# **TECHNICAL MANUAL**

OPERATOR'S ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS LIST

# FOR

TESTER, DIESEL INJECTOR NOZZLE MODEL DT-1300/7008 (KIENE DIESEL ACCESSORIES, INC.) (NSN 4910-00-255-8641)

HEADQUARTERS, DEPARTMENT OF THE ARMY

**MAY 1980** 

HEADQUARTERS Department of the Army Washington D. C., 5 September 1995

Change No. 1

# OPERATORS, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS LIST FOR

# TESTER, DIESEL INJECTOR NOZZLE MODEL DT-1300/7008 (KIENE DIESEL ACCESSORIES, INC.) (NSN 4910-00-255-8641)

TM 9-4910-623-14&P, dated 15 May 1980 is changed as follows:

1. Remove old pages and insert new pages as indicated below.

2. New or changed material is indicated by a vertical bar in the margin of the page. Illustration changes are indicated by a pointing hand adjacent to the illustrations.

| Remove Pages | Insert Pages |
|--------------|--------------|
| i and ii     | i and ii     |
| 1 and 2      | 1 and 2      |
| 9 thru 15    | 9 thru 13    |

3. File this change sheet in back of the publication for reference purposes.

By Order of the Secretary of the Army:

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Acting Administrative Assistant to the Secretary of the Army

**DISTRIBUTION:** To be distributed in accordance with DA Form 12-25-E, block 4942 requirements for TM 9-4910-623-14&P.

Technical Manual No. 9-4910-623-14&P TM9-4910-623-14&P HEADQUARTERS DEPARTMENT OF THE ARMY Washington, DC, 15 May 1980

## OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS LIST FOR

# TESTER, DIESEL INJECTOR NOZZLE MODEL DT-1300/7008 (KIENE DIESEL ACCESSORIES, INC.) (NSN 4910-00-255-8641)

# REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or know of a way to improve the, procedure let us know. Mail your letter, DA Form 2028 (Recommended changes to Publications and Blank Forms) or DA Form 2028-2, located the the back off this manual direct to:

Director, Armament And Chemical Acquisition and Logistics Activity, ATTN.: AMSTA-MASL, Rock Island, IL 61299-7630 A reply will be furnished to you.

## NOTE

This manual is published for the purpose of identifying an authorized commercial manual for the use of the personnel to whom this tester is issued.

Manufactured by: Kiene Diesel Accessories, Inc. 325 South Fairbanks Street Addison, IL 60101

Procured under Contract No. DAAA09-76-D-6003

This technical manual is an authentication of the manufacturers'commercial literature and does not conform with the format and content specified in AR 25-30, The Army Integrated Publishing and Printing Program. This technical manual does, however, contain available information that is essential to the operation and maintenance of the equipment. 

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### INSTRUCTIONS FOR REQUISITIONING PARTS

#### NOT IDENTIFIED BY NSN

When requisitioning parts not identified by National Stock Number, it is mandatory that the following information be furnished the supply officer.

- 1 Manufacturer's Federal Supply Code Number 33559
- 2 Manufacturer's Part Number exactly as listed herein.
- 3 Nomenclature exactly as listed herein, including dimensions, if necessary.
- 4 Manufacturer's Model Number Model DT-1300/7008
- 5 Manufacturer's Serial Number (End Item)
- 6 Any other information such as Type, Frame Number, and Electrical Characteristics, if applicable.
- 7 If DD Form 1348 is used, fill in all blocks except 4, 5, 6, and Remarks field in accordance with AR 725-50.

Complete Form as Follows:

- (a) In blocks 4, 5, 6, list manufacturer's Federal Supply Code Number - 33559 followed by a colon and manufacturer's Part Number for the repair part.

Model: DT-1300/7008 Serial: (of end item)

Any other pertinent information such as Frame Number, Type, Dimensions, etc.

