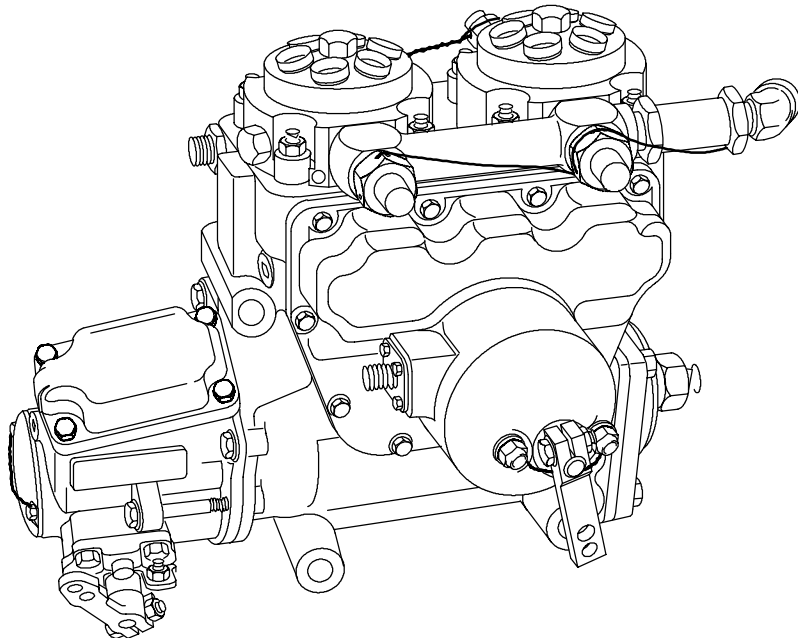


**TECHNICAL MANUAL  
DIRECT SUPPORT AND GENERAL SUPPORT  
MAINTENANCE MANUAL**

(Including Direct Support, General Support,  
and Depot Maintenance  
Repair Parts and Special Tools List)

**PUMP,  
FUEL METERING AND DISTRIBUTING  
AMERICAN BOSCH MODEL PSB-12BT**

**NSN 2910-01-073-0124 (11684129-1, KT 8818)**



Supersedure Notice: This manual supersedes TM 9-2910-212-34&P, dated 27 June 1984, including all changes.  
Distribution Statement A: Approved for public release; distribution is unlimited.

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**HEADQUARTERS, DEPARTMENT OF THE ARMY**

**DECEMBER 2005**



## WARNING SUMMARY

FOR INFORMATION ON FIRST AID, REFER TO FM 4-25.11.

**WARNING**

Cleaning solvent is flammable. Use only well ventilated areas. Keep away from flame, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when using to prevent skin irritation.

**WARNING**

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

**WARNING**

When testing for fuel leakage, cover pump head assembly fuel outlet ports to prevent fuel from squirting. Fuel is under pressure and can cause injury.

**WARNING**

Pump will be hot after testing on test stand. Allow time for pump to cool before removing it from the test stand.

**WARNING**

The spring seat assembly in the pump housing is under spring tension and must be removed slowly to prevent injury.

**WARNING**

Be certain locks are properly seated in retaining ring groove before releasing all spring tension.

**WARNING**

The governor cap is spring loaded. Maintain pressure on governor cap when removing screws to prevent injury.

**WARNING**

Be certain retaining ring is properly seated in retaining ring groove before removing compressor.

**TM 9-2910-212-34&P**

**END ITEM APPLICATION  
FOR  
Pump, Metering and Distributing,  
American Bosch Model PSB-12BT**

- I. ENGINES - AVDS-1790-2C 2815-00-410-1203
- AVDS-1790-2D 2815-00-410-1204
- AVDS-1790-2A 2815-00-856-9005

TM NO. SERIES

A. VEHICLES

- 1. Tank Combat, Full Tracked: 105-MM Gun, M48A5 9-2350-258
- 2. Tank Combat, Full Tracked: 105-MM Gun, M60-M60A1 9-2350-215
- 3. Tank Combat, Full Tracked: 105-MM Gun, M60A1 (RISE) 9-2350-257
- 4. Tank Combat, Full Tracked: 105-MM Gun, M60A3 9-2350-253
- 5. Armored Vehicle Launched Bridge: M48A2 AVLB 5-5420-200
- 6. Armored Vehicle Launched Bridge: M60A1 AVLB 5-5420-202
- 7. Armored Vehicle Launched Bridge: M48A5 AVLB 5-5420-226
- 8. Vehicle, Combat Engineer, Full Tracked: M728 9-2350-222

- II. ENGINE - AVDS-1790-2DR 2815-00-124-5387

B. VEHICLE

- Recovery Vehicle, Full Tracked: Medium M88A1 9-2350-256

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Date of issue for original and changed pages/work packages are:

Original ..... 0 ..... 31 December 2005

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TOTAL NUMBER OF WORK PACKAGES IS 43 CONSISTING OF THE FOLLOWING:

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Blank .....	0	WP 00033 00 (2 pages) ..	0
a/b blank .....	0	WP 00034 00 (2 pages) ..	0
A/B blank .....	0	WP 00035 00 (6 pages) ..	0
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WP 0001 00 (4 pages) ...	0	WP 00037 00 (6 pages) ..	0
Chapter 1 Title Page .....	0	WP 00038 00 (6 pages) ..	0
WP 0002 00 (12 pages) ..	0	Chapter 7 Title Page .....	0
WP 0003 00 (2 pages) ...	0	WP 00039 00 (2 pages) ..	0
Chapter 2 Title Page .....	0	WP 00040 00 (42 pages) .	0
WP 0004 00 (2 pages) ...	0	WP 00041 00 (2 pages) ..	0
Chapter 3 Title Page .....	0	WP 00042 00 (2 pages) ..	0
WP 0005 00 (2 pages) ...	0	WP 00043 00 (2 pages) ..	0
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WP 00010 00 (4 pages) ..	0	DA Form 2028 (Pt 1) .....	0
WP 00011 00 (2 pages) ..	0	DA Form 2028 (Pt 2) .....	0
WP 00012 00 (2 pages) ..	0	Authentication (2 Pages) .	0
WP 00013 00 (2 pages) ..	0	Conversion Table (2 Pages)	0
WP 00014 00 (2 pages) ..	0	Measurement Page .....	0
WP 00015 00 (4 pages) ..	0	Blank .....	0
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WP 00017 00 (4 pages) ..	0		
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Chapter 4 Title Page .....	0		
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WP 00024 00 (6 pages) .	0		
WP 00025 00 (16 pages) .	0		
WP 00026 00 (6 pages) ..	0		
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WP 00029 00 (10 pages) .	0		
WP 00030 00 (4 pages) ..	0		
WP 00031 00 (4 pages) .	0		
WP 00032 00 (8 pages) ..	0		

\*Zero in this column indicates an original page or work package



**DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL**

**(INCLUDING DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE  
REPAIR PARTS AND SPECIAL TOOLS LIST)**

**PUMP, FUEL METERING AND DISTRIBUTING**

**AMERICAN BOSCH MODEL PSB-12BT**

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028 (Recommended Changes to Equipment Technical Publications), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is <https://aeeps.ria.army.mil>. If you need a password, scroll down and click on "ACCESS REQUEST FORM". The DA Form 2028 is located in the ON-LINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or email your letter, DA Form 2028, direct to: Technical Publication Information Office, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The email address is [TACOM-TECH-PUBS@ria.army.mil](mailto:TACOM-TECH-PUBS@ria.army.mil). The fax number is DSN 793-0726 or Commercial (309) 782-0726.

A reply will be furnished directly to you.

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**ALPHABETICAL INDEX** ..... INDEX-1

## HOW TO USE THIS MANUAL

This manual was designed to provide you with the information you will need to perform DS/GS maintenance on the PSB-12BT metering and distributing pump.

The information contained in this manual is presented in chapters and work packages. Each chapter is divided into work packages to cover the replacement and repair of the PSB-12BT metering and distributing pump and its components. Where references are made to tables, figures, and work packages, refer to those portions of the text.

To find information relating to a specific component or system:

- Determine the specific name or function of the component/system.
- Find the name or function in the Index Listing, located in the back of this manual.
- Refer to appropriate work package(s) called out in the Index Listing.

To find information pertaining to a broader range of information (such as engine troubleshooting, component repair, and component descriptions):

- Identify the desired topic.
- Find the general topic in the Table of Contents, located in the front of this manual.
- Refer to appropriate work package(s) called out in the Table of Contents.

## IMPORTANT

You must read and understand this manual BEFORE working on the 11mm PSB-12BT metering and distributing fuel pumps.

## MAINTENANCE

Maintenance procedures are to be performed in the sequence shown in the text and illustrations. Step 1 must be performed before step 2 and so on.

Equipment illustrations use numbers to identify parts of the system/components.

Throughout this manual the words WARNING, CAUTION, and NOTE will appear. There is a reason for every one of them.

**GENERAL INFORMATION****0001 00****THIS WORK PACKAGE COVERS:**

General Information

**SCOPE**

Type of manual: Direct Support and General Support Maintenance and Repair Parts.

Model number and equipment name: PSB-12BT Metering and Distributing Pump.

Identification: Model PSB-12BT (injection) pump is designed for use on all Model AVDS-1790 series engines used in army vehicles, and is identified as part number 11684129-1.

Purpose of equipment: Accurately delivers metered amounts of fuel, under high pressure, to cylinders in the correct firing cycle.

**MAINTENANCE FORMS, RECORDS AND REPORTS**

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 750-8, The Army Maintenance Management System (TAMMS) as contained in the Maintenance Management Update.

Accidents involving injury to personnel or damage to materiel will be reported on DA Form 285 (Accident Reporting) in accordance with AR 385-40.

**REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS**

If your PSB-12BT Metering Pump needs improvement, let us know. Send us an Equipment Improvement Recommendation (EIR). You, the user, are the only one who can tell us what you don't like about our equipment. Let us know why you don't like the design or performance. Put it on a SF 368 (Product Quality Deficiency Report). Mail it to the address specified in DA PAM 750-8.

**CORROSION PREVENTION AND CONTROL**

Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problem with the PSB-12BT Metering Pump be reported so that improvements can be made to prevent the problem in the future. 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 these materials may be a corrosion problem. If a corrosion problem is identified, it can be reported using SF 368, (Product Quality Deficiency Report). Use of keywords such as "corrosion", "rust", "deterioration", or "cracking" will ensure that the information is identified as a CPC problem. SF 368 should be submitted to the address specified in DA PAM 750-8.

**DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE**

Refer to TM 750-244-6 for procedures on how to destroy the PSB-12BT Metering and Distributing Pump.

Below are some general guidelines to follow in destruction of equipment to prevent enemy use.

Destruction of the vehicle and equipment, when subject to capture or abandonment in a combat zone, will be undertaken only when such action is necessary in accordance with orders of, or policy established by, the Army commander.

In general, destruction of essential parts, followed by burning, will usually be sufficient to render the vehicle and equipment useless. Time is usually critical.

Materiel must be damaged so that it cannot be restored to usable condition by either repair or cannibalization. If lack of time or personnel prevents destruction of all parts, give priority to destruction of parts hardest to replace. It is important that the same parts be destroyed on all equipment to prevent construction of one complete item from several damaged ones.

---

**GENERAL INFORMATION - CONTINUED**

---

**0001 00****PREPARATION FOR STORAGE OR SHIPMENT**

Refer to Chapter 6 for the requirements for Administrative Storage and requirements for shipment.

**WARRANTY INFORMATION**

No particular warranty information pertains to the PSB-12BT Metering and Distributing Pump.

**COMMON TOOLS AND EQUIPMENT**

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE), CTA 50-970; or CTA 8-100, as applicable to your unit.

The tool kit (box) assigned to the mechanic (on a 1-per-mechanic-by MOS basis) shall be identified in the individual maintenance work package by nomenclature, item number and work package. No tool in the kit shall be further identified. Other tools required for performance of all tasks for the maintenance levels covered in the manual shall be identified in the setup and shall be referenced to the Tool Identification List, WP 0043 00. "Other tools" includes tools which are part of the components of shop sets authorized to section/teams; tools authorized by RPSTL and CTA 50-970; special and fabricated tools; and items of TMDE.

**SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT**

Special tools and equipment listed and illustrated in this manual are the only special tools and equipment necessary to perform operations described in this manual. This manual is the authority for requisitioning special tools and equipment for supporting maintenance use. All special tools required in this technical manual are listed in WP 0042 00 of this manual. Fabricated tools are identified in the initial setup; manufacturing instructions for fabricated tools are found in WP 0037 00.

**REPAIR PARTS**

Repair parts are listed and illustrated in the repair parts and special tools list covering direct support general support maintenance for this equipment (TM 9-2910-232-34&P, WP 0041 00). All mandatory replacement parts identified in the initial setup are listed in WP 0040 00 of this manual.

**CALIBRATION**

Calibration will be done IAW this TM.

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**GENERAL INFORMATION - CONTINUED****0001 00****NOMENCLATURE CROSS-REFERENCE LIST**

Nomenclature in this manual was chosen in accordance with the terms used for provisioning as they appear in the Repair Parts and Special Tools List (RPSTL).

A few tools and components are, however, referred to by names more common than those in the RPSTL. In many cases the more common name is a shorter name for the same component.

OFFICIAL PROVISIONING NOMENCLATUREMORE COMMON NAME

Cable assembly

Wiring harness

Safety wire

Lockwire

Socket head screw key

Hex key (Allen wrench)

**LIST OF ABBREVIATIONS**

°C	Degree Centigrade
CAGEC	Contract and Government Entity Code
CAR	Corrective Action Report
CARC	Chemical Agent Resistant Coating
CCW	Counterclockwise
CM	Centimeters
CPC	Corrosion Prevention and Control
CTA	Common Table of Allowances
CW	Clockwise
DC	Direct Current
DF	Diesel Fuel
DIA or dia	Diameter
DMWR	Depot Maintenance Work Order
DOD	Department of Defense
DS	Direct Support
EIR	Equipment Improvement Recommendation
°F	Degree Fahrenheit
GND	Ground
GS	General Support
IAW	In Accordance With General Support
KG	Kilogram
KPA	Kilopascals

**GENERAL INFORMATION - CONTINUED**

**0001 00**

**LIST OF ABBREVIATIONS - CONTINUED**

L	Liter
M	Meter
MM	Millimeter
MAX	Maximum
MIN	Minimum
MOS	Military Occupational Specialties
MTOE	Modified Table of Organization and Equipment
N•M	Newton-Meters
NSN	National Stock Number
PMCS	Preventive Maintenance Checks and Services
PSI	Pounds Per Square Inch
PWR	Power
QA	Quality Assurance
QDR	Quality Deficiency Report
R	Reverse
RPM	Revolutions Per Minute
RPSTL	Repair Parts and Special Tools List
SAE	Society of Automotive Engineers
TB	Technical Bulletin
TM	Technical Manual
TAMMS	The Army Maintenance Management System
TMDE	Test, Measurement, Diagnostic Equipment
TOE	Tables of Equipment

**SYMBOLS**

°	Degrees
±	Plus or Minus
%	Percent

**QUALITY ASSURANCE (QA)**

No particular quality assurance manual pertains specifically to the PSB-12BT Metering and Distributing Pump.

Defective material received through the supply system should be reported on Quality Deficiency Report (QDR) SF 368. Instructions for preparing QDR's are provided in AR 702-7, Reporting of Quality Deficiency Data. QDR's should be mailed directly to:

Commander  
 U.S. Army Tank-automotive and Armaments Command  
 ATTN: AMSTA-QRT  
 Warren, MI 48397-5000

A reply will be furnished directly to you.

**END OF WORK PACKAGE**

# **CHAPTER 1**

## **DESCRIPTION AND THEORY OF OPERATION**





**EQUIPMENT DESCRIPTION AND DATA****0002 00****THIS WORK PACKAGE COVERS:**

Equipment Description and Data

**GENERAL DESCRIPTION**

The following terms will be used to identify pump areas and components (refer to Figure 1-1):

Governor end shall be called the front.

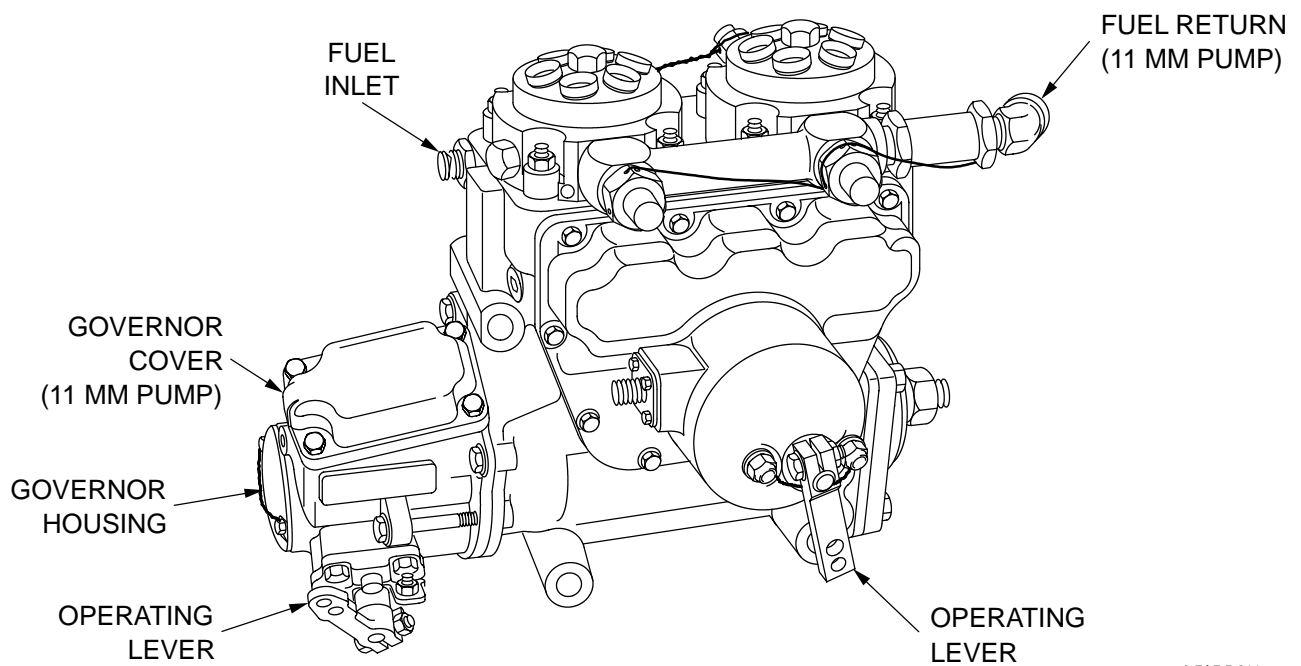
Drive end shall be called the rear.

Left and right sides of the pump will be determined when viewing the pump from the front.

Head assemblies are numbered 1 and 2 viewed from the rear.

**PURPOSE**

The pump is designed to deliver accurately metered quantities of high pressure fuel to the engine cylinders.



03i352M

**Figure 1-1. PSB-12BT Fuel Injection Pump (11 mm) Right Front View.**

---

**EQUIPMENT DESCRIPTION AND DATA - CONTINUED**

---

**0002 00****MAJOR PUMP COMPONENTS**

For major pump components, refer to Figures 1-2 and 1-3.

Pump housing:

- One-piece aluminum casting.

- Has passages for lubricating oil flow (Figures 1-4 and 1-5).

- Lubricating oil is supplied by the engine.

Electrical/manual solenoid:

- Mounted in cover and solenoid.

- Can be operated electrically or manually.

- Shuts off fuel flow to engine.

Fuel injection pump head assemblies include:

- Heads.

- Fuel plungers.

- Plunger sleeves.

- Plunger drive spur gears.

- Fuel delivery valves.

- Plunger springs.

Head assemblies have:

- Centrally ground and lapped bores with fitted plungers.

- Counterbored and threaded upper ends for plunger bore screw.

- Fuel discharge passages extending symmetrically from plunger bore.

- Inclined passages from plunger bore to fuel delivery valves.

- Inclined passages from fuel delivery valve to plunger annulus.

- Tapped openings for inlet and outlet bleeder valve stems.

- Drilled passages from inlet/outlet openings to fuel supply sump (Figure 1-4).

- Supply sump located at center of plunger bore.

- Sump accommodates plunger sleeve (Figure 1-4).

- Additional passages for lubricating oil.

---

**EQUIPMENT DESCRIPTION AND DATA - CONTINUED**

---

**0002 00****MAJOR PUMP COMPONENTS - CONTINUED**

Fuel plunger, plunger sleeve and head assembly:

Are matched components.

Plunger is lapped to head and plunger sleeve.

Plunger has parallel flats at lower end.

Parallel flats lock plunger to spur gear through plunger guide.

Guide will shear if plunger freezes preventing damage to other internal parts.

Plunger spring and spring seats are held on plunger by plunger locks.

Fuel filter assembly:

Contains a 10 micron filter element.

Element is replaceable.

Mounted to head assemblies by drilled bleeder valve stems and cap nuts.

Bleeder housing and valve assembly:

Returns excess fuel to vehicle fuel tanks through hose and tube system.

Bleeder valve is spring loaded.

Maintains constant fuel pressure in head assemblies.

Valve has 0.062 in. (1.57 mm) orifice allowing air to be bled off even if valve is closed.

Mounted to head assemblies by drilled bleeder valve stems and cap nuts.

Camshaft has:

Two three-lobe cams.

Two spiral gears.

Spiral gears are machined as part of camshaft.

Tappet assemblies:

Consists of guide assembly, roller and roller pin.

Cam lobe action is transmitted by tappet roller to guide assembly.

Tappet assembly transmits cam lobe action to fuel plunger.

Gear shaft assemblies:

Composed of quill shaft, bushing assembly, and camshaft driven helical gear.

Transmit camshaft rotary motion to fuel plungers for fuel distribution.

Plungers rotate at one half camshaft speed.

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**EQUIPMENT DESCRIPTION AND DATA - CONTINUED**

---

**0002 00****MAJOR PUMP COMPONENTS - CONTINUED**

Governor housing components composed of:

Weight and spider assembly.

Sleeve assembly.

Inner and outer governor springs.

Fulcrum lever assembly.

Operating linkages.

Operating lever assembly.

Governor weight and spider assembly is an integral part of fuel injection pump assembly.

Weight and spider assembly:

Pressed on camshaft extension.

Has two moveable weight assemblies.

Weights are pinned to opposite sides of friction drive spider.

Weights swing freely on weight pins.

Sleeve assembly:

Moves freely on camshaft extension.

Governor weights act against thrust bearing on inner end of sleeve.

Inner and outer springs act against outer end of sleeve.

Slots on sides of sleeve receive the fulcrum lever pivot pins.

Fulcrum lever assembly:

Has smoke limit cam and droop screw.

Is controlled by the operating lever assembly and sleeve assembly.

Fulcrum lever action is transmitted to smoke limit cam and droop screw.

Control rod assembly transmits fulcrum lever action to fuel control lever assembly.

Fuel control lever assembly:

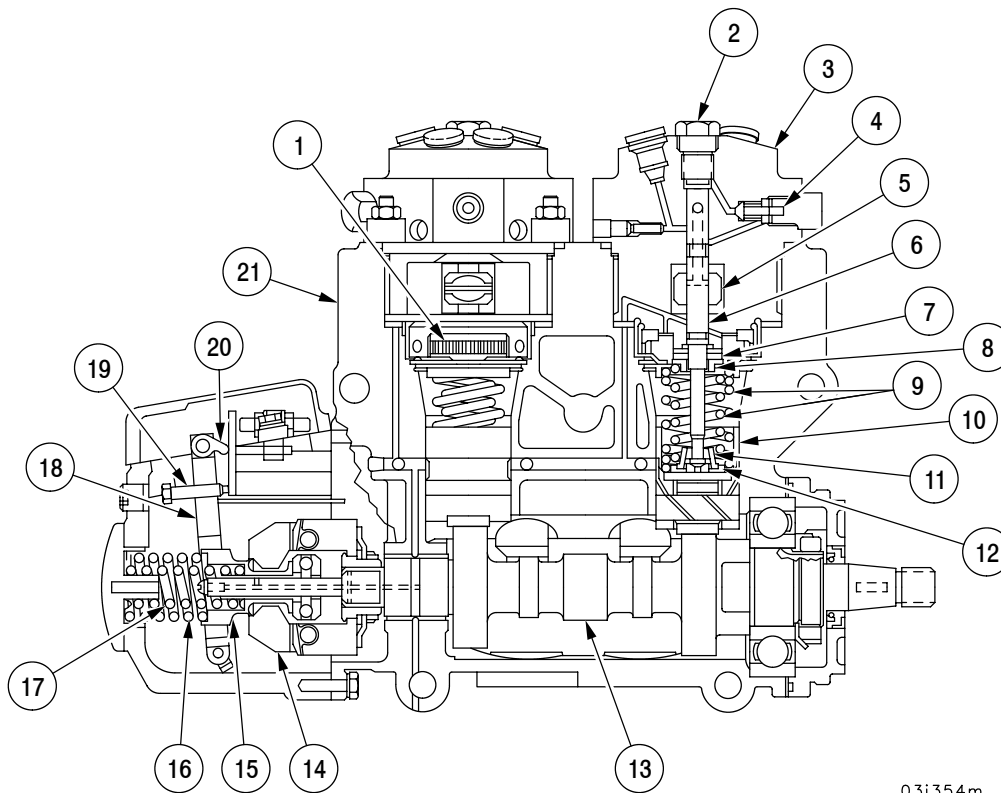
Pivots on fuel control lever screw.

Transmits control rod action to fuel control unit assemblies through yoke assembly.

Fuel control unit assemblies:

Control position of fuel plunger sleeve in relation to plunger spill port.

Spill port and sleeve relationship determine amount of fuel pumped each stroke.

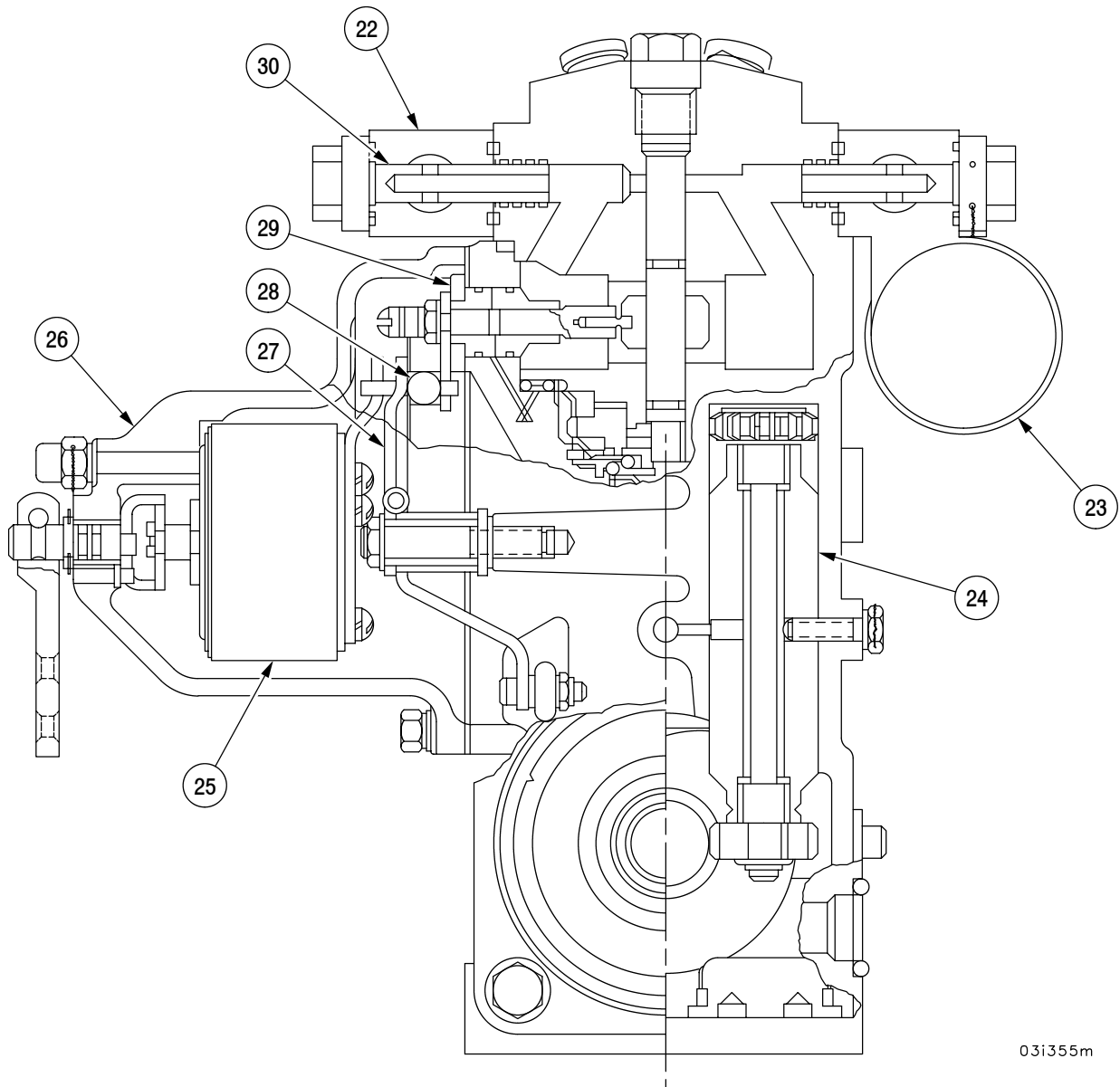


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- |                           |  |
|---------------------------|--|
| 1 Plunger drive spur gear | 12 Lower spring seat                   |
| 2 Plunger bore screw      | 13 Camshaft                            |
| 3 Head assembly           | 14 Governor weight and spider assembly |
| 4 Fuel delivery valve     | 15 Sleeve assembly                     |
| 5 Plunger sleeve          | 16 Governor outer spring               |
| 6 Fuel plunger            | 17 Governor inner spring               |
| 7 Plunger guide           | 18 Fulcrum lever assembly              |
| 8 Upper spring seat       | 19 Droop screw                         |
| 9 Plunger springs         | 20 Smoke limit cam                     |
| 10 Tappet assembly        | 21 Pump housing                        |
| 11 Plunger lock           |  |

Figure 1-2. Major Pump Components (Sheet 1 of 2).

(Cutaway through Governor Housing, Camshaft, and Head Assembly)

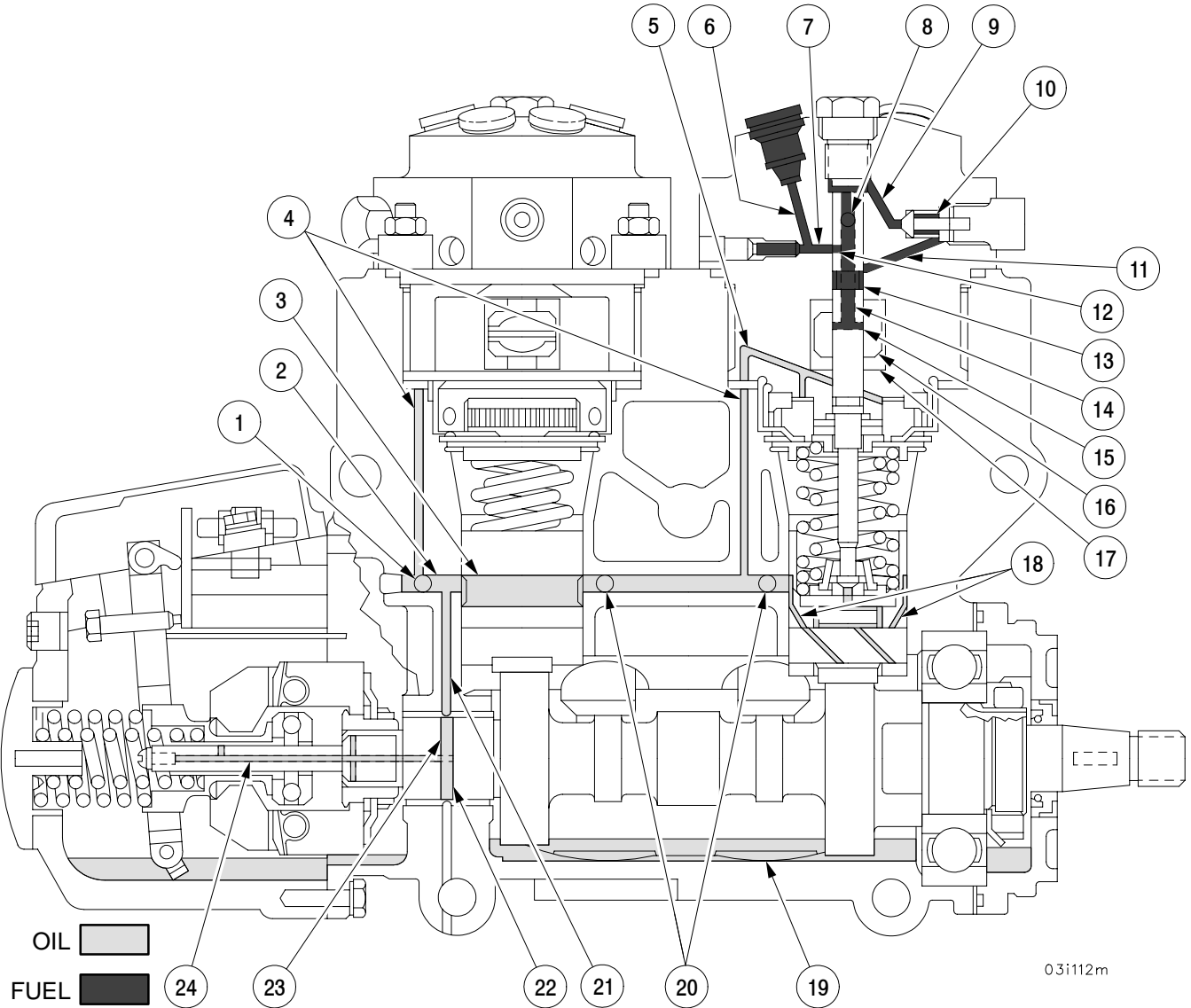


03i355m

- 22 Bleeder housing and valve assembly
- 23 Fuel filter assembly
- 24 Gear shaft assembly
- 25 Electrical solenoid
- 26 Cover and solenoid
- 27 Fuel control lever
- 28 Fuel control yoke assembly
- 29 Fuel control unit assembly
- 30 Bleeder valve stem

Figure 1-3. Major Pump Components (Sheet 2 of 2).

(Cutaway through Cover and Solenoid, Head Assembly, and Gear Shaft Assembly)



- |                                      |                                    |
|--------------------------------------|------------------------------------|
| 1 Horizontal oil passage             | 13 Plunger annulus                 |
| 2 Main horizontal oil passage        | 14 Plunger vertical fuel passage   |
| 3 Tappet assembly annulus            | 15 Plunger horizontal fuel passage |
| 4 Upper vertical oil passage         | 16 Plunger sleeve                  |
| 5 Hydraulic head oil passage         | 17 Fuel supply sump                |
| 6 Vertical outlet fuel passage       | 18 Tappet assembly oil passage     |
| 7 Horizontal outlet fuel passage     | 19 Oil sump                        |
| 8 Fuel port                          | 20 Gear shaft oil passage          |
| 9 Delivery valve upper fuel passage  | 21 Lower vertical oil passage      |
| 10 Fuel delivery valve               | 22 Camshaft journal oil passage    |
| 11 Delivery valve lower fuel passage | 23 Camshaft bushing annulus        |
| 12 Plunger distributing slot         | 24 Camshaft oil passage            |

Figure 1-4. Fuel and Oil Flow Diagram (Sheet 1 of 2).

(Cutaway through Governor Housing, Camshaft, and Head Assembly)

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**EQUIPMENT DESCRIPTION AND DATA - CONTINUED**

---

**0002 00****MAJOR PUMP COMPONENTS - CONTINUED**

Lubrication System (Figures 1-4 and 1-5):

Pressurized engine oil is delivered to the fuel injection pump through an external hose.

Pump housing has one main horizontal oil passage to lubricate tappet assemblies and gear shaft assemblies.

One vertical passage provides lubrication for head assembly components.

Another vertical passage provides lubrication for camshaft journal and governor weight and spider assembly components.

Camshaft lobes, ball bearing and gear shaft drive gear are splash lubricated.

Overflow oil drains from oil outlet on left side of pump.

Fuel System (Figures 1-4 and 1-5):

Fuel flow:

Continuous flow of filtered fuel enters pump through filter assembly.

Inlet flow branches in two directions.

One branch flows through sump, fuel outlet housing, and bleeder valve assembly.

One branch flows through plunger fuel ports to pressure chamber when plunger is at bottom of stroke.

Constant flow of fuel also acts as coolant for pump heads.

Fuel pumping and distribution:

Provided by camshaft.

Camshaft rotates at engine speed.

Camshaft action lifts and rotates plungers.

During two revolutions of camshaft each plunger completes six strokes and one revolution.

During lower portion of stroke, plunger pressure chamber is filled through fuel port.

During upper portion of stroke fuel port is closed off and fuel is compressed.

Compressed fuel opens fuel delivery valve and fuel flows to plunger annulus and distributing slot.

Distributing slot aligns with outlet port and fuel is delivered to engine cylinder.

Continued upward movement of plunger uncovers fuel spill port.

Fuel flows from pressure chamber to fuel sump relieving pressure.

Delivery valve closes and pumping cycle is completed.

Fuel metering control:

Position of plunger sleeve determines quantity of fuel delivered for each stroke.

With plunger sleeve raised effective stroke of plunger is longer and more fuel is delivered.

Lowering plunger sleeve reduces effective stroke and less fuel is delivered.

Lowering sleeve to extreme position uncovers both the fill port and spill port and no fuel can be delivered.

Position of plunger sleeve is controlled by the governor weight and spider assembly.

Increase in camshaft speed causes governor weight assemblies to move outward.

Outward weight movement forces governor sleeve against governor springs.

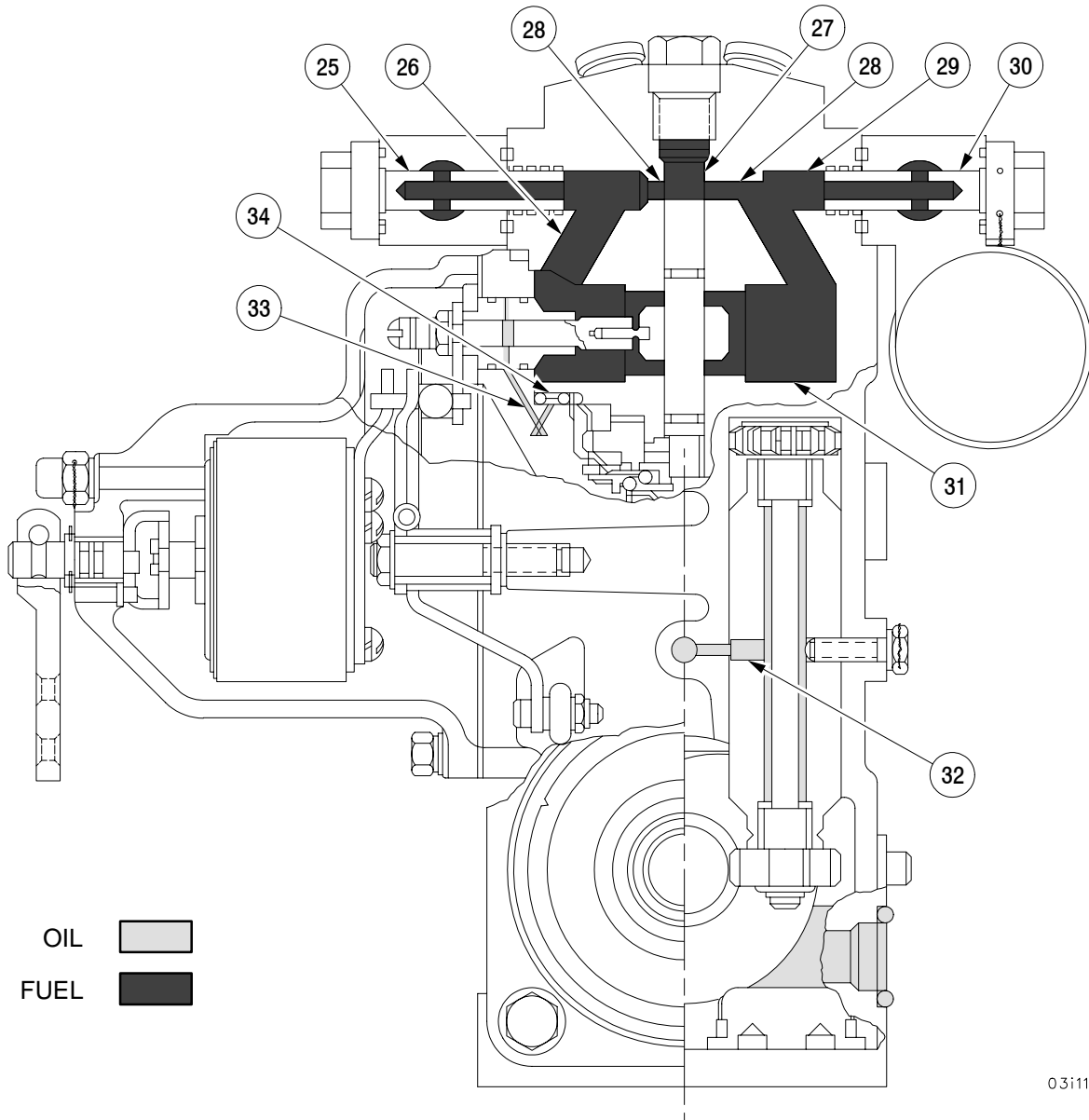
Spring tension balances governor weight action at any given speed after sleeve assembly has shifted.

