel facing down and stem packing spring (15) in body (29).
(14) Install stem guide (14) into body (29) using stem guide tool and torque to 28-30 in lb.

NOTE

The two grooves in the valve stem are at the top of the stem.

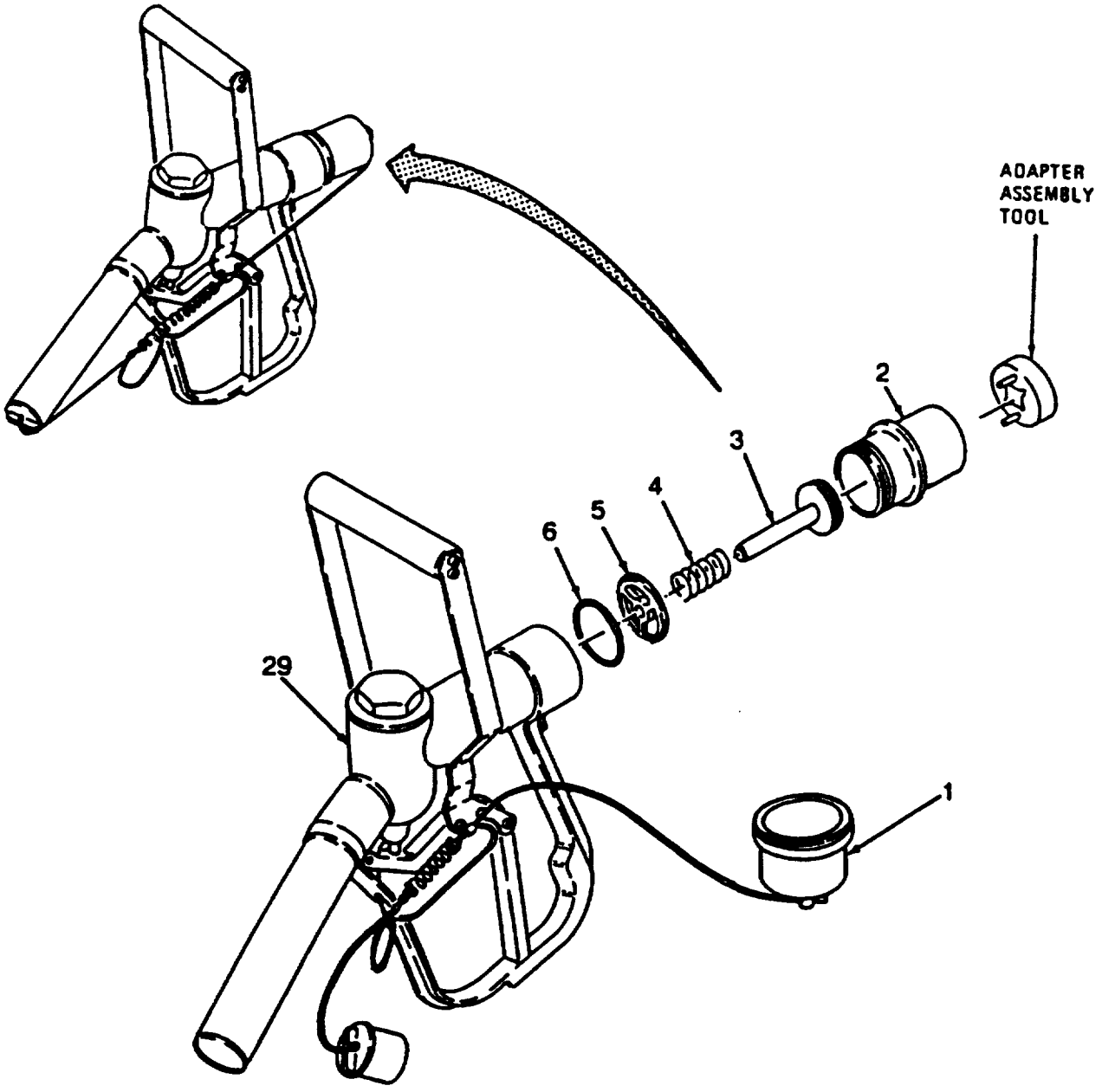
(15) Install one snap ring (12) on lower groove in valve stem (11).
(16) Install the molded seal (13) with beveled end facing down. Install the second snap ring (12) above the molded seal (13).
(17) Install lift cap (10) and valve spring (9) in body (29).
(18) Install preformed packing (8) on valve cap (7).
(19) Install valve cap (7) on body (29).



5-3. GFA ASSEMBLY REPAIR-continued.

c. Assembly-continued.

(20) Install preformed packing (6) into groove in body (29).
(21) Install poppet guide (5), poppet spring (4) and poppet (3) into body (28).
(22) Insert adapter tool into adapter (2).
(23) Install adapter (2) into body (28). Remove adapter tool.
(24) Install dust cap and plug (1).



APPENDIX A
REFERENCES

A-1. SCOPE.

This appendix lists all forms, field manuals, technical manuals, and miscellaneous publications referenced in this manual. Also listed are publications that should be consulted for additional information.

A-2. FORMS.

Recommended Changes to Publications and Blank Forms	DA Form 2028
Recommended Changes to Equipment Technical Publications	DA Form 2028-2
Equipment Inspection and Maintenance Worksheet	DA Form 2404
Maintenance Request	DA Form 2407
Equipment Log Assembly (Records)	DA Form 2408-9
Quality Deficiency Report	STD Form 368

A-3. FIELD MANUALS.

NBC Contamination Avoidance	FM 3-3
NBC Protection	FM 3-4
NBC Decontamination	FM 3-5
Aircraft Refueling	FM 10-68
Petroleum Supply Point Equipment and Operations	FM 10-69
Organizational Maintenance of Military Petroleum Pipelines, Tanks and Related Equipment	FM 10-20
Fist Aid for Soldiers	FM 21-11
Rigging, Loading and Dropping Procedures	FM 10-564
Basic Cold Weather Manual	FM 31-70
Northern Options	FM 31-71

A-4. TECHNICAL MANUALS.

Destruction of Army Material to Prevent Enemy Use	TM 750-224-3

A-5. MISCELLANEOUS.

The Army Maintenance Management System	DA PAM 738-750
Security Procedures	AR 190-11, AR 190-13
Packing of Army Material for Shipment and Storage	AR 746-1

Appendix B. MAINTENANCE ALLOCATION CHART (MAC)

INTRODUCTION

B-1. THE ARMY MAINTENANCE SYSTEM MAC.

a. This introduction (section I) provides a general explanation of all maintenance and repair functions authorized at various maintenance levels under the standard Army Maintenance System concept.

b. The Maintenance Allocation Chart (MAC) in section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be constant with the capacities and capabilities of the designated maintenance levels, which are shown in the MAC in column (4) as:

Unit-includes two subcolumn, C (operator/crew) and O (unit) maintenance.
Direct Support-includes an F subcolumn.
General Support-includes an H subcolumn.
Depot-includes an D subcolumn.

c. Section III lists the tools and test equipment (both special tools and common tools sets) required for each maintenance function as referenced from section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS. MAINTENANCE FUNCTIONS WILL BE LIMITED TO AND DEFINED AS FOLLOWS:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (i.e., by sight, sound, or feel).

b. Test. To verify serviceability 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 decontamination, when required), to preserve, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

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

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

g. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. Replace is authorized by the MAC and is shown as the 3rd position code of the SMR code.

i. Repair. The application of maintenance services[1] including fault location/troubleshooting[2], removal/installation, and disassembly/assembly[3] procedures, and maintenance actions[4] to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), and item, or system.