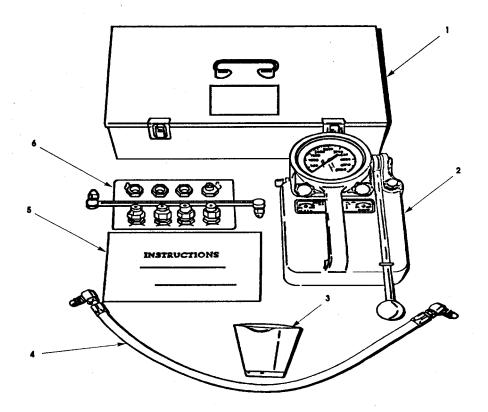
# Section I. INTRODUCTION AND DESCRIPTION

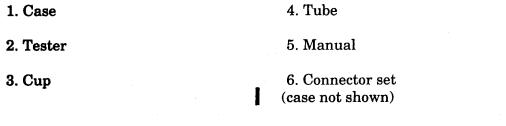
1. Introduction. This manual contains descriptive information, operation, and service instructions for diesel fuel injector nozzle tester (model DT-1300) accessories (fig 1).

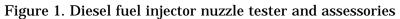
2. Purpose. The tester is designed to measure the opening pressure of fuel injector nozzles and to check the fuel spray pattern being dispersed from the Nozzle tip holes. In addition, the tester can check fuel leakage of nozzles and fuel injection pump heads.

3. Description. The tester and accessories are contained in a metal carrying case. The tester housing is of cast aluminum, providing lightweight transportability. This housing contains a reservoir for holding calibration fluid. A handle is provided to pump the fluid from the reservoir to a nozzle under test. The two valves are used while checking nozzle opening pressure and for performing leak test. A pressure gage, with a range of 0 to 5000 psi, is provided to measure the opening and leakage pressures. The pump output capacity is 1300mm<sup>3</sup> (1.3 cc) per stroke at 7500 psi.

4. Identification of Components and Accessories. Table 1 and figure 1 identify components furnished with the tester: nozzle tester (model DT-1300) and accessories.







# Change 1

TM9-4910-623-14 & P TABLE 1. LIST OF COMPONENTS AND ACCESSORIES (FIG 1)

| ITEM NO. | PART NO.                                 | DESCRIPTION                            | QTY                             |
|----------|--|--|---------------------------------|
| 1        |  | CARRYING CASE                          | 1                               |
| 2        | DT-1300                                  | TESTER, DIESEL FUEL INJECTOR<br>NOZZLE | 1                               |
| 3        |  | CUP, COLLECTOR                         | 1                               |
| 4        |  | TUBE, FLEXIBLE CONNECTION              | 1                               |
| 5        |  | MANUAL, INSTRUCTION                    | 1                               |
| б        | 7551255                                  | CONNECTOR SET<br>CONSISTING OF:        | 1                               |
|          | 7551260<br>7551261<br>7551262<br>7551263 |  | 1<br>1<br>1<br>1<br>1<br>1<br>1 |

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Section II. PREPARATION FOR USE AND TRANSPORTING

5. Preparation for Use. The tester is shipped without fluid in the reservoir. Prior to operation, the reservoir must be filled with calibration fluid 6850-00-974-3738 or equivalent.

#### NOTE

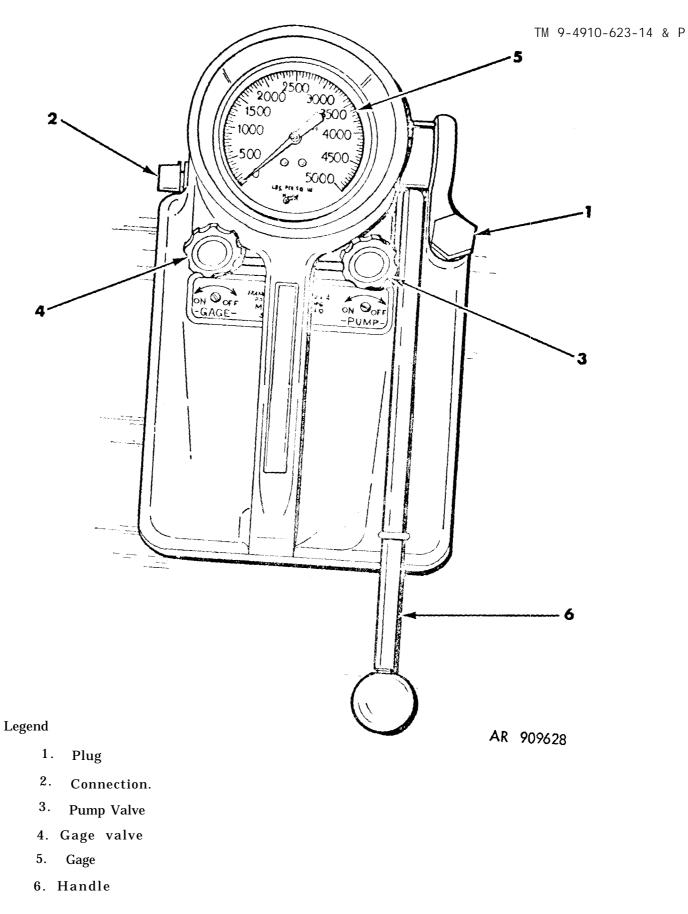
The following procedure is required whenever fluid is added to the tester.