Governor sleeve assembly is connected to plunger sleeve through fulcrum lever and linkage.

For any given engine speed there is a corresponding governor sleeve assembly and plunger sleeve position.

Adjustable smoke limit cam in linkage path between governor and plunger sleeve limits maximum fuel delivery to specified limits to prevent overfueling.





03i116ma

- 25 Bleeder valve stem
- 26 Fuel outlet passage
- 27 Plunger bore pressure chamber
- 28 Fuel port
- 29 Fuel inlet passage
- 30 Bleeder valve stem
- 31 Hydraulic head spill port
- 32 Gear shaft oil passage
- 33 Pump housing oil passage
- 34 Spacer

Figure 1-5. Fuel and Oil Flow Diagram (Sheet 2 of 2).

(Cutaway through Cover and Solenoid, Head Assembly, and Gear Shaft Assembly)

---

**EQUIPMENT DESCRIPTION AND DATA - CONTINUED**

---

**0002 00****DIFFERENCES BETWEEN MODELS**

Early and late model pumps are similar in design. Early model 11 mm pumps have dust shields, late model 11 mm pumps do not. Late model 11 mm pumps incorporate cold weather start components to permit easier engine starts in cold weather. Early model pumps, not so equipped, will be modified at time of overhaul by requisitioning Injection Pump Cold Weather Start Modification Kit, Part No. 12275776.

Cold Start Components were incorporated to provide more fuel when starting the engine in cold temperatures. Silicone lubricant was also added to provide smoother operation of the fuel control units and the electrical solenoid internal lever. New cold start components are:

- Fulcrum lever with droop screw.
- Operating lever assembly spring plate.
- Fuel control levers.
- Fuel control unit spacers.

Manual Coverage. This manual covers pumps that have cold start components.

**EQUIPMENT DESCRIPTION AND DATA - CONTINUED**

**0002 00**

**EQUIPMENT DATA**

General.

Manufacturer .....	American Bosch, United Technologies Automotive Group
Model .....	PSB-12BT
Part No. ....	11684129-1 11 mm used on 750 HP. Engine)
Governor Speed Range .....	700 to 2660 rpm (11684129 Pump)
Rotation (viewed from the rear) .....	Counterclockwise
Fuel injection sequence .....	1R, 2L, 5R, 4L, 3R, 1L, 6R, 5L, 2R, 3L, 4R, 6L
Fuel outlet ports .....	5/8-18UNF
Lubrication oil inlet port .....	1/8-27 NPTF
Bleeder valve operating pressure .....	30-38 psi (207-262 kPa)
Length overall .....	16.60 in. (42.2 cm)
Width overall .....	12.63 in. (32.1 cm)
Height overall .....	12.05 in. (30.6 cm)

Mounting Data.

Number of mounting holes .....	4
Diameter of mounting holes .....	0.562 in. (14.3 mm)

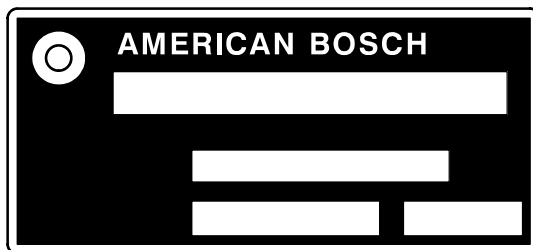
**IDENTIFICATION PLATE**

Location. The metering and distributing fuel pump has three identification plates. The pump identification plate is located on the right side of the governor housing. The fuel injection pump head assembly identification plates are located on the side of each head assembly.

Data.

The pump identification plate includes the pump type, part number, governor speed rpm, and serial number.

The head identification plate includes injection sequence, vendor pump head assembly part number, and an arrow that indicates which cylinder bank is serviced by that head. The front head (no. 2 head) arrow points to the right which indicates the engine right bank of cylinders is being served by that head. The rear head (No. 1 head) serves the left bank of cylinders.



**Pump Identification Plate**



**Head Assembly Identification Plate**

03i356m

**END OF WORK PACKAGE**



**THEORY OF OPERATION****0003 00****THIS WORK PACKAGE COVERS:**

Theory of Operation

**OPERATION**

The constant stroke, distributing plunger, sleeve assembly controlled type fuel injection pump (refer to Figure 1-1):

Contains two plungers.

Actuated by a camshaft and tappet assembly.

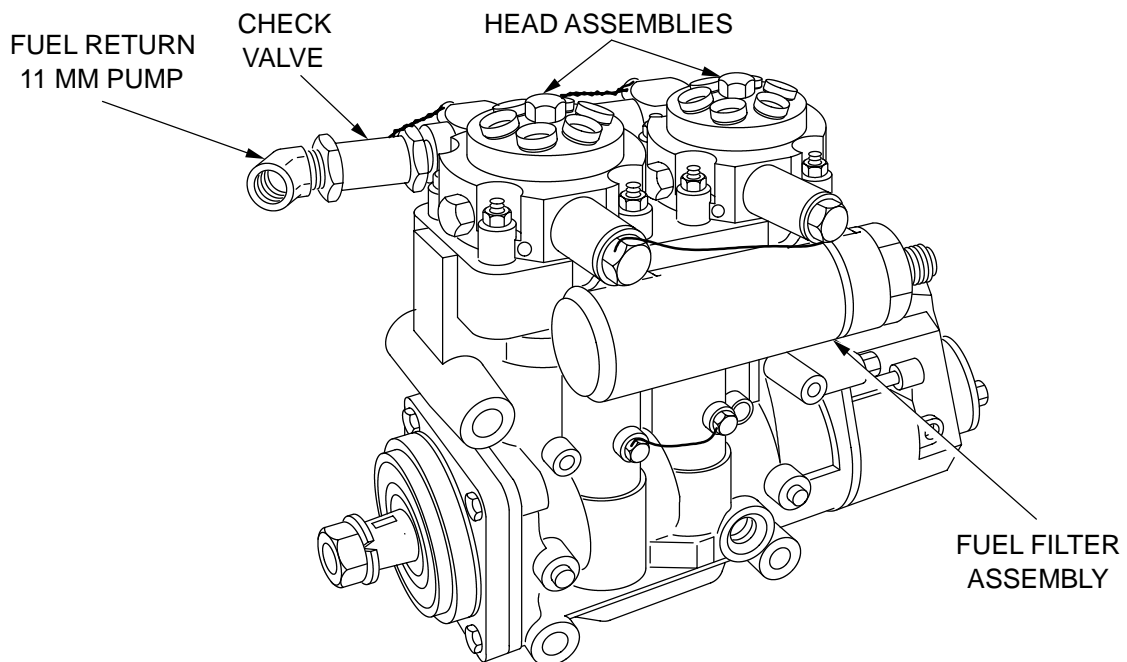
Camshaft includes gearing for fuel distribution function.

Plungers operate in multi-outlet head assemblies.

Pump is designed to be driven at crankshaft speed on four-cycle engines.

Fuel delivery is controlled by a centrifugal type governor weight and spider assembly which is driven directly from the camshaft.

Fuel delivery is timed in relation to required injection period of the engine firing cycle.



031353m

**Figure 1-1. PSB-12BT Fuel Injection Pump (11 mm) Left Rear View.**

**END OF WORK PACKAGE**



**CHAPTER 2**

**TROUBLESHOOTING PROCEDURES**





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**TROUBLESHOOTING INSTRUCTIONS AND QUICK GUIDE TO  
TROUBLESHOOTING (SYMPTOM/MALFUNCTION) INDEX**

---

**0004 00****THIS WORK PACKAGE COVERS:**

Troubleshooting Instructions, Troubleshooting Sample, and Quick Guide to Troubleshooting (Symptom/Malfunction) Index

---

**SCOPE**

This work package contains a "Quick Guide to Troubleshooting (Symptom/Malfunction) Index." The "Quick Guide to Troubleshooting (Symptom/Malfunction) Index" is the master reference table for locating troubleshooting information. The guide contains a list of various malfunctions which may occur during operation or inspection and provides a reference to the troubleshooting information or a solution. The troubleshooting work packages provide function description and step-by-step instructions for isolating and correcting malfunctions. Remember, troubleshooting should always be performed with common sense and two personnel.

**TROUBLESHOOTING INSTRUCTIONS AND QUICK GUIDE TO TROUBLESHOOTING (SYMPTOM/MALFUNCTION) INDEX – CONTINUED**

0004 00

**TROUBLESHOOTING SAMPLE**

To effectively troubleshoot the fuel metering pump, follow these steps:

- a. Determine the symptom/malfunction.
- b. Locate page (2) for your symptom in Table 3-1, Troubleshooting Procedures.
- c. Locate the troubleshooting work package page (2) for your symptom.
- d. Perform the TEST OR INSPECTION (3) and CORRECTIVE ACTION (4).
- e. Verify that the corrective action eliminated the symptom.

**QUICK GUIDE TO TROUBLESHOOTING (SYMPTOM/MALFUNCTION) INDEX**

SYMPTOM ← (1)	ACTION OR WP REF
UNEVEN FUEL DISTRIBUTION	(2) → WP 0003 00-7

**TROUBLESHOOTING INSTRUCTIONS AND QUICK GUIDE TO TROUBLESHOOTING (SYMPTOM/MALFUNCTION) INDEX - CONTINUED**

0003 00

**MALFUNCTION**

**TEST OR INSPECTION**

**CORRECTIVE ACTION**

**UNEVEN FUEL DISTRIBUTION**

(3)

Check for worn or sticking fuel plunger. Remove head assembly (WP 0025 00 or WP 0026 00). Disassemble and inspect head assembly (WP 0025 00 or WP 0026 00).

- (4)
- a. Plunger worn or sticking in bore. Remove head assembly (WP 0025 00 or WP 0026 00). Repair head assembly (WP 0025 00 or WP 0026 00). Install head assembly (WP 0025 00 or WP 0026 00).
  - b. Plunger not worn or sticking indicates uneven wear on camshaft lobes. Repair fuel injection pump (WP 0019 00).

0003-00-7

**TROUBLESHOOTING INSTRUCTIONS AND QUICK GUIDE TO  
TROUBLESHOOTING (SYMPTOM/MALFUNCTION) INDEX – CONTINUED**

**0004 00**

**QUICK GUIDE TO TROUBLESHOOTING (SYMPTOM/MALFUNCTION) INDEX**

SYMPTOM	ACTION OR WP REF
NO FUEL OUTPUT .....	WP 0003 00-4
FUEL OUTPUT DIFFERS BETWEEN HEAD ASSEMBLIES .....	WP 0003 00-5
FUEL LEAKS INTO LUBRICATION SYSTEM .....	WP 0003 00-5
FUEL LEAKS AT CONTROL UNIT .....	WP 0003 00-6
FUEL LEAKS AROUND HEAD ASSEMBLIES .....	WP 0003 00-6
UNEVEN FUEL DISTRIBUTION .....	WP 0003 00-7
EXCESSIVE VIBRATION .....	WP 0003 00-7
PUMP WILL NOT SHUT OFF ELECTRICALLY .....	WP 0003 00-8

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**TROUBLESHOOTING INSTRUCTIONS AND QUICK GUIDE TO  
TROUBLESHOOTING (SYMPTOM/MALFUNCTION) INDEX – CONTINUED**


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0004 00

**GENERAL**

These troubleshooting instructions are to be used when test procedures indicate that a malfunction is apparent.

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**Table 3-1. TROUBLESHOOTING PROCEDURES**


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**MALFUNCTION****TEST OR INSPECTION****CORRECTIVE ACTION****NO FUEL OUTPUT**

- Step 1. Test for internal fuel leakage (WP 0008 00).
- a. Internal fuel leakage, repair housing valve assembly (WP 0019 00).
  - b. No internal fuel leakage, go to step 2.
- Step 2. Inspect for stuck plungers. Remove both plunger bore screws (WP 0025 00 or WP 0026 00). Hold small wood dowel (or eraser end of wood pencil) against top of each plunger in turn. Rotate camshaft (WP 0006 00) and feel for plunger movement.
- a. Plungers do not move up and down, repair head assembly (WP 0025 00 or WP 0026 00).
  - b. Plungers move up and down, go to step 3.
- Step 3. Check for sheared plunger guides. While rotating camshaft (WP 0006 00), look in plunger bores to see if plungers rotate.
- a. Plungers do not rotate, repair head assembly (WP 0025 00 or WP 0026 00).
  - b. Plungers rotate, go to step 4.
- Step 4. Check for damage to internal linkage. Remove governor cover (WP 0011 00). Move governor operating lever back and forth. Look for corresponding movement of internal linkage.
- a. Internal linkage does not move in relation to actuating lever. Remove governor (WP 0021 00). Repair governor (WP 0021 00). Install governor (WP 0021 00).
  - b. Internal linkage moves in relation to actuating lever. Failure of camshaft or tappets is indicated as cause of no fuel delivery. First remove tappets (WP 0027 00) and inspect parts for damage. If tappets pass inspection, remove camshaft (WP 0032 00) and inspect for damage.

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**TROUBLESHOOTING INSTRUCTIONS AND QUICK GUIDE TO  
TROUBLESHOOTING (SYMPTOM/MALFUNCTION) INDEX – CONTINUED**

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**0004 00****MALFUNCTION****TEST OR INSPECTION****CORRECTIVE ACTION**

---

**FUEL OUTPUT DIFFERS BETWEEN HEAD ASSEMBLIES**

- Step 1. Check adjustment of fuel control yoke (WP 0012 00).
- a. Fuel control yoke out of adjustment. Adjust fuel control yoke (WP 0013 00).
  - b. Fuel control yoke properly adjusted, go to step 2.
- Step 2. Test for internal fuel leakage (WP 0008 00).
- a. Internal fuel leakage. Repair fuel injection pump (WP 0008 00).
  - b. No internal fuel leakage indicates a damaged fuel control unit. Remove head assemblies (WP 0025 00 or WP 0026 00). Repair head assemblies (WP 0025 00 or WP 0026 00). Install head assemblies (WP 0025 00 or WP 0026 00). Test fuel injection pump (WP 0010 00).

**FUEL LEAKS INTO LUBRICATION SYSTEM**

- Check head assemblies for fuel leakage (WP 0008 00). Remove head assemblies (WP 0025 00 or WP 0026 00). Remove and inspect preformed packings. Inspect head assemblies (WP 0025 00 or WP 0026 00).
- a. Preformed packings damaged. Replace preformed packings (WP 0025 00 or WP 0026 00). Head assemblies cracked. Replace head assemblies (WP 0025 00 or WP 0026 00). Install head assemblies (WP 0025 00 or WP 0026 00). Test fuel injection pump (WP 0010 00).
  - b. Preformed packings not damaged, or head assemblies not cracked, indicates worn plungers. Remove head assemblies (WP 0025 00 or WP 0026 00). Repair head assemblies (WP 0025 00 or WP 0026 00). Install head assemblies (WP 0025 00 or WP 0026 00). Test fuel injection pump (WP 0010 00).

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**TROUBLESHOOTING INSTRUCTIONS AND QUICK GUIDE TO  
TROUBLESHOOTING (SYMPTOM/MALFUNCTION) INDEX – CONTINUED**

---

**0004 00****MALFUNCTION****TEST OR INSPECTION****CORRECTIVE ACTION**

---

**FUEL LEAKS AT FUEL CONTROL UNIT**

Check for damaged fuel control unit preformed packings. Remove cover and solenoid (WP 0021 00). Remove fuel control yoke (WP 0023 00). Remove fuel control unit (WP 0024 00) and inspect preformed packings for damage.

- a. Preformed packings damaged. Replace preformed packings (WP 0024 00). Install fuel control unit (WP 0024 00). Install fuel control yoke (WP 0023 00). Install cover and solenoid (WP 0021 00).
- b. Preformed packings not damaged indicates worn fuel control unit. Disassemble and repair fuel control unit (WP 0024 00). Install fuel control unit (WP 0024 00). Install fuel control yoke (WP 0023 00). Install cover and solenoid (WP 0021 00).

**FUEL LEAKS AROUND HEAD ASSEMBLIES**

Step 1. Check for proper torque of head assembly hold-down nuts (WP 0006 00).

- a. Nuts loose, torque nuts (WP 0006 00).
- b. Nuts tight, go to step 2.

Step 2. Check for damaged preformed packings. Remove head assembly (WP 0025 00 or WP 0026 00). Remove and inspect preformed packings for damage.

- a. Preformed packings damaged. Install new preformed packings (WP 0025 00 or WP 0026 00). Install head assembly (WP 0025 00 or WP 0026 00).
- b. Preformed packings not damaged indicates damaged fuel injection pump housing or cracked hydraulic head(s). Repair housing assembly (WP 0019 00), and repair injection pump housing as required (WP 0031 00).

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**TROUBLESHOOTING INSTRUCTIONS AND QUICK GUIDE TO  
TROUBLESHOOTING (SYMPTOM/MALFUNCTION) INDEX – CONTINUED**

---

**0004 00****MALFUNCTION****TEST OR INSPECTION****CORRECTIVE ACTION**

---

**UNEVEN FUEL DISTRIBUTION**

Check for worn or sticking fuel plunger. Remove head assembly (WP 0025 00 or WP 0026 00). Disassemble, inspect, and repair head assembly (WP 0025 00 or WP 0026 00).

**EXCESSIVE VIBRATION**

- Step 1. Check runout of governor end of camshaft. Remove cover and solenoid and disconnect governor control rod assembly (WP 0021 00). Remove governor housing (WP 0022 00). Check runout of camshaft extension (WP 0028 00).
- a. Runout over 0.003 in. (0.08 mm). Straighten camshaft extension (WP 0028 00). Replace governor housing and connect governor control rod assembly (WP 0022 00). Install cover and solenoid (WP 0021 00).
  - b. Runout is within 0.003 in. (0.08 mm), go to step 2.
- Step 2. Check governor weight and spider assembly for wear or damage. Remove governor weight and spider assembly (WP 0028 00). Disassemble and inspect governor weight and spider assembly (WP 0028 00).
- a. Weight and spider parts worn or damaged. Repair or replace parts as required. Assemble and install weight and spider assembly (WP 0028 00). Install governor housing and connect governor control rod assembly (WP 0022 00). Install cover and solenoid (WP 0021 00).
  - b. Weight and spider parts not worn or damaged, go to step 3.
- Step 3. Check for worn or damaged camshaft ball bearing. Inspect camshaft ball bearing (WP 0032 00).
- a. Camshaft ball bearing worn or damaged. Replace camshaft ball bearing (WP 0032 00).
  - b. Camshaft ball bearing not worn or damaged. Replace camshaft sleeve bearing (WP 0031 00).

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**TROUBLESHOOTING INSTRUCTIONS AND QUICK GUIDE TO  
TROUBLESHOOTING (SYMPTOM/MALFUNCTION) INDEX – CONTINUED**

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**0004 00****MALFUNCTION****TEST OR INSPECTION****CORRECTIVE ACTION**

---

**PUMP WILL NOT SHUT OFF ELECTRICALLY**

Check for manual fuel linkage shut-off. Remove governor cover (WP 0021 00). Move manual operating lever toward governor. Watch for movement of fulcrum lever away from stop plate (WP 0022 00).

- a. Fulcrum lever moves away from stop plate. Remove cover and solenoid (WP 0021 00). Remove and discard electrical solenoid (WP 0021 00). Install new solenoid (WP 0021 00). Install cover and solenoid (WP 0021 00). Install governor cover (WP 0021 00).
- b. Fulcrum lever does not move away from stop plate. Internal damage is indicated. Repair governor housing and associated parts (WP 0022 00).

**END OF WORK PACKAGE**



**CHAPTER 3**

**GENERAL MAINTENANCE  
INSTRUCTIONS**



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**GENERAL MAINTENANCE INSTRUCTIONS**

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**0005 00****THIS WORK PACKAGE COVERS:**General Maintenance Instructions

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**SCOPE**

This work package provides general maintenance instructions and basic guidance for performing required maintenance functions. References are also provided for maintenance-related procedures not within the scope of this manual.

**DISASSEMBLY AND ASSEMBLY PROCEDURES**

Complete disassembly of a component is not always necessary to make a required repair or replacement. Good judgment should be used to keep disassembly operations to a minimum.

In disassembling a unit, first follow basic inspection procedures, then remove only necessary components and sub-assemblies. These components may then be reduced, as necessary, into individual parts.

During disassembly, tag critical parts such as shims, bearings and electrical leads, to facilitate reassembly. This is especially important for electrical equipment if circuit number tags are illegible or missing.

**CAUTION**

Never scribe-mark bearing surfaces.

Mark gears on mating teeth by scribe marks, or with dye, indelible ink or paint to be certain of correct positioning at assembly. The use of chalk or crayon for marking should be avoided because of lack of permanence.

During assembly, subassemblies should be assembled first, combined into major components where possible and then installed to form a complete component.

Records to provide repair and replacement data and statistics should be carefully prepared and maintained according to DA PAM 750-8.

**REPLACEMENT OF PARTS**

Unserviceable and unrepairable assemblies will be broken down into items of issue and serviceable parts will be returned to stock. Parts or assemblies which cannot be repaired or reconditioned will be salvaged and new parts will be used to replace them.

When assembling components and assemblies, replace damaged keys with new ones. If screws, washers or nuts are damaged, they must be replaced.

Gaskets, packings, preformed packings, seals, lockwashers, locknuts, self-locking nuts, self-locking screws, cotter pins and spring pins must be replaced. Bushings must be replaced only if removed.

Springs must be replaced if broken, kinked, cracked or do not conform to standards specified in the repair data.

If a required part is not available, reconditioning of the old part is necessary. Such parts should be inspected carefully after reconditioning to determine their suitability and probable service life. Replacement parts should be requisitioned immediately.

**BALL AND ROLLER BEARINGS**

Refer to TM 9-214, "Inspection and Care of Bearings," for cleaning, inspection and lubrication of bearings and instructions for evaluation of bearing life.

**REMOVING BURRS, SCRATCHES AND RAISED METAL**

Use a fine mill file, soft stone or abrasive cloth dipped in dry-cleaning solvent (item 7, WP 0041 00) to remove burrs, scratches or raised metal.

**REMOVAL AND INSTALLATION OF SELF-LOCKING STUDS****Removal of Self-Locking Studs**

Position stud remover/setter over stud to be replaced. Remove and discard stud.

**Installation of Self-Locking Studs**

Install new stud and tighten with remover/setter.

**WELDING**

For welding instructions and welding materials, refer to TC 9-237.

**ELECTRICAL TEST EQUIPMENT AND ELECTRICAL TESTING**

To use electrical test equipment, refer to appropriate system technical manual.

**SHAFTS, GEARS AND BEARINGS**

Gears, bearings, sleeves and other components may be installed on shafts as tight fits. The use of arbor press, gear pullers or other appropriate tools for removal and installation may be required.

**CLEANING**

Procedures for cleaning are the same for a great percentage of parts and components. Refer to TM 9-247 for instructions on cleaning and necessary cleaning materials. Refer to this TM for specific areas to be cleaned.

Clean all parts before inspection, after repair and before assembly.

Hands should be kept free of grease which can collect dust and dirt.

After cleaning, all parts should be covered to protect them from dust and dirt.

**PAINTING**

Refer to TM 43-0139 and TB 43-0147 for information on painting.

**LUBRICATION**

Pump is self-lubricating.

**END OF WORK PACKAGE**

**INSPECTION UPON RECEIPT****0006 00****THIS WORK PACKAGE COVERS:**

Inspection

**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)  
 Work bench  
 Bristle brush (item 6, WP 0042 00)  
 Machinist's vise (item 58, WP 0042 00)  
 Plastic scraper (item 35, WP 0042 00)  
 Automotive fuel and electrical system repair tool kit  
 (item 56, WP 0042 00)  
 Torque wrench (item 62, WP 0042 00)  
 Torque wrench (item 63, WP 0042 00)  
 Holding plate (item 24, WP 0042 00)  
 Turning and holding wrench (item 64, WP 0042 00)  
 Steel rod (Fabricated tool) (item 47, WP 0042 00)  
 Adapter kit (item 1, WP 0042 00)

**Materials/Parts**

Wiping rags (item 4, WP 0041 00)  
 Cleaning solvent (item 7, WP 0041 00)  
 Tape (item 9, WP 0041 00)

**Equipment Conditions**

Fuel metering pump assembly removed  
 (TM 9-2815-247-34)

**Inspection****NOTE**

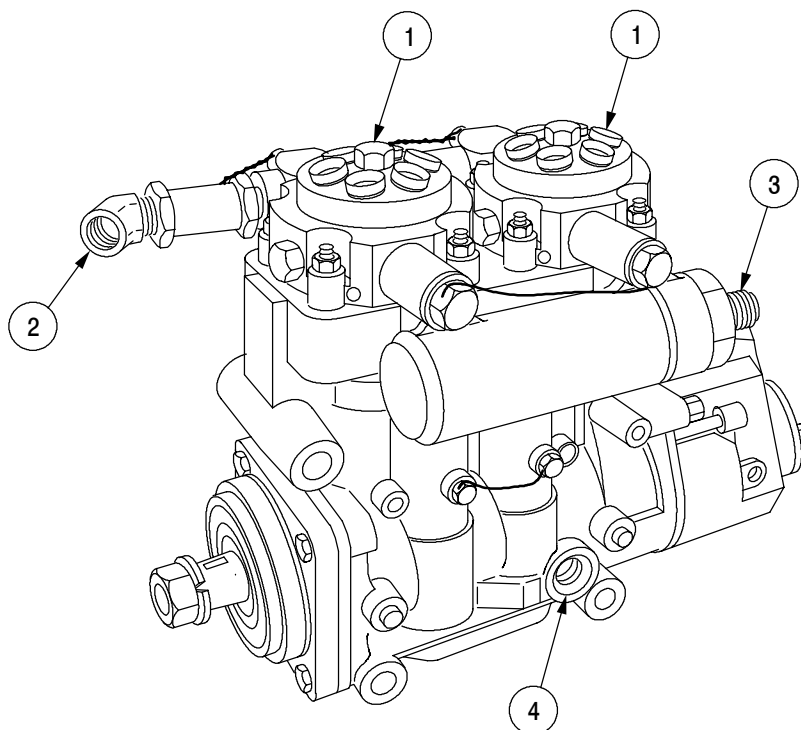
Metering pump must be clean prior to inspection.

1. Place pump on workbench. Using tape, cover head assembly fuel outlet ports (1).
2. Using tape, cover threaded openings (2) and (3), and oil drain hole (4).

**CAUTION**

Use solvent, bristle brush, or plastic scraper only.

3. Using plastic scraper and bristle brush, remove dirt and debris from exterior surfaces.



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**INSPECTION UPON RECEIPT - CONTINUED****0006 00****Inspection - Continued****WARNING**

Cleaning solvent is flammable. Use only in well ventilated areas. Keep away from flame, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when using to prevent skin irritation.

4. Remove any remaining foreign material using a clean cloth moistened in solvent.

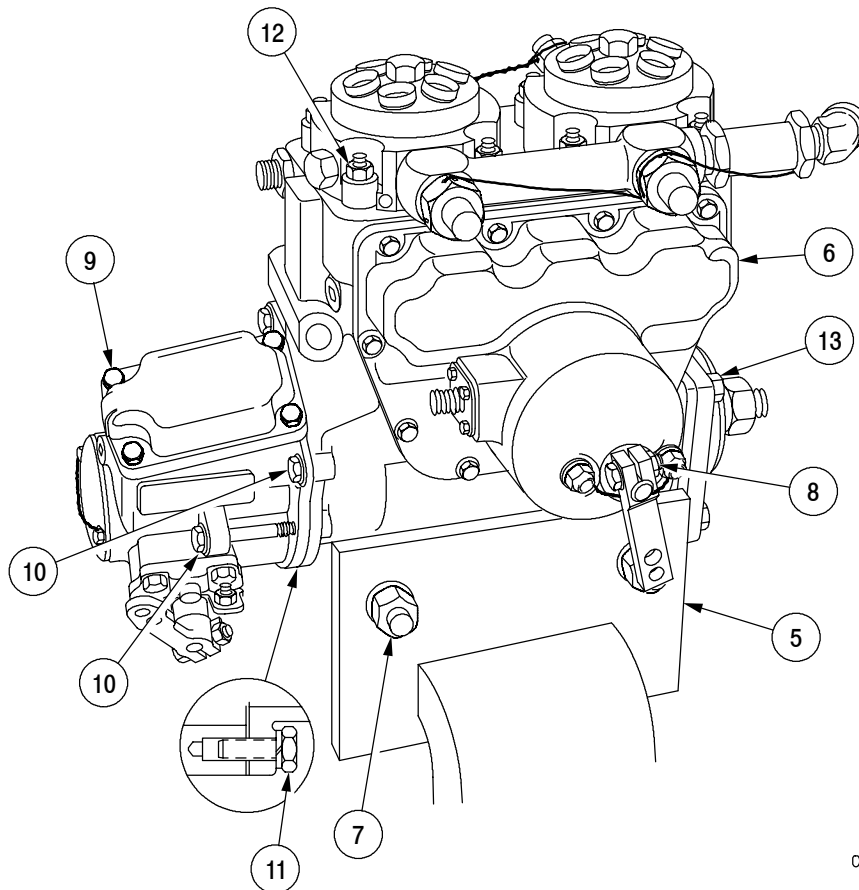
**WARNING**

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc).

5. Blow dry with compressed air, or wipe dry with a clean cloth. Remove all grease and/or oil, particularly around gaskets and mating surfaces, so fuel or oil leakage can be detected during testing.

**INSPECTION UPON RECEIPT - CONTINUED****Inspection - Continued**

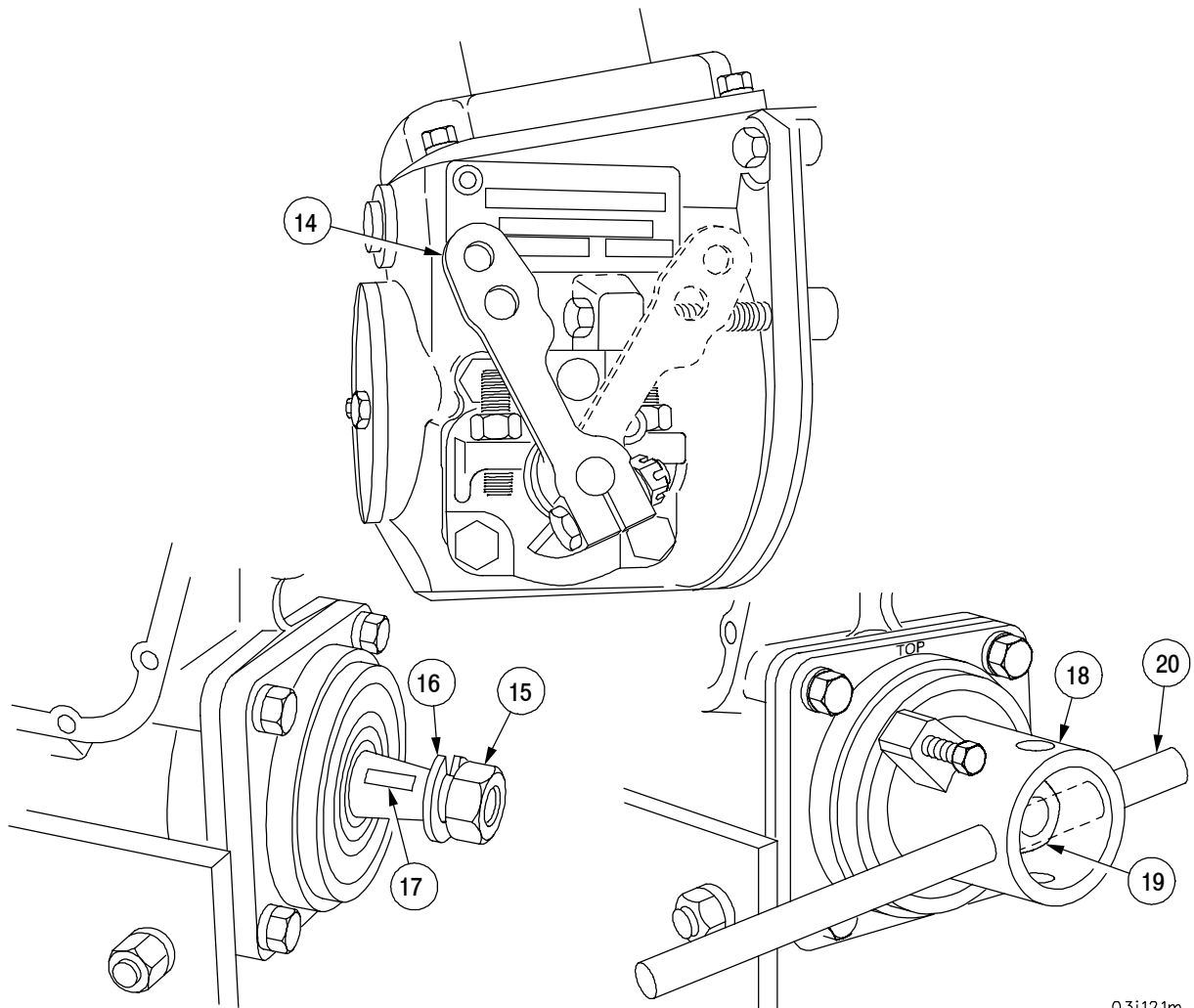
6. Position holding plate (5) on pump (6) and secure with two bolts, flat washers, lockwashers, and nuts (7).
7. Place holding plate (5) and pump (6) in vice.
8. Using 7/16 in. socket and torque wrench, tighten solenoid operating lever nut (8) to 70 to 75 lb-in. (8 to 8.5 N•m).
9. Using 7/16 in. socket and torque wrench, tighten four governor cover machine bolts (9) to 50 to 60 lb-in. (6 to 7 N•m).
10. Using 7/16 in. socket, torque wrench, and extension, tighten four governor housing capscrews (10) to 50 to 60 lb-in. (6 to 7 N•m).
11. Using 7/16 in. open end wrench, tighten screw (11) snug-tight.
12. Using 1/2 in. deep well socket, torque wrench, and extension, tighten eight head assembly nuts (12).
13. Using 9/16 in. socket and torque wrench, tighten four bearing plate screws (13) to 18 to 20 lb-ft (24.5 to 27 N•m).



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**INSPECTION UPON RECEIPT - CONTINUED****0006 00****Inspection - Continued**

14. Move operating lever assembly (14) to ensure that linkages and controls are free and not binding.
15. If operating lever is free, proceed to step 16. If operating lever does not operate properly, the governor housing and associated parts must be repaired (WP 0022 00).
16. Remove nut (15) and lockwasher (16).
17. Align keyway with Woodruff key (17) and install turning and holding wrench (18) and secure with lockwasher and nut (19). Using 1 1/16 in. deep well socket, adapter, and ratchet handle, tighten nut (19).
18. Using steel rod (20) and turning and holding wrench (18), rotate camshaft to ensure that there are no broken parts or binding of camshaft or associated parts.
19. If camshaft and associated parts are free, proceed with steps 21 and 22, and test pump (WP 0008 00).
20. If camshaft and associated parts do not operate properly, proceed with steps 21 and 22, then remove injection pump housing (WP 0031 00) to repair camshaft and associated parts (WP 0032 00).

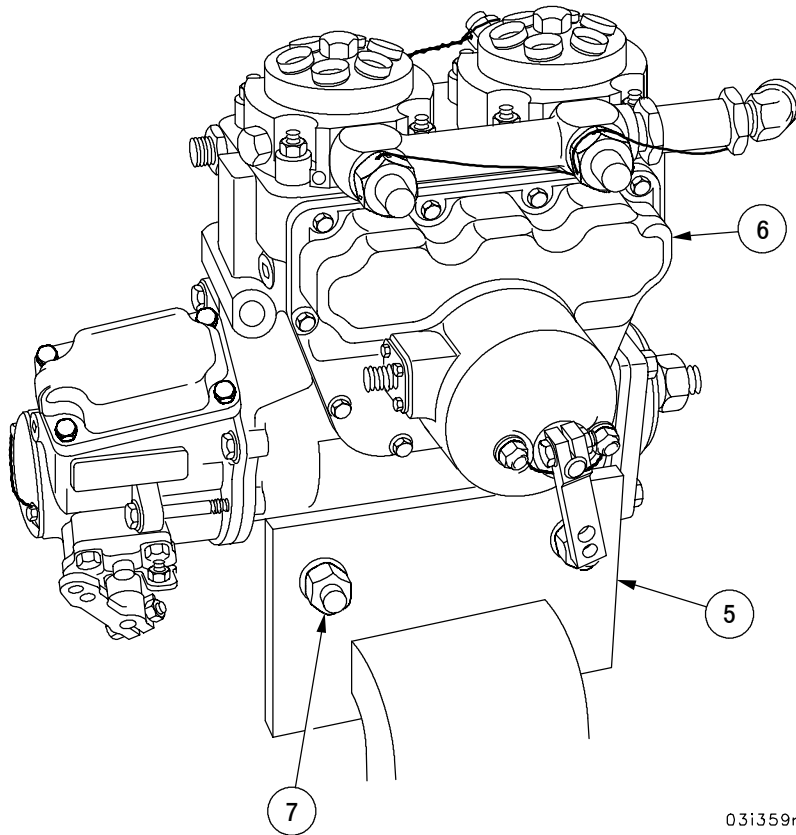


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**INSPECTION UPON RECEIPT - CONTINUED****0006 00****Inspection - Continued**

21. Remove holding plate (5) and pump (6) from vise.
22. Remove nuts (7), lockwashers, flat washers, and bolts and remove holding plate (5) from pump (6) (return hardware to adapter kit).