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

k. Rebuild. Consists of those service/actions necessary for the restoration of unserviceable equipment to a like-new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in carrying Army equipment and components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II.

a. Column 1-Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2-Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3-Maintenance Function. Column 3 list the functions to be performed on the item listed in column 2. (For detailed explanation of these functions, see paragraph NO TAG-2.)

d. Column 4-Maintenance Category. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance categories, appropriate work time figures will be shown for each category. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting fault location time, and quality assurance control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance categories are as follows:

C Operator or Crew
O Unit Maintenance
F Direct Support Maintenance
H General Support Maintenance
D Depot Maintenance

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[1]Service-Inspect, test, service, adjust, aline, calibrate, and/or replace

[2]Fault location/troubleshooting-The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UUT).

[3]Disassembly/assembly-The step-by-step breakdown (taking apart) of a spare/functional group coded item to the level of its least component, that is assigned as SMR code for the level of maintenance under consideration (i.e., identification as maintenance significant).

[4]Actions-Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

e. Column 5-Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. Column 6-Remarks. This column shall when applicable, contain a letter code, in alphabetic order, which shall be keyed to the remarks contained in section IV.

B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS. SECTION III.

a. Column 1-Reference Code. The tool and 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 Stock Number. The National stock number of the tool or test equipment.

e. Column 5-Tool Number. The manufacturer's part number.

B-5. EXPLANATION OF COLUMNS IN REMARKS 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.

MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS & EQUIP.	(6) RE-MARKS
			UNIT		DS	GS	DEPOT		
			C	O	F	H	D		
00	Closed-Circuit Refueling Nozzle Assembly with Adapter	INSPECT REPLACE REPAIR							
01	Closed-Circuit Refueling Nozzle Assembly	INSPECT REPLACE REPAIR	0.5	 0.5 0.5	 2.5			 1,2 3,4,5,6,7,8,9	 A
02	Adapter	INSPECT REPLACE REPAIR	0.2	0.5 0.5 0.5				 3,4 10,11,12	 A

TOOLS AND TEST EQUIPMENT REQUIREMENTS

(1) REFERENCE CODE	(2) MAINTENANCE CATEGORY	(3) NOMENCLATURE	(4) NATIONAL STOCK NUMBER (NSN)	(5) TOOL NUMBER
1	O	Tool Kit, General Mechanics	5180-00-177-7033	SC-5180-90-CL-N26
2	O	Shop Set, Automotive Vehicle	4910-00-754-0654	SC-4910-95-CL-A74
3	F	Tool Kit, General Mechanics	5180-00-699-5273	SC-5180-90-CL-N05
4	F	Shop Equipment, Automotive	4910-00-754-0705	SC-4910-95-CL-A31
5	F	Body Wrench		220281
6	F	Diaphragm Carrier Wrench		220282
7	F	Piston Compression Tool		220283
8	F	Locking Lug Assembly Tool		220284
9	F	Poppet Wrench		220329
10	F	GFA Assembly Tool		AT220217
11	F	Stem Guide Tool		AF220221
12	F	Packing Assembly Tool		AF64014

REMARKS

REFERENCE CODE	REMARKS
A	Repair limited to replacement of defective parts.

APPENDIX C

UNIT, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

INTRODUCTION

C-1. SCOPE. This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of unit, direct support maintenance of the Closed-Circuit Refueling Nozzle and Gravity Fill Adapter, Arctic Service. It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools as indicated by the source, maintenance and recoverability (SMR) codes.

C-2. GENERAL. In addition to this section, Introduction, this Repair Parts and Special Tools List is divided into the following sections:

a. Section II. Repair Parts List. A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. This list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Bulk materials are listed in item name sequence. Items listed are shown in the associated illustration(s)/figure(s).

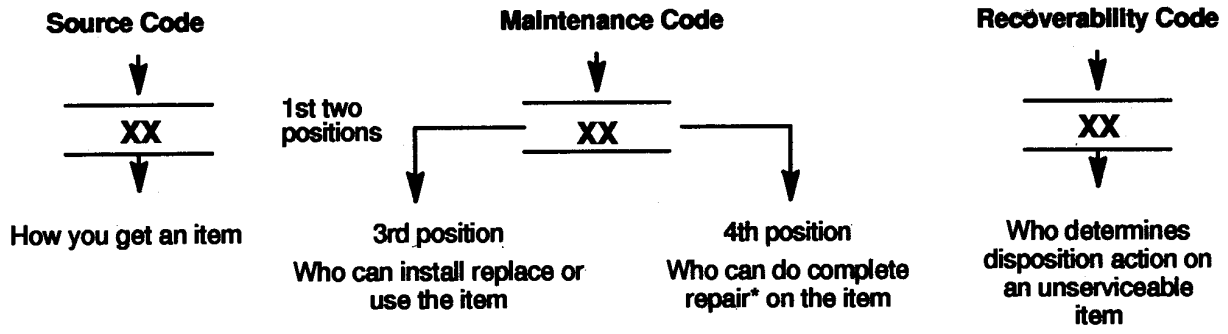
b. Section III. Special Tools List. A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in DESCRIPTION AND USABLE ON CODE column) for the performance of maintenance.

c. Section IV. Cross-Reference Index. A list, in National Item Identification Number (NIIN) sequence, of all national stock numbered items appearing in the listing, followed by a list in alphanumeric sequence of all part numbers appearing in the listings. National stock numbers and part numbers are cross referenced to each illustration figure and item number appearance. The figure and item number index lists figure and item numbers in alphanumeric sequence and cross references NSN, CAGEC and part number.

C-3. EXPLANATION OF COLUMNS (SECTIONS II AND III).

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

b. SMR Code (Column (2)). The Source, Maintenance, and Recoverability (SMR) code is a 5-position code containing supply/requisitioning information, maintenance category authorization criteria, and disposition instruction, as shown in the following breakout:



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

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

Source Code	Explanation
PA PB PC** PD PE PF PG	Stocked items; use the applicable NSN to request/requisition items with these source codes. They are authorized to the category indicated by the code entered in the 3rd position of the SMR code. **NOTE : Items coded PC are subject to deterioration.
KD KF KB	Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance category indicated in the 3rd position of the SMR code. The complete kit must be requisitioned and applied.
MO (Made at Unit/AVUM Level) MF (Made at DS/AVIM Level) MH (Made at GS Level) ML (Made at Specialized Repair Activity (SRA)) MD (Made at Depot)	Items with these codes are not to be requested/requisitioned individually. They must be made from bulk material which is identified by the part number in the DESCRIPTION and USABLE ON CODE (UOC) column and listed in the Bulk Material group of the repair parts list in the RPSTL. If the item is authorized to you by the 3rd position code of the SMR code, but the source code indicates it is made at a higher level, order the item from the higher level of maintenance.
AO (Assembled by Unit/AVUM Level) AF (Assembled by DS/AVIM Level) AH (Assembled by GS Category) AL (Assembled by SRA) AD (Assembled by Depot)	Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the 3rd position code of the SMR code, authorizes you to replace the item, but the source code indicates the items are assembled at a higher level, order the item from the higher level of maintenance.