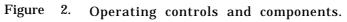
- a. To fill the reservoir, remove filler plug (1, fig 2) and fill with approximately 1/2 gallon of fluid.
- b. Once the reservoir is filled, replace filler plug loosely and remove plastic cap from the discharge connection (2).
- c. Open pump valve (3) two or three turns counterclockwise.
- d. Operate pump handle until air is purged from the tester system. This is evident by fluid being omitted from the discharge connector.

6. Transporting. Before transporting, close pump valve (3), gage valve (4), and filler plug (1) to avoid leakage.

Section III. OPERATING CONTROLS AND COMPONENTS 7. Operating Controls (Fig 2).

a. <u>Pump Valve</u>. The pump valve (3) controls the fluid flow to devices under test. Turning the valve clockwise until it seats shuts the tester off, thus giving a leakage reaction of the device under test. Turning the valve two or three turns counterclockwise allows fluid to be pumped to devices under test.





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b. <u>Gage Valve</u>. The gage valve (4) permits the pressure gage (5) to measure the pressure being delivered to devices under test. To apply pressure to a device without overloading the pressure gage, the valve should be turned clockwise until it seats. This protects the gage from hydraulic shock. When measuring pressure, the valve must be turned counterclockwise one turn off its seat. To release the pressure, turn valve counterclockwise until pressure reads 0 on the pressure gage.

8. Measuring Devices and Other Components (Fig 2).

a. <u>Pressure Gage.</u> The pressure gage (5) is used to check delivery pressure of fuel injector nozzles and to monitor pressure drop while performing leakage test. The gage range is 0 to 5000 psi in increments of 50 psi.

b. <u>Handle.</u> The pump handle (6), when operated in a pumping motion with the pump valve (3) turned counterclockwise two or three turns allows fluid to be delivered under pressure to device under test.

c. <u>Filler Plug</u>. The filler plug (1) has to be removed so that the reservoir can be filled with calibration fluid. Filler plug must be left loose while the tester is in operation to allow air to enter the fluid reservoir.

d. <u>Discharge Connection</u>. Fluid is disposed from this connection (2) through proper connectors, tube assembly, etc, to the device under test.

### Section IV. TESTING

9. General Procedures for Testing Fuel Injector Nozzles.

#### WARNING

Before-using the tester, the operator should be familiar with the following instructions. The tester is capable of developing high pressures. Improper use can result in damage to the instrument or injury to the operator.

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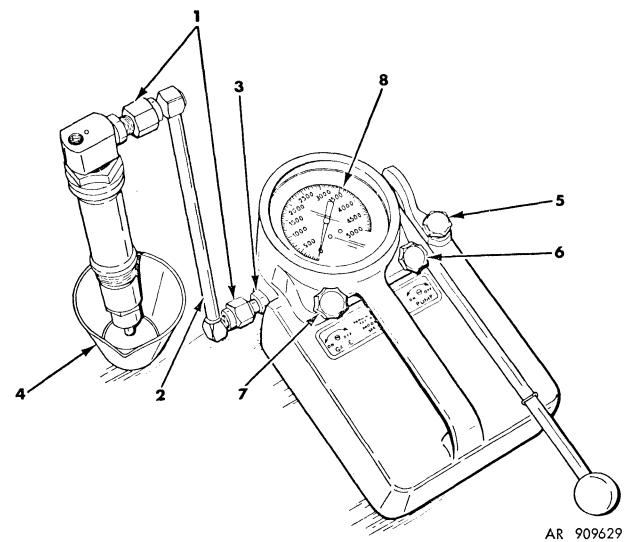
## CAUTION

When working with high pressures and precision parts, be sure all connecting components are clean before attaching to any device being tested. Clean components by pumping fluid through the connector components.

Avoid continual testing in the upper 1/5 of the gage scale without gage valve closed. It can cause excessive hydraulic shocks and result in reduced gage life.