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**END OF WORK PACKAGE****0006 00-5/6 blank**



## PREPARING A8020 TEST STAND FOR TESTING AND MOUNTING THE PSB-12BT FUEL METERING PUMP ON THE A8020 TEST STAND

0007 00

### THIS WORK PACKAGE COVERS:

Preparation for Testing

### INITIAL SETUP:

#### Tools and Special Tools

General mechanic's tool kit (item 23, WP 0042 00)  
 Work bench  
 Automotive fuel and electrical system repair tool kit (item 56, WP 0042 00)  
 Fuel injection pump tester (item 53, WP 0042 00)  
 Adapter kit (item 1, WP 0042 00)  
 Turning and holding wrench (item 64, WP 0042 00)  
 Steel rod (Fabricated tool) (item 47, WP 0042 00)

#### Materials/Parts

Wiping rags (item 4, WP 0041 00)

#### Equipment Conditions

Manifold pressure adjusted (WP 0016 00)

#### References

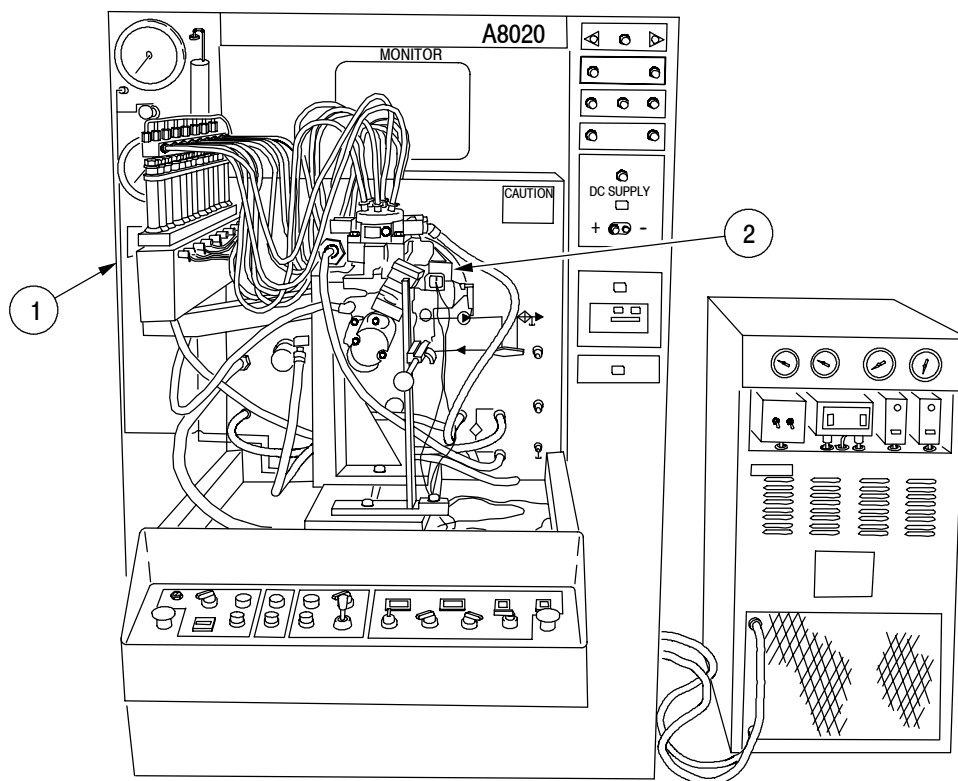
TM 9-4910-778-14&P  
 Instruction booklet 74-9168

### Preparation for Testing

#### NOTE

All references to camshaft rotation are designated as either left or right while facing the test stand.

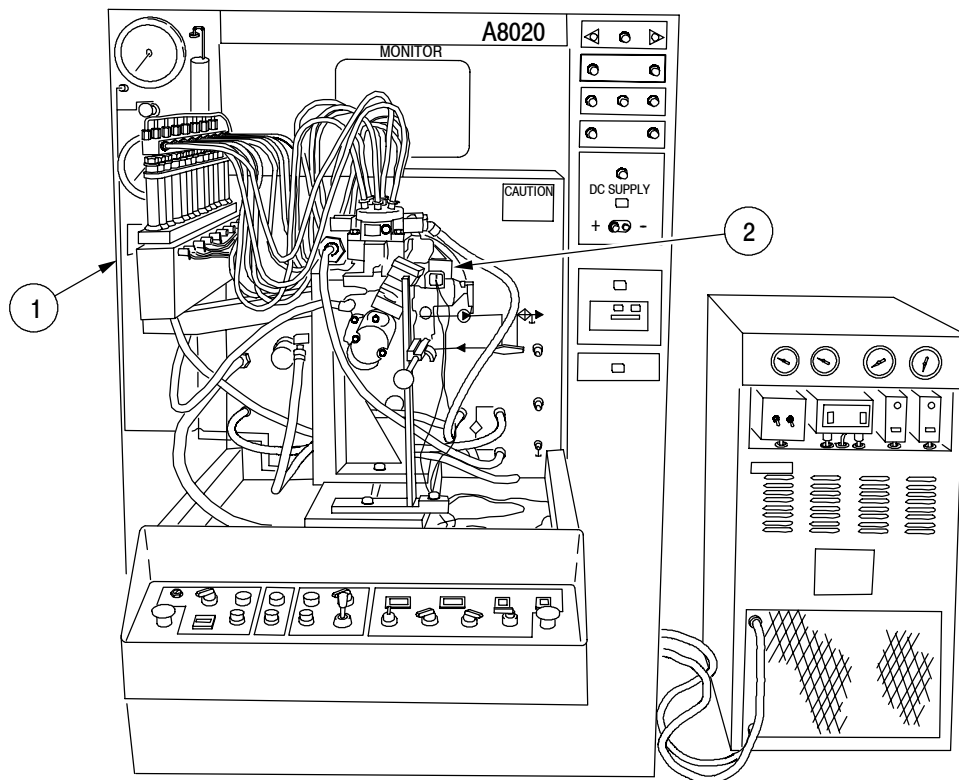
1. Prepare A8020 test stand (1) for testing the PSB-12BT series fuel metering pump (2) (TM 9-4910-778-14&P).
2. Mount PSB-12BT fuel metering pump (2) on A8020 test stand (1) (TM 9-4910-778-14&P and Instruction booklet 74-9168) found in adapter kit 74-8017.



03i002ma

**PREPARING A8020 TEST STAND FOR TESTING AND MOUNTING THE  
PSB-12BT FUEL METERING PUMP ON THE A8020 TEST STAND -  
CONTINUED****0007 00****Preparation for Testing - Continued**

3. Shut down A8020 test stand (1) (TM 9-4910-778-14&P).
4. Remove PSB-12BT fuel metering pump (2) from A8020 test stand (1) (TM 9-4910-778-14&P and Instruction booklet 74-9168).



03i002ma

**END OF WORK PACKAGE**

**TEST FOR FUEL LEAKAGE OR DELIVERY VALVE MALFUNCTION IN HEADS****0008 00****THIS WORK PACKAGE COVERS:**

Testing

**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)  
 Automotive fuel and electrical system repair tool kit  
 (item 56, WP 0042 00)  
 Torque wrench (item 62, WP 0042 00)  
 Torque wrench (item 63, WP 0042 00)  
 Fuel injection pump tester (item 53, WP 0042 00)  
 Adapter kit (item 1, WP 0042 00)  
 Turning and holding wrench (item 64, WP 0042 00)  
 Steel rod (fabricated tool) (item 47, WP 0042 00)  
 Nozzle tester (item 32, WP 0042 00)  
 Micrometer, 1-in. OD (item 29, WP 0042 00)  
 Work bench

**Materials/Parts**

Wiping rags (item 4, WP 0041 00)  
 1/4-18 dryseal NPTF pipe plug  
 Delivery valve spring, if required  
 Preformed packing (8) from gasket and packing set,  
 Part No. 5702632 or Parts kit, Part No. 5704356  
 Parts kit, Part No. 5702739

**Equipment Conditions**

Fuel metering pump mounted on test stand (TM  
 9-4910-778-14&P and Instruction booklet 74-9168)

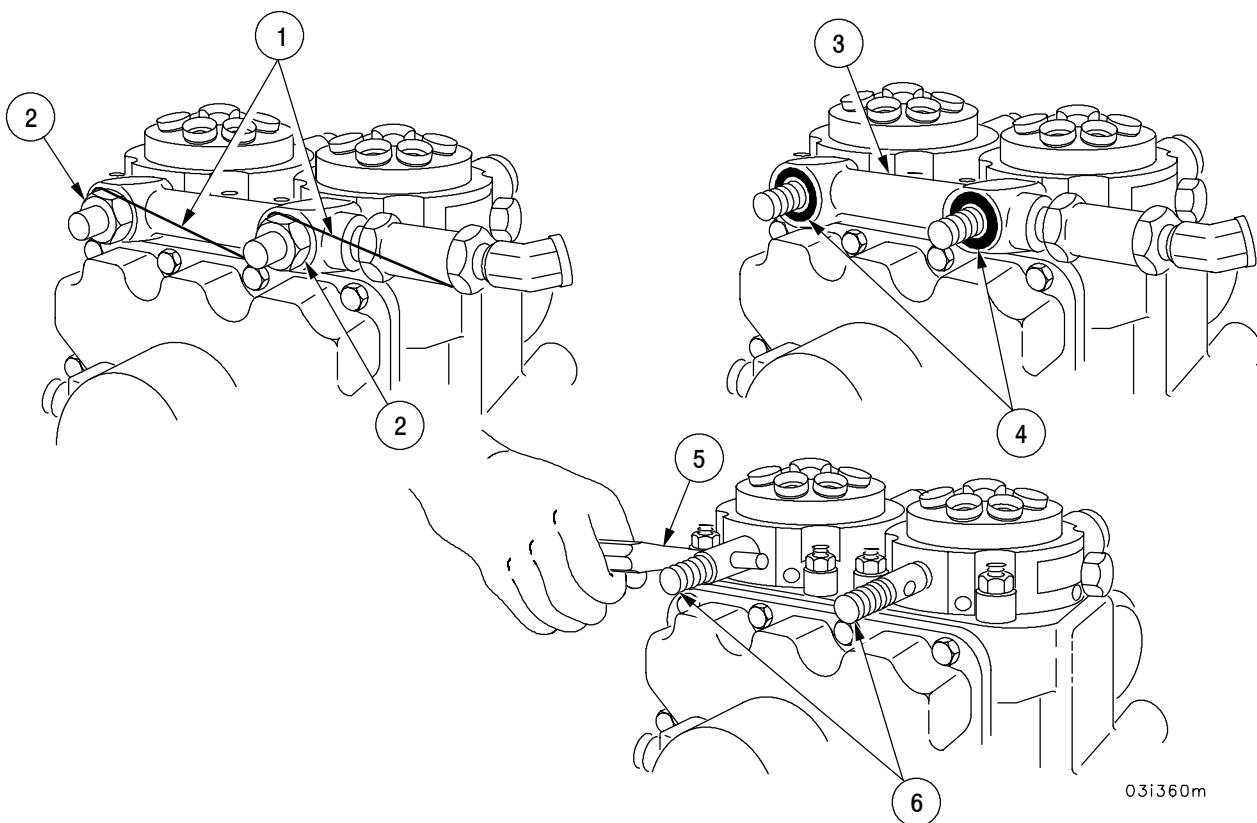
**References**

Instruction booklet 74-9168  
 TM 9-4910-778-14&P

**Testing****NOTE**

Test for fuel leakage or delivery valve malfunction will be performed first on head assembly No. 1, then on head assembly No. 2. All references to camshaft rotation are designated as either left or right while facing the test stand.

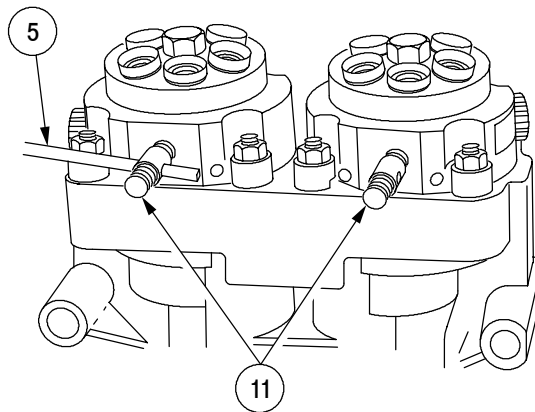
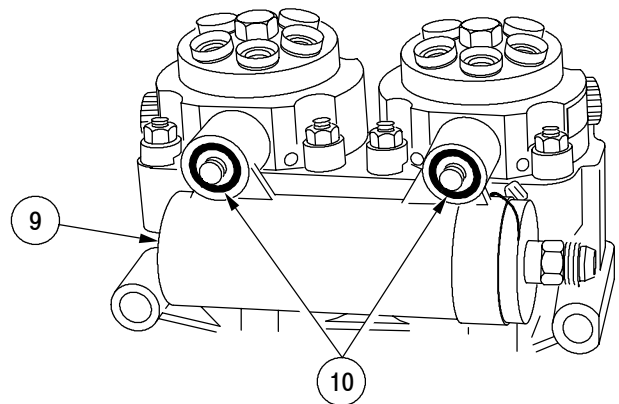
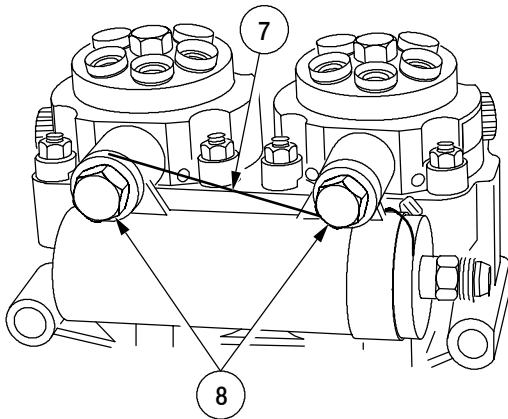
- Using diagonal cutting pliers, cut and remove wire (1). Using 1 1/8 in. socket ratchet handle, remove two nuts (2).
- Remove housing and valve assembly (3). Remove and discard two preformed packings (4) from each side of housing.
- Using a drift (5), remove two bleeder valve stems (6).



031360m

**TEST FOR FUEL LEAKAGE OR DELIVERY VALVE MALFUNCTION IN HEADS**  
**- CONTINUED****0008 00****Testing - Continued**

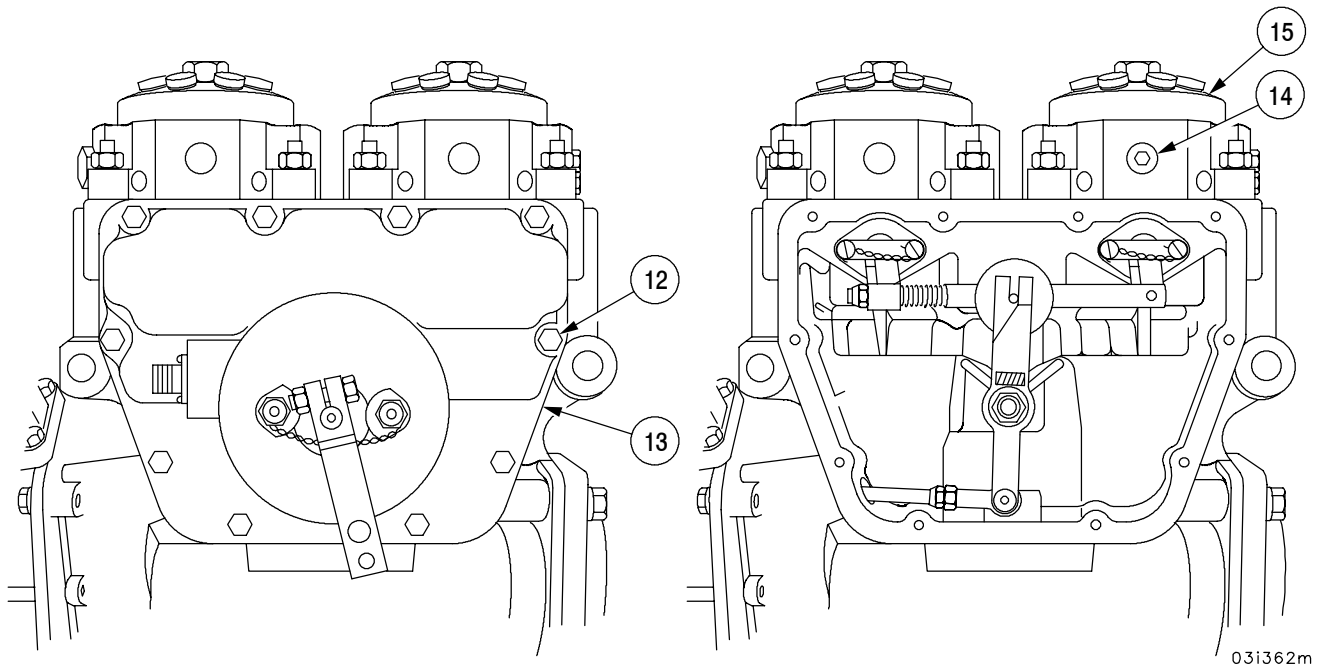
4. Using diagonal cutting pliers, cut and remove wire (7). Using 3/4 in. socket and ratchet handle, remove two nuts (8).
5. Remove filter assembly (9). Remove and discard two preformed packings (10) from each side of filter assembly.
6. Using a drift (5), remove two bleeder valve stems (11).



03i361m

**TEST FOR FUEL LEAKAGE OR DELIVERY VALVE MALFUNCTION IN HEADS  
- CONTINUED****0008 00****Testing - Continued**

7. Using 7/16 in. socket, ratchet handle, and extension, remove 10 machine bolts and lockwashers (12) from cover and solenoid (13). Remove cover and solenoid (13).
8. Install 1/4-18 dryseal NPTF pipe plug (14) in fuel outlet port on right side of head assembly No. 1 (15).

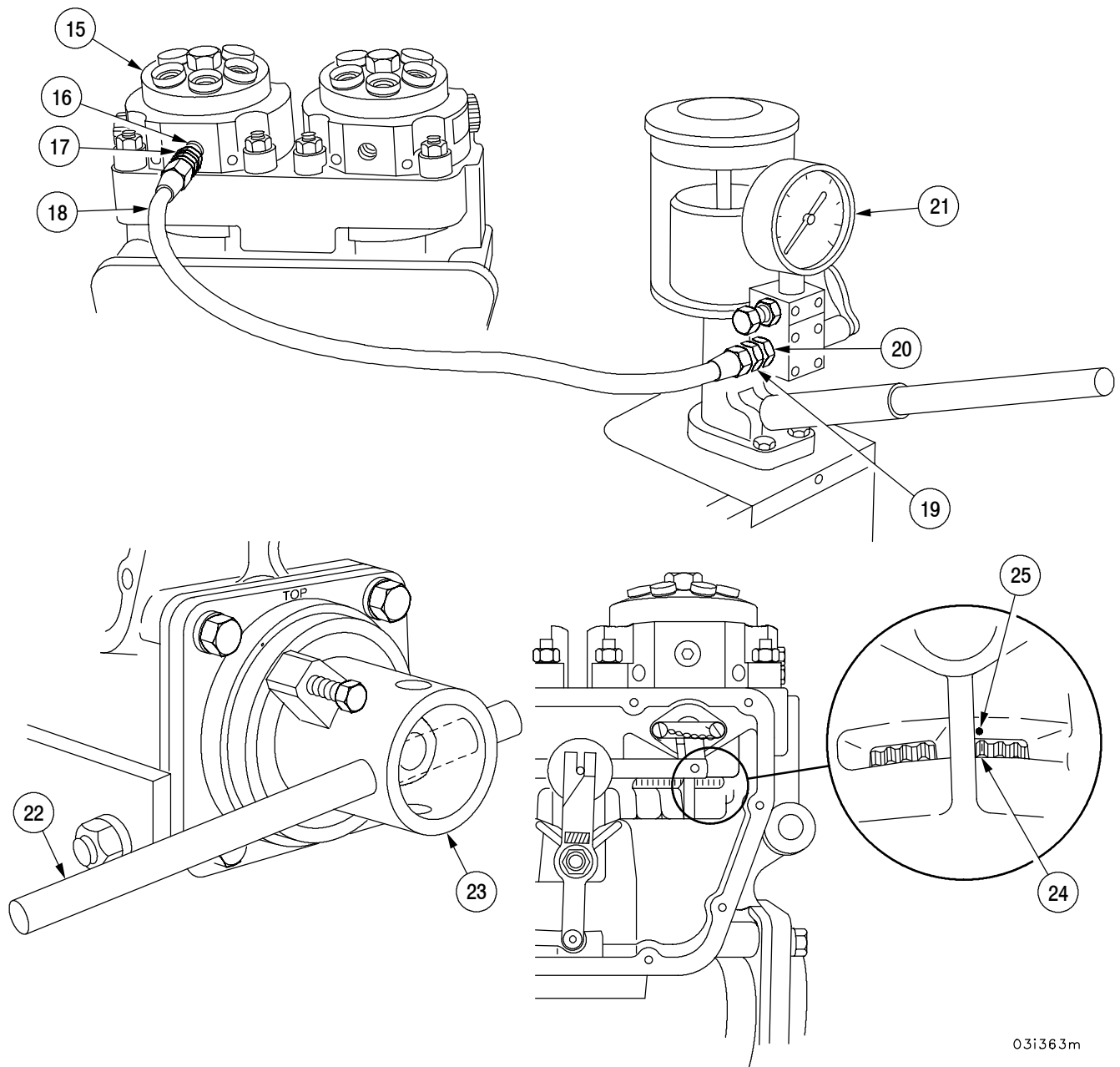


**TEST FOR FUEL LEAKAGE OR DELIVERY VALVE MALFUNCTION IN HEADS**  
**- CONTINUED**

**0008 00**

**Testing - Continued**

9. Using 5/8 in. open end wrench, install connector stud (16), in fuel inlet port on left side of head assembly No. 1 (15).
10. Install connector (17) on hose (18).
11. Install other end of connector (17) on stud (16).
12. Install connector (19) on hose (18).
13. Install other end of connector (19) on lower connector (20) on tester (21).
14. Using steel rod (22), rotate camshaft with turning and holding wrench (23) to align plunger drive spur gear slotted tooth (24) with punch mark (25) on underside of housing deck.



031363m



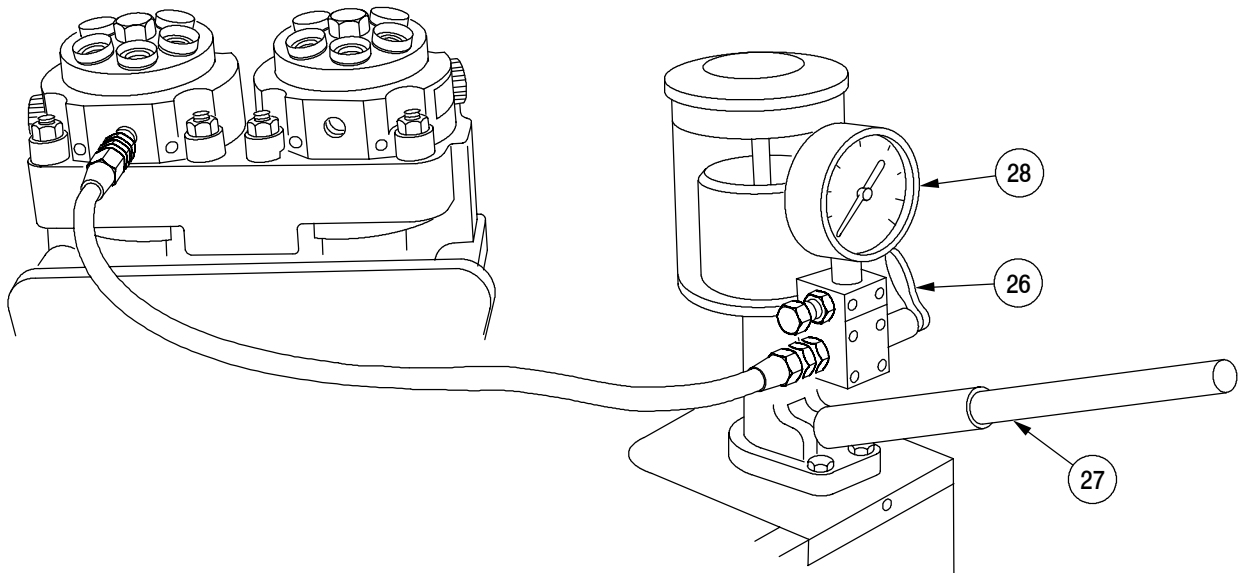
**TEST FOR FUEL LEAKAGE OR DELIVERY VALVE MALFUNCTION IN HEADS  
- CONTINUED****0008 00****Testing - Continued****WARNING**

Cover pump head assembly fuel outlet ports to prevent fuel from squirting.

**CAUTION**

Do not allow fuel pressure to exceed 425 psi (2930 kPa).

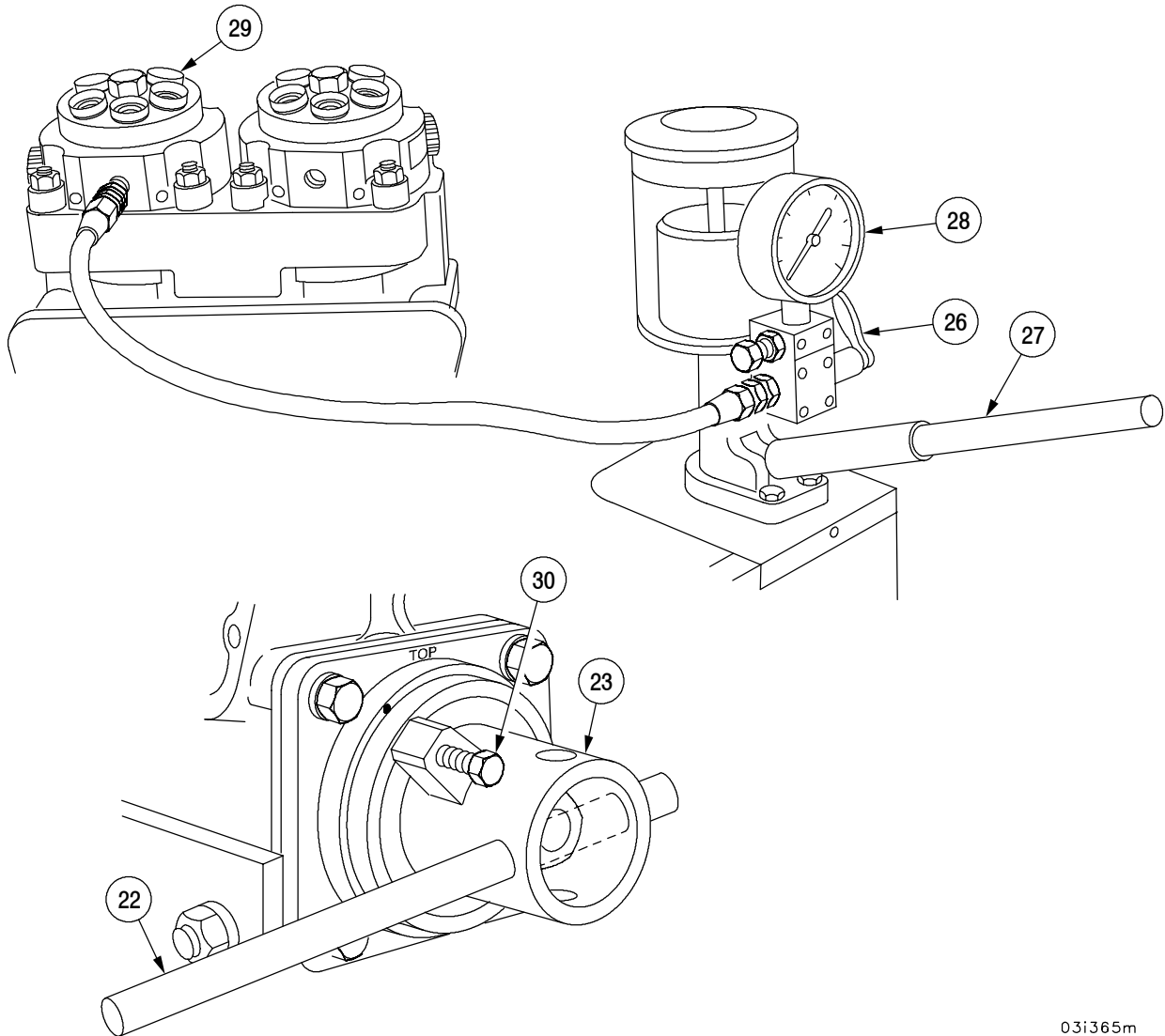
15. Open pressure valve (26). Operate nozzle tester pump handle (27) until pressure of 400 psi (2758 kPa) is registered on the tester gauge (28). Close pressure valve (26).
16. When pressure drops to 350 psi (2413 kPa) time rate of drop to 250 psi (1724 kPa). If pressure drops to 250 (1724 kPa) or below within 25 seconds, there is an internal or external leak. Observe exterior of hydraulic head for visible leak or from tester connections. Repair external leak, or if no external leak, repair fuel injection pump (WP 0031 00).
17. If pressure does not drop to 250 psi (1724 kPa) within 25 seconds, proceed to step 18.



03i364m

**TEST FOR FUEL LEAKAGE OR DELIVERY VALVE MALFUNCTION IN HEADS**  
**- CONTINUED****0008 00****Testing - Continued**

18. Open pressure valve (26) and operate nozzle tester pump handle (27) until a pressure of 425 psi (2930 kPa) is registered on the gauge (28).
19. Using steel rod (22), rotate camshaft with turning and holding wrench (23) until fuel flows from one of six outlets (29) of the head assembly.
20. Using 7/16 in. box end wrench, lock camshaft in position by tightening the locking screw (30).



03i365m

## TEST FOR FUEL LEAKAGE OR DELIVERY VALVE MALFUNCTION IN HEADS - CONTINUED

0008 00

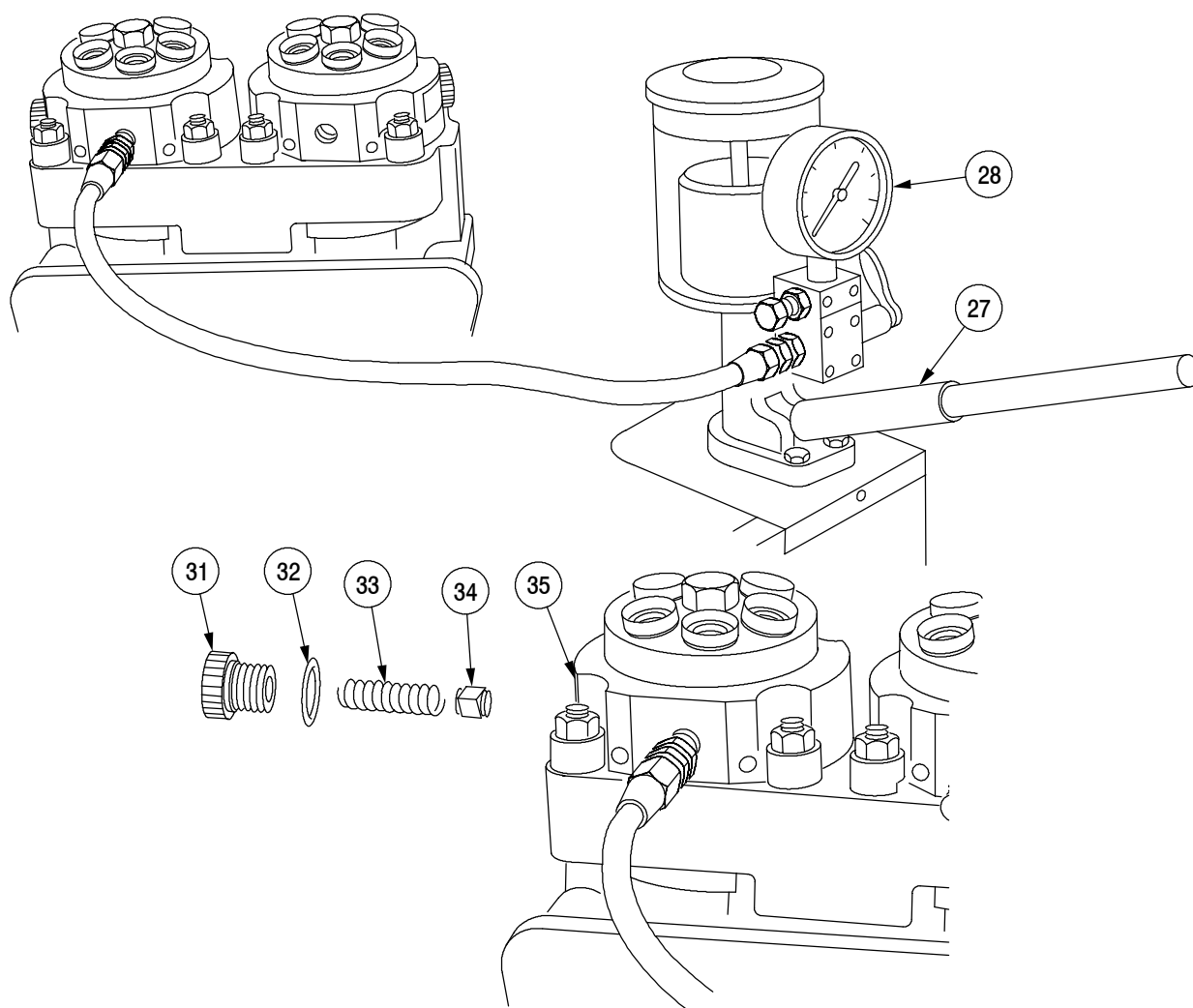
### Testing - Continued

21. After delivery valve has seated a residual pressure may be indicated on pressure gauge and must remain above zero for at least 10 seconds.

### NOTE

Due to leak-down test step 16, a slight movement of the pressure gauge would be normal.

22. If not, slowly operate test pump handle (27) while noting pressure buildup registered on the tester gauge (28) to approximately 100 psi (689 kPa). Release tester pump handle (27), repeat 10 second test. Slowly operate tester pump handle (27) while noting pressure buildup registered on tester gauge (28). If delivery valve does not open between 250 and 400 psi (1724 and 2758 kPa), perform following inspection:
23. Using 7/16 in. socket and ratchet handle, remove delivery valve screw (31), remove and discard gasket (32), remove spring (33), and valve (34). Inspect delivery valve (34) and valve seat (35) in head for foreign material or improper seating.

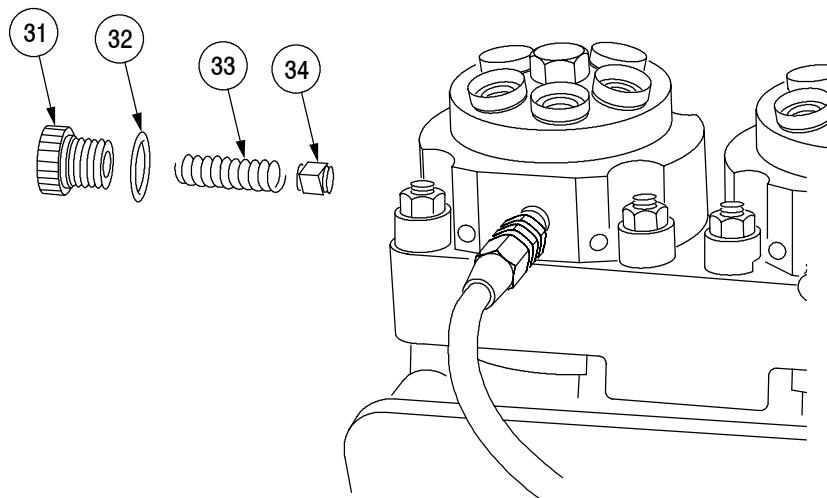


03i366m

**TEST FOR FUEL LEAKAGE OR DELIVERY VALVE MALFUNCTION IN HEADS  
- CONTINUED****0008 00****Testing - Continued****NOTE**

If delivery valve or valve seat is defective, head assembly must be replaced (WP 0025 00 or WP 0026 00).

24. Using one in. micrometer, measure length of delivery valve spring. Replace spring if free length is not 0.780 to 0.954 in. (19.8 to 24.2 mm).
25. Spring load must be 5.3 to 5.7 pounds (2.4 to 2.6 kg) when compressed to 0.760 in. (19.3 mm) length. Replace spring if it does not meet all requirements.
26. Install delivery valve (34) and valve spring (33) in head assembly. Install new gasket (32). Using 7/16 in. socket and torque wrench, install fuel delivery valve screw (31). Torque screw to 50 to 55 lb-ft (68 to 75 N•m).



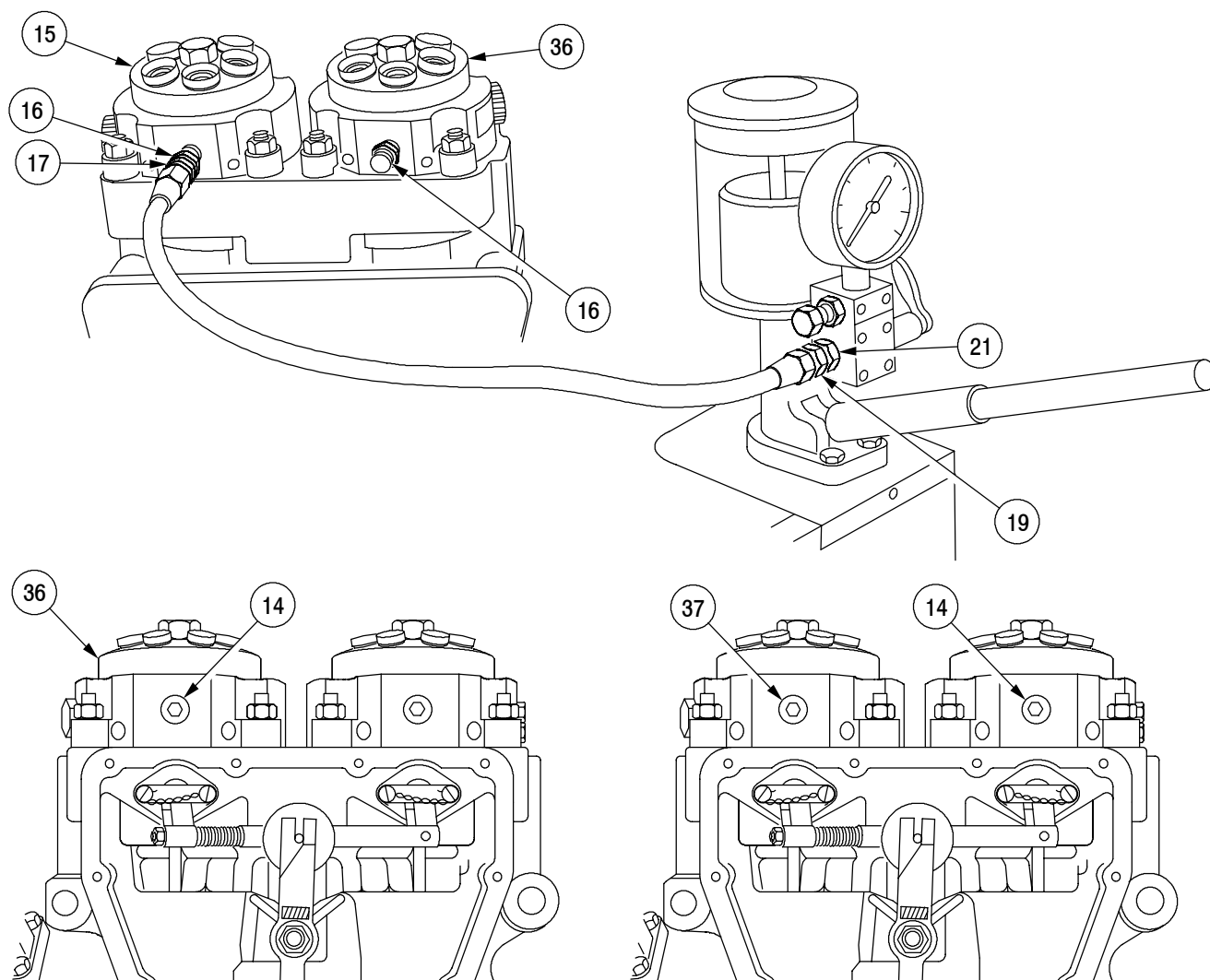
03i367m

## TEST FOR FUEL LEAKAGE OR DELIVERY VALVE MALFUNCTION IN HEADS - CONTINUED

0008 00

### Testing - Continued

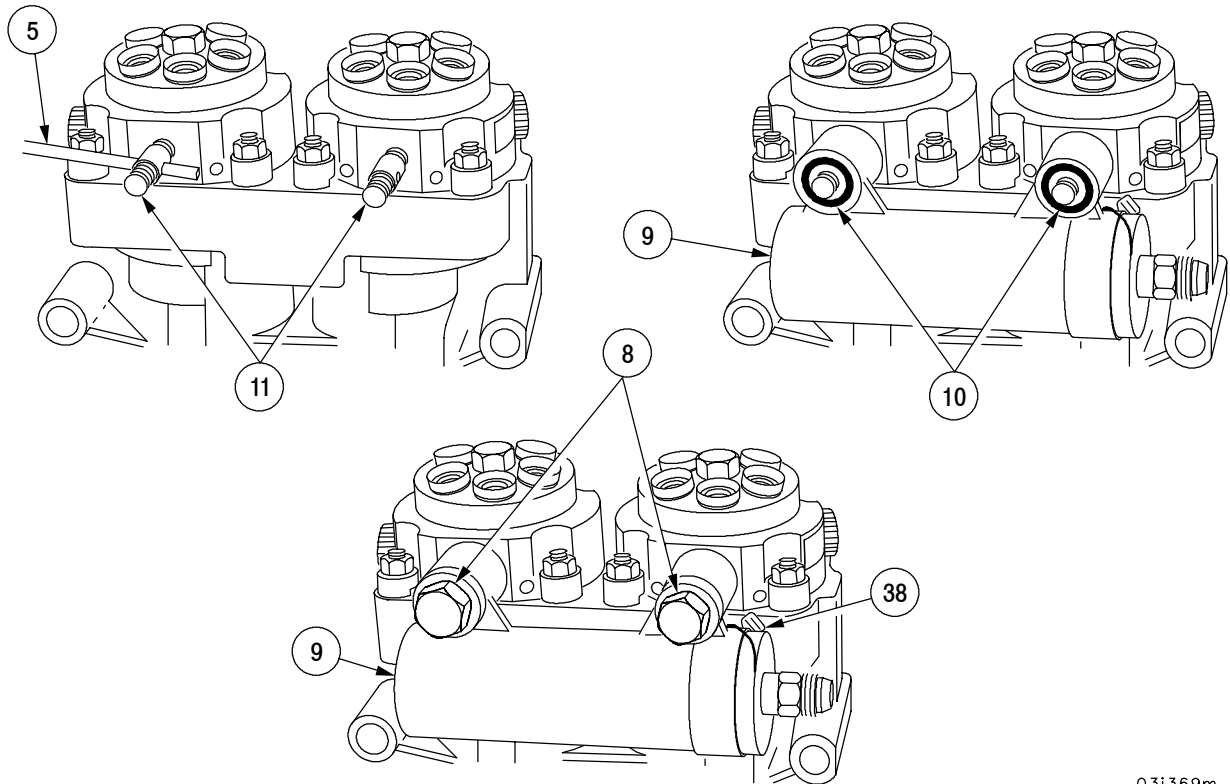
27. Disconnect connectors (17) and (19) from connector stud (16) and nozzle tester (21).
28. Using 5/8 in. open end wrench, remove connector stud (16) from fuel inlet port on left side of head assembly No. 1 (15) and install connector stud in inlet port of head assembly No. 2 (36).
29. Install 1/4-18 dryseal NPTF pipe plug (14) in outlet port of head assembly No. 2 (36).
30. Repeat Fuel Leakage and Delivery Valve Tests (steps 15, 16, and 17) for head assembly No. 2 (36). If no fuel leakage or delivery valve malfunction is found, proceed to step 31.
31. Remove pipe plugs (37) and (14).