XA Do not requisition an "XA"-coded item. Order its next higher assembly. (Also, refer to the NOTE below.)
XB If an "XB" item is not available from salvage, order it using the CAGE Code and part number given.
XC Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number.
XD Item is not stocked. Order an "XD"-coded item through normal supply channels using the CAGE Code and part number given, if no NSN is available.

NOTE

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes, except for those source coded "XA" or those aircraft support items restricted by requirements of AR 750-1.

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

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

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

(b) The maintenance code entered in the fourth position tells whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (i.e., perform all authorized repair functions).

NOTE

Some limited repair may be done on an item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.

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

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

Recoverability Codes		Application/Explanation
Z	-	Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in 3rd position of SMR Code.
O	-	Reparable item. When not economically reparable, condemn and dispose of the item at unit or AVUM level.
F	-	Reparable item. When uneconomically reparable, condemn and dispose of the item at the direct support or AVIM level.
H	-	Reparable item. When uneconomically reparable, condemn and dispose of the item at the general support level.
D	-	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item not authorized below depot level.

L - Reparable item. Condemnation and disposal not authorized below specialized repair activity (SRA).

A - Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

c. CAGEC (Column (3)). The Commercial and Government Entity Code (CAGEC) is a 5-digit numeric code which is used to identify the manufacturer, distributor, or Government agency/activity that supplies the item.

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

NOTE

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

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

(1) The Federal item name and, when required, a minimum description to identify the item.
(2) Part numbers of bulk materials are referenced in this column in the line entry for the item to be manufactured/fabricated.
(3) The statement END OF FIGURE" appears just below the last item description in Column (5) for a given figure in both Section II and Section III.

f. QTY (Column (6)). The QTY (quantity per figure) column indicates the quantity of the item used in the breakout shown on the illustration/figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column instead of a quantity indicates that the quantity is variable and may vary from application to application.

C-4. EXPLANATION OF INDEX FORMAT AND COLUMNS (SECTION IV).

a. NATIONAL STOCK NUMBER (NSN) INDEX.

(1) STOCK NUMBER Column. This column lists the NSN in national item identification number (NIIN) sequence. The NIIN consists of the last nine digits of the NSN, i.e.

NSN
5305-01-574-1467
NIIN

When using this column to locate an item, ignore the first four digits of the NSN. Use the complete NSN (13 digits) when requisitioning items by stock number.

(2) FIG. Column. This column lists the number of the figure where the item is identified/located. The figures are in numerical order in Section II and Section III.
(3) ITEM Column. The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

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

(1) CAGEC Column. The Commercial and Government Entity Code (CAGEC) is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency/activity that supplies the item.

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

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

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

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

c. FIGURE AND ITEM NUMBER INDEX.

(1) FIG. Column. This column lists the number of the figure where the item is identified/located in Section II and Section Ill.
(2) ITEM Column. The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.
(3) STOCK NUMBER Column. This column lists the NSN for the item.
(4) CAGEC Column. The Commercial and Government Entity Code (CAGEC) is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency/activity that supplies the item.
(5) PART NUMBER Column. Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

C-5. SPECIAL INFORMATION.

a. USABLE ON CODE. The usable on code appears in the lower left comer of the Description column heading. Usable on codes are shown as "UOC:.." in the Description Column (justified left) on the last line of the applicable item description/nomenclature. Uncoded items are applicable to all models. Identification of the usable on codes used in this RPSTL are:

Code	Used On

b. FABRICATION INSTRUCTIONS. Bulk materials required to manufacture items are listed in the Bulk Material Functional Group of this RPSTL. Part numbers for bulk materials are also referenced in the description column of the line item entry for the item to be manufactured/fabricated. Detailed fabrication instructions for items source coded to be manufactured or fabricated are found in APPENDIX G.

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

d. ASSOCIATED PUBLICATIONS. The publications listed below pertain to the D-1 Pressure Nozzle, Fuel Servicing, Arctic Service and its components.

Publication	Short Title
TM 10-4930-242-13&P	Operator, Unit and Direct Support Maintenance Manual Including Repair parts and Special Tools List

C-6. HOW TO LOCATE REPAIR PARTS.

a. When National Stock Numbers or Part Numbers are NOT Known.

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

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

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

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

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

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

C-7. ABBREVIATIONS. Abbreviations used in this manual are listed in MIL-STD-12.