- a. <u>Preparation for Testing</u>. See paragraph 5.
- b. Sample Hookup of Fuel Injection Nozzle.
  - (1) Using proper nuts, adapters, or connectors (1, fig 3) and tube assembly (2), connect and adapt assembly to the discharge connection (3).
  - (2) Connect fuel injection nozzle to upper connector (1).
  - (3) Place collector cup (4) under nozzle tip.
  - (4) Loosen filler cap (5) and turn pump valve (6) counterclockwise two or three turns.
  - (5) Purge the nozzle under test by operating the handle with a pumping motion.
  - (6) Open gage valve (7) counterclockwise one turn.
  - (7) Operate pump handle and note when gage (8) shows a drop in pressure. This is the delivery pressure of the fuel being dispersed from the injector nozzle tip. (Refer to appropriate manual on the nozzle under test for its delivery.)
  - (8) Upon completion of the test, open gage valve (7) counterclockwise until pressure is released from nozzle and tester.
  - (9) Remove injector and connector assembly from tester and nozzle.

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# Legend

- 1. Connector
- 2. Tube assembly
- 3. Connection
- 4. Collector cup
- 5. Filler cap
- 6. Pump valve
- 7. Gage valve
- 8. Gage

Figure 3. Fuel injector nozzle under test.

#### 10. General Procedures for Leakage Test.

- a. Preparation for Testing\_. See paragraph 5.
- b. Leakage Test.
  - Using proper connectors, nuts, adapters, and the flexible connector tube (4, fig 1), adapt the connection assembly to the device under test.
  - (2) Loosen filler cap (5, fig 3) and turn pump valve (6) counterclockwise two or three turns.
  - (3) Purge the nozzle under test by operating the handle with a pumping motion.
  - (4) Open the gage valve (7) counterclockwise one turn.
  - (5) Operate pump handle and note when gage (8) reaches the pressure recommended for recording the leakage test. (Refer to the appropriate manual on the device under test for the recommended pressure to be used for the leakage test.)
  - (6) Turn pump valve clockwise until the valve is seated.
  - (7) Record the time and pressure drop as described in the manual on the device under test.
  - (8) Upon completion of the test, open gage valve (7) counterclockwise until the pressure is released from the device and tester.
  - (9) Remove the connector assembly from the device and tester.

## Section V. MAINTENANCE

11. Replacement of Pressure Gage (Fig 4).

# a. <u>Removal</u>.

- (1) Before interchanging gages, release existing pressures on gages by turning gage valve fully counterclockwise.
- (2) Place fingers in semicircular opening under gage housing and push gage (1) and adapter assembly (2) up and out.

9

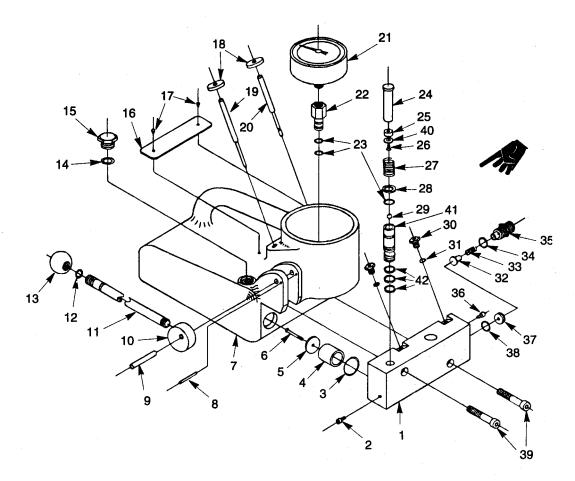


Figure 4. Diesel fuel injector nozzle tester - exploded view.