03i368m

**TEST FOR FUEL LEAKAGE OR DELIVERY VALVE MALFUNCTION IN HEADS  
- CONTINUED****0008 00****Testing - Continued**

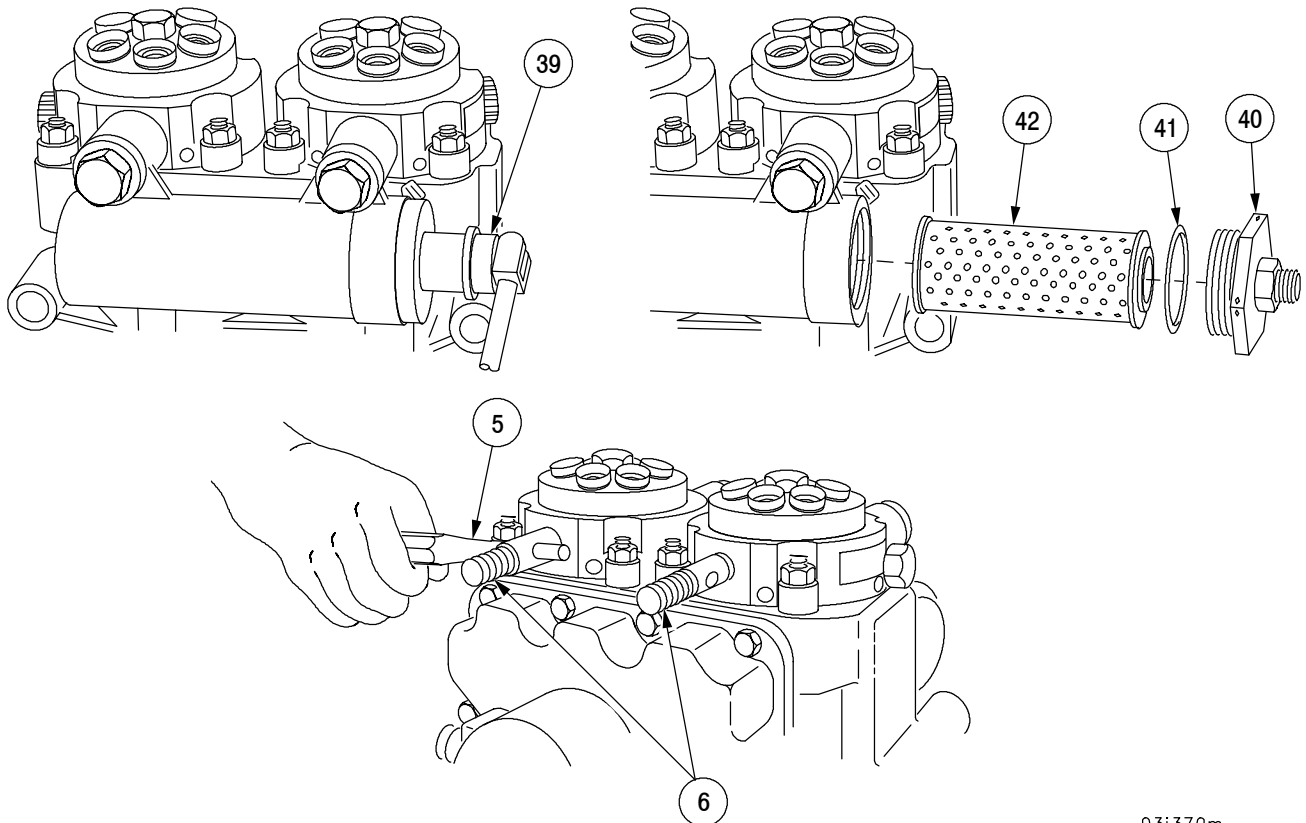
32. Install two bleeder valve stems (11). Using a drift (5), tighten stems.
33. Install filter assembly (9) using two new preformed packings (10) on each side of housing.
34. Secure filter assembly (9) with two cap plain nuts (8) using 3/4 in. socket and ratchet handle. Using 3/4 in. socket and torque wrench, torque nuts to 15 to 18 lb-ft (20 to 24 N•m).
35. Using diagonal cutting pliers, cut and remove seal (38).



03i369m

**TEST FOR FUEL LEAKAGE OR DELIVERY VALVE MALFUNCTION IN HEADS  
- CONTINUED****0008 00****Testing - Continued**

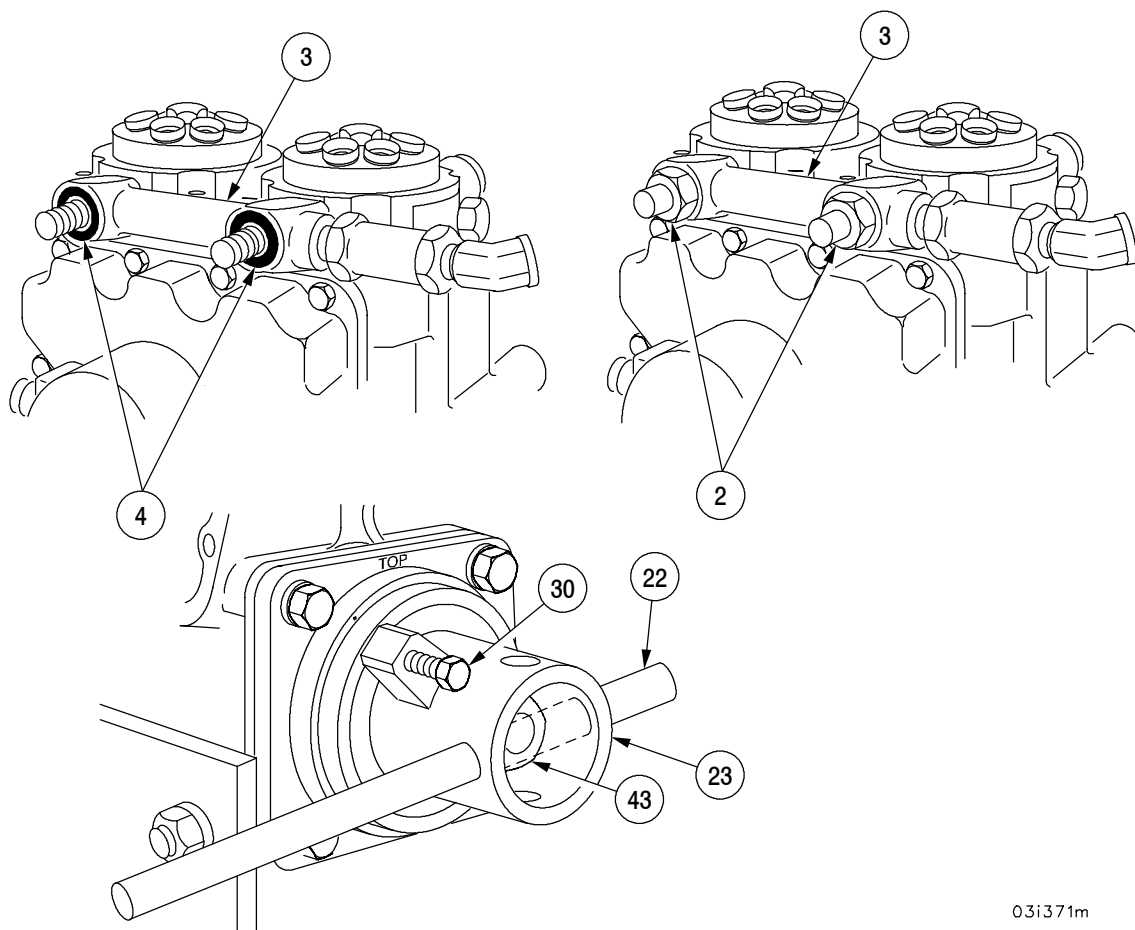
36. Using fuel filter socket (39) and ratchet handle, remove fuel inlet housing cap (40). Remove and discard preformed packing (41) and filter (42).
37. Clean cavity with clean, lint-free cloth.
38. Install new filter (42) with pilot end toward front of pump. Install new preformed packing (41).
39. Install cap (40) and torque to 25 to 30 lb-ft (34 to 40 N•m) using filter socket (39) and torque wrench.
40. Install two bleeder valve stems (6). Using a drift (5), tighten stems.



03i370m

**TEST FOR FUEL LEAKAGE OR DELIVERY VALVE MALFUNCTION IN HEADS  
- CONTINUED****0008 00****Testing - Continued**

41. Install housing and valve assembly (3) using two new preformed packings (4) on each side of housing.
42. Using 1 1/8 in. socket and ratchet handle, secure housing and valve assembly (3) with two nuts (2). Using 1 1/8 in. socket and torque wrench, torque nuts to 15 to 18 lb-ft (20 to 24 N•m).
43. Remove steel rod (22). Using 7/16 in. box end wrench, loosen turning and holding wrench locking screw (30). Using 1 1/16 in. deep well socket and ratchet handle, remove plain nut and lockwasher (43). Using plastic insert hammer, remove wrench (23). Retain lockwasher and nut for hub installation.



03i371m

**NOTE****FOLLOW-ON MAINTENANCE:**

Remove fuel metering pump from test stand  
(TM 9-4910-778-14&P and Instruction booklet  
74-9168)

**END OF WORK PACKAGE**



**TESTING BLEEDER VALVE****0009 00****THIS WORK PACKAGE COVERS:**

Testing

**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)  
 Automotive fuel and electrical system repair tool kit  
 (item 56, WP 0042 00)  
 Micrometer, 2 in. OD (item 30, WP 0042 00)  
 Fuel metering pump test stand A8020  
 (item 53, WP 0042 00)

**Materials/Parts**

Wiping rags (item 4, WP 0041 00)  
 Bleeder valve spring, if required

**Equipment Conditions**

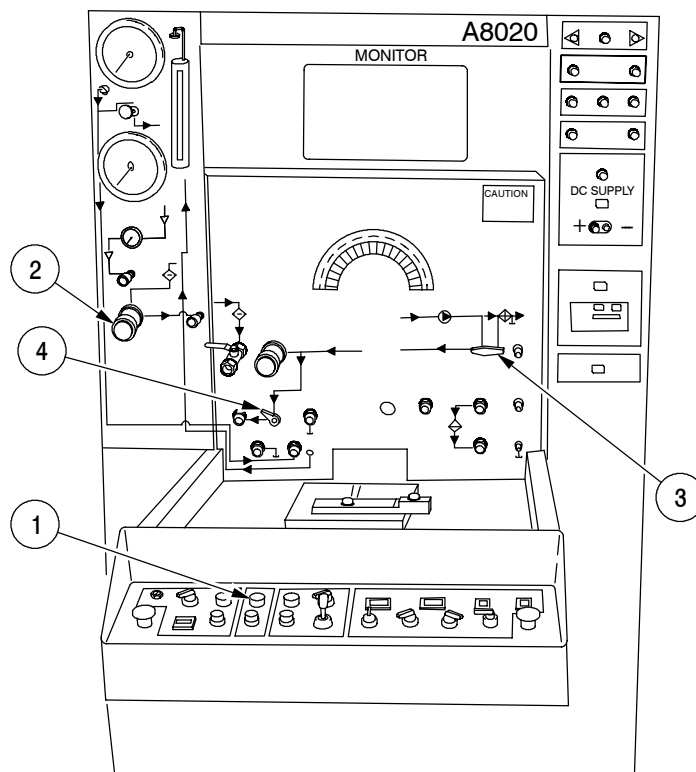
Fuel metering pump mounted on test stand  
 (TM 9-4910-778-14&P and Instruction booklet  
 74-9168)  
 Fuel metering pump test stand set up to test the PSB-  
 12BT fuel metering pump (Instruction booklet  
 74-9168)

**References**

TM 9-4910-778-14&P  
 Instruction booklet 74-968

**Testing**

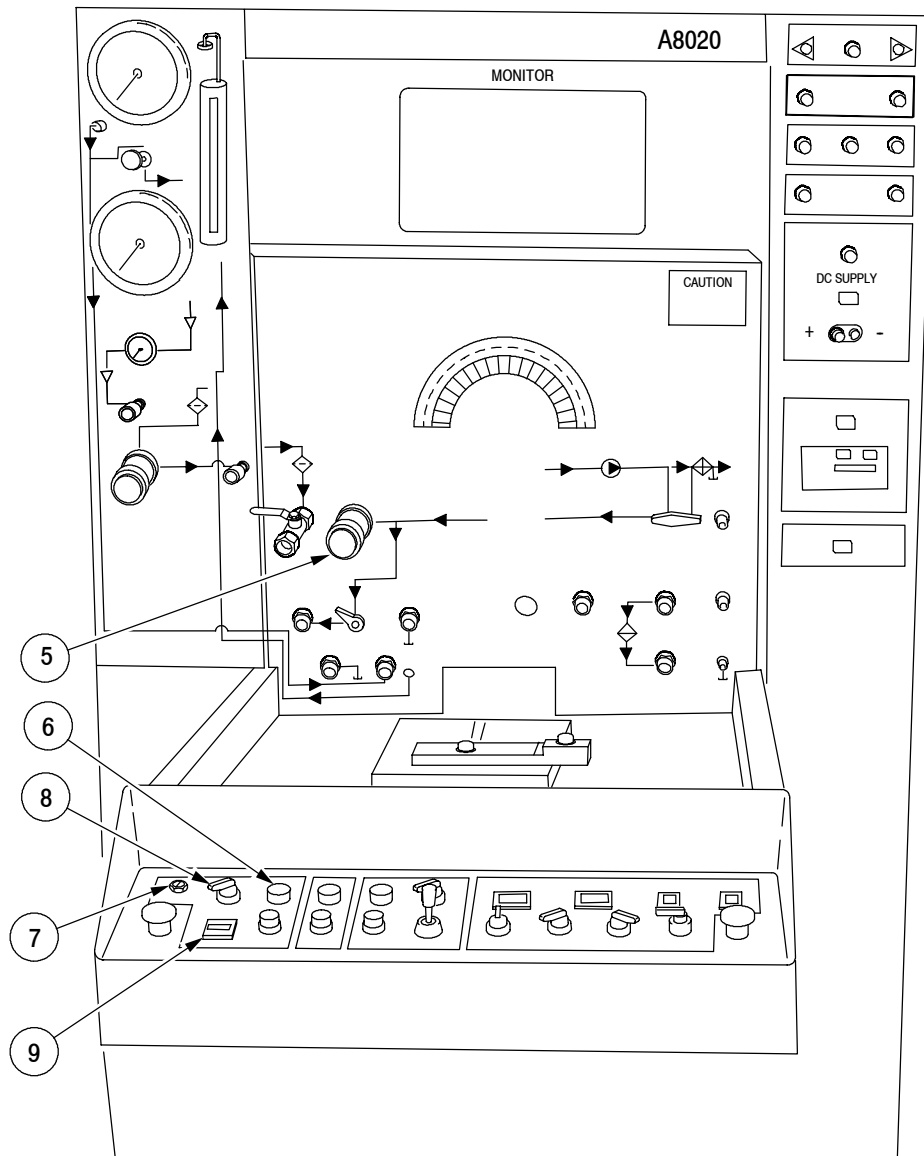
1. Turn on the lube oil system (1) and adjust the LUBE pressure regulator (2) and observe the lube oil indication on the monitor. Adjust the lube oil to 35 to 45 psi.
2. Set lube oil temperature to 150°F (65.5°C) (TM 9-4910-778-14&P).
3. Turn LUBE oil system switch (1) ON to heat lubricating oil. Observe temperature on monitor.
4. Turn the calibration fluid selector valve (3) to INJ PUMP and the shutoff valve (4) to ON.



03i002mb

**TESTING BLEEDER VALVE - CONTINUED****0009 00****Testing - Continued**

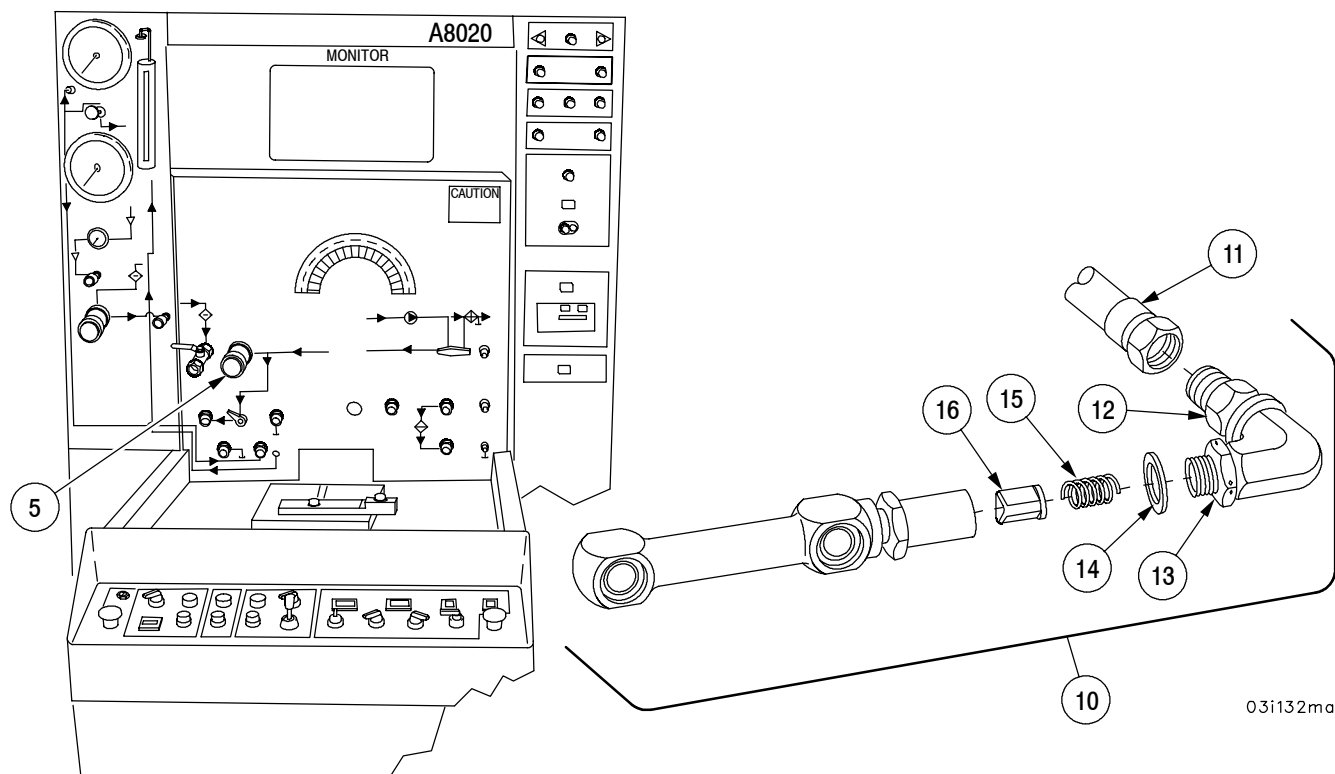
5. Turn the CALIBRATION FLUID PRESSURE regulator (5) fully counterclockwise (CCW). Press the calibration fluid system button (6) to ON and increase the calibration fluid pressure to 10 psi (69 kPa) on the monitor (supply psi).
6. Turn Fuel Heat Switch (7) to set the fuel temperature to 115°F (46°C if using Gulf calibrating oil) or 100°F (37.7°C if using DF2). Observe temperature on monitor.
7. Turn the TEMP SELECT (8) to BULKHD.
8. Set the NOMINAL TEMP thumbwheel switch (9) to 46°C.



03i002mc

**TESTING BLEEDER VALVE - CONTINUED****0009 00****Testing - Continued**

9. Turn FUEL REGULATOR (5) to slowly increase fuel pressure until the bleeder valve assembly (10) opens as indicated by fluid flowing out of bleeder valve. This will be noticed by a drop in gallery psi on the monitor. Check printout. The pressure should read between 40 and 50 psi (276 and 245 kPa). If valve unseats, valve is operable and task ends here. If valve does not unseat between 40 and 50 psi (276 and 245 kPa), turn the test stand off and perform the following steps.
10. Using 7/8 in. open-end wrench, disconnect fuel return hose (11) at nipple (12). Using 1 1/8 in. open-end wrench, remove retainer (13) (with elbow and nipple), ring spacer (14), spring (15), and bleeder valve (16).
11. Inspect bleeder valve (16) for burrs or damage. Inspect spring (14) for damage. Using micrometer, measure spring for free length. Spring free length must not be less than 1.42 in. (36 mm). Check spring load at 1.11 in. (28.2 mm). Spring load must be 22.5 lb  $\pm$  0.5 lb (10.2 Kg  $\pm$  (0.2Kg)). Replace spring if it does not meet all requirements. Replace damaged parts.
12. Assemble valve (16), spring (15), ring spacer (14), and retainer (13) (with elbow and nipple) using 11/8 in. open-end wrench. Using 7/8 in. open-end wrench, connect fuel return hose (11) and nipple (12).
13. Repeat tests in steps 3 and 4 above.
14. Turn the test stand off (TM 9-4910-778-14&P).

**NOTE****FOLLOW-ON MAINTENANCE:**

Remove fuel metering pump from test stand  
(TM 9-4910-778-14&P and Instruction booklet  
74-9168)

**END OF WORK PACKAGE**



**TESTING FLOW TIMING IN PUMP HEAD ASSEMBLIES****0010 00****THIS WORK PACKAGE COVERS:**

Testing

**INITIAL SETUP:****Tools and Special Tools**

- General mechanic's tool kit (item 23, WP 0042 00)
- Automotive fuel and electrical system repair tool kit (item 56, WP 0042 00)
- Cover (fabricated tool) (item 9, WP 0042 00)
- Fuel metering pump test stand A8020 (item 53, WP 0042 00)
- 5/8 inch plastic plug (item 41, WP 0042 00)
- Torque wrench (item 63, WP 0042 00)

**Equipment Conditions**

- Test stand set up to adjust main fuel flow for Head assembly No. 1 (TM 9-4910-778-14&P and Instruction booklet 74-9168)

**References**

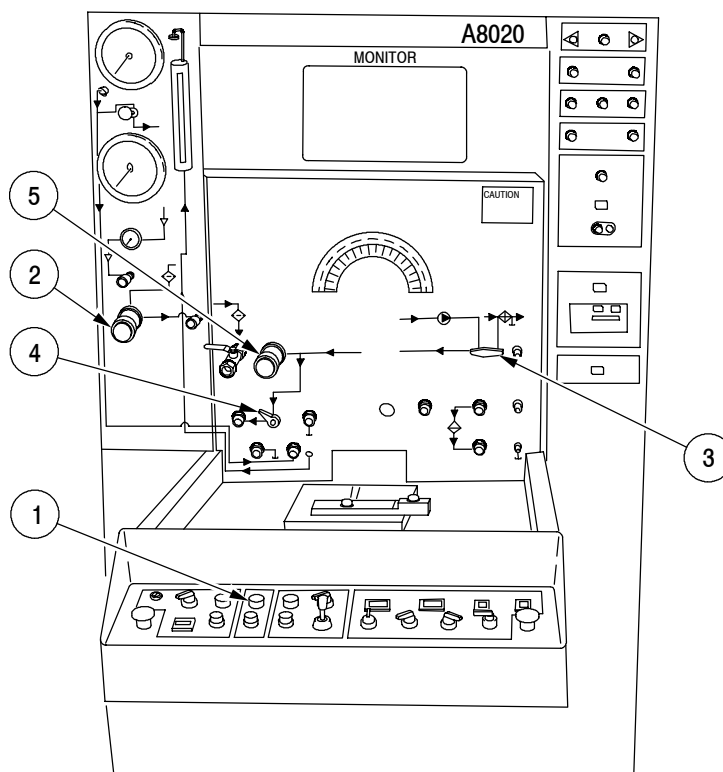
- TM 9-4910-778-14&P
- Instruction booklet 74-9168

**Materials/Parts**

- Wiping rags (item 4, WP 0041 00)
- Timing plug spacer ring from gasket set Part No. 5702632
- Delivery gasket Part No. GA9035

**Testing**

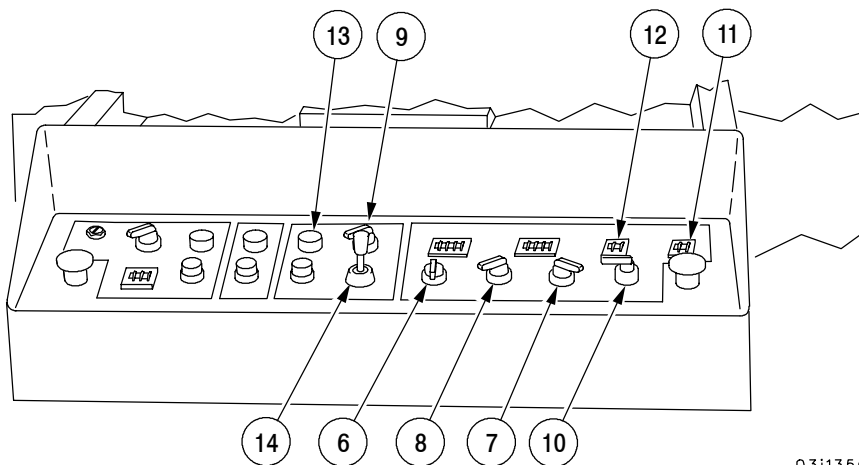
1. Turn on the lube oil system (1) and adjust the LUBE pressure regulator (2) and observe the lube oil indication on the monitor. Adjust the lube oil to 35 to 45 psi.
2. Set lube oil temperature to 150°F (65.5°C) (TM 9-4910-778-14&P).
3. Turn LUBE oil system switch (1) ON to heat lubricating oil. Observe temperature on monitor.
4. Turn the calibration fluid selector valve (3) to INJ PUMP and the shutoff valve (4) to ON.
5. Adjust the calibration fluid REGULATOR VALVE (5) pressure to 55 to 65 psi (379 to 448 kPa).



03i135ma

**TESTING FLOW TIMING IN PUMP HEAD ASSEMBLIES - CONTINUED****0010 00****Testing - Continued**

6. Set the STROKES count switch (6) to 50 and the RATIO switch (7) 1:1, the UNITS switch (8) CC/500 STK and the PUMP ROTATION switch (9).
7. Set the MODE switch (10) to AVG and the NUMBER OF OUTLETS switch (11) to 12.
8. To display the average delivery of the FRONT head, set the NUMBER OF OUTLETS switch (11) to 12, and the OUTLET NUMBER switch (12) to any number between 1-6 (observe readings on monitor).
9. To display the REAR head, perform steps 5, 6, and 7, except set OUTLET NUMBER switch (12) to any number between 7 and 11 (observe readings on monitor).
10. To display the average delivery of both heads, set the NUMBER OF OUTLETS switch (11) to 12, and the OUTLET NUMBER switch (12) to 12 (observe readings on monitor).
11. Push the DRIVE SYSTEM switch (13) to ON and use the SPEED SELECT joystick (14) to increase speed to 600 rpm (observe speed on monitor). Run test stand until calibration reaches operating temperature 46 to 49°C.
12. Increase speed to 2400 rpm and adjust the calibration fluid to between 55 and 65 psi (379 to 448 kPa) and record the average fuel delivery readings for both heads.
13. Set the OUTLET NUMBER switch (12) to 1, and record the average delivery of fuel to FRONT or No. 1 head.
14. The 12 outlet average and the No. 1 head assembly average should be the same (107.5 to 109.1 cc's). If this the case, calibration of the governor is not required. If not, perform steps 15, 16 and 17.



03i135mb

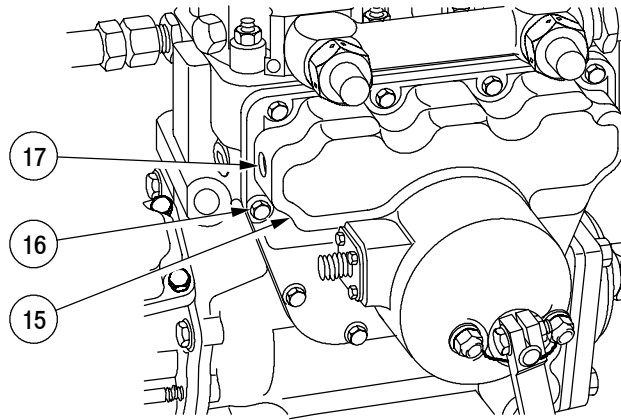
**Testing - Continued**

15. Using 7/16 in. socket, ratchet handle, and extension, remove 10 machine bolts, 10 lockwashers (16) and solenoid cover (15).

**NOTE**

Do not remove fabricated solenoid cover until all testing is completed.

16. Using 7/16 in. socket, ratchet handle, and extension, install fabricated solenoid cover (15) and secure with 10 machine bolts and lockwashers (16). Install plastic plug (17) in hole.



03i135mc

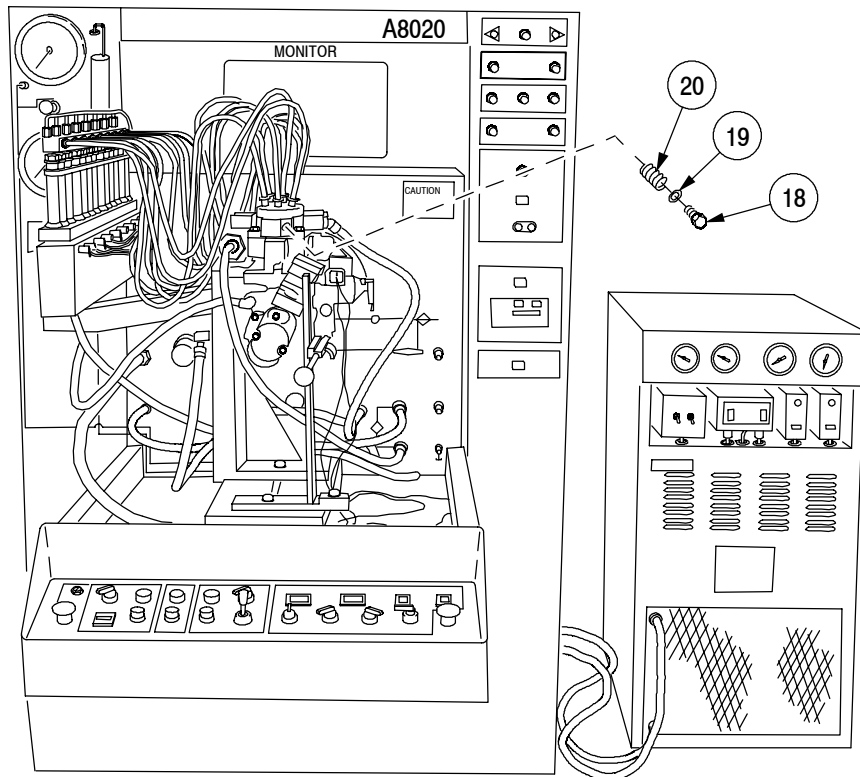
**Testing - Continued**

17. Using 3/4 in. box end wrench, remove delivery valve screw (18) and delivery valve spring (20), and remove and discard gasket [11 mm old style pump has no gasket] (19) from each head assembly. Install delivery valve spring (20) and new gasket (19) in each head assembly and secure with delivery valve screws (18).

**CAUTION**

Make certain delivery valve spring and gasket are centered before tightening to proper torque. If overchecking timing and/or phasing, replace the delivery valve gasket due to the increased risk of leakage.

18. Using 3/4 in. socket and torque wrench, torque screws (18) to 50 to 55 lb-ft (68 to 75 N•m).



03i135md

**NOTE****FOLLOW-ON MAINTENANCE:**

Remove fuel metering pump from test stand  
(TM 9-4910-778-14&P and Instruction booklet  
74-9168)

**END OF WORK PACKAGE**



**ADJUST MAIN FUEL FLOW NO. 1 (LEFT BANK) HEAD ASSEMBLY****0011 00****THIS WORK PACKAGE COVERS:**

Adjustment

**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)  
A8020 fuel pump test stand (item 53, WP 0042 00)  
Torque wrench (item 62, WP 0042 00)

**Materials/Parts**

Cover and solenoid gasket from gasket and preformed packing set, Part No. 5702632 or Parts Kit No. 5705050 or Parts Kit No. 5705051  
Pencil  
Paper  
Lockwashers (4) from Parts Kit No. 5705051 or 5705050

**Equipment Conditions**

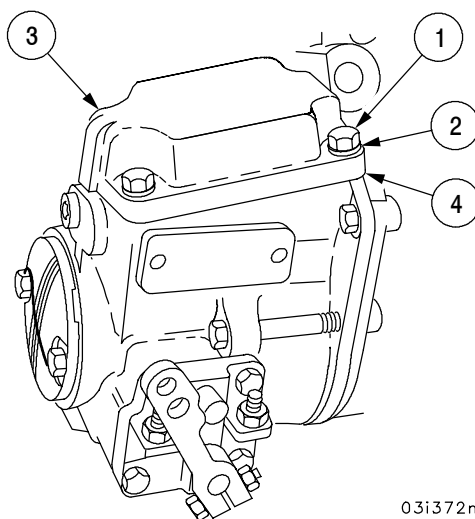
Fuel pump mounted on A8020 test stand  
(TM 9-4910-778-14&P and Instruction booklet 74-9168)

**References**

TM 9-4910-778-14&P  
Instruction booklet 74-9168

**Adjustment**

1. Set the pump speed to 2400 rpm (TM 9-4910-778-14&P).
2. Set the fuel pressure to 55-60 psi (379 to 448 kPa).
3. Set the OUTLET number switch to 12 (TM 9-4910-778-14&P).
4. Read and print out the fuel delivery of the front or No. 1 head assembly (TM 9-4910-778-14&P).
5. The average fuel for No. 1 (front head) should be (107.5 to 109.1 cc's). If the results are within the parameters listed above, the main fuel flow is properly adjusted. If the results are not within the parameters listed above, proceed to step 6.
6. Remove four screws (1), four lockwashers (2), governor cover (3) and gasket (4). Discard gasket and lockwashers.



03i372m

## ADJUST MAIN FUEL FLOW NO. 1 (LEFT BANK) HEAD ASSEMBLY - CONTINUED

0011 00

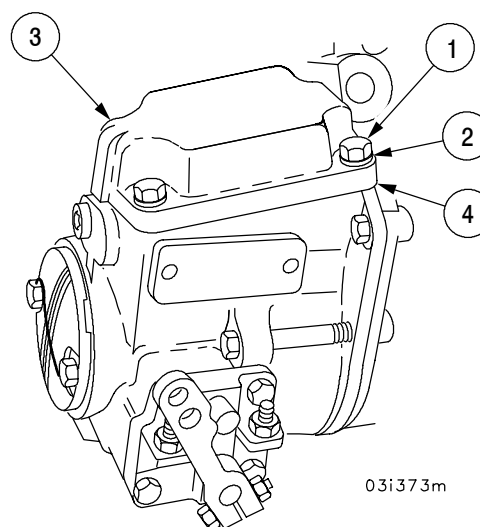
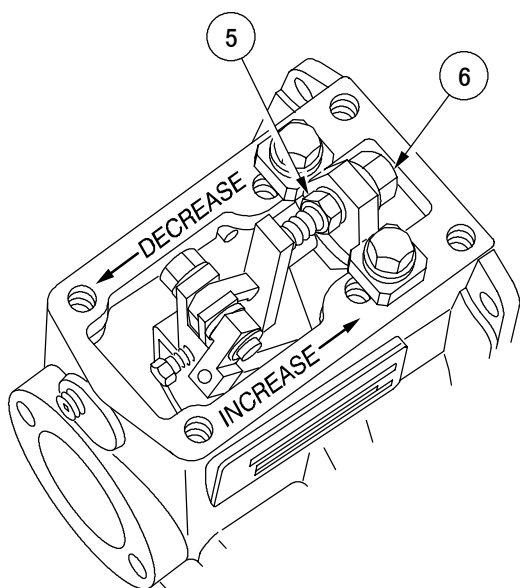
### Adjustment - Continued

- Using 7/16 in. open-end wrench, loosen stop plate nut (5) and tighten nut (6) to increase fuel delivery. Loosen nut (6) and tighten nut (5) to decrease fuel delivery.

### NOTE

Turning the nuts one flat will change the fuel delivery four cc's for 1000 count.

- Repeat steps 6 through 10, and 12 to obtain an average fuel delivery of 107.5 to 109.1 cc's in each burette.
- Using 7/16 in. box wrench, install governor cover (3) with new gasket (4), four new lockwashers (2), and four machine bolts (1). Using torque wrench, torque bolts 50 to 60 lb-in. (6 to 7 N•m).



### NOTE

#### FOLLOW-ON MAINTENANCE:

Remove fuel metering pump from test stand (TM 9-4910-778-14&P and Instruction booklet 74-9168)

END OF WORK PACKAGE

**BALANCE FUEL FLOW FROM HEAD ASSEMBLIES****0012 00****THIS WORK PACKAGE COVERS:**

Balancing

**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)  
A8020 fuel pump test stand (item 53, WP 0042 00)  
Cover (fabricated tool) (item 9, WP 0042 00)  
3/8 inch fixed nut driver (item 44, WP 0042 00)

**Materials/Parts**

Cover and solenoid gasket from gasket and preformed packing set, Part No. 5702632

**Equipment Conditions**

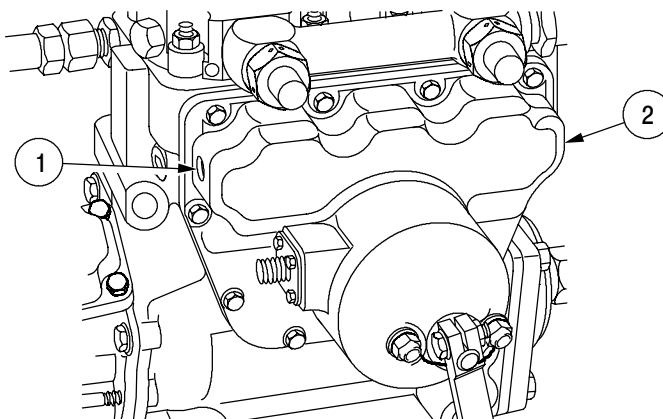
Fuel pump mounted on A8020 test stand  
(TM 9-4910-788-14&P and Instruction  
booklet 74-9168)  
Solenoid cover removed and fabricated cover installed  
(WP 0021 00)

**References:**

TM 9-4910-778-14&P  
Instruction booklet 74-9168  
WP 0021 00

**Balancing**

1. Set the pump speed 2400 rpm with fuel pressure 55-65 psi (TM 9-4910-778-14&P).
2. Set the OUTLET number switch to 1 (TM 9-4910-778-14&P).
3. Read and print out the fuel delivery of the front or No. 1 head assembly (TM 9-4910-778-14&P).
4. Set the OUTLET number switch to 7 (TM 9-4910-778-14&P).
5. Read and print out the fuel delivery of the rear or No. 2 head assembly (TM 9-4910-778-14&P).
6. The difference between the readings of the front and rear heads should be no more than 1-2 cc/500 stk. If the difference is greater than 1-2 cc/500 stk., proceed to step 7. If the difference is 1-2 cc/500 stk. or less, proceed to step 10.
7. Remove plastic plug (1) from cover (2).