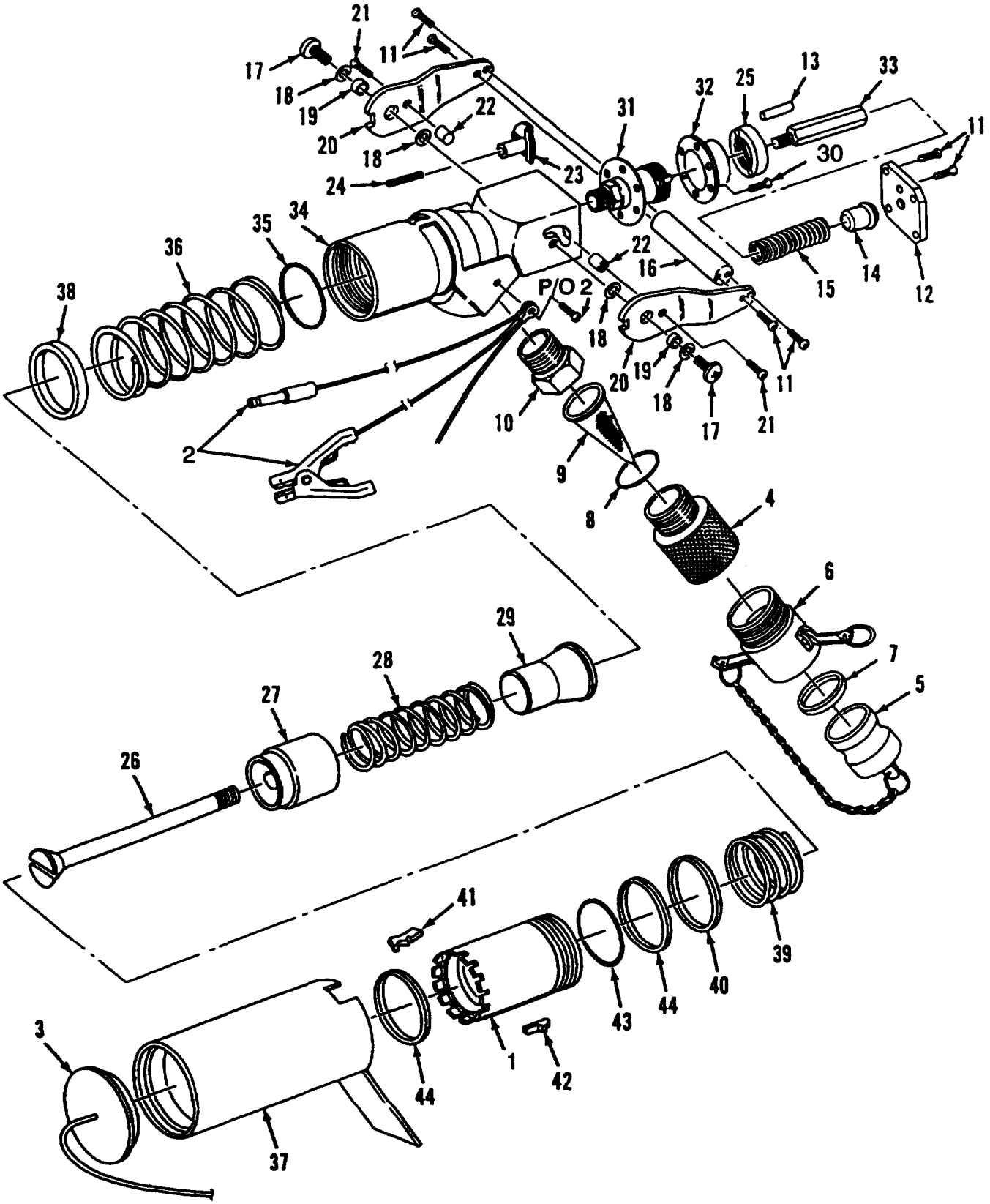


Figure 1. Closed Circuit Refueling Nozzle

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 01 CLOSED-CIRCUIT REFUELING NOZZLE ASSEMBLY	
				FIG. 1 CLOSED CIRCUIT REFUELING NOZZLE	
1	XBFZZ	ODT23	220080	BODY	1
2	PAOZZ	ODT23	47028	CABLE ASSEMBLY, SPEC COMES WITH ATTACHING HARDWARE	1
3	XBOZZ	ODT23	47025-2	CAP, ASSEMBLY, METAL	1
4	XBOZZ	ODT23	220121-2	BODY, STRAINER	1
5	PAOZZ	96906	MS27029-11	PLUG, QUICK DISCONNE	1
6	PAOZZ	96906	MS27026-11	COUPLING HALF, QUICK DISCARD STD GASKET, REPLACE WITH 220126-6(0DT23)	1
7	PCOZZ	ODT23	220126-6	GASKET PART OF KIT P/N KD64017-3	1
8	PCOZZ	96906	MS29513-226	PACKING, PREFORMED PART OF KIT P/N KD64017-3	1
9	PBOZZ	ODT23	220122-100	STRAINER	1
10	XBFZZ	ODT23	220120-2	HOUSING, STRAINER	1
11	XBFZZ	ODT23	LP51958-64	SCREW, PAN HEAD	9
12	XBFZZ	ODT23	220086-2	COVER, END	1
13	XBFZZ	ODT23	220111	PIN, LOCK	1
14	XBFZZ	ODT23	220097	RETAINER, SPRING	1
15	XBFZZ	ODT23	220113	SPRING, REGULATOR	1
16	XBFZZ	ODT23	220095-2	HANDLE, VALVE	1
17	XBFZZ	ODT23	LP51957-108	SCREW, PAN HEAD	2
18	XBFZZ	ODT23	5710-179-60	WASHER	4
19	KFFZZ	ODT23	220101	BUSHING PART OF KIT P/N KD64017-3	2
20	XBFZZ	ODT23	220090-2	SIDE PLATE HANDLE	2
21	XBFZZ	96906	MS16998-42L	SCREW, CAP SOCKET HD	2
22	XBFZZ	ODT23	220109	CAM, ACTUATING	2
23	XBFZZ	ODT23	220202	ACTUATOR, LATCH	1
24	XBFZZ	ODT23	C0180-0126-1000S	SPRING, DETENT	1
25	XBFZZ	ODT23	220098	RING, VALVE ACTUATE	1
26	XBFZZ	ODT23	220088	POPPET	1
27	KFFZZ	ODT23	220083-2	SLEEVE, SEAL PART OF KIT P/N KD64017-3	1
28	XBFZZ	ODT23	220112	SPRING, VALVE	1
29	XBFZZ	ODT23	220326	GUIDE, FLOW	1
30	XBFZZ	96906	MS16997-21L	SCREW, CAP, SOCKET HD	6
31	KFFZZ	ODT23	47060-2	DIAPHRAGM ASSEMBLY PART OF KIT P/N KD64017-3	1
32	XBFZZ	ODT23	220085	RETAINER, DIAPHRAGM	1
33	XBFZZ	ODT23	220160	INDICATOR, POSITION	1
34	XBFZZ	ODT23	220078-2	HOUSING	1
35	KFFZZ	96906	MS29513-136	PACKING, PREFORMED PART OF KIT P/N KD64017-3	1
36	XBFZZ	ODT23	220114	SPRING, COLLAR	1
37	XBFZZ	ODT23	220081-2	COLLAR	1
38	XBFZZ	ODT23	220096	RING, RETAINER	1
39	XBFZZ	ODT23	220103	SPRING, STAY BACK	1

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
40	XBFZZ	ODT23	220099	RING, LUG RETAINER	1
41	XBFZZ	ODT23	220093	LUG, LOCKING	9
42	XBFZZ	ODT23	220104	DETENT, STAY BACK	3
43	XBFZZ	ODT23	220100	WIRE, LUG	1
44	KFFZZ	ODT23	220094-2	SEAL, WIPER PART OF KIT P/N KD64017-3	2
	PCFZZ	ODT23	KD64017-3	MAINTENANCE KIT, NOZ	1
				BUSHING (2) 1-19	
				DIAPHRAGM ASSEMBLY (1) 1-31	
				GASKET (1) 1-7	
				PACKING, PREFORMED (1) 1-8	
				PACKING, PREFORMED (1) 1-35	
				SEAL, WIPER (2) 1-44	
				SLEEVE, SEAL (1) 1-27	