## PARTS LIST

**ITEM PART NAME ITEM PART NO. NAME ITEM PART NO. NAME** NO. DTP-09\* Ball DTP-31-1 Pump Block 15 DTP-25 Filler Plug 29 1 **DTP-36** Name Plate DTP-10 Gland Nut 2 Soc Hd Scr 16 30 **DTP-26** 31\* 'O' Ring 3 DTP-33\* 17 **DTP-37** Screw-Drive DTP-1t 'O' Ring DTP-34\* Filter 18 **DPG-38** Knob 32 DTP-12\* Valve 4 5 **DTP-35** Washer 19 **DTP-39** Valve - Pump 33 **DTP-13\*** Spring 20 DTP-0 Valve - Gage 34 **DTP-14\*** 'O' Ring 6 **DTP-16** Screw DTP-15\* Connector 7 **DTP-17** Pump Housing 21 **DTP-41** Gage 35 **DTP-02** Gage Adaptor 36 **DTP-26** Soc Hd Scr 8 DTP-18 Pin-Roll 22 9 **DTP-19** Dowel 23 DTP-3\* 'O' Ring 37 DTP-27\* Seat 24 Piston 38 DTP-43 'O' Ring DTP-4 10 DTP-20 Cam Soc Hd Scr 11 DTP-21 Handle 25 DTP-5\* Seal - Piston 39 **DTP-29** Washer 26 Screw - Pan Hd 40 DTP-47 DTP-6\* 12 DTP-22\* 'O' Ring DTP-46 Sleeve - Pump 27 DTP-47\* Spring 41 13 DTP-23 Knob 42 DTP-45 DTP-24\* 28 DTP-48\* Washer 'O' Ring 14 'O' Ring \*components that are included in the DT-1300 RK Repair Kit.

REPAIR SERVICE: For complete factory repair and reconditioning service, at nominal charge, send your KIENE instrument to manufacturer.

b. <u>Installation</u>. Press new gage (21) and adapter assembly (22) into gage housing on the top.

12. Replacement of Filter (Fig 4).

a. Removal,

(1) Unscrew two socket head screws (39).

# WARNING

When removing pump block (1), apply pressure downward on piston (24) to prevent it from springing out of the block.

- (2) Pull pump block (1) away from pump housing (7).
- (3) Remove filter (4)

b. Installation.

- (1) Install new filter (4).
- (2) Push pump block (1) into pump housing (7).
- (3) Install two socket head screws (39).

13. Lubrication. Lubricate the surface of cam (10) and dowel (9) with SAE 10 oil every 10 to 20 hours of tester use.

14. Troubleshooting.

a. This section contains the troubleshooting information for locating and correcting most of the operating troubles which may develop in the diesel fuel injector nozzle tester. Each malfunction for an individual component, unit, or system is followed by a list of tests or inspections which will help you to determine the corrective actions for you to take. You should perform the tests/inspections and corrective actions in the order listed.

b. This supplement cannot list all possible malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed (except when malfunction and cause are obvious) or is not corrected by listed corrective action, notify your supervisor.

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# **Table 2. Troubleshooting**

# MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. Fluid Is Not Being Dispersed From the ischarge. Connection.

Step 1. Check for low level of fluid in tester.

Fill tester with fluid.

Step 2. Check to see that pump valve is fully closed in the clockwise position.

Turn pump valve counterclockwise two turns.

Step 3. Check for dirty filter.

Replace filter.

Step 4. Check for stuck or dirty piston.

Clean piston and piston hole. Take care not to mar surface.

Step 5. Check for stuck valve.

Clean valve.

2. No Pressure Readings Are On The Pressure Gage.

Step 1. Check to see that the gage valve is fully closed in the clockwise position.

Open valve clockwise one turn. Step 2. Check for plugged gage adapter.

Remove gage and then remove obstruction. Step 3. Check for inoperable gage.

Replace gage.

# **INSTRUCTIONS**

## CAUTION

Prior to putting this new tester into use, familiarize yourself with the following instructions. Since the tester is capable of developing very high pressures, improper use could result in damage to instrument or injury to operator.

1. Thread HANDLE (Fig. 4, Item 11) into CAM (Item 10).

## 2. PUMP VALVE (Item 19)

a. Turning valve clockwise until it seats shuts the tester off thus giving a true leakage reading of the device being tested.

b. Turn valve two or three turns counter-clockwise off its seat, for normal pump operation.

## 3. GAGE VALVE (Item 20)

a. To apply pressure to a device without overloading gage, turn the valve clockwise until it seats. This position is used to protect gage from hydraulic shock.

b. To test any device, using the gage, turn valve counter-clockwise to a neutral position, approximately one turn off its seat.

c. To release pressure on the test system, continue turning gage valve counter-clockwise until pressure is released. Screw valve in (clockwise) again in preparation for the next test.

## CAUTION

Continuous testing in the upper 1/5 of gage scale, and severe hydraulic shocks without gage valve closed could result in reduced gage life. Avoid when possible.