03i324m

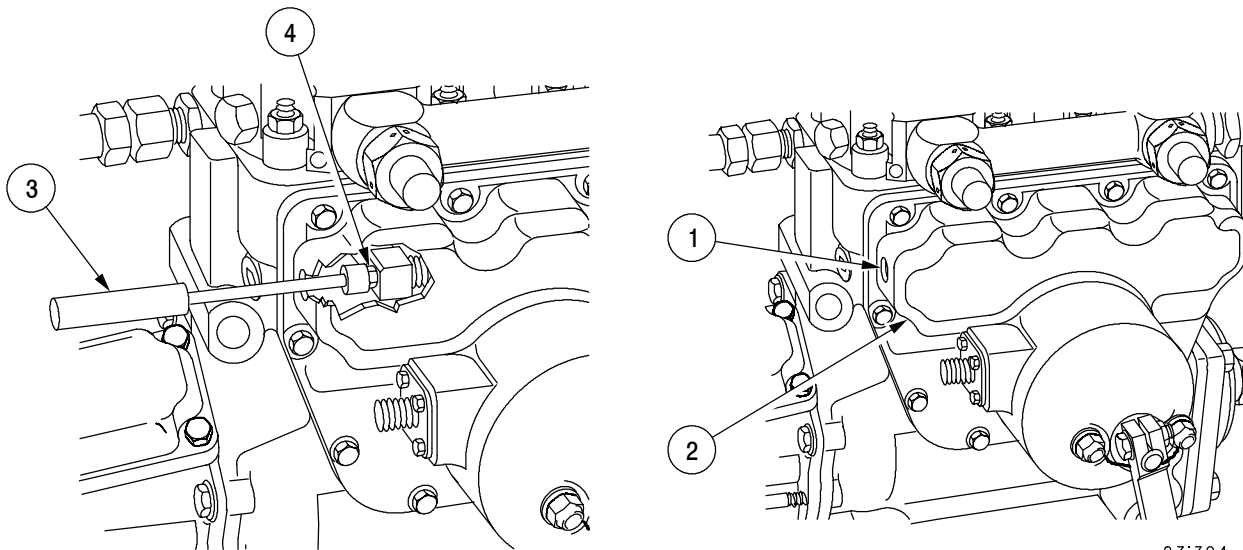
**BALANCE FUEL FLOW FROM HEAD ASSEMBLIES - CONTINUED****0012 00****Balancing – Continued**

8. Using 3/8 in. fixed nut driver (3), turn yoke self-locking nut (4) clockwise to decrease or counterclockwise to increase fuel delivery of No. 2 (right bank) head assembly.

**NOTE**

One complete turn (360 degrees) equals approximately 6 cc's.

9. Repeat steps 1 through 4, and 8, until average fuel delivery from both head assemblies is balanced.  
10. Install plastic plug (1) in cover (2).



031324ma

**NOTE****FOLLOW-ON MAINTENANCE:**

Remove fabricated cover and install solenoid cover  
(WP 0021 00)

Remove fuel metering pump from test stand  
(TM 9-4910-778-14&P and Instruction Booklet  
74-9168)

**END OF WORK PACKAGE**

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**ADJUST HIGH IDLE FUEL FLOW AND FUEL CUTOFF**

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**0013 00****THIS WORK PACKAGE COVERS:**

Adjustment

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**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)  
A8020 fuel pump test stand (item 53, WP 0042 00)

**Materials/Parts**

Cover and solenoid gasket from gasket and  
preformed packing set, Part No 5702632

**Equipment Conditions**

Pump mounted on A8020 test stand  
(TM 9-4910-788-14&P and Instruction  
booklet 74-9168)

**References**

TM 9 4910-788-14&P  
Instruction booklet 74-9168

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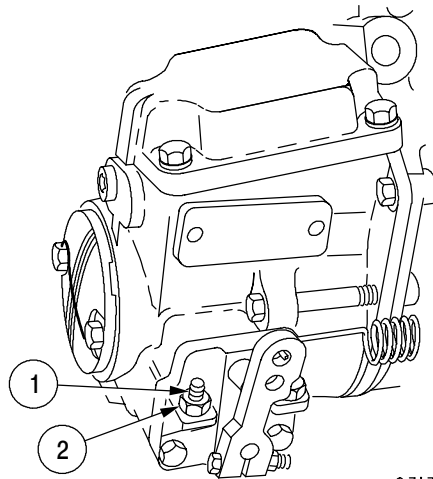
**Adjustment**

1. Adjust pump speed to 2750 rpm. Observe rpm on monitor (TM 9-4910-778-14&P).

**NOTE**

Fuel pressure must be 58/60 psi (400/414 kPa). Adjust fuel  
pressure valve if necessary.

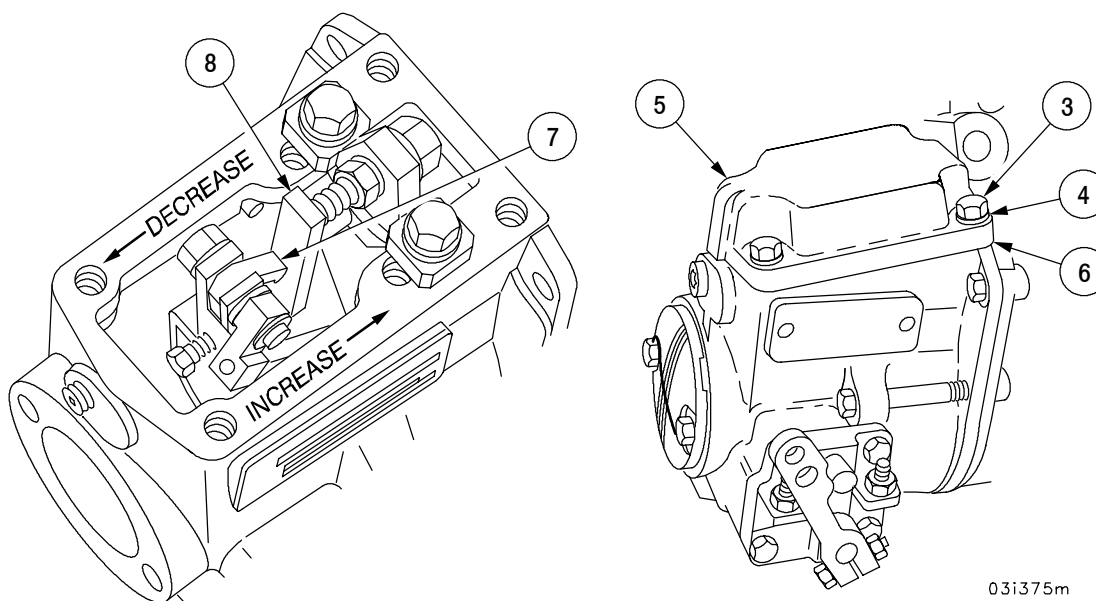
2. Adjust high speed adjusting screw (1) to obtain cam nose departure. Use a 7/16 in. open-end wrench to loosen locknut (2) and a screwdriver to adjust screw (1).



03i374m

**ADJUST HIGH IDLE FUEL FLOW AND FUEL CUTOFF - CONTINUED****0013 00****Adjustment - Continued**

3. Remove four screws (3), four lockwashers (4), and governor cover (5) and gasket (6). Discard gasket.
4. Make adjustment to where cam nose (7) just leaves full load stop plate (8). Cam will appear to pulsate as it departs. This is the desired departure point.
5. Set pump speed to 2750 rpm. Speed is observed on monitor (TM 9-4910-778-14&P).
6. There should be no flow at 2750 rpm. If there is no fuel flow, proceed to step 7. If fuel continues to flow, governor inner spring shim dimensions are incorrect. Disassemble governor and install shims (WP 0023 00).
7. Install governor cover (5) with four screws (3), four new lockwashers (4), and new gasket (6).

**NOTE****FOLLOW-ON MAINTENANCE:**

Remove fuel metering pump from test stand  
 (TM 9-4910-778-14&P and Instruction Booklet  
 74-9168)

**END OF WORK PACKAGE**

**ADJUST DROOP SCREW****0014 00****THIS WORK PACKAGE COVERS:**

Adjustment

**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)  
Automotive fuel and electrical system repair tool kit  
(item 56, WP 0042 00)

**Equipment Conditions**

Test stand set up to adjust droop screw  
(TM 9-4910-778-14&P and Instruction booklet  
74-9168)

**References**

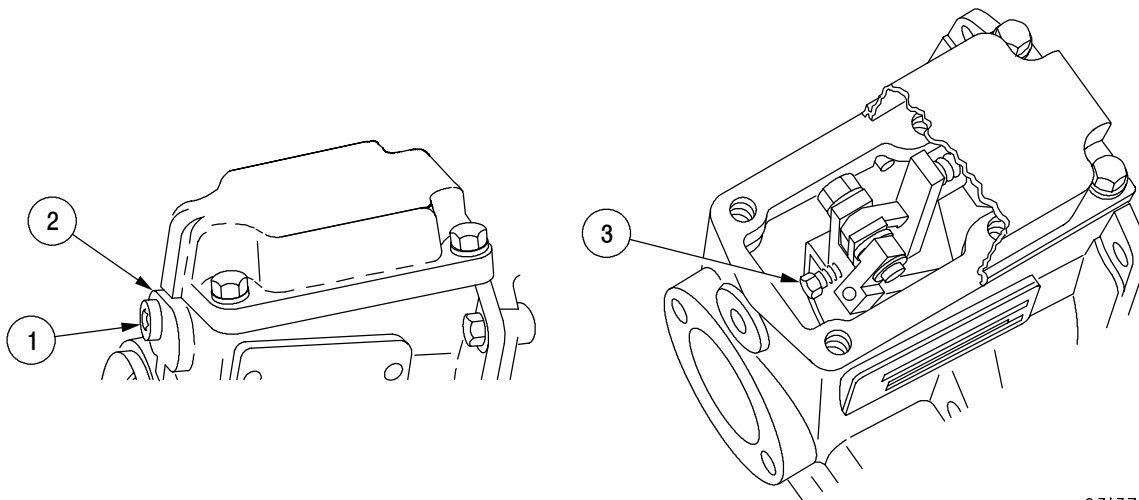
TM 9-4910-778-14&P  
Instruction booklet 74-9168

**Adjustment**

1. Set the pump speed to 1800 rpm (TM 9-4910-778-14&P).
2. Observe the monitor. The fuel flow should be 105.9 to 108.1 cc's. If fuel flow is within range, proceed to step 7, if not, proceed to step 3.
3. Using 1/4 in. socket head screw key, remove pipe plug (1) from governor housing (2).
4. Using 1/8 in. socket head screw key, for old style 11 mm, 1/4 in. socket for new style 11 mm, adjust droop screw (3) to obtain 105.9 to 108.1 cc's in each burette at 1800 rpm.

**NOTE**

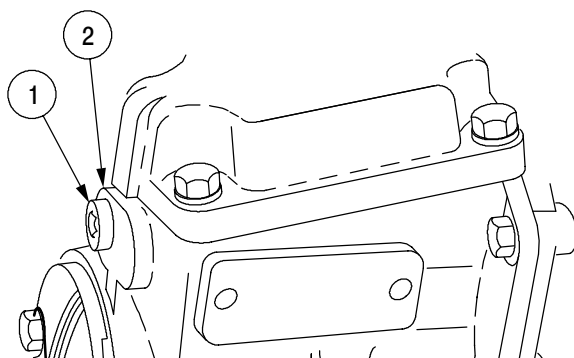
Turn the droop screw clockwise to decrease fuel flow. Turn droop screw counterclockwise to increase fuel flow.



03i376m

**ADJUST DROOP SCREW - CONTINUED****0014 00****Adjustment - Continued**

5. Repeat steps 1, 2, 3, and 4 to obtain 105.9 to 108.1 cc's.
6. Using 1/4 in. socket head screw key, install pipe plug (1) in housing (2).
7. Increase speed to 2400 rpm (TM 9-4910-778-14&P).
8. Observe the monitor.
9. Fuel delivery should be 165-167 cc's minimum. Run rpm to 2000 and retest. If it is, proceed to step 10. If fuel delivery is not within limits, the plunger is worn and the head assembly must be replaced (WP 0025 00 or WP 0026 00).
10. Shut down test stand (TM 9-4910-778-14&P).



03i270mb

**NOTE****FOLLOW-ON MAINTENANCE:**

Remove fuel metering pump from test stand  
(TM 9-4910-778-14&P and Instruction booklet  
74-9168)

**END OF WORK PACKAGE**



**ADJUST IDLE SPEED****0015 00****THIS WORK PACKAGE COVERS:**

Adjustment

**INITIAL SETUP:****Tools and Special Tools**

Automotive fuel and electrical system repair tool kit  
(item 56, WP 0042 00)

**References**

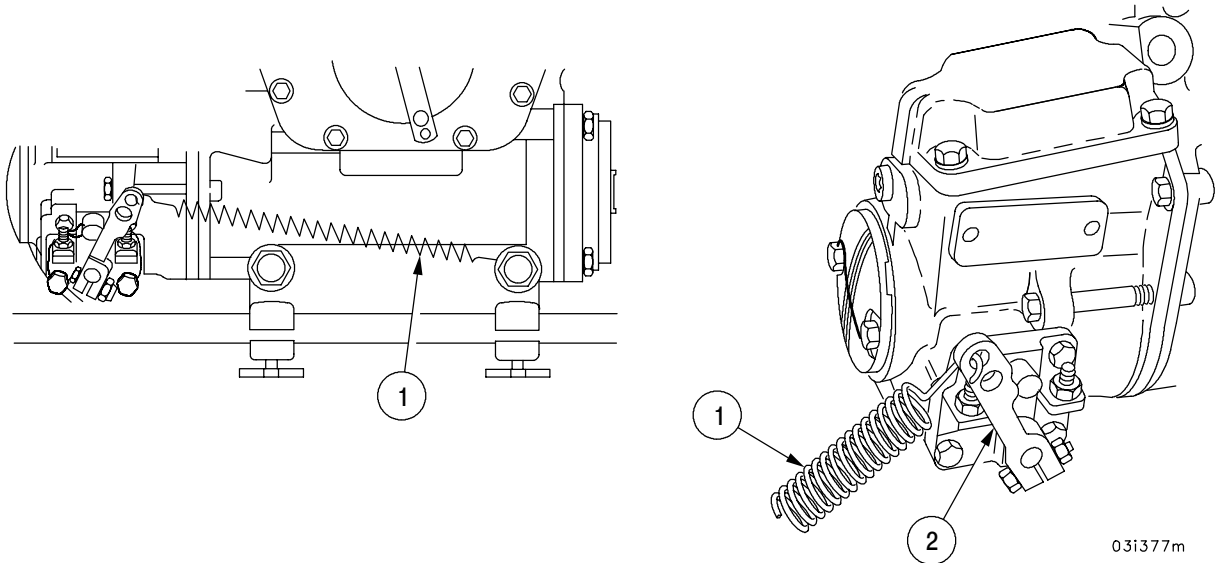
TM 9-4910-788-14&P  
Instruction booklet 74-9168

**Equipment Conditions**

Fuel metering pump mounted on A8020 test stand  
(TM 9-4910-788-14&P and Instruction booklet  
74-9168)

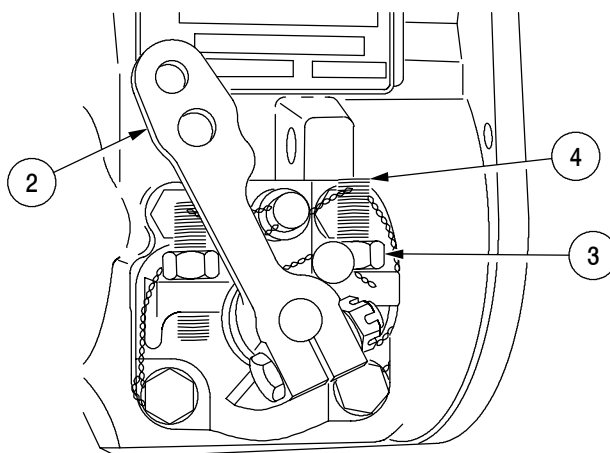
**Adjustment**

1. Remove throttle spring (1).
2. Install throttle spring (1) on operating lever assembly (2), with lever in idle position, and secure other end to test stand to hold lever assembly in idle position.
3. Start test stand (TM 9-4910-778-14&P).



**ADJUST IDLE SPEED - CONTINUED****0015 00****Adjustment – Continued**

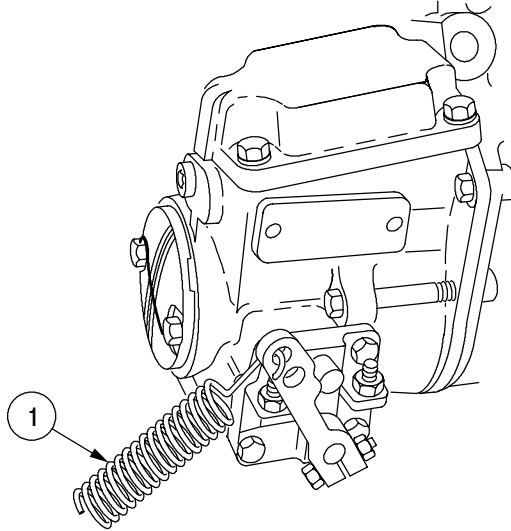
4. Set speed to 650 rpm on the monitor (TM 9-4910-778-14&P).
5. If flow rate is within 25 to 27 cc range, proceed to step 8. If flow rate is not within the 25 to 27 cc range, proceed to step 6.
6. Using 7/16 in. open end wrench, loosen locknut (3). Using screwdriver, turn adjusting screw (4) clockwise to increase fuel flow. Turn screw counterclockwise to decrease fuel flow. Tighten locknut (3).
7. If flow rate is not within the 25 to 27 cc range, repeat step 6 until flow rate is within 25 to 27 cc range. Proceed with step 8.
8. Set pump speed at 650 rpm, hold pump operating lever (2) in idle position. Increase speed to 1000 rpm on monitor (TM 9-4910-778-14&P).



03i323ma

**ADJUST IDLE SPEED - CONTINUED****0015 00****Adjustment – Continued**

9. Observe monitor – there should be no fuel flow.
10. Slowly reduce speed. Fuel flow should resume between 750 and 700 rpm (TM 9-4910-778-14&P).
11. Remove throttle spring (1).
12. Shut down test stand (TM 9-4910-778-14&P).



03i378m

**NOTE****FOLLOW-ON MAINTENANCE:**

Remove pump from test stand. (TM 9-4910-778-14&P and Instruction Booklet 74-9168)

**END OF WORK PACKAGE**



**CHECK CRANKING FUEL FLOW****0016 00****THIS WORK PACKAGE COVERS:**

Checking

**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)

A8020 fuel pump test stand (item 53, WP 0042 00)

**Equipment Conditions**

Pump mounted on A8020 test stand

(TM 9-4910-788-14&amp;P and Instruction booklet 74-9168)

**References**

TM 9-4910-778-14&amp;P

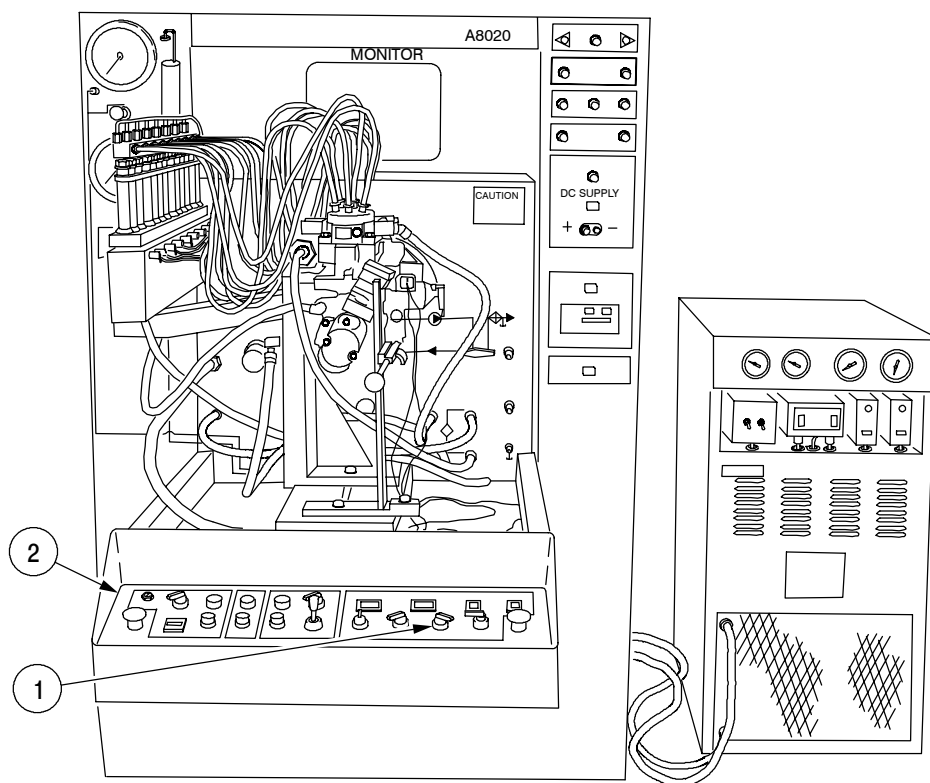
Instruction booklet 74-9168

WP 0028 00

WP 0034 00

**Checking**

1. Set RATIO switch (1) on test stand control panel (2) to 1-2 ratio (TM 9-4910-778-14&P).
2. Set fuel pump speed to 150 rpm. Observe rpm on monitor (TM 9-4910-778-14&P).
3. If fuel delivery is 30.0 cc's or more, proceed to step 5. If fuel flow is less than 30.0 cc's, governor inner and outer spring shims dimensions are incorrect. Disassemble governor and install shims (WP 0028 00).
4. If inner and outer spring shims are changed, repeat calibration procedure (WP 0034 00).
5. Shut down test stand (TM 9-4910-778-14&P).



03i002md

**NOTE****FOLLOW-ON MAINTENANCE:**

Remove fuel pump from test stand  
(TM 9-4910-778-14&P and Instruction booklet 74-9168)

**END OF WORK PACKAGE**



**CHECK ELECTRICAL AND MANUAL FUEL SHUT-OFF**

**0017 00**

**THIS WORK PACKAGE COVERS:**

Checking

**INITIAL SETUP:**

**Tools and Special Tools**

- General mechanic's tool kit (item 23, WP 0042 00)
- A8020 fuel pump test stand (item 53, WP 0042 00)

**Equipment Conditions**

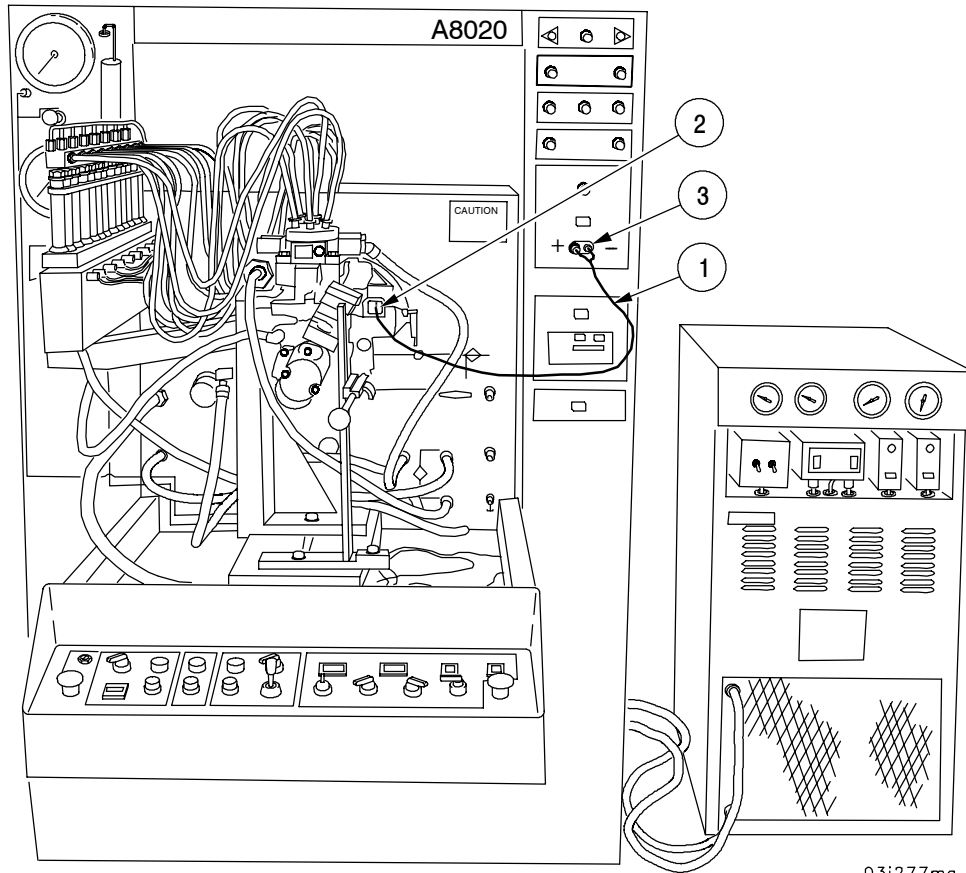
- Test stand set up to adjust fuel delivery screw (TM 9-4910-778-14&P and Instruction booklet 74-9168)

**References**

- TM 9-4910-778-14&P
- Instruction booklet 74-9168

**Checking**

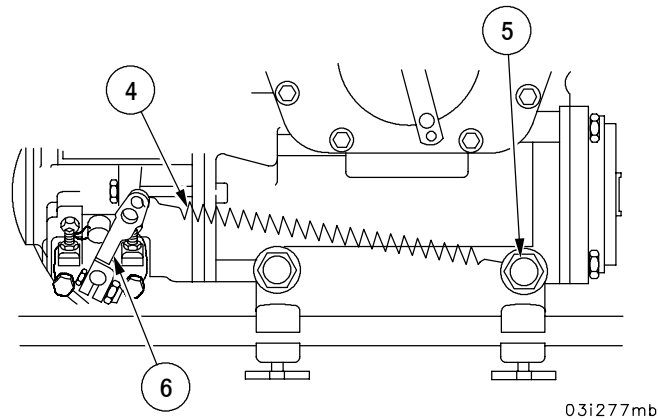
1. Connect solenoid fuel shutoff cable (1) to solenoid electrical receptacle connector (2) and to connector (3) on test stand.



03i277ma

**CHECK ELECTRICAL AND MANUAL FUEL SHUT-OFF - CONTINUED****0017 00****Checking - Continued**

2. Install throttle spring (4) between stud (5) on pump mounting bracket and pump operating lever assembly (6) to hold lever in full throttle position illustrated.
3. Set pump speed to 2400 rpm. Observe on the monitor (TM 9-4910-778-14&P).

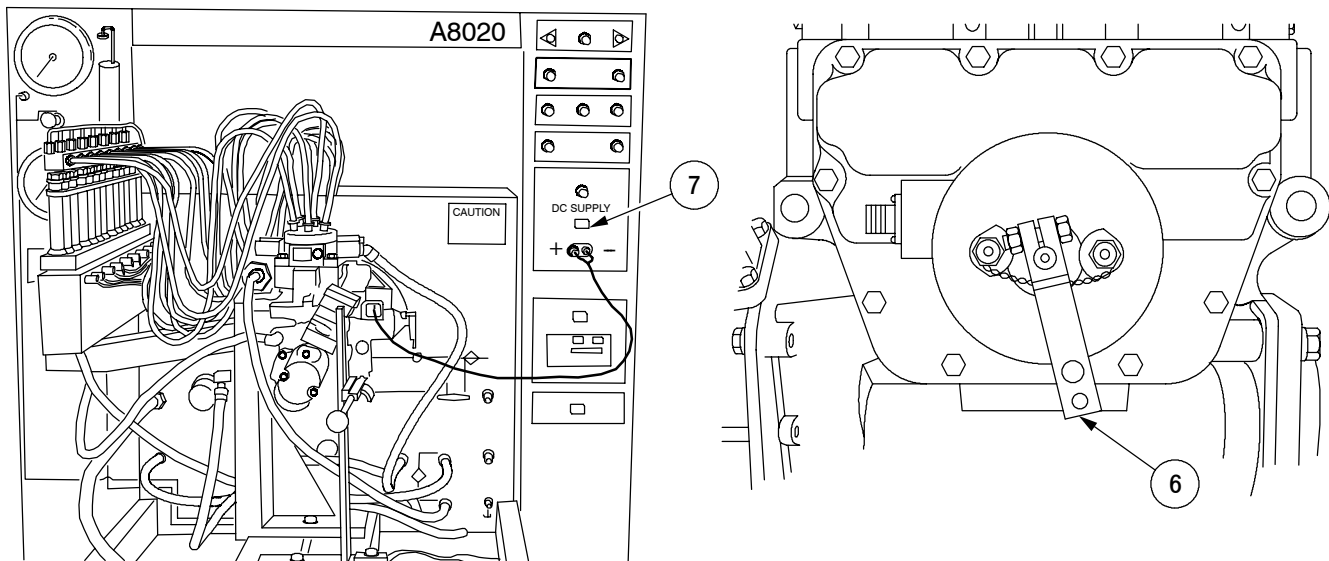


03i277mb



**CHECK ELECTRICAL AND MANUAL FUEL SHUT-OFF - CONTINUED****0017 00****Checking - Continued**

4. After fuel begins to flow, push 24 VDC button switch (7). Fuel flow should cut off cleanly. Release switch. Fuel flow should resume. If fuel does not cut off cleanly, the electrical solenoid is faulty and must be replaced (WP 0021 00).
5. After fuel begins to flow, move manual remote control lever (6) toward front of pump until it contacts the internal stop. Fuel flow should cut off cleanly. If not, the solenoid must be replaced (WP 0021 00).
6. Shut down test stand (TM 9-4910-778-14&P).



03i277mc

**NOTE****FOLLOW-ON MAINTENANCE:**

Remove fuel metering pump from test stand (TM 9-4910-778-14&P and Instruction booklet 74-9168)

**END OF WORK PACKAGE**



**LOCKWIRE AND TAPE INSTALLATION****0018 00****THIS WORK PACKAGE COVERS:**

Installation

**INITIAL SETUP:****Tools and Special Tools**

Lockwire pliers (item 39, WP 0042 00)

Seal pliers (item 40, WP 0042 00)

**Materials/Parts**

Wire, nonelectrical (item 10, WP 0041 00)

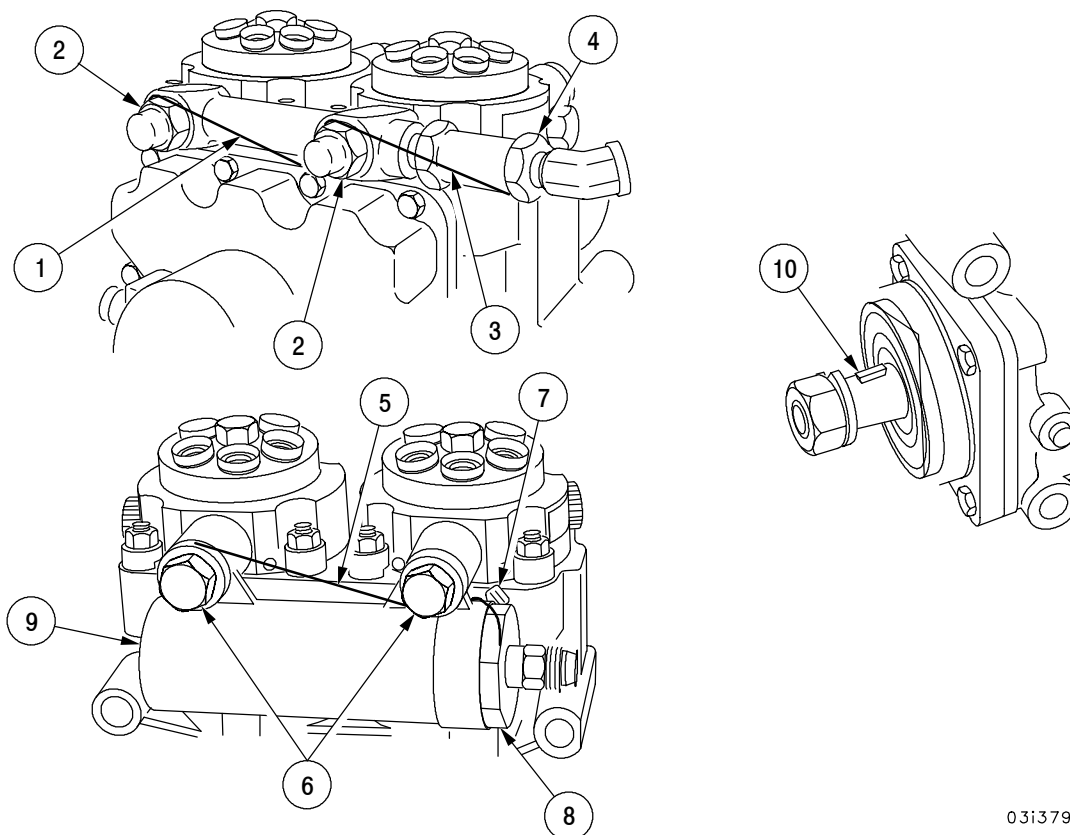
Seal

**Installation**

1. Install twisted lockwire (1) to secure fuel outlet housing nuts (2).
2. Install twisted lockwire (3) to secure bleeder valve retainer (4) to nut (2).
3. Install twisted lockwire (5) to secure filter assembly nuts (6).
4. Install seal (7) to secure filter assembly cap (8) to filter assembly housing (9).
5. Apply tape over Woodruff key (10) and around camshaft to retain key.

**NOTE**

If pump has been adjusted to meet all test and calibration requirements, repair is not required. The pump can be returned to service after preparation in accordance with Chapter 6.



03i379m

**END OF WORK PACKAGE**



## **CHAPTER 4**

# **DIRECT SUPPORT MAINTENANCE**



**HOUSING VALVE ASSEMBLY AND BLEEDER VALVE STEMS REPAIR****0019 00****THIS WORK PACKAGE COVERS:**

Removal, Disassembly, Cleaning, Inspection, Repair, Assembly and Installation

**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)  
 Automotive fuel and electrical system repair tool kit  
 (item 56, WP 0042 00)  
 Micrometer, 1-in. ID (item 28, WP 0042 00)  
 Micrometer, 1-in. OD (item 29, WP 0042 00)  
 Micrometer, 2-in. OD (item 30, WP 0042 00)  
 Spring tester (item 54, WP 0042 00)  
 Fine mill file (item 13, WP 0042 00)  
 Work bench

**Materials/Parts**

Wiping rags (item 4, WP 0041 00)  
 Dry-cleaning solvent (item 7, WP 0041 00)

**Materials/Parts - Continued**

Engine oil (item 3, WP 0041 00)  
 Sealant (item 8, WP 0041 00)  
 Nonelectrical wire (item 10, WP 0041 00)

**Equipment Conditions**

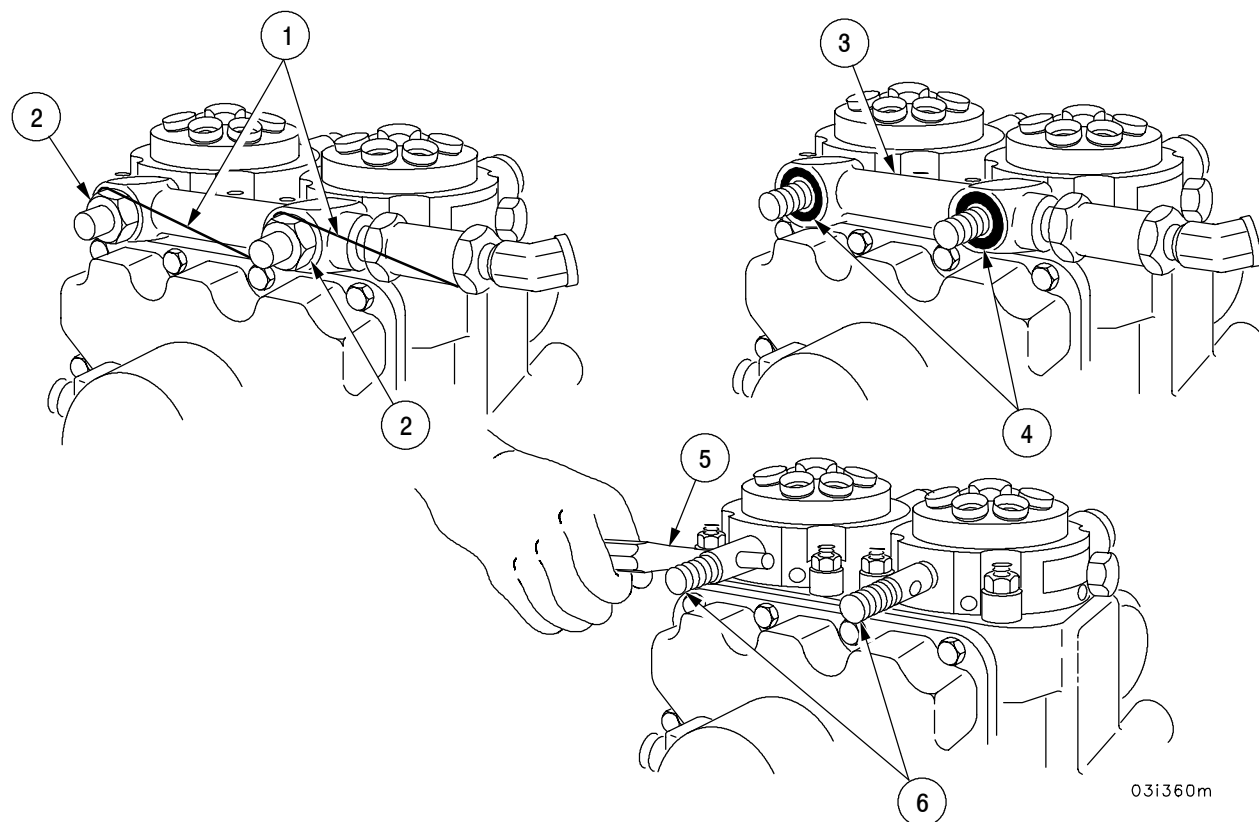
Fuel metering pump mounted on test stand  
 (TM 9-4910-778-14&P and Instruction booklet  
 74-9168)

**References**

TM 9-4910-778-14&P  
 Instruction booklet 74-9168

**Removal**

1. Using diagonal cutting pliers, cut and remove lockwire (1). Discard lockwire.
2. Using 1-1/8 in. socket ratchet handle, remove two nuts (2).
3. Remove housing and valve assembly (3).
4. Remove and discard two preformed packings (4) from each side of housing.
5. Using a drift (5), remove two bleeder valve stems (6).