END OF FIGURE

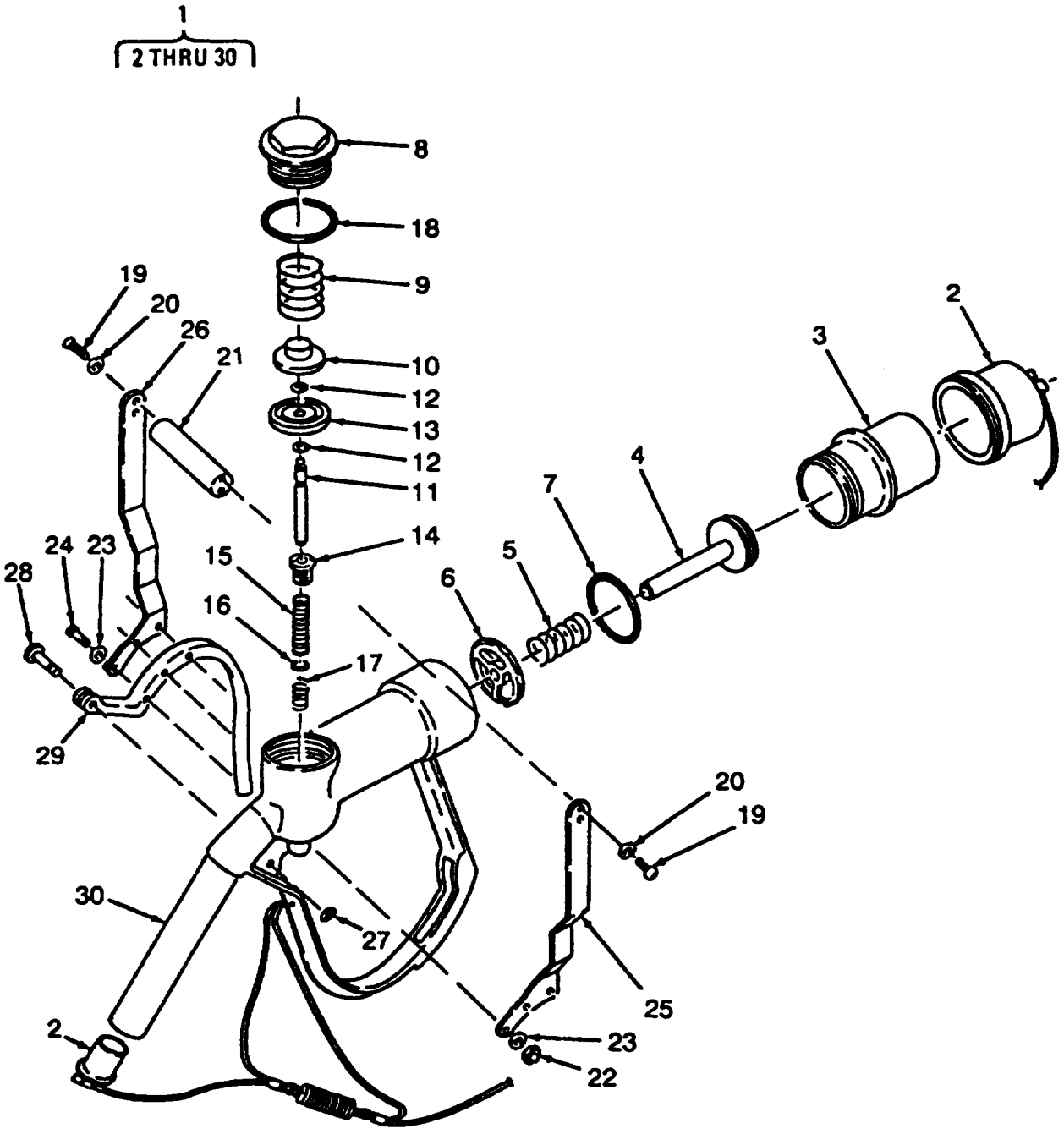


Figure 2. Gravity Fill Adapter

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 02 ADAPTER	
				FIG. 2 GRAVITY FILL ADAPTER	
1	PAOFF	ODT23	64033	NOZZLE, ARCTIC, GFA	1
2	XBOZZ	ODT23	47066-2	.DUST-CAP ASSEMBLY	1
3	XBFZZ	ODT23	220217	.ADAPTER, INLET	1
4	KFFZZ	ODT23	47048	.POPPET, MOLDED SEAL PART OF KIT P/N KD64033	1
5	XBFZZ	ODT23	220208	.SPRING, POPPET	1
6	XBFZZ	ODT23	220209	.GUIDE, POPPET	6
7	KFFZZ	96906	MS259813-135	.PACKING, PREFORMED PART OF KIT P/N KD64033	1
8	XBFZZ	ODT23	220213-2	.CAP, VALVE, MACH	1
9	XBFZZ	ODT23	220230	.SPRING, VALVE	1
10	XBFZZ	ODT23	220223	.CAP, LIFT	1
11	XBFZZ	ODT23	220222	.STEM, VALVE	1
12	XBFZZ	79136	5133-25-H	.RING	2
13	KFFZZ	79136	47068	.SEAL, MOLDED PART OF KIT P/N KD64033	1
14	XBFZZ	ODT23	220221	.GUIDE, STEM	1
15	XBFZZ	ODT23	220231	.SPRING, STEM PACKING	1
16	XBFZZ	ODT23	220232	.CAP, PACKING	1
17	KFFZZ	ODT23	220233	.PACKING PART OF KIT P/N KD64033	1
18	KFFZZ	96906	MS29513-030	.PACKING, PREFORMED PART OF KIT P/N KD64033	1
19	XBFZZ	ODT23	LP51958-64	.SCREW, PAN HEAD	4
20	XBFZZ	96906	MS35338-43	.WASHER, LOCK	4
21	XDOFF	ODT23	220095-2	.HANDLE, VALVE	1
22	XBFZZ	ODT23	220325	.NUT, CAP	3
23	XBFZZ	ODT23	NAS620C8	.WASHER, FLAT	6
24	XBFZZ	ODT23	GF16997-37	.SCREW, SELF LOCKING	3
25	XBFZZ	ODT23	220289-1	.LEVER, LT, OPERATING	1
26	XBFZZ	ODT23	220289-2	.LEVER, RT, OPERATING	1
27	XBFZZ	79136	5115-18-H	.RING, RETAINING	1
28	XBFZZ	ODT23	220228	.PIN, LEVER	1
29	XBFZZ	ODT23	220287	.LEVER, ACTUATOR, MACH	1
30	XBFFF	ODT23	47051-2	.BODY, ASSY, WELDMENT	1
	PCFZZ	ODT23	KD64033	.KIT, GFA, ARCTIC	1
				PACKING (1) 2-17	
				PACKING, PREFORMED (1) 2-7	
				PACKING, PREFORMED (1) 2-18	
				POPPET, MOLDED SEAL (1) 2-4	
				SEAL, MOLDED (1) 2-13	