# 4. QUICK-CHANGE GAGE (Item 21)

Before interchanging gages, release existing pressure on gage to avoid damage to instrument. Place fingers in semi-circular opening under gage housing and push GAGE (Item 21) and GAGE ADAPTER (Item 22) up and out. To install another gage merely reverse procedure, pressing gage in from the top.

5. PUMP OUTPUT CAPACITY - 1300 mm<sup>3</sup> (1.3 cc) per stroke at 7500 psi

### 6. FILTER (Item 4)

The tester is equipped with a very fine (3 to 5 Microns) filter which will remove any dirt that maybe in the fluid. The use of clean fluid will insure longer service and life of filter.

7. FILLER PLUG (Item 15) must be left loose while tester is in operation to allow air to enter fluid reservoir.8. Before transporting, close pump and gage valves and filler plug to avoid leakage.

9. Remove FILLER PLUG (Item 15) and fill with fluid desired for testing. Reservoir capacity - Approximately 1/2 gallon

10. Operate pump handle until air is purged from the system as evidenced by fluid emitting from Discharge Connection (Item 35). This step is also necessary in the event the tester runs completely out of fluid.

# CAUTION

When dealing with high pressures and precision parts the introduction of dirt is very harm ful. Be sure all connecting apparatuses are clean before attachment to device to be tested. The simplest and best way to do this is to pump fluid through them with the tester.

11. CAM (Item 10) surface and DOWEL (Item 9) should be lubricated with SAE 10 oil every 10 to 20 hours of tester use.

12. Keeping above instructions in mind will assure trouble-free operation and efficient service in a widevariety of tests.

TM9-4910-623-14 & P SECTION VI. PARTS LIST 15. PARTS LIST. REFER TO TABLE 3 FOR A LIST OF THE COMPONENTS SHOWN IN FIGURE 4.

TABLE 3. PARTS LIST

| ITEM NO. | PART NO. | DESCRIPTION          |
|----------|----------|----------------------|
| 1        | DT-1     | GAGE                 |
| 2        | DT-2     | ADAPTER, GAGE        |
| 3        | DT-29    | SCREW, SOCKET HEAD   |
| 4        | DT-31    | BLOCK, PUMP          |
| 5        | DR-34    | FILTER               |
| 6        | DT-4     | PISTON               |
| 7        | DT-17    | HOUSING, PUMP        |
| 8        | DT-20    | CAM                  |
| 9        | DT-19    | DOWEL                |
| 10       | DT-32    | SCREW, SOCKET HEAD   |
| 11       | DT-33    | O-RING               |
| 12       | DT-35    | WASHER               |
| 13       | DT-16    | SCREW, PHILLIPS HEAD |
| 14       | DT-18    | PIN, ROLL            |
| 15       | DT-21    | HANDLE               |
| 16       | DT-22    | O-RING               |
| 17       | DT-23    | KNOB                 |
| 18       | DT-24    | O-RING               |
| 19       | DT-25    | PLUG, FILLER         |
| 20       | DT-36    | NAMEPLATE            |
| 21       | DT-37    | SCREW, DRIVE         |

| TM9-4910-623-14<br>TABLE 3. PARTS | LISTCONTINUED |                    |
|-----------------------------------|---------------|--------------------|
| ITEM NO.                          | PART NO.      | DESCRIPTION        |
| 22                                | DT-38         | KNOB               |
| 23                                | DT-39         | VALVE, PUMP        |
| 24                                | DT-40         | VALVE, GAGE        |
| 25                                | DT-3          | O-RING             |
| 26                                | DT-5          | SEAL, PISTON       |
| 27                                | DT-6          | SCREW, PAN HEAD    |
| 28                                | DT-7          | SPRING             |
| 29                                | DT-8          | WASHER             |
| 30                                | DT-9          | BALL               |
| 31                                | DT-10         | NUT, GLAND         |
| 32                                | DT-11         | O-RING             |
| 33                                | DT-12         | VALVE              |
| 34                                | DT-13         | SPRING             |
| 35                                | DT-14         | O-RING             |
| 36                                | DT-15         | CONNECTOR          |
| 37                                | DT-26         | SCREW, SOCKET HEAD |
| 38                                | DT-27         | SEAT               |
| 39                                | DT-28         | O-RING             |
| 40                                | DT-30         | DOWEL              |

TM 9-4910-623-14&P

E. C. MEYER General United States Army Chief of Staff

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