03i360m

**HOUSING VALVE ASSEMBLY AND BLEEDER VALVE STEMS REPAIR -  
CONTINUED****0019 00****Disassembly****WARNING**

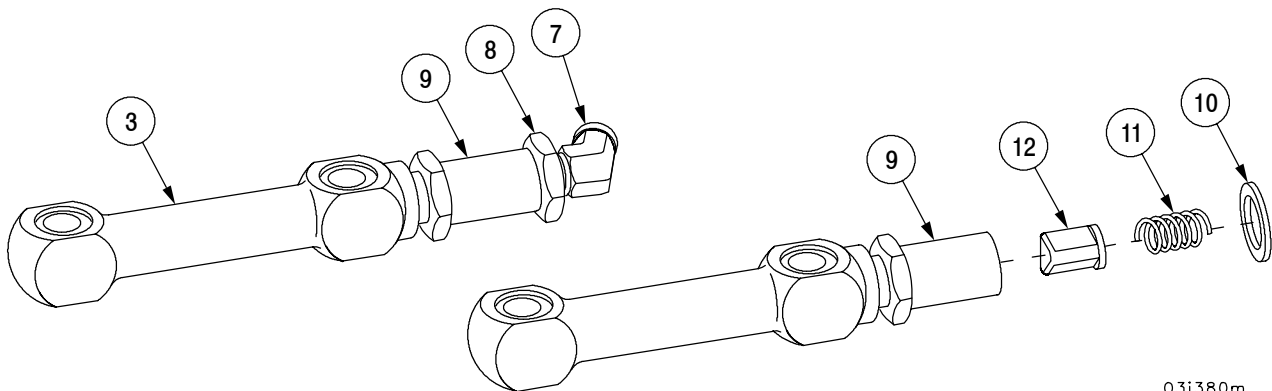
Retainer is spring-loaded. Be careful when removing retainer.

1. Place bleeder valve housing (3) in vise. Scribe alignment marks on elbow (7) and retainer (8).
2. Using 1-1/8 in. open-end wrench to hold housing (9), remove elbow (7) and retainer (8).
3. Remove ring spacer (10), spring (11), and bleeder valve (12). Using 1-1/8 in. open-end wrench, remove housing (9).

**Cleaning****WARNING**

Cleaning solvent is flammable. Use only in well ventilated areas. Keep away from flame, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when using to prevent skin irritation.

1. Clean all parts in solvent.
2. Wipe dry with clean lint-free cloth.



03i380m



## HOUSING VALVE ASSEMBLY AND BLEEDER VALVE STEMS REPAIR - CONTINUED

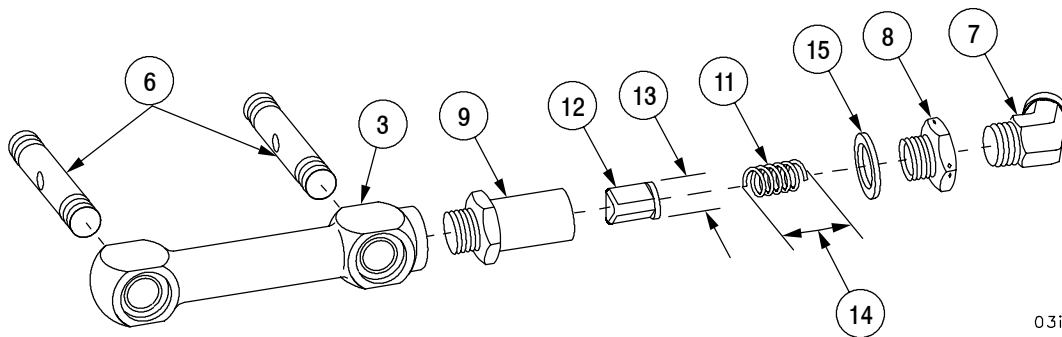
0019 00

### Inspection

1. Inspect stems (6), valve housing (3), retainer (8), housing (9), and elbow (7) for cracks or damaged threads. Replace stems (6) and elbow (7) if cracked or if threads are damaged. Replace housing and valve assembly, if other parts are cracked or if threads are damaged.
2. Measure valve bore diameter in housing (9) using inside micrometer. If housing is out-of round or if bore diameter exceeds 0.7520 in. (19.1 mm), replace valve assembly.
3. Inspect valve (12) for cracks, scoring or burrs. Using micrometer, measure outside diameter (13) of valve. If valve is damaged or if diameter is less than 0.7480 in. (18.9 mm), replace valve assembly.
4. Inspect spring (11) for nicks and cracks. Replace if nicked or cracked. Measure free length of spring using micrometer. Replace spring if free length (14) is less than 1.420 in. (36 mm). Check spring load. Spring load at 1.11 in. (28.2 mm) must be 22.5 lb  $\pm$  .05 lb (10.2 kg  $\pm$  0.2 kg). Replace spring if it does not meet all requirements.
5. Inspect spacer (15) for cracks or scoring. Replace spacer if cracked or scored.

### Repair

1. Smooth small burrs or raised metal using a fine mill file.
2. No other repairs are authorized for these parts.

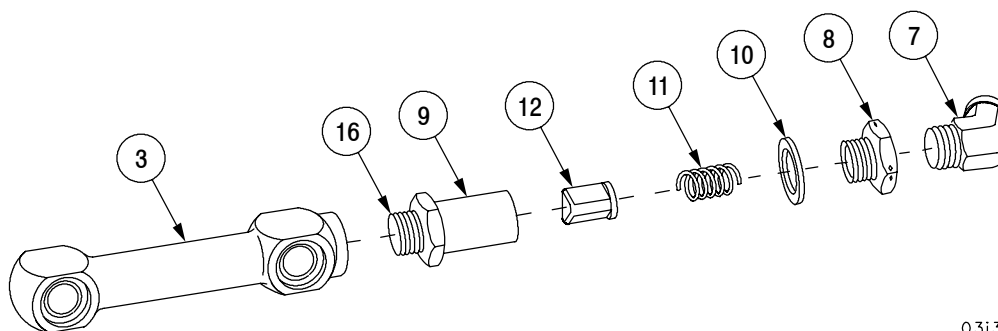


03i381m

**HOUSING VALVE ASSEMBLY AND BLEEDER VALVE STEMS REPAIR -  
CONTINUED****0019 00****Assembly****NOTE**

Coat exterior surfaces of both housings and retainer with light film of engine oil.

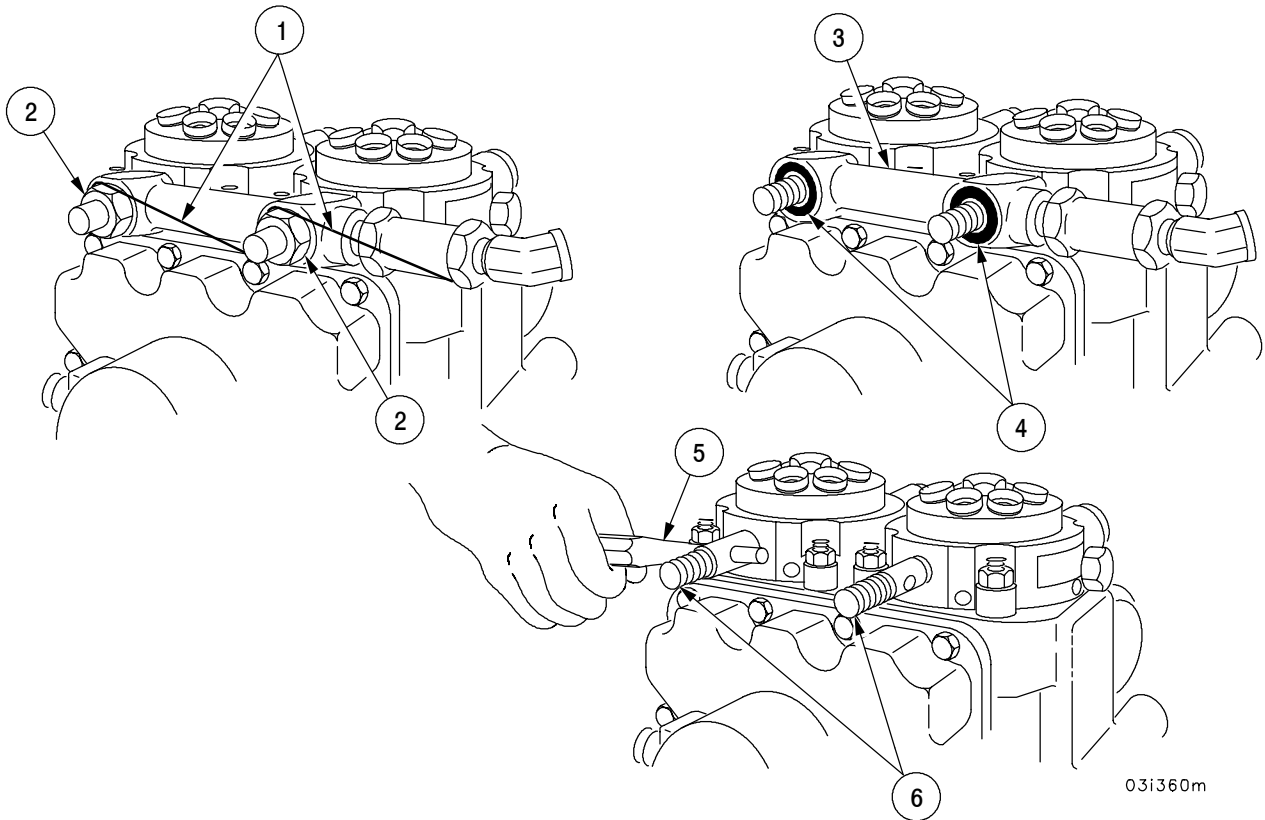
1. Place housing (3) in vise.
2. Apply light coat of sealant to housing threads (16) and install valve housing (9). Tighten housing using 1-1/8 in. open-end wrench.
3. Install valve (12), spring (11), spacer (10), and retainer (8). Tighten retainer using 1-1/8 in. open-end wrench.
4. Apply light coat of sealant to elbow threads and install elbow (7). Tighten elbow until scribe marks are aligned.



03i382m

**HOUSING VALVE ASSEMBLY AND BLEEDER VALVE STEMS REPAIR -  
CONTINUED****0019 00****Installation**

1. Using a drift (5), install two bleeder valve stems (6).
2. Install two new preformed packings (4) in each side of housing.
3. Install housing and valve assembly (3).
4. Using 1-1/8 in. socket and ratchet handle, install two nuts (2).
5. Install new lockwire (1).

**NOTE****FOLLOW-ON MAINTENANCE:**

Remove fuel metering pump from test stand  
(TM 9-4910-778-14&P and Instruction booklet  
74-9168)

**END OF WORK PACKAGE**



**FILTER ASSEMBLY AND BLEEDER VALVE STEMS REPAIR****0020 00****THIS WORK PACKAGE COVERS:**

Removal, Disassembly, Cleaning, Inspection, Assembly and Installation

**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)  
 Automotive fuel and electrical system repair tool kit  
 (item 56, WP 0042 00)  
 Torque wrench (item 63, WP 0042 00)  
 Filter socket (item 52, WP 0042 00)  
 Magnifying glass (item 24, WP 0042 00)  
 Machinist's vise, with vise jaw caps (item 58,  
 WP 0042 00)  
 Fine mill file (item 13, WP 0042 00)

**Materials/Parts**

Wiping rags (item 4, WP 0041 00)  
 1/4-18 dryseal NPTF pipe plug  
 Wire (item 10, WP 0041 00)

**Materials/Parts - Continued**

Engine oil (item 3, WP 0041 00)  
 Parts kit, part No. 5704356 or  
 Parts kit, part No. 5702739  
 Sealant (item 8, WP 0041 00)  
 Dry-cleaning solvent (item 7, WP 0041 00)

**Equipment Conditions**

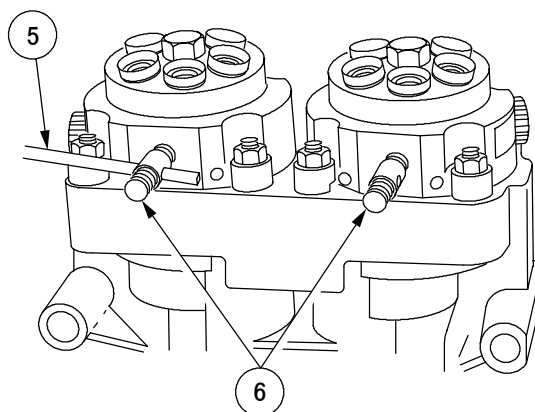
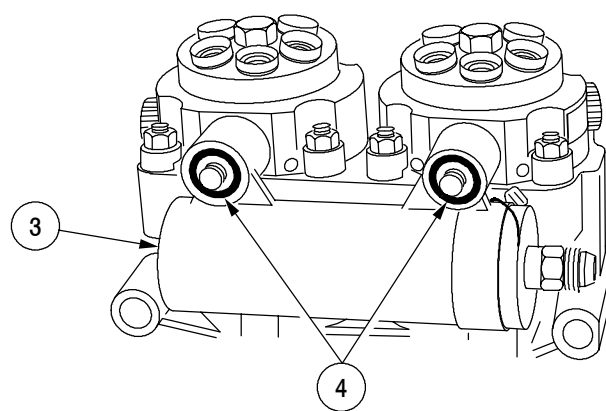
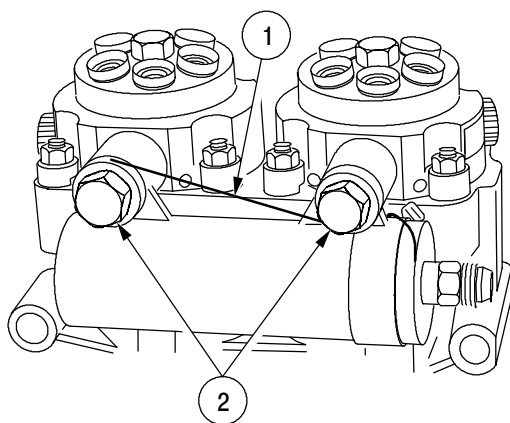
Fuel metering pump mounted on test stand  
 (TM 9-4910-778-14&P and Instruction booklet  
 74-9168)

**References**

TM 9-4910-778-14&P  
 Instruction booklet 74-9168

**Removal**

- Using diagonal cutting pliers, cut and remove wire (1). Using 3/4 in. socket and ratchet handle, remove two nuts (2).
- Remove filter assembly (3). Remove and discard two preformed packings (4) from each side of filter assembly.
- Using a drift (5), remove two bleeder valve stems (6).



031383m

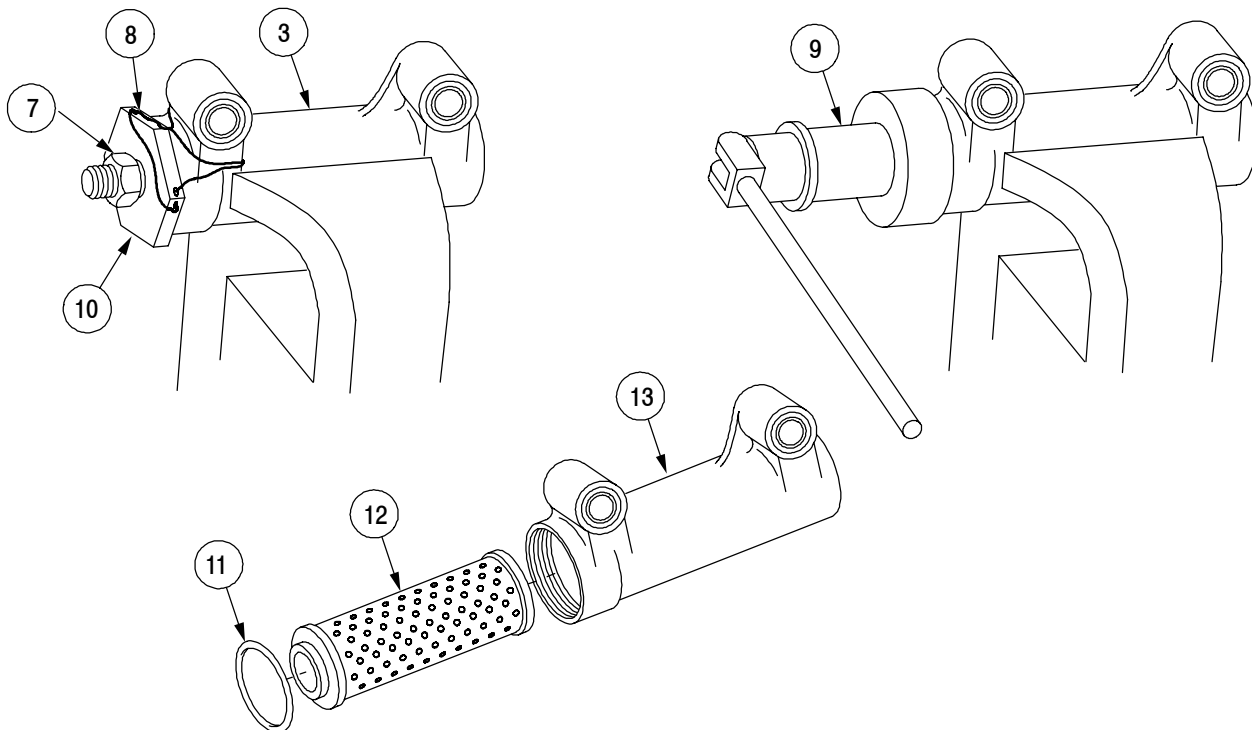
**FILTER ASSEMBLY AND BLEEDER VALVE STEMS REPAIR - CONTINUED****0020 00****Disassembly**

1. Place filter assembly (3) in vise.
2. Using 13/16 in. deep well socket, remove adapter (7).
3. Using diagonal cutting pliers, cut and remove seal (8).
4. Using fuel filter socket (9) and handle, remove cap (10).
5. Remove filter (12) from housing (13). Remove and discard preformed packing (11) and filter (12).

**Cleaning****WARNING**

Cleaning solvent is flammable. Use only in well ventilated areas. Keep away from flame, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when using to prevent skin irritation.

1. Clean all parts in solvent.
2. Wipe dry with clean lint-free cloth.



03i221m

**FILTER ASSEMBLY AND BLEEDER VALVE STEMS REPAIR - CONTINUED****0020 00****Inspection**

1. Inspect cap nuts (2), bleeder valve stems (6), cap (10) and adapter (7) for cracks or damaged threads. Replace parts if cracked or if threads are damaged.
2. Inspect housing (13) for cracks or damaged threads using magnifying glass and strong light. Inspect preformed packing grooves (14) for burrs or raised metal. Discard housing if cracked or if threads are damaged.

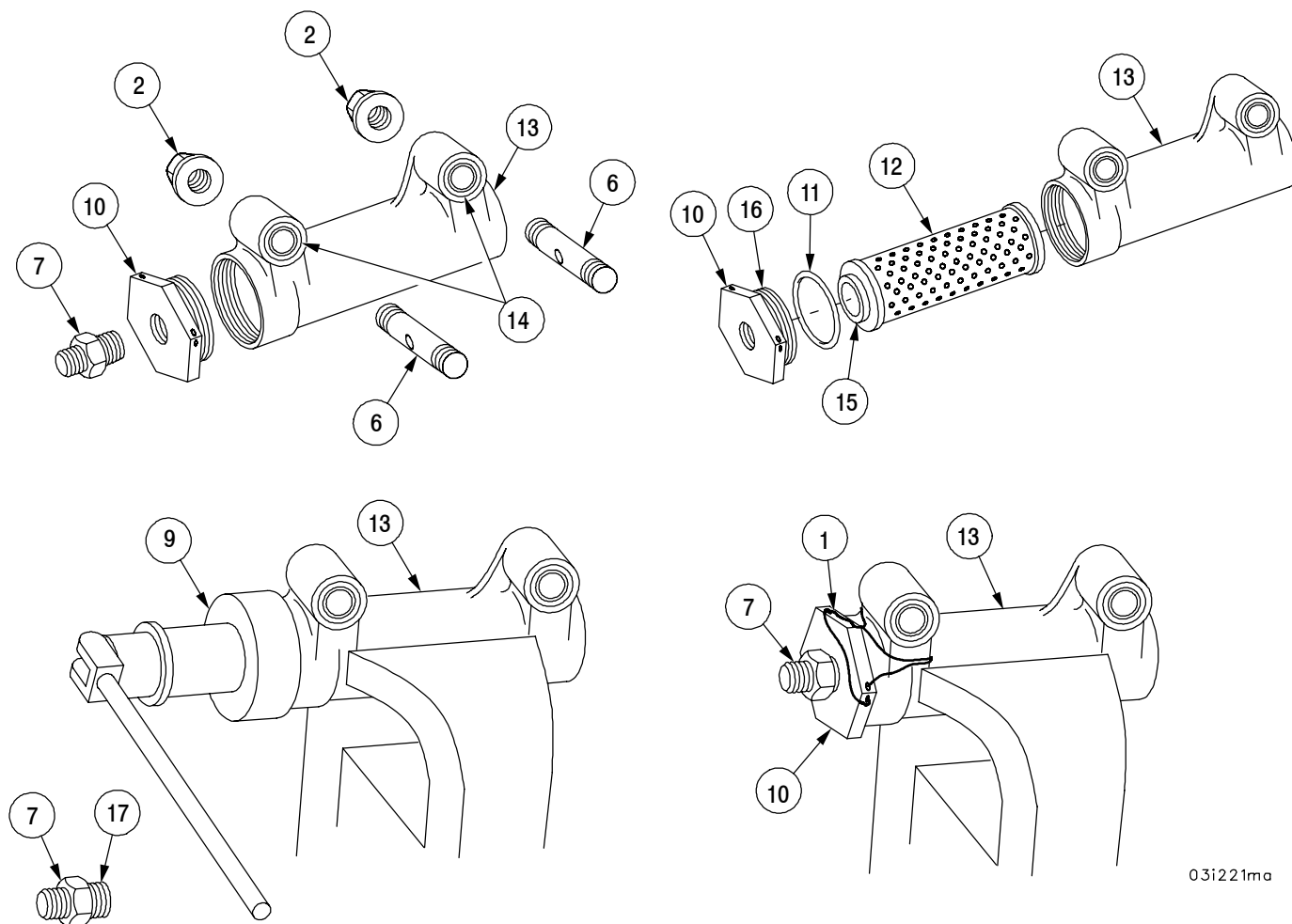
**Repair**

1. Smooth small burrs or raised metal using a fine mill file.
2. No other repairs are authorized for these parts.

**Assembly****NOTE**

Coat cap and outside of housing and adapter with a light film of engine oil.

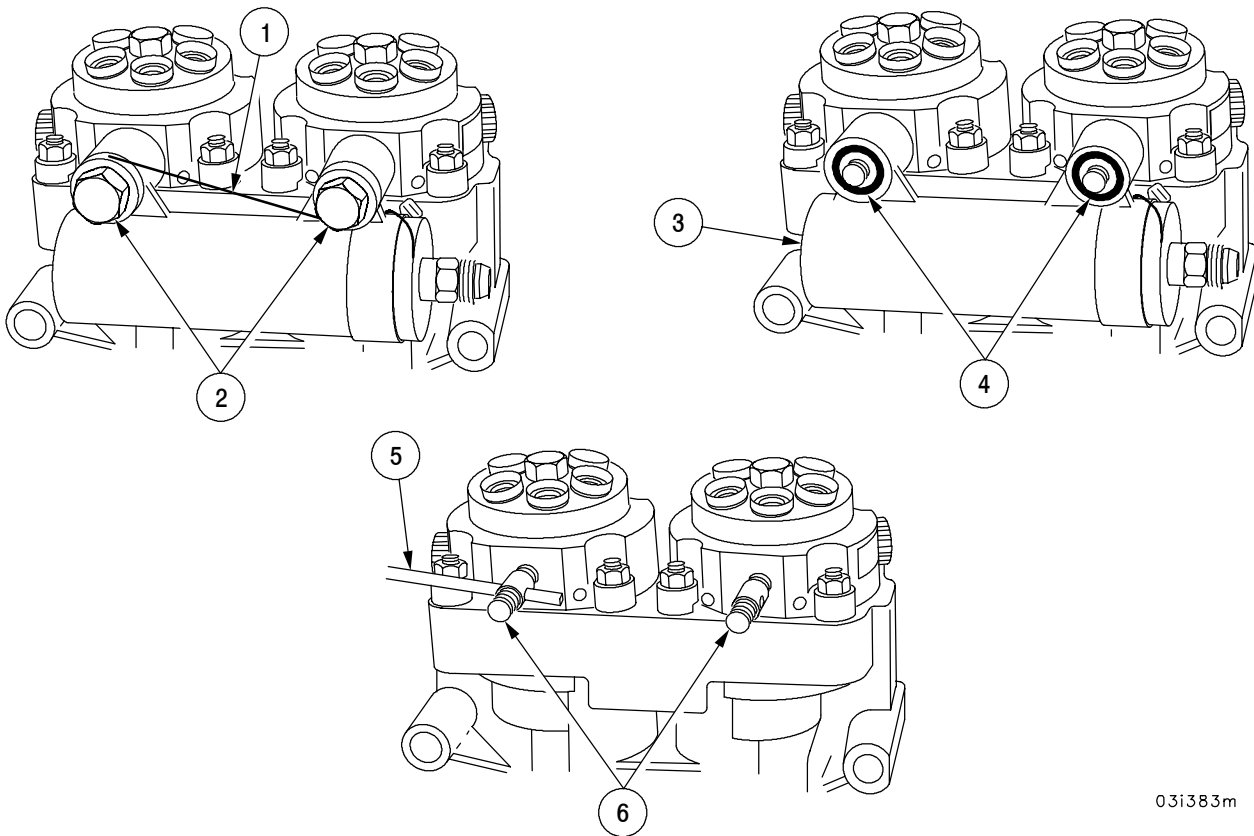
1. Install new filter (12) in housing (13) with pilot (15) toward front. Install new preformed packing (11). Apply light coat of sealant to cap threads (16) and install cap (10).
2. Place housing (13) in vise. Using fuel filter socket (9) and torque wrench, torque cap (10) to 25 to 30 lb-ft (34 to 40 N•m).
3. Apply light coat of sealant to adapter pipe threads (17), install adapter (7) in cap (10) and tighten using 13/16 in. deep well socket and ratchet handle.
4. Secure cap (10) to housing (13) with new seal (1).



03i221ma

**FILTER ASSEMBLY AND BLEEDER VALVE STEMS REPAIR - CONTINUED****0020 00****Installation**

1. Using a drift (5), install two bleeder valve stems (6).
2. Install filter assembly (3) and two new preformed packings (4) in each side of manifold housing.
3. Using diagonal cutting pliers, cut and remove wire (1). Using 3/4 in. socket and ratchet handle, install two nuts (2). Secure two nuts (2) with new lockwire (1).



03i383m

**NOTE****FOLLOW-ON MAINTENANCE:**

Remove fuel metering pump from test stand  
(TM 9-4910-778-14&P and Instruction booklet  
74-9168)

**END OF WORK PACKAGE**



## **CHAPTER 5**

# **GENERAL SUPPORT MAINTENANCE**



**COVER, SOLENOID AND GOVERNOR ROD ASSEMBLY REPAIR****0021 00****THIS WORK PACKAGE COVERS:**

Removal, Disassembly, Cleaning, Inspection, Assembly and Installation

**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)  
 Automotive fuel and electrical system repair tool kit  
 (item 56, WP 0042 00)  
 Ohmmeter (item 34, WP 0042 00)  
 Magnifying glass (item 24, WP 0042 00)  
 Soldering gun (item 26, WP 0042 00)  
 Telescope gauge (item 20, WP 0042 00)  
 Micrometer, 1-in. OD (item 29, WP 0042 00)  
 24 vdc source (item 42, WP 0042 00)  
 Fine mill file (item 13, WP 0042 00)  
 Protractor (item 44, WP 0042 00)  
 Torque wrench (item 62, WP 0042 00)

**Materials/Parts**

Wiping rags (item 4, WP 0041 00)  
 Wire, nonelectrical (item 10, WP 0041 00)

**Materials/Parts - Continued**

Engine oil (item 3, WP 0041 00)  
 Sealant (item 8, WP 0041 00)  
 Dry-cleaning solvent (item 7, WP 0041 00)  
 Parts kit, part No. 5705050 or  
 Preformed packing set, part No. 5702632

**Equipment Conditions**

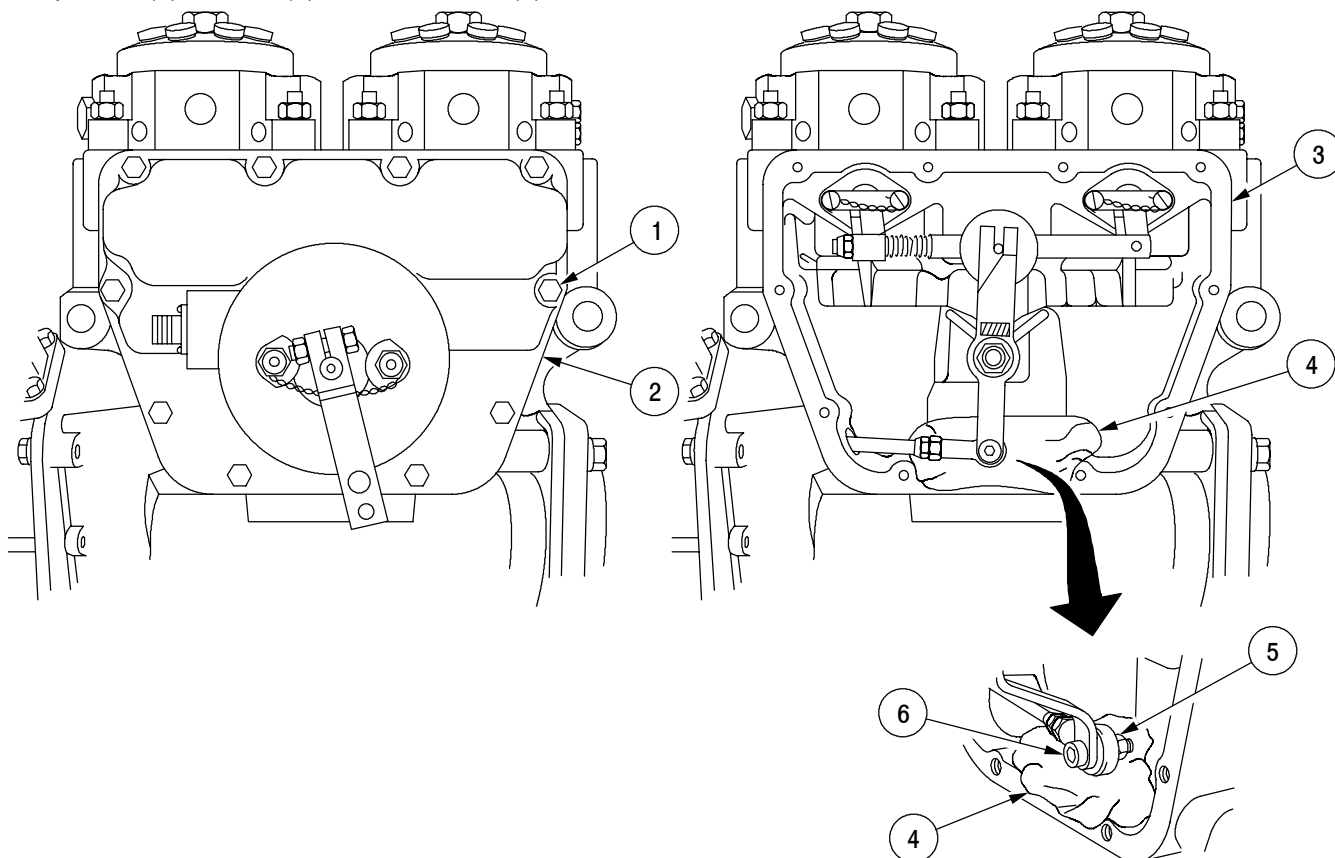
Fuel metering pump mounted on test stand  
 (TM 9-4910-778-14&P and Instruction booklet  
 74-9168)

**References**

TM 9-4910-778-14&P  
 Instruction booklet 74-9168

**Removal**

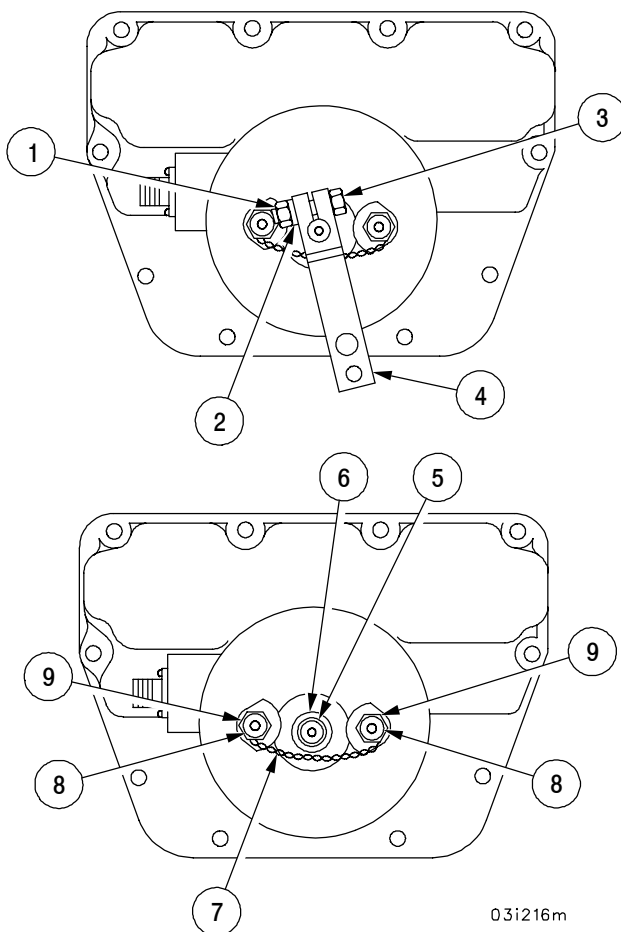
- Using 7/16 in. socket, ratchet handle, and extension, remove 10 bolts and lockwashers (1). Remove cover and solenoid (2).
- Remove and discard gasket (3).
- Place a clean cloth (4) below the bearing on rod assembly to prevent dropping parts into pump oil sump.
- Use 3/8 in. open-end wrench to hold self-locking nut (5). Using 5/32 in. socket head screw key, remove capscrew (6) and nut (5). Remove cloth (4).



031384m

**COVER, SOLENOID AND GOVERNOR ROD ASSEMBLY REPAIR -  
CONTINUED****0021 00****Disassembly**

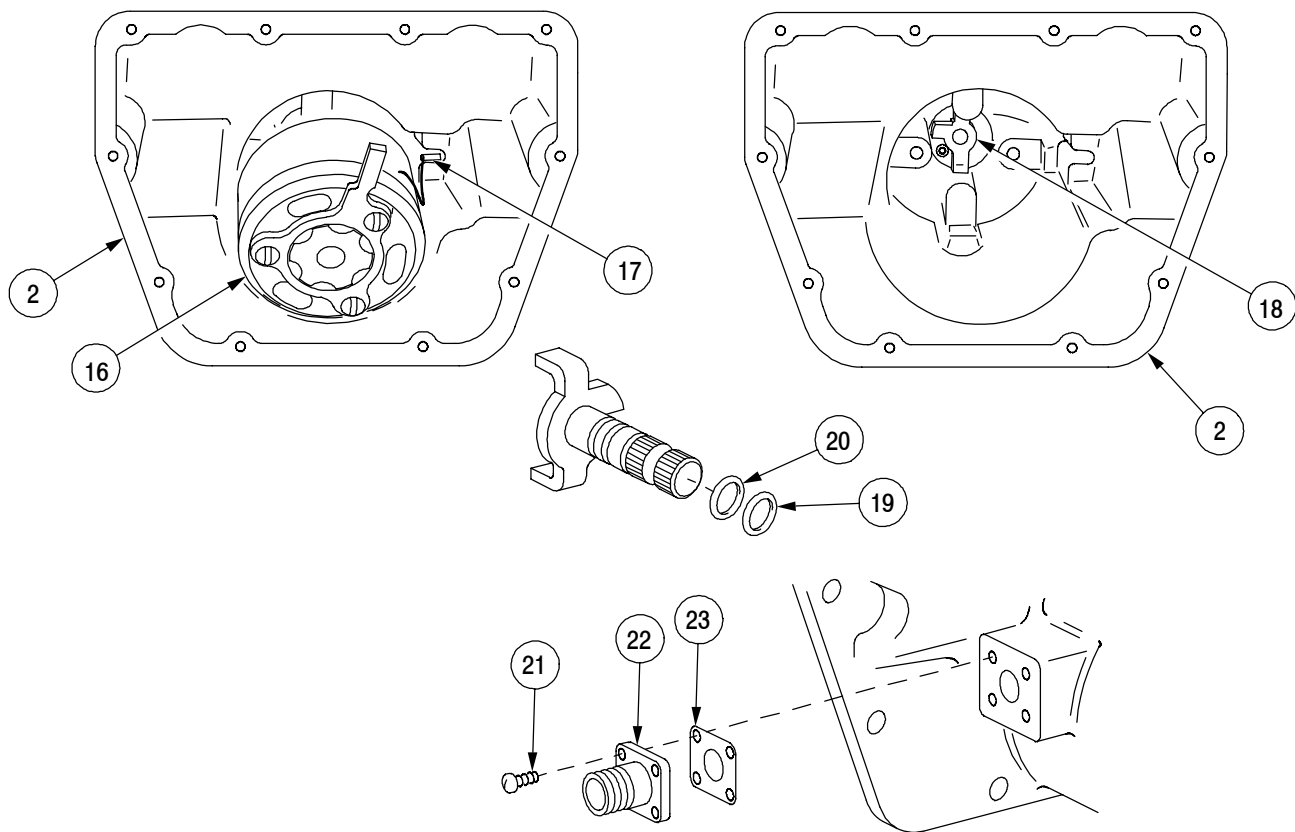
1. Using 7/16 in. socket and ratchet handle, remove plain nut (1).
2. Remove lockwasher (2), machine bolt (3), and operating lever (4). Discard lockwasher.
3. Using screwdriver, remove retaining ring (5). Remove flat washer (6).
4. Using diagonal cutting pliers, cut and remove wire (7). Discard lockwire.
5. Using 7/16 in. socket and ratchet handle, remove two cap nuts (8) and flat washers (9).



03i216m

**COVER, SOLENOID AND GOVERNOR ROD ASSEMBLY REPAIR -  
CONTINUED****0021 00****Disassembly - Continued**

6. Pull electrical solenoid (16) from cover (2) far enough to expose electrical lead solder joint at terminal (17). Using soldering iron, unsolder lead at terminal. Remove solenoid (16).
7. Remove shutoff lever assembly (18) from cover (2).
8. Remove and discard preformed packing (19) and gasket (20).
9. Remove and discard four assembled washer screws (21). Remove electrical receptacle connector (22) and gasket (23). Discard gasket.



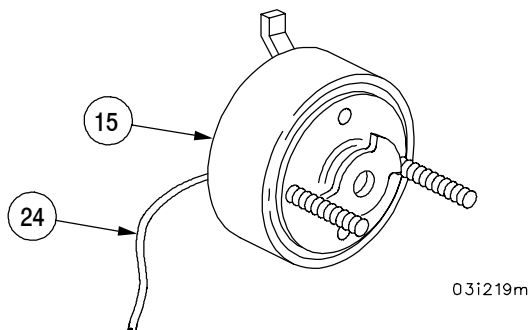
**COVER, SOLENOID AND GOVERNOR ROD ASSEMBLY REPAIR -  
CONTINUED****0021 00****Cleaning****WARNING**

Cleaning solvent is flammable. Use only in well ventilated areas. Keep away from flame, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when using to prevent skin irritation.

**CAUTION**

Do not immerse solenoid in solvent.

1. Clean solenoid (15) using clean lint-free cloth moistened with solvent, being careful not to contact electrical lead (24).
2. Wipe dry with clean lint-free cloth. Clean electrical lead (24) using clean lint-free cloth.
3. Clean remaining parts using solvent. Wipe dry using clean lint-free cloth.