END OF FIGURE

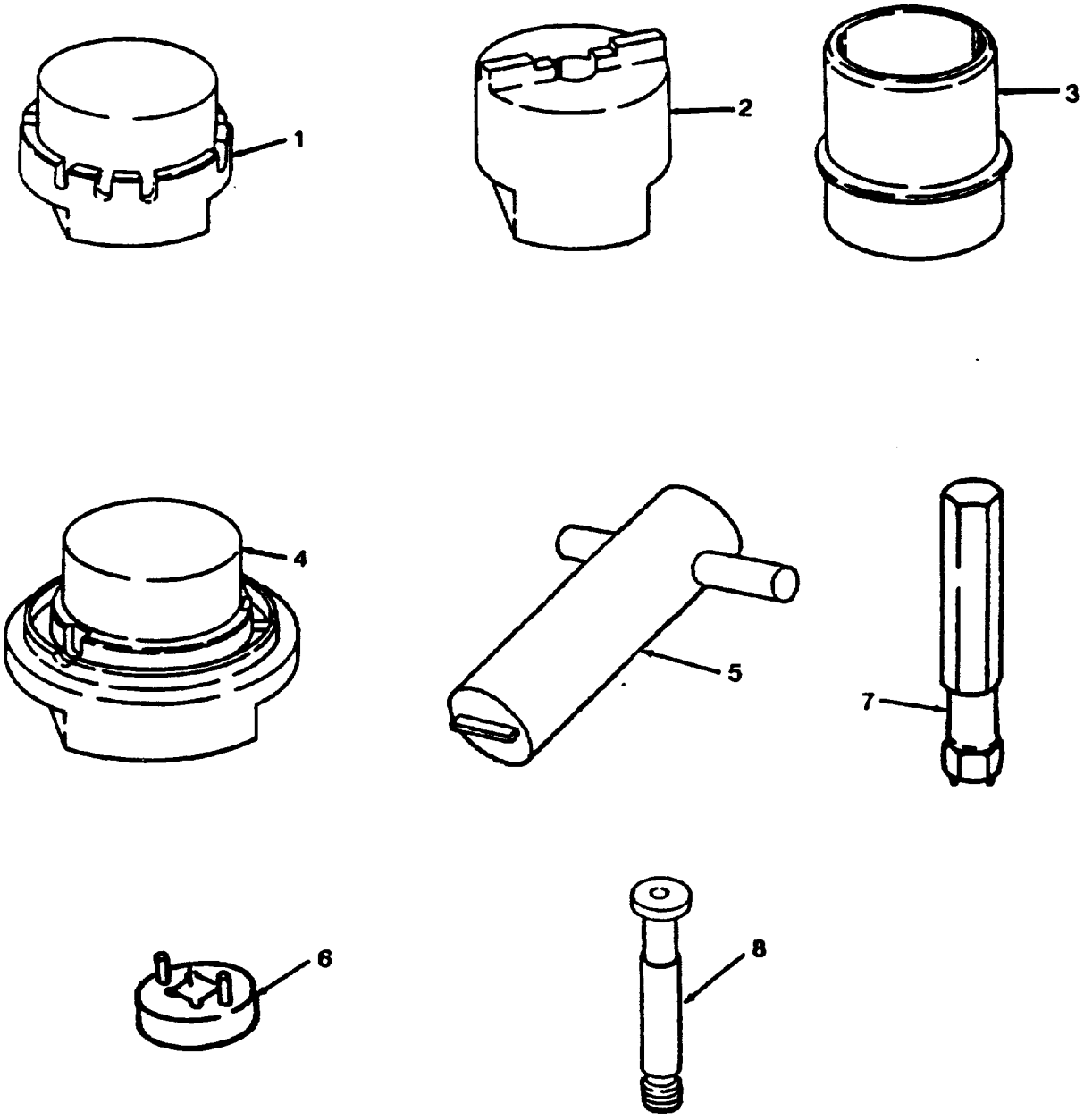


Figure 3 Special Tools

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 03 SPECIAL TOOLS	
				FIG. 3 SPECIAL TOOLS	
1	PFFZZ	ODT23	220281	SOCKET, WRENCH, FACE USED WITH CLOSED CIRCUIT REFUELING NOZZLE	
2	PFFZZ	ODT23	220282	WRENCH, DIAPHRAGM USED WITH CLOSED CIRCUIT REFUELING NOZZLE.....	
3	PFFZZ	ODT23	220283	TOOL, PISTON COMPRES USED WITH CLOSED CIRCUIT REFUELING NOZZLE	
4	PFFZZ	ODT23	220284	WRENCH, SPANNER USED WITH CLOSED CIRCUIT REFUELING NOZZLE.....	
5	PFFZZ	ODT23	220329	WRENCH, SPANNER USED WITH CLOSED CIRCUIT REFUELING NOZZLE.....	
6	PFFZZ	ODT23	AT220217	ASSY TOOL, ADAPTER USED WITH GRAVITY FILL ADAPTER.....	
7	PFFZZ	ODT23	AF220221	TOOL, STEM GUIDE USED WITH GRAVITY FILL ADAPTER	
8	PFFZZ	ODT23	AF64014	TOOL, PACKING ASSY USED WITH GRAVITY FILL ADAPTER.....	
				END OF FIGURE	

SECTION IV

CROSS-REFERENCE INDEXES

NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
4730-00-088-9285	1	6			
5330-00-263-5173	1	8			
4730-00-915-5127	1	5			
5120-01-391-5129	3	1			
6150-01-392-0442	1	2			
5120-01-392-4141	3	3			
5120-01-393-6290	3	5			
5120-01-397-4789	3	4			
5120-01-398-2649	3	2			
4930-01-412-9869	2	1			
5330-01-413-3710	1	7			
4930-01-413-4036	1				
5120-01-414-3386	3	6			
5120-01-414-3388	3	7			
4730-01-414-7864	1	9			
5120-01-416-7208	3	8			

SECTION IV

CROSS-REFERENCE INDEXES

NATIONAL STOCK NUMBER INDEX

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
ODT23	AF220221	5120-01-414-3388	3	7
ODT23	AF64014	5120-01-416-7208	3	8
ODT23	AT220217	5120-01-414-3386	3	6
ODT23	C0180-0126-1000S		1	24
ODT23	GF16997-37		2	24
ODT23	KD64017-3	4930-01-413-4036	1	
ODT23	KD64033		2	
ODT23	LP51957-108		1	17
ODT23	LP51958-64		1	11
			2	19
96906	MS16997-21L		1	30
96906	MS16998-42L		1	21
96906	MS259813-135		2	7
96906	MS27026-11	4730-00-088-9285	1	6
96906	MS27029-11	4730-00-915-5127	1	5
96906	MS29513-030		2	18
96906	MS29513-136		1	35
96906	MS29513-226	5330-00-263-5173	1	8
96906	MS35338-43		2	20
ODT23	NAS620C8		3	23
ODT23	220078-2		1	34
ODT23	220080		1	1
ODT23	220081-2		1	37
ODT23	220083-2		1	27
ODT23	220085		1	32
ODT23	220086-2		1	12
ODT23	220088		1	26
ODT23	220090-2		1	20
ODT23	220093		1	41
ODT23	220094-2		1	44
ODT23	220095-2		1	16
			2	21
ODT23	220096		1	38
ODT23	220097		1	14
ODT23	220098		1	25
ODT23	220099		1	40
ODT23	220100		1	43
ODT23	220101		1	19
ODT23	220103		1	39
ODT23	220104		1	42
ODT23	220109		1	22
ODT23	220111		1	13
ODT23	220112		1	28
ODT23	220113		1	15
ODT23	220114		1	36
ODT23	220120-2		1	10
ODT23	220121-2		1	4
ODT23	220122-100	4730-01-414-7864	1	9
ODT23	220126-6	5330-01-413-3710	1	7
ODT23	220160		1	33
ODT23	220202		1	23

SECTION IV

CROSS-REFERENCE INDEXES

NATIONAL STOCK NUMBER INDEX

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
ODT23	220208		2	5
ODT23	220209		2	6
ODT23	220213-2		2	8
ODT23	220217		2	3
ODT23	220221		2	14
ODT23	220222		2	11
ODT23	220223		2	10
ODT23	220228		2	28
ODT23	220230		2	9
ODT23	220231		2	15
ODT23	220232		2	16
ODT23	220233		2	17
ODT23	220281	5120-01-391-5129	3	1
ODT23	220282	5120-01-398-2649	3	2
ODT23	220283	5120-01-392-4141	3	3
ODT23	220284	5120-01-397-4789	3	4
ODT23	220287		2	29
ODT23	220289-1		2	25
ODT23	220289-2		2	26
ODT23	220325		2	22
ODT23	220326		1	29
ODT23	220329	5120-01-393-6290	3	5
ODT23	47025-2		1	3
ODT23	47028	6150-01-392-0442	1	2
ODT23	47048		2	4
ODT23	47051-2		2	30
ODT23	47060-2		1	31
ODT23	47066-2		2	2
79136	47068		2	13
79136	5115-18-H		2	27
79136	5133-25-H		2	12
ODT23	5710-179-60		1	18
ODT23	64033	4930-01-412-9869	2	1

SECTION IV

CROSS-REFERENCE INDEXES

NATIONAL STOCK NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
1		4930-01-413-4036	ODT23	KD64017-3
1	1		ODT23	220080
1	2	6150-01-392-0442	ODT23	47028
1	3		ODT23	47025-2
1	4		ODT23	220121-2
1	5	4730-00-915-5127	96906	MS27029-11
1	6	4730-00-088-9285	96906	MS27026-11
1	7	5330-01-413-3710	ODT23	220126-6
1	8	5330-00-263-5173	96906	MS29513-226
1	9	4730-01-414-7864	ODT23	220122-100
1	10		ODT23	220120-2
1	11		ODT23	LP51958-64
1	12		ODT23	220086-2
1	13		ODT23	220111
1	14		ODT23	220097
1	15		ODT23	220113
1	16		ODT23	220095-2
1	17		ODT23	LP51957-108
1	18		ODT23	5710-179-60
1	19		ODT23	220101
1	20		ODT23	220090-2
1	21		96906	MS16998-42L
1	22		ODT23	220109
1	23		ODT23	220202
1	24		OD1-23	C0180-0126-1000S
1	25		ODT23	220098
1	26		ODT23	220088
1	27		ODT23	220083-2
1	28		ODT23	220112
1	29		ODT23	220326
1	30		96906	MS16997-21L
1	31		ODT23	47060-2
1	32		ODT23	220085
1	33		ODT23	220160
1	34		ODT23	220078-2
1	35		96906	MS29513-136
1	36		ODT23	220114
1	37		OD123	220081-2
1	38		ODT23	220096
1	39		ODT23	220103
1	40		ODT23	220099
1	41		ODT23	220093
1	42		ODT23	220104
1	43		ODT23	220100
1	44		ODT23	220094-2
2			ODT23	KD64033
2	1	4930-01-412-9869	ODT23	64033
2	2		ODT23	47066-2
2	3		ODT23	220217
2	4		ODT23	47048
2	5		ODT23	220208

SECTION IV

CROSS-REFERENCE INDEXES

NATIONAL STOCK NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
2	6		ODT23	220209
2	7		96906	MS259813-135
2	8		ODT23	220213-2
2	9		ODT23	220230
2	10		ODT23	220223
2	11		ODT23	220222
2	12		79136	5133-25-H
2	13		79136	47068
2	14		ODT23	220221
2	15		ODT23	220231
2	16		ODT23	220232
2	17		ODT23	220233
2	18		96906	MS29513-030
2	19		ODT23	LP51958-64
2	20		96906	MS35338-43
2	21		ODT23	220095-2
2	22		ODT23	220325
2	24		ODT23	GF16997-37
2	25		ODT23	220289-1
2	26		ODT23	220289-2
2	27		79136	5115-18-H
2	28		ODT23	220228
2	29		ODT23	220287
2	30		ODT23	47051-2
3	1	5120-01-391-5129	ODT23	220281
3	2	5120-01-398-2649	ODT23	220282
3	3	5120-01-392-4141	ODT23	220283
3	4	5120-01-397-4789	ODT23	220284
3	5	5120-01-393-6290	ODT23	220329
3	6	5120-01-414-3386	ODT23	AT220217
3	7	5120-01-414-3388	ODT23	AF220221
3	8	5120-01-416-7208	ODT23	AF64014
3	23		ODT23	NAS620C8

APPENDIX D COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS

INTRODUCTION

D-1. SCOPE. This appendix lists components of the end item and basic issue items for the Closed-Circuit Refueling Nozzle to help you inventory the items for safe and efficient operation of the equipment.

D-2. GENERAL. The Components of End Item and Basic Issue Items (BII) Lists are divided into the following sections:

a. Section II. Components of End Item. This listing is for information purposes only, and is not authority to requisition replacements. These items are part of the end item, but they are to be removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to help you find and identify the items.

b. Section III. Basic Issue Items. These essential items are required to place the D-1 Arctic Nozzle in operation, operate it, and to do emergency repairs. Although shipped separately packaged, BII must be with the D-1 Arctic Nozzle during operation and when it is transferred between property accounts. Listing items is your authority to request/requisition them for replacement based on authorization of the end item by the TOE/MTOE. Illustrations are furnished to help you find and identify the items.

D-3. EXPLANATION OF COLUMNS.

a. Column (1), Illustration Number, gives you the number of the item illustrated.

b. Column (2), National Stock Number, identifies the stock number of the item to be used for requisitioning purposes.

c. Column (3), Description and Useable On Code, identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The last line below the description is the CAGEC (commercial and Government entity code) (in parenthesis) and the part number.