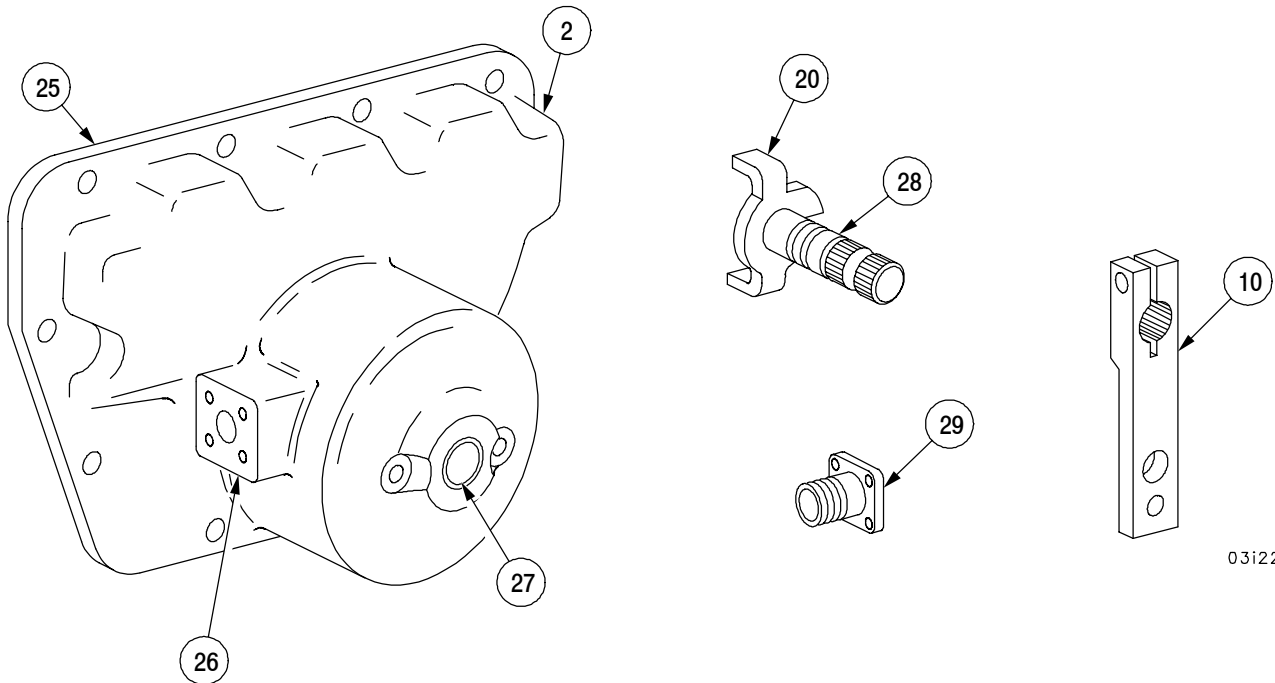


**COVER, SOLENOID AND GOVERNOR ROD ASSEMBLY REPAIR -  
CONTINUED**

**0021 00**

**Inspection**

1. Inspect cover (2) for cracks using magnifying glass and strong light. Look for raised metal and warped or distorted mounting flanges (25) and (26). Replace cover if cracked, warped or distorted.
2. Measure bore diameter (27) using telescope gauge and micrometer. Replace housing if bore exceeds 0.3775 in. (10 mm).
3. Inspect shutoff lever (20) and operating lever (28) for cracks, raised metal, or damaged spline. Replace lever (20) if cracked or if spline is damaged. Measure lever shaft diameter (10) using micrometer. Replace lever if diameter is less than 0.3745 in. (9.50 mm). If lever (28) is cracked or spline is damaged, replace lever assembly.
4. Inspect connector (29) for cracks, damaged threads or loose pin. Replace connector if cracked, or if threads are damaged or pin is loose.
5. Using an ohmmeter, check connector (29) for continuity. Replace connector if check is negative.



## COVER, SOLENOID AND GOVERNOR ROD ASSEMBLY REPAIR - CONTINUED

0021 00

### Inspection - Continued

6. Apply 24 volt power source to solenoid electrical lead (24) and connect ground lead to mounting stud (30). When energized, the solenoid lever (31) should move clockwise and return to rest position when power source is turned off. Replace solenoid if it does not operate freely.

### Repair

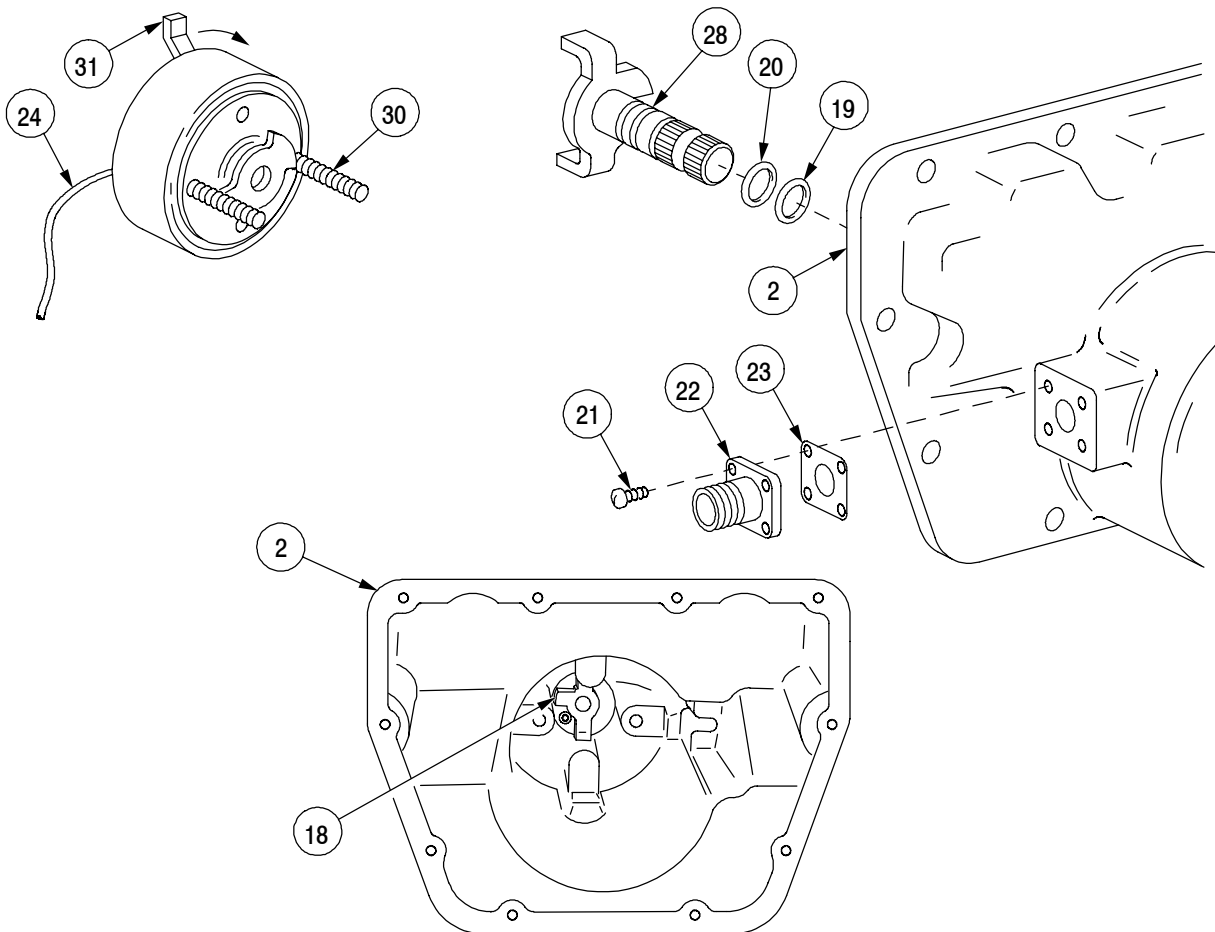
1. Smooth small nicks or raised metal using a fine mill file.
2. No other repairs are authorized for these parts.

### Assembly

#### NOTE

Coat all metal parts with a light film of engine oil.

1. Install new gasket (20) and preformed packing (19) in grooves on shutoff lever (28). Install the assembled lever (18) in solenoid cover (2).
2. Install new gasket (23), connector (22) and secure with four new assembled washer screws (21).



03i220ma

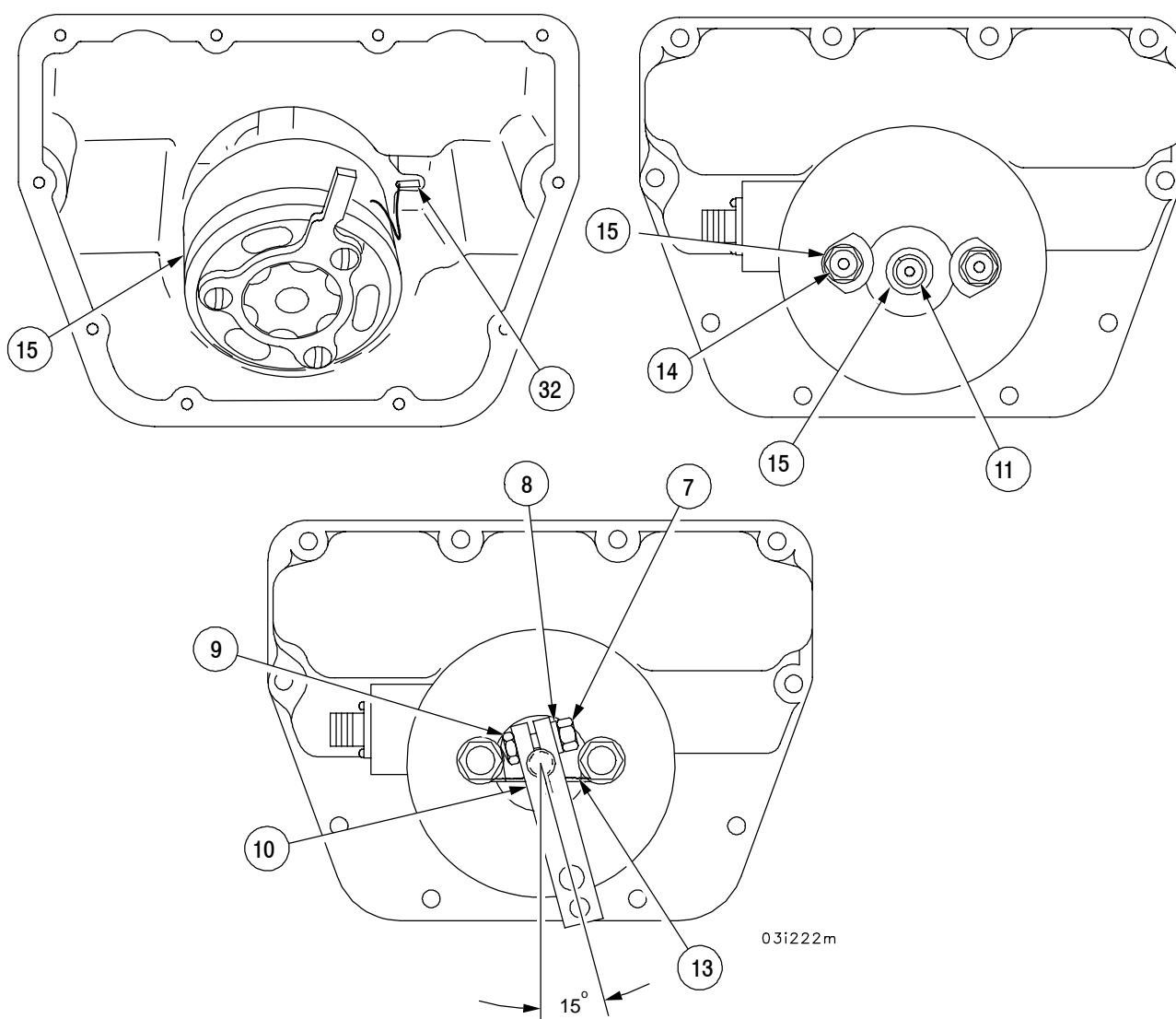


## COVER, SOLENOID AND GOVERNOR ROD ASSEMBLY REPAIR - CONTINUED

0021 00

### Assembly - Continued

3. Using soldering iron, solder electrical lead to terminal (32). Install solenoid (15) in cover.
4. Install two flat washers (15) and cap nuts (14). Using 7/16 in. socket and torque wrench, torque nuts to 45 to 50 lb-in. (5 to 6 N•m).
5. Install flat washer (15). Using flat side of screwdriver, install retaining ring (11).
6. Using protractor, position operating lever (10) on shaft with centerline of lever 15 degrees to the right of vertical, with the lever in the down position (with solenoid in rest position). Push lever against retaining ring.
7. Install machine bolt (9), new lockwasher (8), and nut (7) to secure lever (10). Using 7/16 in. socket and torque wrench, torque nut to 70 to 75 lb-in. (8 to 8.5 N•m).
8. Secure cap nuts (14) with wire (13).



## COVER, SOLENOID AND GOVERNOR ROD ASSEMBLY REPAIR - CONTINUED

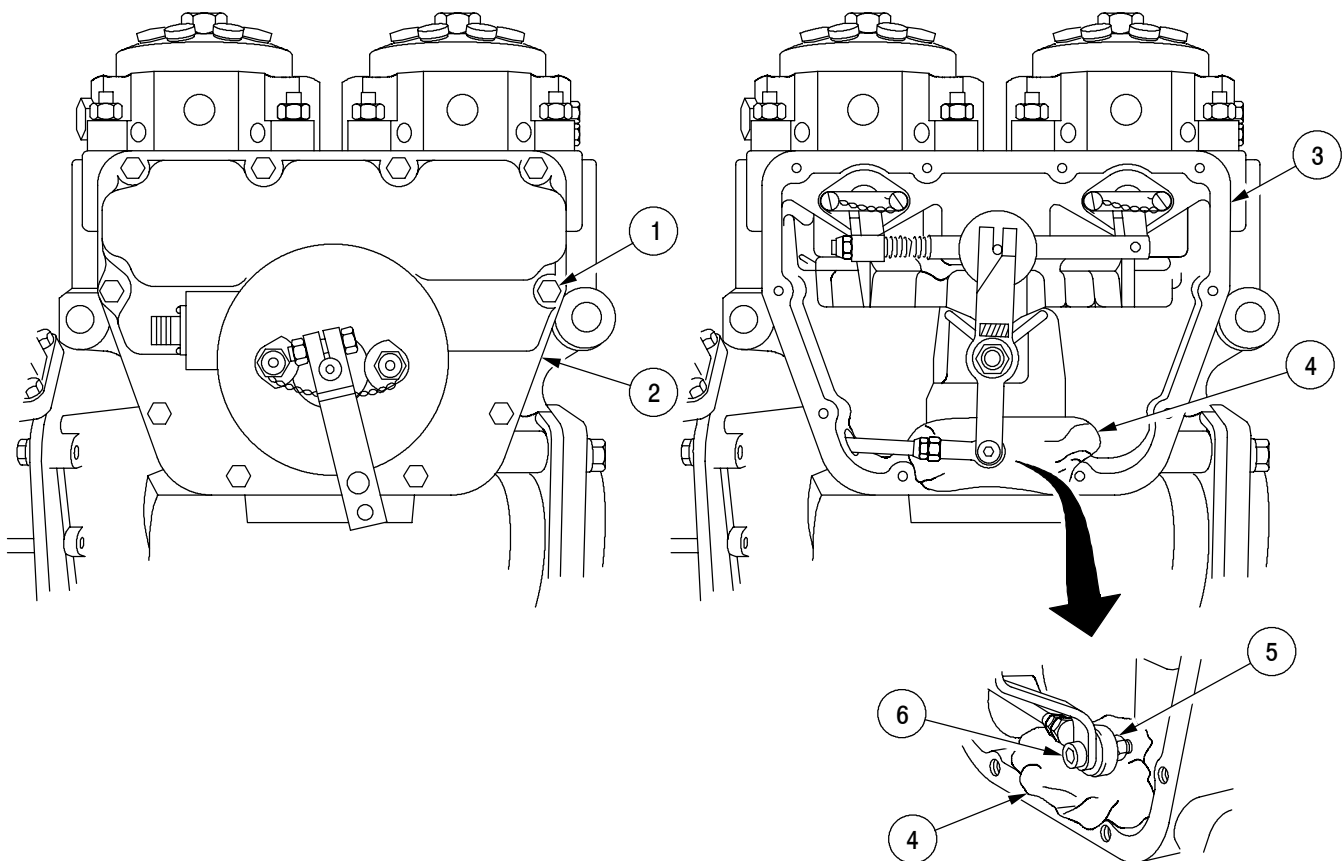
0021 00

### Installation

1. Place a clean cloth (4) below the bearing on rod assembly to prevent dropping parts into pump oil sump.
2. Use 3/8 in. open-end wrench to install self-locking nut (5). Using 5/32 in. socket head screw key, install capscrew (6).
3. Install new gasket (3).
4. Install cover and solenoid (2) and secure with 10 lockwashers and machine bolts (1) finger-tight since they will be removed during testing.

### NOTE

The fuel bleeder housing and valve assembly, fuel inlet filter assembly, and bleeder valve stems will be installed after the Fuel Leakage and Delivery Valve Tests have been performed. The pump must be tested (WP 0033 00) and calibrated (WP 0034 00) following any repair.



031384m

### NOTE

#### FOLLOW-ON MAINTENANCE:

Remove fuel metering pump assembly from test stand  
(TM 9-4910-778-14&P and Instruction booklet  
74-9168)

**END OF WORK PACKAGE**

**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR****0022 00****THIS WORK PACKAGE COVERS:**

Removal, Disassembly, Cleaning, Inspection, Assembly, Installation

**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)  
 Automotive fuel and electrical system repair tool kit (item 56, WP 0042 00)  
 Machinist's vise with vise jaw caps (item 58, WP 0042 00)  
 Torque wrench (item 62, WP 0042 00)  
 Ohmmeter (item 34, WP 0042 00)  
 Magnifying glass (item 24, WP 0042 00)  
 Micrometer, 1-in. OD (item 29, WP 0042 00)  
 Micrometer, 2-in. OD (item 30, WP 0042 00)  
 Micrometer, 3-in. OD (item 31, WP 0042 00)  
 24 vdc source (item 42, WP 0042 00)  
 Fine mill file (item 13, WP 0042 00)  
 Protractor (item 44, WP 0042 00)  
 Depth gauge (item 16, WP 0042 00)  
 Spring gauge (item 54, WP 0042 00)  
 Work bench

**Materials/Parts**

Wiping rags (item 4, WP 0041 00)  
 Wire, nonelectrical (item 10, WP 0041 00)  
 Engine oil (item 3, WP 0041 00)  
 Preformed packing set, Part No. 5702632  
 Sealant (item 8, WP 0041 00)  
 Dry-cleaning solvent (item 7, WP 0041 00)  
 Parts kit 5705050  
 Parts kit 5705051  
 Pencil  
 Paper  
 Shim set, Part No. 5702638

**Equipment Conditions**

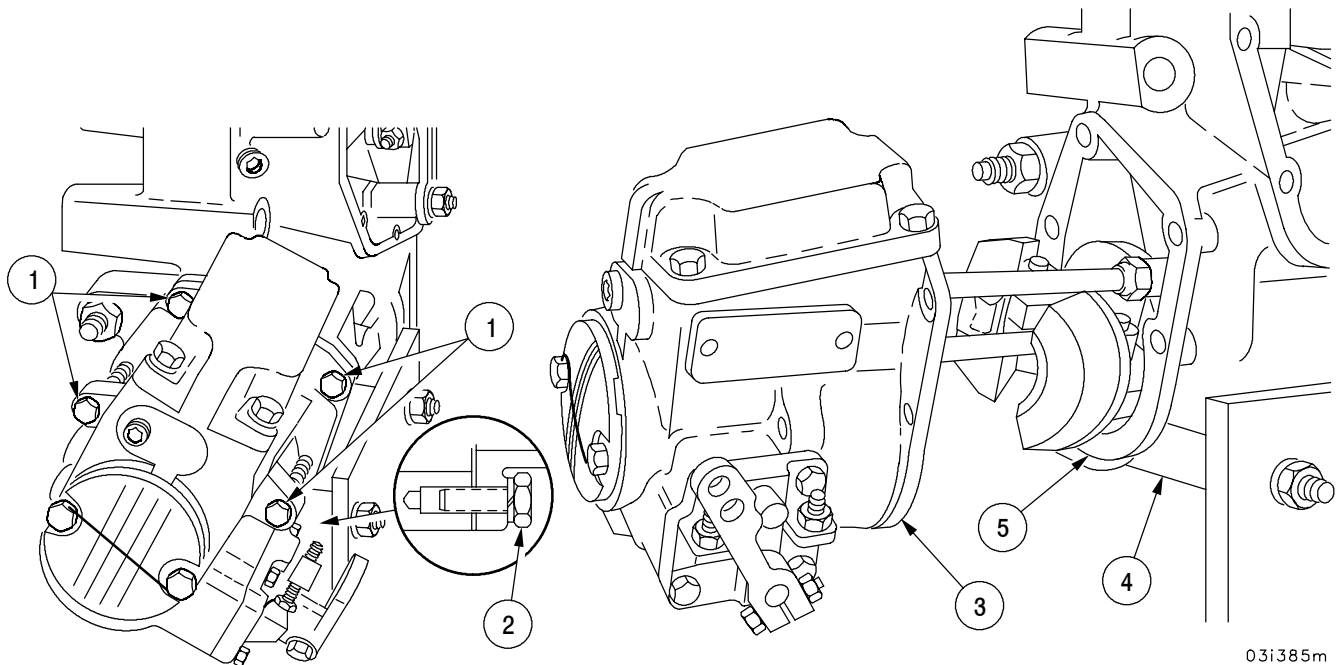
Governor rod assembly disconnected (WP 0021 00)

**References**

WP 0021 00	WP 0008 00
WP 0013 00	WP 0015 00
	WP 0023 00

**Removal**

- Using 7/16 in. open-end wrench, remove four screws and lockwashers (1).
- Using 7/16 in. open-end wrench, remove one screw and lockwasher (2) from the bottom of governor housing. This screw threads into governor housing (the opposite direction from the other four screws).
- Discard lockwashers.
- Pull governor housing (3) from injection pump housing (4). Remove and discard gasket (5).



03i385m

**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND  
ASSOCIATED PARTS REPAIR - CONTINUED****0022 00****Disassembly****NOTE**

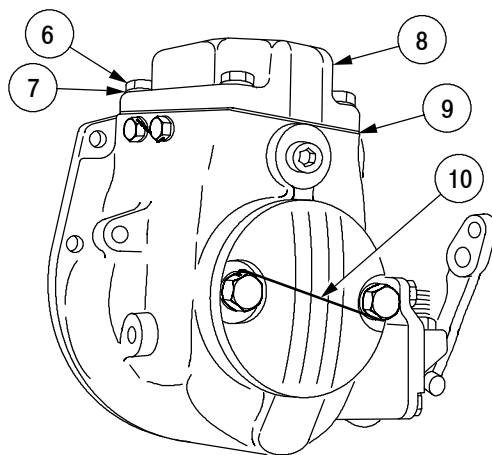
Retain all unused kit parts. They will be used to repair other components.

1. Using 7/16 in. socket and ratchet handle, remove four machine bolts (6).
2. Remove and discard four lockwashers (7).
3. Remove governor cover (8).
4. Remove and discard gasket (9).

**WARNING**

The governor cap is spring loaded. Maintain pressure on governor cap when removing screws.

5. Using diagonal cutting pliers, cut and remove wire (10).



03i386m

## GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED

0022 00

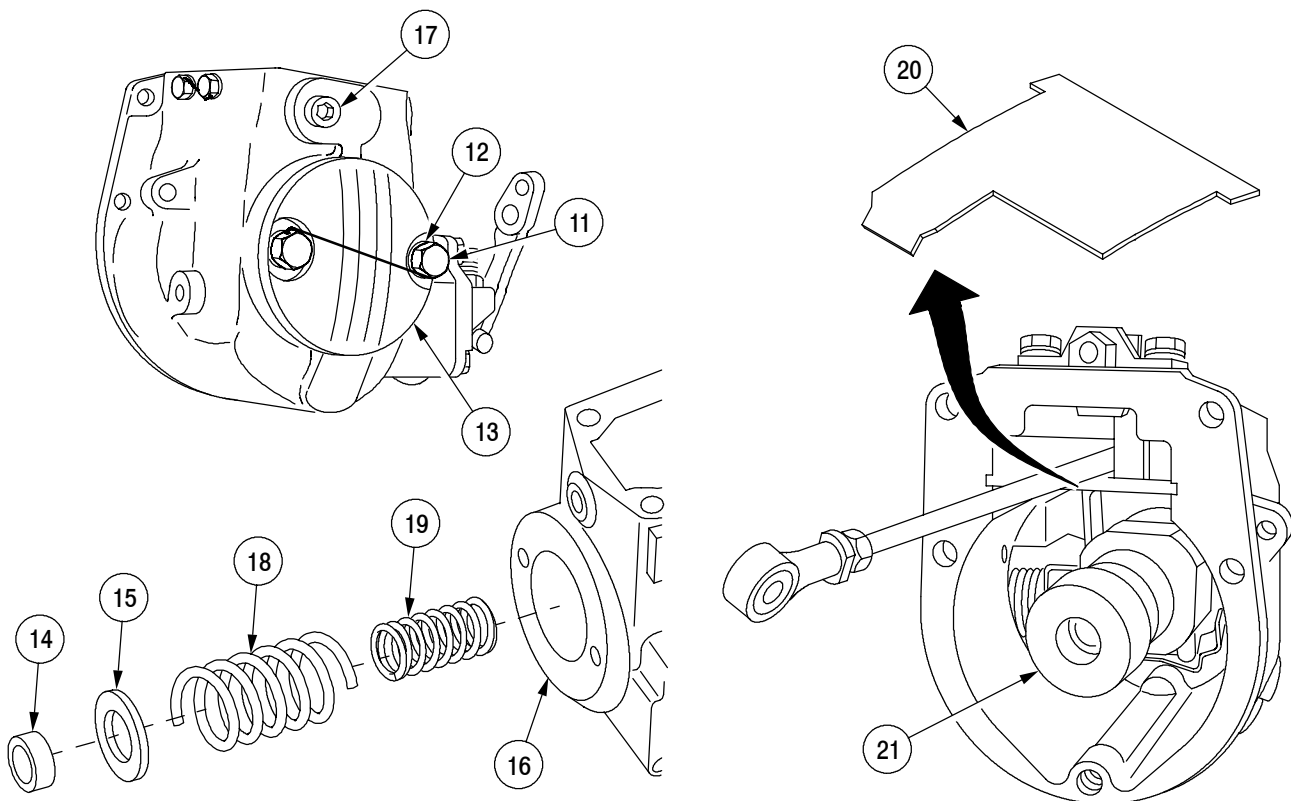
### Disassembly - Continued

6. Using 7/16 in. socket and ratchet handle, remove two screws (11) and two lockwashers (12).
7. Remove governor cap (13).
8. Remove inner shims (14) and outer shims (15).
9. Using 1-in. micrometer, measure thickness of inner and outer shims (14) and (15). Record thickness of each shim pack. Discard shims.

### NOTE

Record of shim pack thicknesses will aid in selecting new shims during assembly.

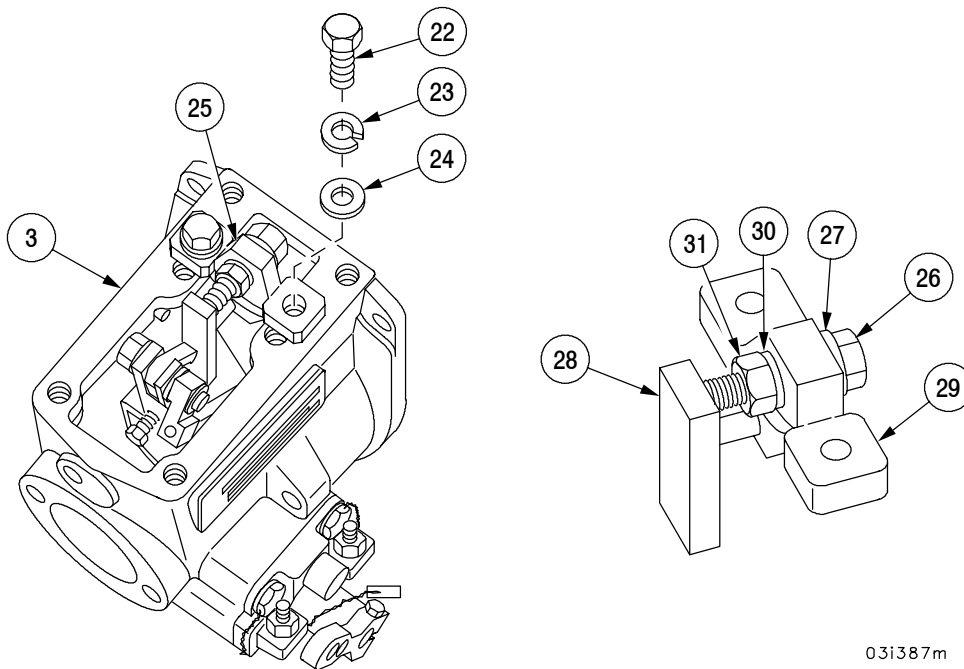
10. Remove and discard gasket (16).
11. Using 1/4 in. socket head screw key, remove pipe plug (17).
12. Remove outer spring (18) and inner spring (19).
13. Remove oil baffle (20) and sleeve assembly (21).



031208m

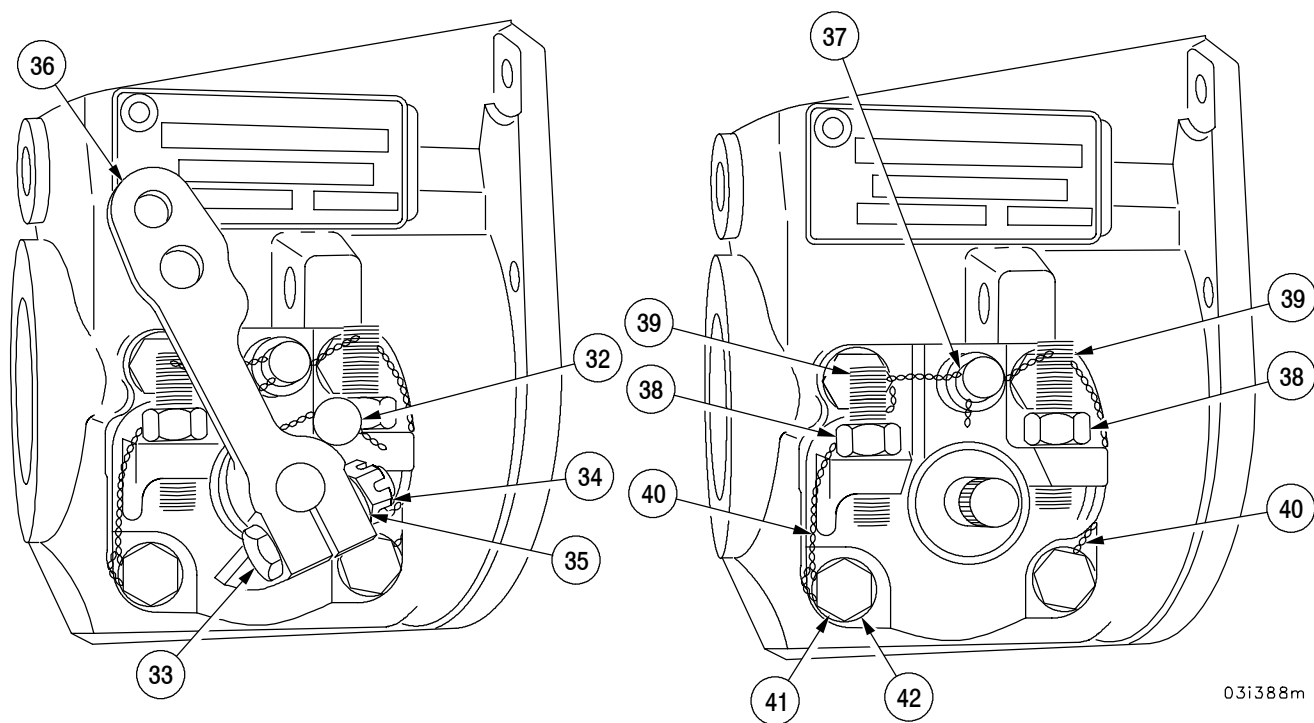
**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED****0022 00****Disassembly - Continued**

14. Place housing assembly (3) in vise.
15. Using 7/16 in. socket and ratchet handle, remove two screws (22), lockwasher (23) and remove flat washer (24). Remove assembled stop plate bridge (25).
16. Using two 7/16 in. open-end wrenches, remove hexagon plain nut (26) and lockwasher (27) from stop plate assembly (28). Remove stop plate (28) from stop plate bridge (29).
17. Remove lockwasher (30) and nut (31).



**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED****0022 00****Disassembly - Continued**

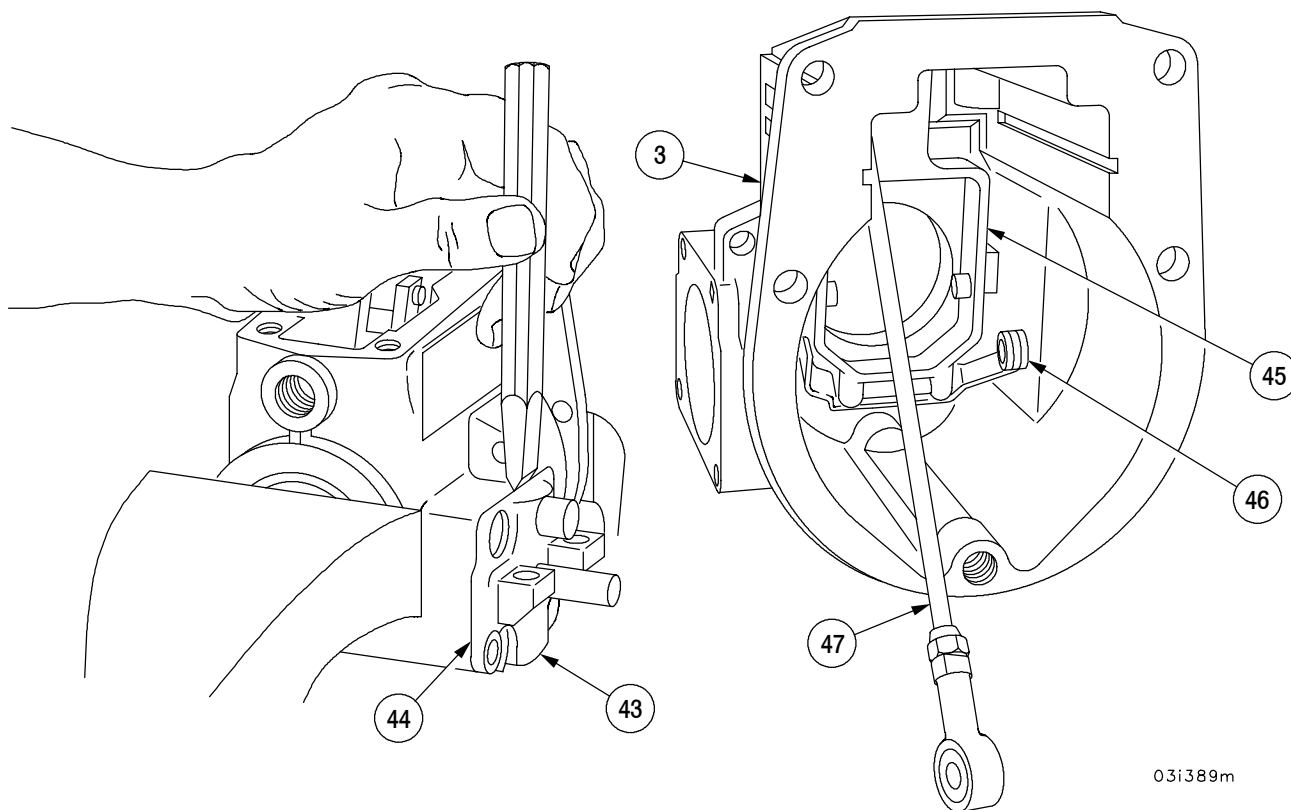
18. Using diagonal cutting pliers, cut and remove seal (32).
19. Using 7/16 in. socket and ratchet handle, hold screw (33) and remove nut (34).
20. Remove lockwasher (35), screw (33), and operating lever (36). Discard lockwasher.
21. Using diagonal cutting pliers, cut and remove seal (37).
22. Using 7/16 in. open-end wrench and screwdriver, loosen two adjusting screw nuts (38). Remove two adjusting screws (39) and nuts. Discard nut and screws.
23. Using diagonal cutting pliers, cut and remove two wires (40).
24. Using 7/16 in. socket and ratchet handle, remove and discard four capscrews (41) and lockwashers (42).



03i388m

**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED****0022 00****Disassembly - Continued**

25. Using hand cold chisel and hammer, loosen, remove, and discard assembled bearing plate (43).
26. Remove and discard gasket (44).
27. Remove fulcrum lever assembly (45) from pivot pin (46) and remove fulcrum lever and control rod (47) from housing.
28. Remove governor housing (3) from vise.

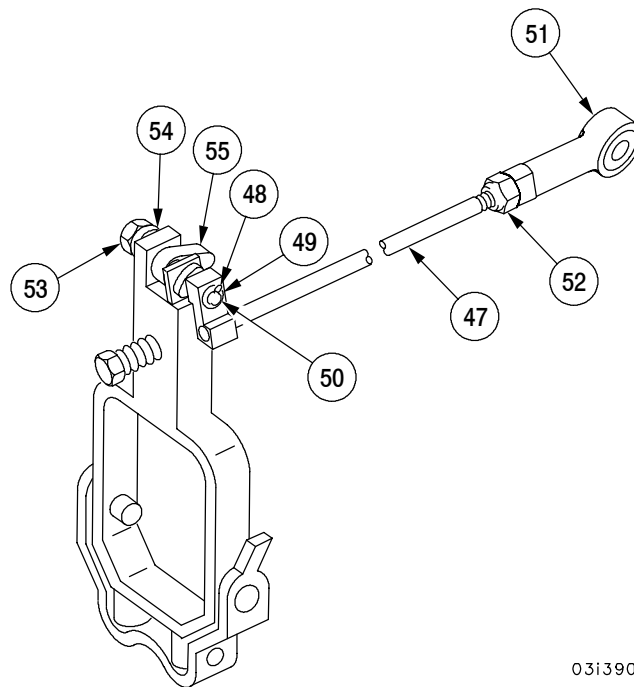


03i389m



**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED****0022 00****Disassembly - Continued**

29. Using needle nose pliers, remove and discard cotter pin (48).
30. Remove control rod (47), flat washer (49) from fulcrum lever screw (50).
31. Using 5/16 in. open-end wrench, hold rod end bearing flat (51), and loosen self-locking nut (52) using 3/8 in. open-end wrench. Remove bearing (51). Using 3/8 in. open-end wrench, remove nut from rod (47).
32. Using 7/16 in. socket and ratchet handle, remove nut (53), lockwasher (54) and smoke limit cam (55) from fulcrum lever screw (50).
33. Discard cotter pin (48), lockwasher (54), and smoke limit cam (55). Retain all other parts.