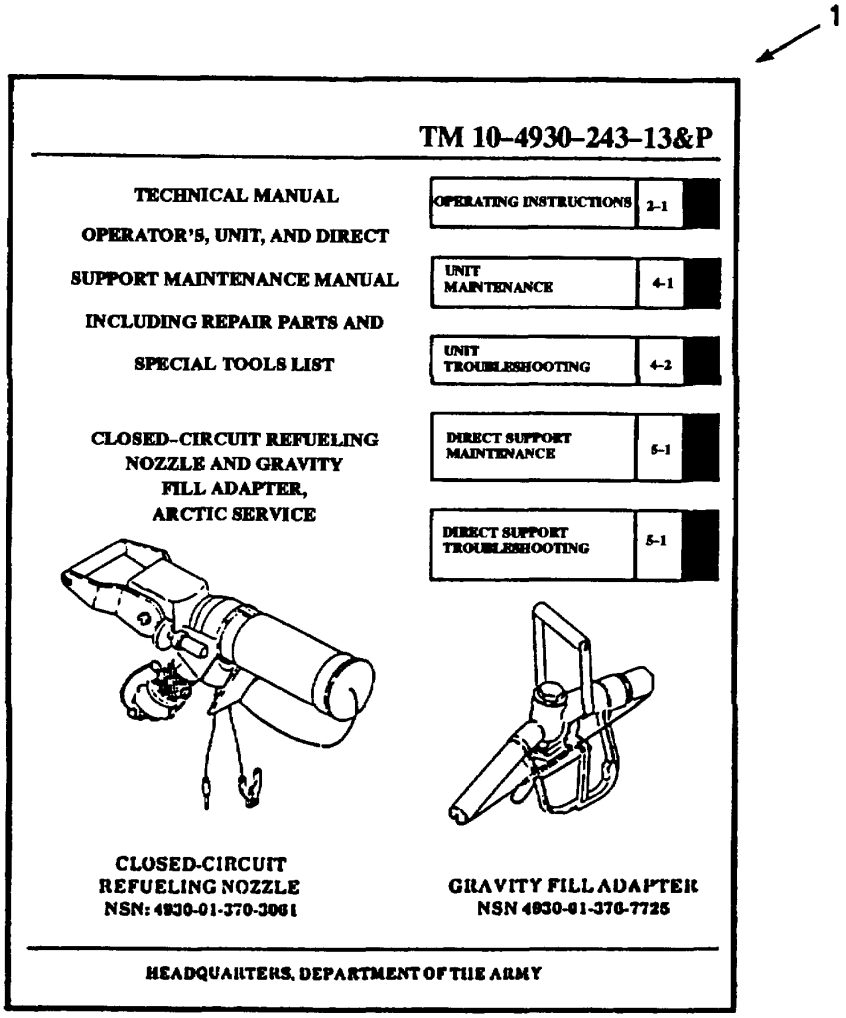
d. Column (4), U/I (unit of issue), indicates how the item is issued for the National Stock Number shown on column two.

e. Column (5), Qty Rqd, indicates the quantity required.

COMPONENTS OF END ITEM LIST

Order NSN 4930-01-370-3061 to receive Closed Circuit Refueling Nozzle.

Section III. BASIC ISSUE ITEMS



ITEM NUMBER	NATIONAL STOCK NUMBER	DESCRIPTION CAGE CODE AND PART NUMBER	U/I	QTY REQD
1	N/A	Operator's Unit, and Direct Support Maintenance Manual TM 10-4930-243-13&P	EA	1

APPENDIX E
ADDITIONAL AUTHORIZATION LIST

Section I. Introduction.

E-1. SCOPE. This appendix lists additional items you are authorized for the support of the CCR Arctic Nozzle and Adapter.

E-2. GENERAL. This list identifies items that do not have to accompany the CCR Arctic Nozzle and Adapter and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

E-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. The items are listed in alphabetical sequence by item name. If the item you require differs between serial numbers of the same model, effective serial numbers are shown in the last line of the description. If item required differs for different models of this equipment, the model is shown under the "Usable on" heading in the description column.

Section II. Additional Authorization Items List

NATIONAL STOCK NUMBER	DESCRIPTION CAGE CODE AND PART NUMBER	U/I	QTY REQD
4930-01-376-7725	Gravity Fill Adapter, ODT23, 64017	EA	1

APPENDIX F

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

F-1. SCOPE. This appendix lists expendable/durable supplies and materials you will need to operate and maintain the Arctic Closed-Circuit Refueling Nozzle and Gravity Fill Adapter. This listing is for informational purpose only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

F-2. EXPLANATION OF COLUMNS.

a. Column 1-Item Number. This number is assigned to the entry in the listing and is referenced in the task Initial Setup instructions to identify the material; e.g., "Dry cleaning solvent (App E)."

b. Column 2-Category. This column identified the lowest category of maintenance that requires the listed item:

C-Operator/Crew

O-Unit Maintenance

F-Direct Support Maintenance

G-General Support Maintenance

c. Column 3-National Stock Number. This is the national stock number assigned to the item; use it to request or requisition the items.

d. Column 4-Description. Indicates the federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Commercial And Government Entity (CAGE) Code for Manufacturer in parentheses, if applicable.

e. Column 5-Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two character alphabetical abbreviation (e.g., ea., in, pr). If the unit of measure differs from the rest of the issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE/DURABLE ITEMS LIST

Item Number	Category	National Stock Number	Description	U/M
1	O	6850-00-281-1985	Cleaning Solvent, Federal Specification AA 711, Types I and II	GL
2	O	7920-00-295-1711	Rags, wiping (58536) A-A-531	LB
3	O	9150-00-119-9291	Silicone Compound (81349) MIL-G-4343	TU
4	O	8030-01-837-5885	Sealing Compound (77247) MIL-S-45180	TU
5	F	6505-00-655-8366	Alcohol, Rubbing	BT

APPENDIX G

ILLUSTRATED LIST OF MANUFACTURED ITEMS

There are no manufactured items for the Arctic CCR Nozzle.

APPENDIX H

MANDATORY REPLACEMENT PARTS

ITEM NO.4-38.	NOMENCLATURE	PART NUMBER
1	Packing, Preformed	MS29513-226
2	Bushing	220101
3	Diaphragm Assembly	47060-2
4	Seal, Sleeve	220083-2
5	Seal, Wiper	220094-2
6	Packing, Preformed	MS29513-136
7	Seal, Molded	47068
8	Packing	220233
9	Packing, Preformed	MS25913-030
10	Packing, Preformed	MS25913-135
11	Retaining Ring	5133-25-H
12	Lock washer	GF35338-43
13	Popper, Molded Seal	47048

GLOSSARY

Section I. ABBREVIATIONS

App	Appendix
BT	Bottle
CCR	Closed-Circuit Refueling
F	Fahrenheit
GFA	Gravity Fill Adapter
GL	Gallon
in lb	Inch Pounds
in	Inch
lb	Pound
P/N	Part Number
psig	Pound-force per Square Inch, Gage
TU	Tube

Section II. DEFINITIONS OF UNUSUAL TERMS

Packing: O-Ring seals.

ALPHABETICAL INDEX

SUBJECT, PARAGRAPH

SUBJECT, PARAGRAPH

By Order the Secretary of he Army:

DENNIS J. REIMER
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Acting Administrative Assistant to the
Secretary of the Army
01618

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From: "Whomever" <whomever@avma27.army.mil>
To: mpmt%avma28@st-louis-emh7.army.mil

Subject: DA Form 2028

1. **From:** Joe Smith
2. *Unit***:** home
3. **Address:** 4300 Park
4. ***City*:** Hometown
5. ***St*:** MO
6. ***Zip*: 77777**
7. ***Date Sent*:** 19-OCT-93
8. ***Pub no*: 55-2840-229-23**
9. ***Pub Title*:** TM
10. ***Publication Date*:** 04-JUL-85
11. *Change Number***:** 7
12. *Submitter Rank***: MSG**
13. ***Submitter FName*: Joe**
14. *Submitter MName***:** T
15. ***Submitter LName*: Smith**
16. ***Submitter Phone*: 123-123-1234**
17. ***Problem*: 1**
18. *Page*: 2
19. *Paragraph*: 3
20. *Line*: 4
21. *NSN:* 5
22. *Reference:* 6
23. *Figure:* 7
24. *Table:* 8
25. *Item:* 9
26. *Total:* 123
27. ***Text:***

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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 = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 feet

Approximate Conversion Factors

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

Temperature (Exact)

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