03i390m

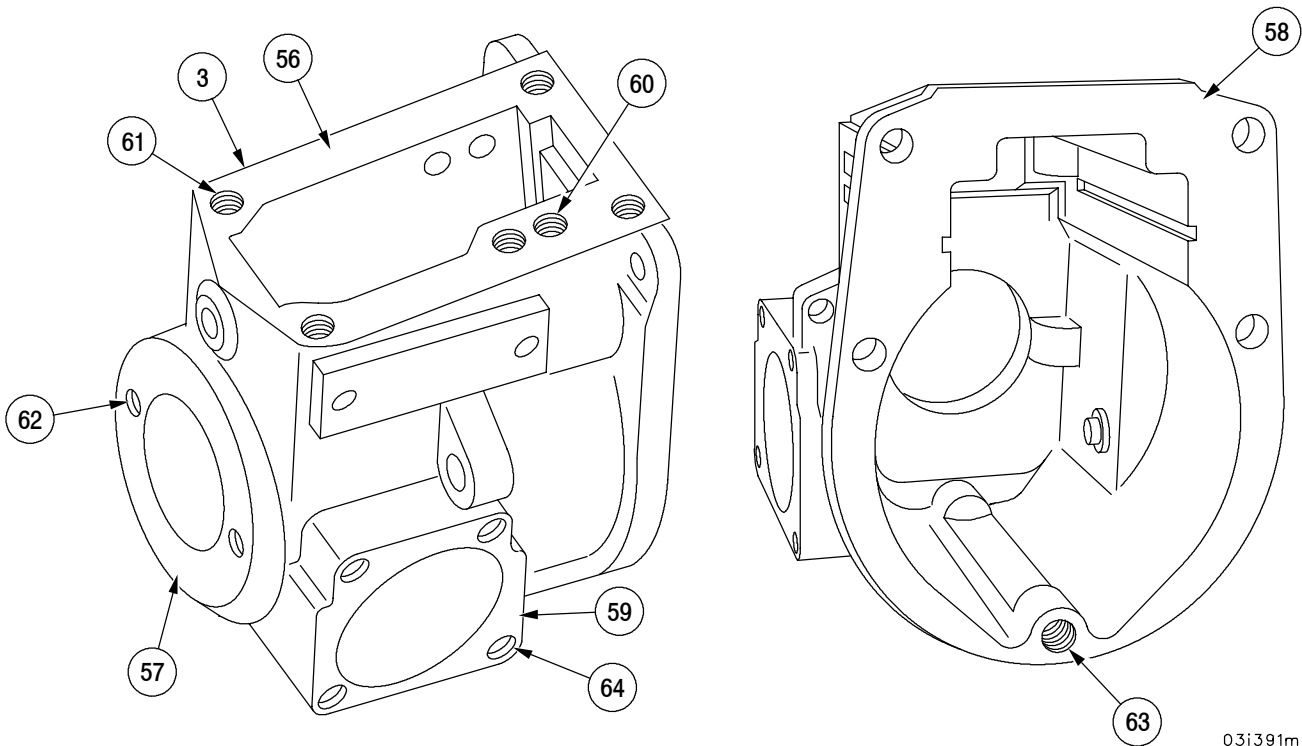
**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND  
ASSOCIATED PARTS REPAIR - CONTINUED****0022 00****Cleaning****WARNING**

Cleaning solvent is flammable. Use only in well ventilated areas. Keep away from flame, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when using to prevent skin irritation.

1. Clean all parts using solvent.
2. Wipe dry with clean lint-free cloth.

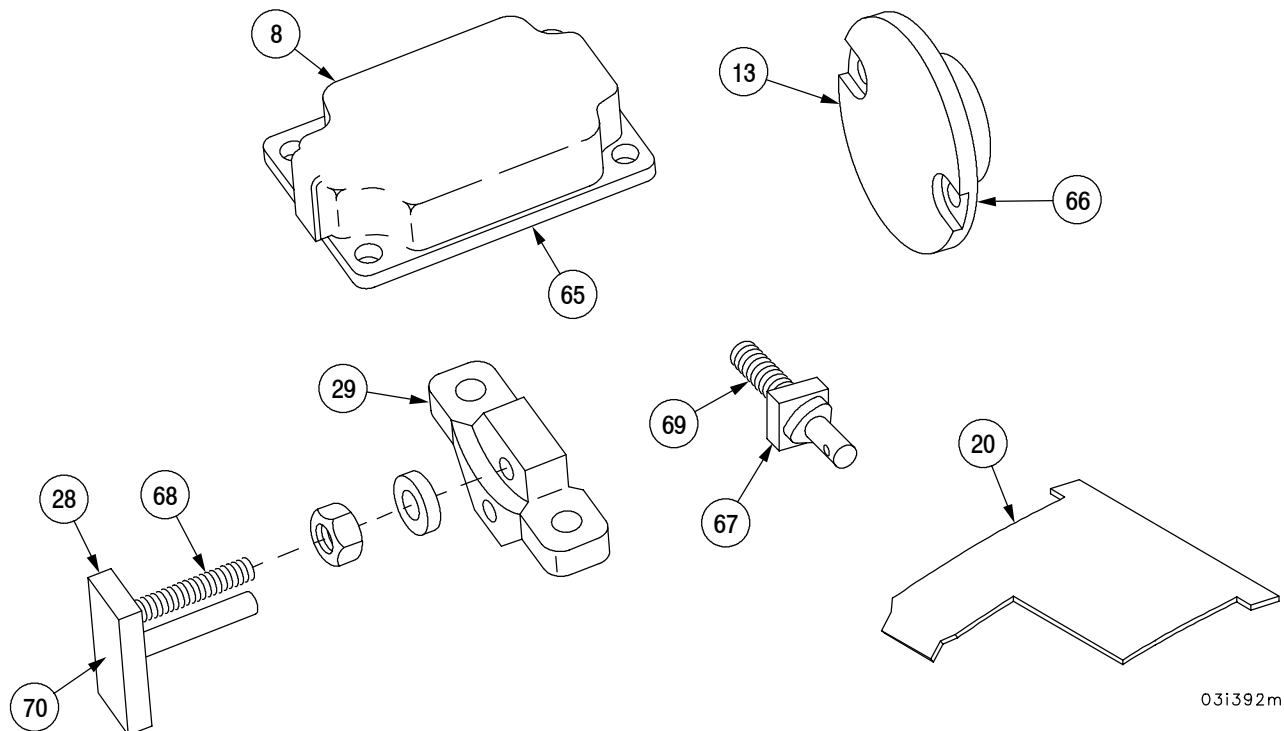
**Inspection**

1. Inspect governor housing (3) for cracks using magnifying glass and strong light. Look for raised metal, distorted or warped mounting flanges (56), (57), (58), and (59). Replace housing if cracked or if mounting flanges are distorted.
2. Inspect tapped holes (60), (61), (62), (63), and (64) for thread damage. Replace housing if threads are damaged.



**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED****0022 00****Inspection - Continued**

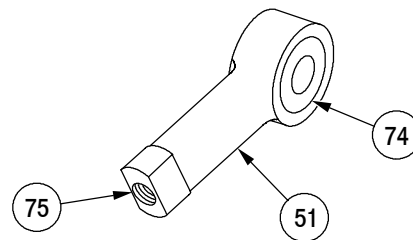
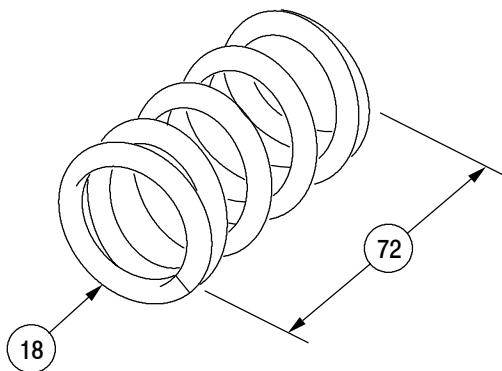
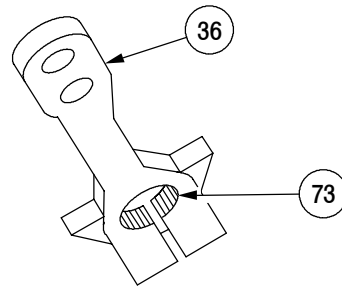
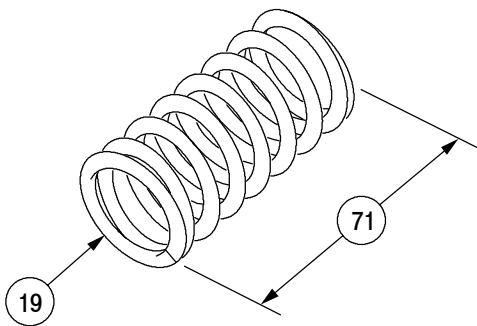
3. Inspect governor cover (8) for cracks or damage using a magnifying glass and strong light. Look for raised metal and distorted or warped mounting surface (65). Replace if cracked or warped, if nicks or raised metal are found, see repair, in this work package.
4. Inspect governor end cap (13) for cracks or damage using a magnifying glass and strong light. Look for raised metal and distorted or warped mounting surface (66). Replace if cracked or warped. If nicks or raised metal are found, see repair, in this work package.
5. Inspect stop plate (28), bridge (29), and screw (67) for cracks using magnifying glass and strong light. Replace bridge if cracked. Inspect threads (68) on stop plate (28) and threads (69) on screw (67) for damage. Inspect wear face (70) for wear pattern or roughness. If stop plate (28) wear face or threads are damaged, replace bridge assembly. Replace screw (67) if threads are damaged.
6. Inspect baffle (20) for cracks using magnifying glass and strong light. Replace baffle if cracked.



03i392m

**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED****0022 00****Inspection - Continued**

7. Inspect governor inner spring (19) and outer spring (18) for cracks or nicks. Replace springs if cracked or nicked.
8. Using 3-in. micrometer, measure free length of inner spring (19). Free length (71) must be 1.9530 to 2.0470 in. (49.6 to 52 mm). Check spring load. Spring load must be 50 to 55 lb (22.7 to 25 kg) at 1.80 in. (45.7 mm) length. Replace spring if it does not meet specified data.
9. Using 2 in. micrometer, measure free length of outer spring (18). Free length (72) must be 1.5150 to 1.6090 in. (38.5 to 40.9 mm). Check spring load. Spring load must be 6.00 to 6.50 lb (2.72 to 2.95 kg) at 1.40 in. (35.6 mm) length. Replace spring if it does not meet specified data.
10. Inspect operating lever (36) for cracks using magnifying glass and strong light. Replace lever if cracked. Inspect spline (73) for damage. Replace lever if spline is damaged.
11. Inspect rod end bearing (51) for cracks and freedom of ball (74). Ball must move freely in race without end play. Inspect threads (75) for damage. Replace bearing if cracked. Replace bearing if threads are damaged or if ball does not move freely in race. Replace bearing if ball has end play.



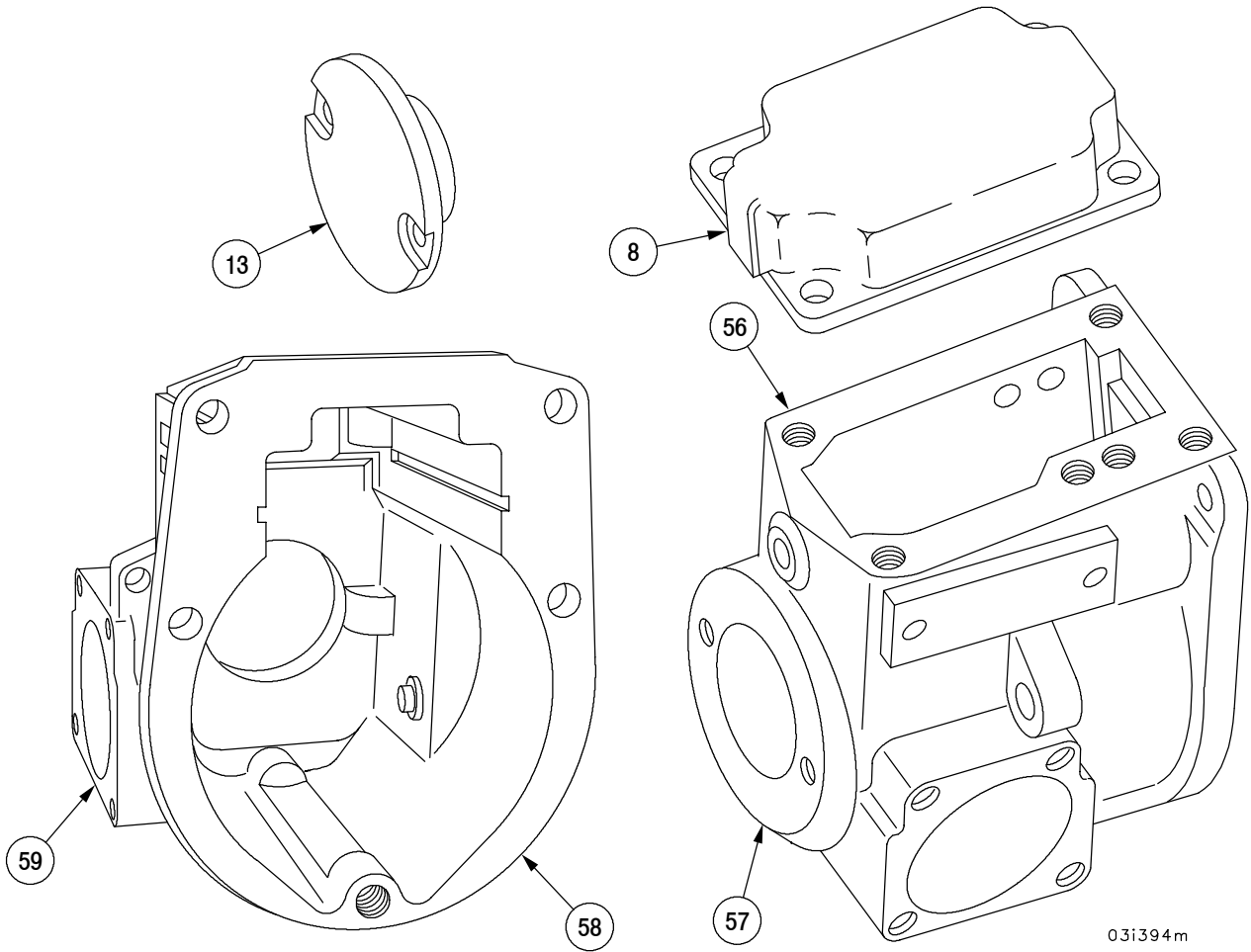
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**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED**

**0022 00**

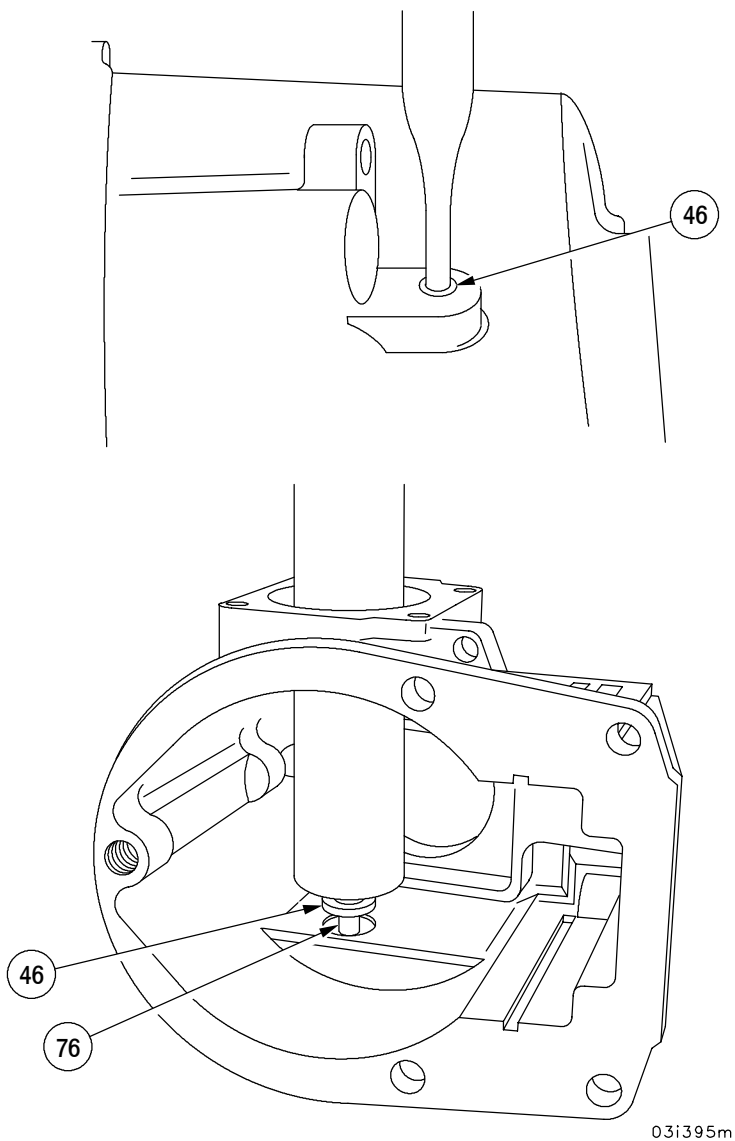
**Repair**

1. Smooth small nicks or raised metal on mating surfaces: governor cover (8), governor end cap (13), and governor housing mounting surfaces (56), (57), (58), and (59) using a fine mill file.



**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND  
ASSOCIATED PARTS REPAIR - CONTINUED****0022 00****Repair - Continued**

2. Place housing on arbor press. Using a drive pin punch, remove pivot pin (46).
3. Turn housing over on arbor press. Position a new pivot pin (46) over pin bore with long shaft (76) down. Press pin until shoulder bottoms on housing.
4. No repairs authorized for the remaining parts.



# GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED

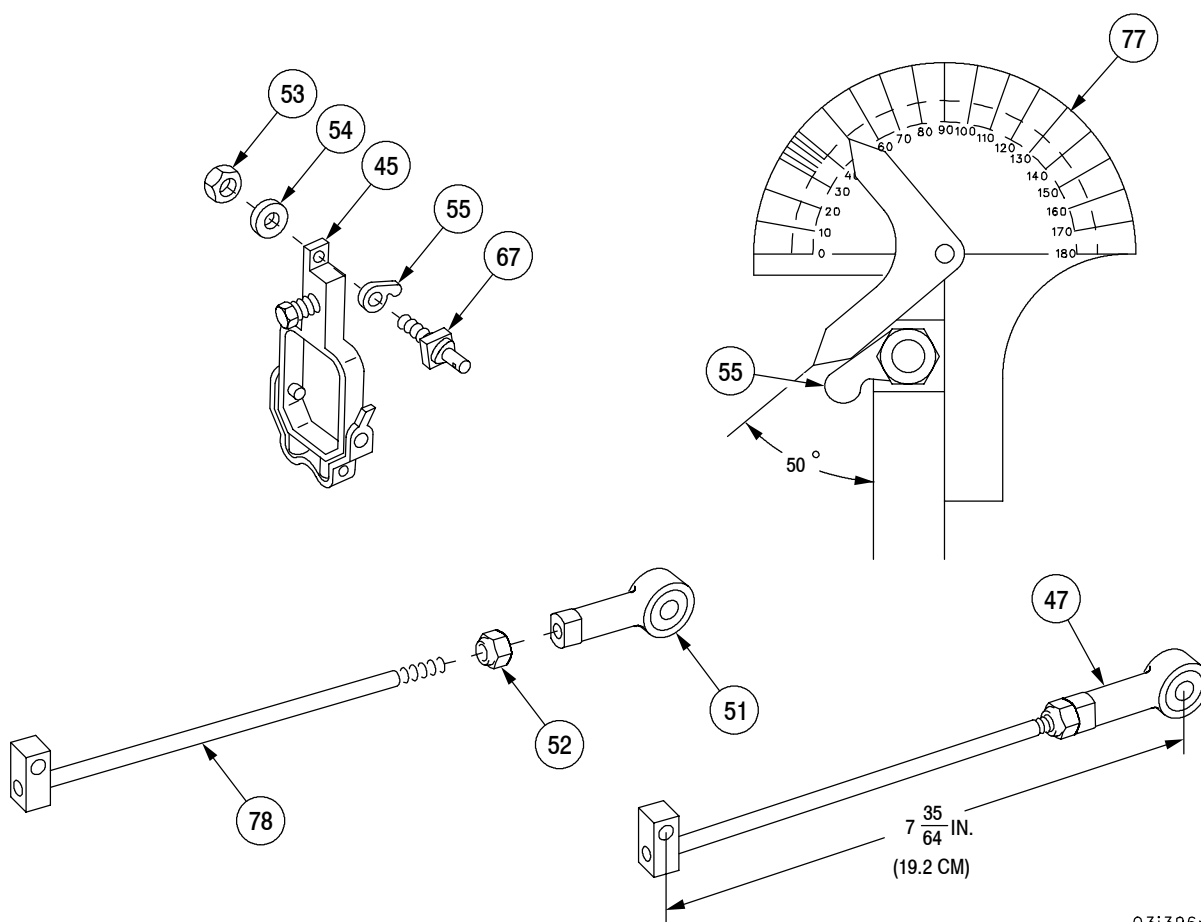
0022 00

## Assembly

### NOTE

Coat all metal parts with a light film of engine oil.

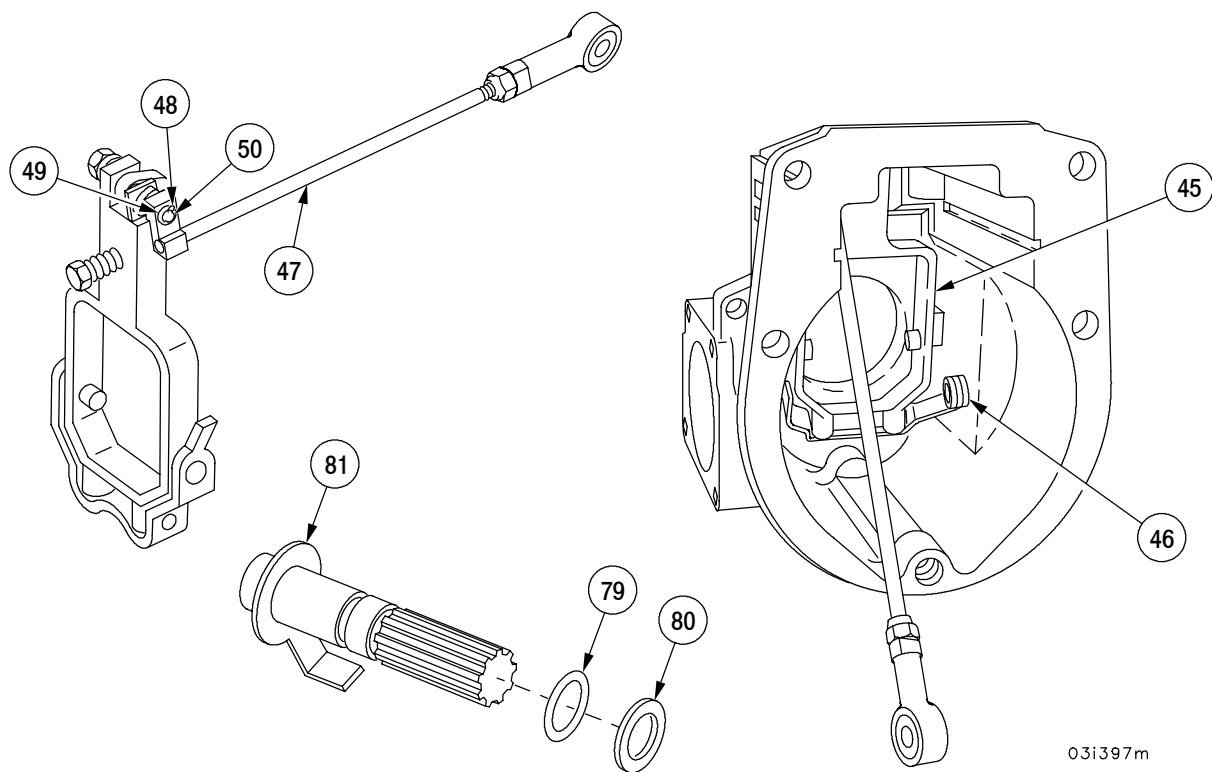
1. Install cam (new) (55) on to fulcrum lever screw (67). Install loosely to fulcrum lever (45) using new lockwasher (54) and nut (53).
2. Using protractor (77), position cam (55) 50 degrees from vertical. Using torque wrench and 7/16 in. socket, tighten nut to 50 to 60 lb-in. (6 to 7 N•m).
3. Using 3/8 in. open-end wrench, install nut (52) on rod (78). Install bearing (51) on rod (78). Adjust length of rod assembly (47) to 7 35/64 in. (19.2 cm). Hold bearing flats with 5/16 in. open-end wrench, and tighten nut.



03i396m

**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND  
ASSOCIATED PARTS REPAIR - CONTINUED****0022 00****Assembly - Continued**

4. Install rod assembly (47) onto fulcrum screw (50). Secure with new flat washer (49) and new cotter pin (48). Bend legs of cotter pin around screw.
5. Place governor housing in vise. Install fulcrum lever and rod assembly (45) in housing. Be certain arm of lever is installed on pivot pin (46).
6. Install new gasket (79) and new preformed packing (80) on new operating shaft assembly (81).

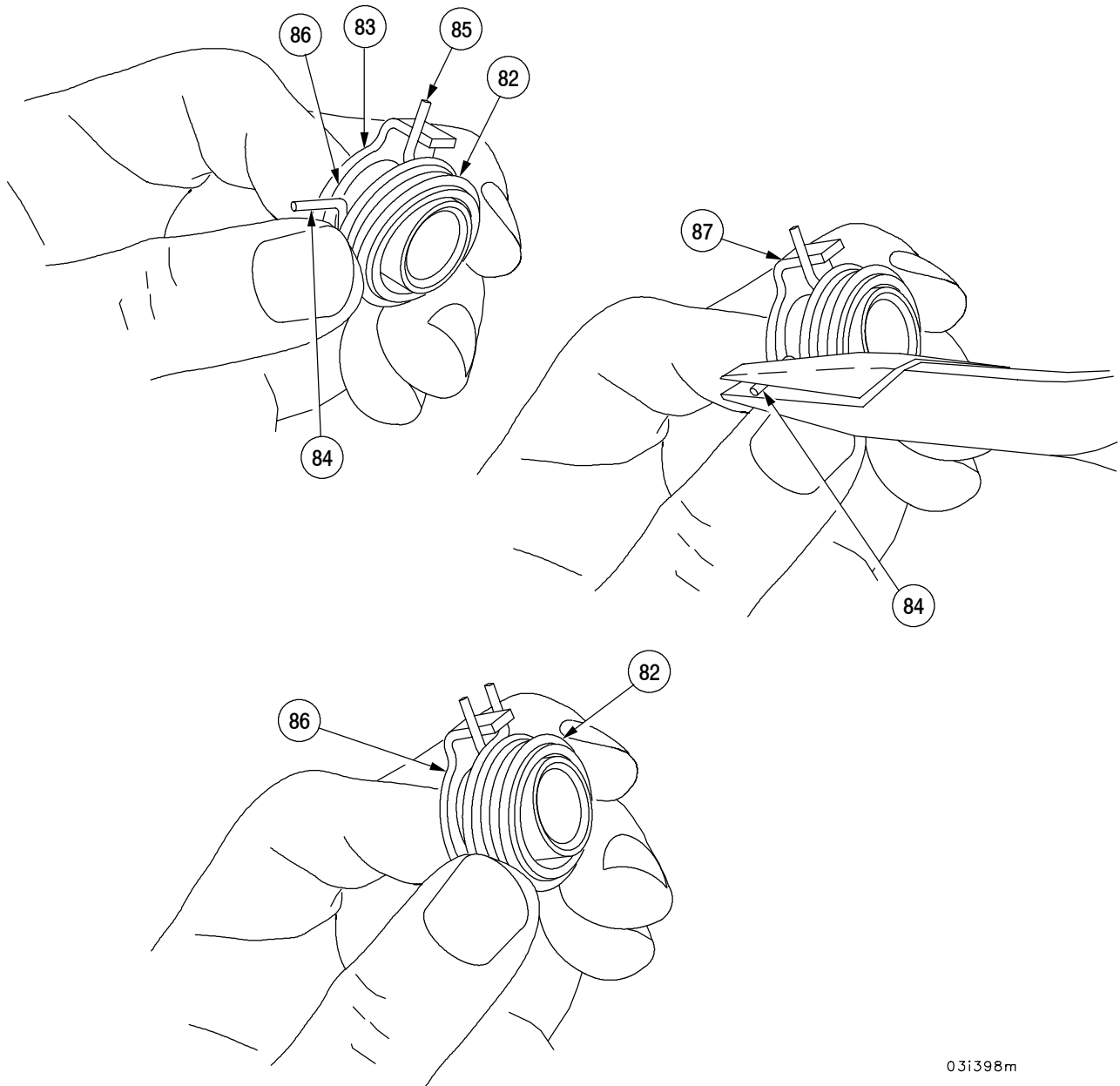


03i397m



**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND  
ASSOCIATED PARTS REPAIR - CONTINUED****0022 00****Assembly - Continued**

7. Install new spring (82) on new spring plate (83) with spring ends (84) and (85) facing spring plate flange (86). Position right hand spring end (84) on left side of tang.
8. Using flat wide nose pliers, twist left hand spring end (84) to right side of tang (87).
9. Push spring (82) against spring plate flange (86).



03i398m

**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED****0022 00****Assembly - Continued**

10. Install spring plate assembly (83) on operating shaft (81) making sure tangs (87) and (88) align. Push shaft (81) until tang (88) covers tang (87).

**NOTE**

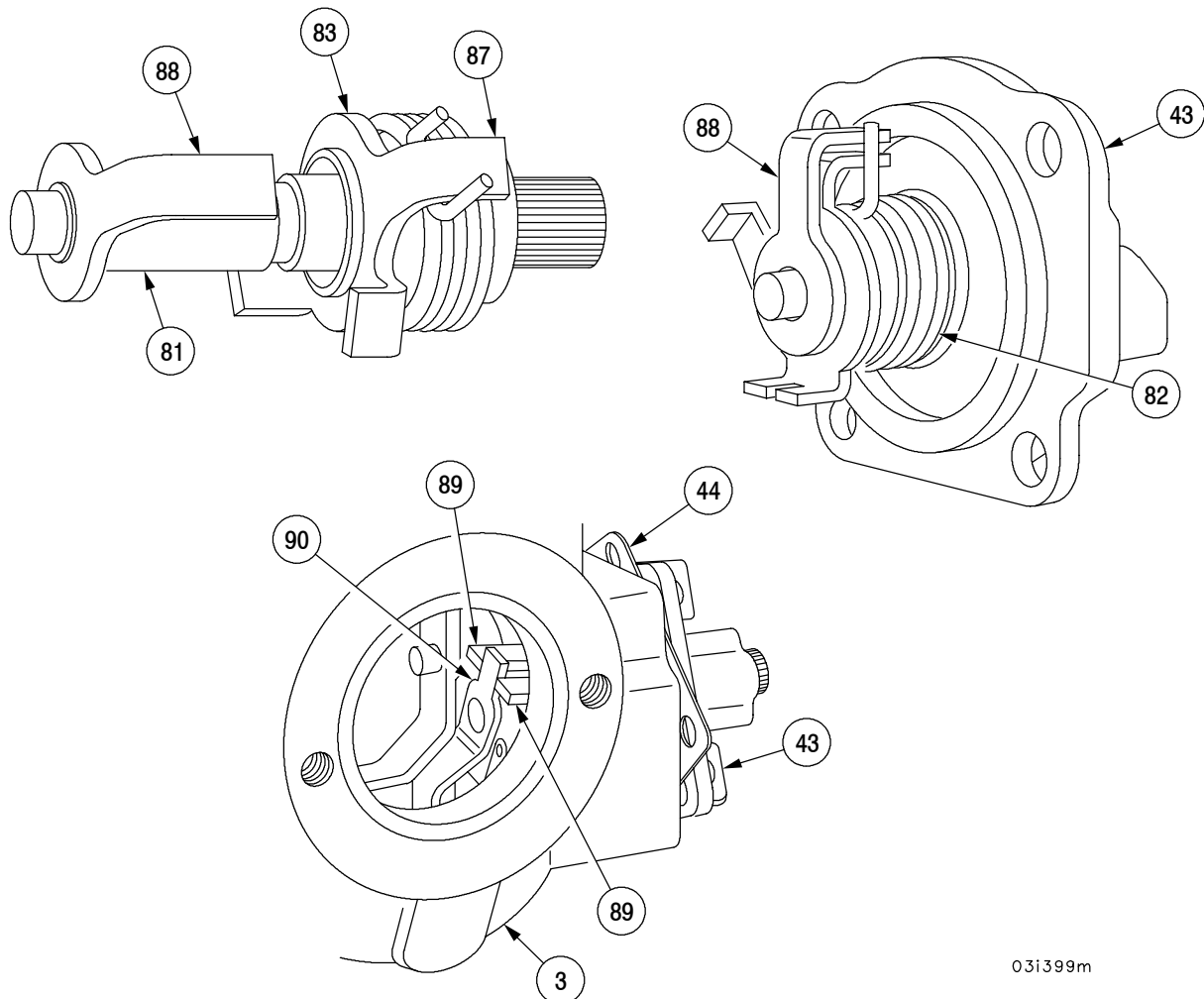
Spring ends must hold tangs securely.

11. Install assembled shaft, spring plate (83) and spring (82) on new bearing plate (43).

**NOTE**

Check 4-point spring to plate contact. If over 0.003 in. (0.08 mm) free play, bend spring fingers as required to reduce free play.

12. Coat both sides of new gasket (44) sparingly with sealant. Install gasket on bearing plate (43). Install bearing plate assembly on governor housing (3) with spring plate prongs (89) engaged with fulcrum lever arm (90).



031399m

# GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED

0022 00

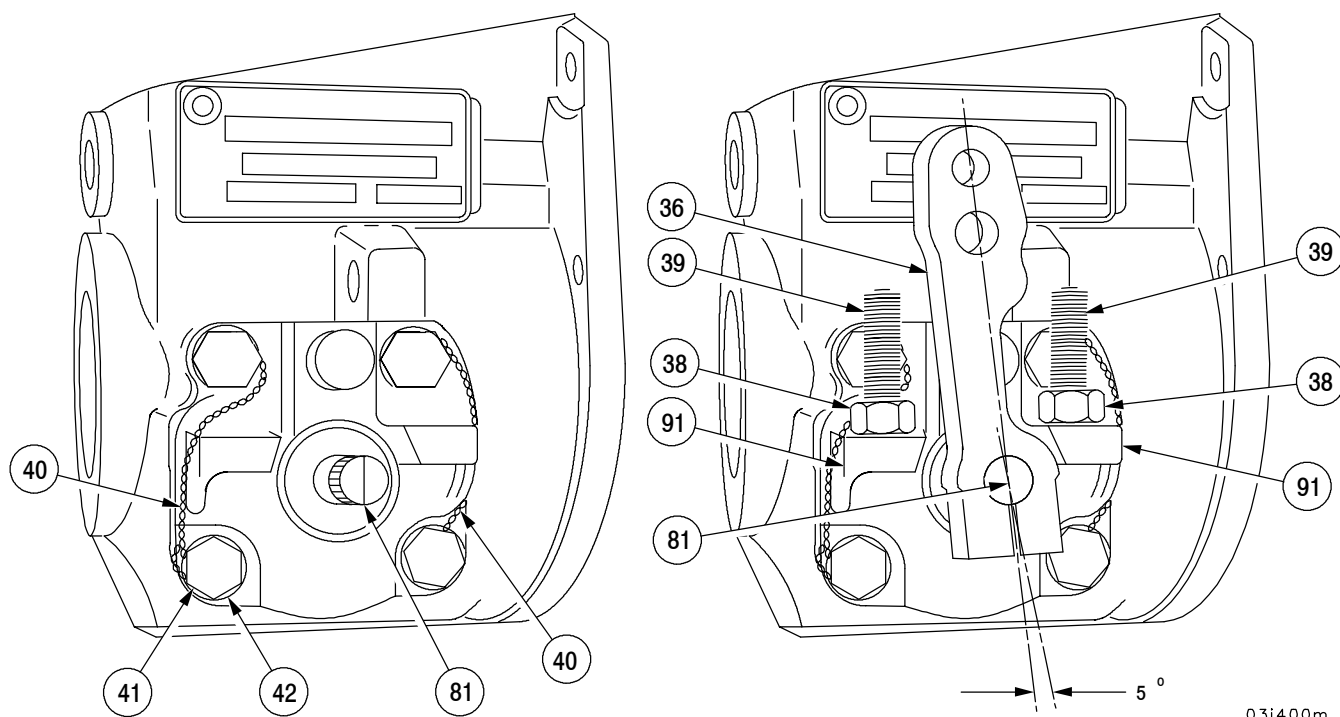
## Assembly - Continued

13. Align bearing plate mounting holes. Apply sealant sparingly to threads of four new capscrews (41). Install four new lockwashers (42) and capscrews (41).
14. Using torque wrench and 7/16 in. socket, tighten capscrews to 50 to 60 lb-in. (6 to 7 N•m). Secure capscrews with twisted wire (40).
15. Place two new adjusting nuts (38) on lugs (91) and align with holes in lugs. Hold nuts with 7/16 in. open-end wrench. Using screwdriver, install two new adjusting screws (39) until bottom of screws are flush with bottom of lugs (91).

### NOTE

Final adjustments on the adjusting screws will be made in WP 0015 00 and WP 0013 00.

16. Position operating lever (36) on shaft (81) with slot in lever (36) one spline tooth (5 degrees) to the right of alignment mark on shaft (81).



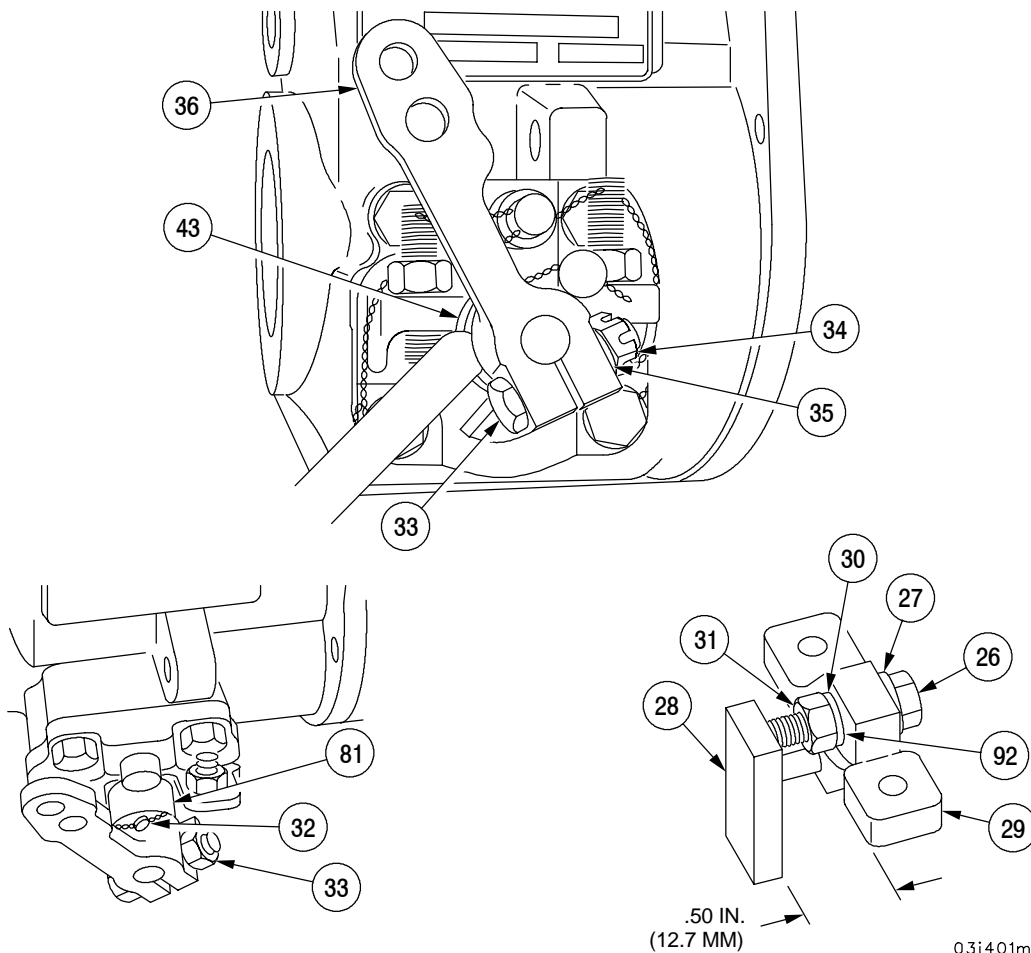
03i400m

# GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED

0022 00

## Assembly - Continued

17. Push lever (36) on shaft and maintain 0.004 in. (0.10 mm) clearance between lever (36) and bearing plate (43) using a feeler gauge. Install screw (33), new lockwasher (35), and nut (34) using two 7/16 in. open-end wrenches, to snug the operating lever on the shaft.
18. Using 7/16 in. open-end wrench, 7/16 in. socket and torque wrench, torque tighten nut (34) to 70 to 75 lb-in. (8 to 8.5 (N•m)). Check operating lever for binding. If lever is binding, recheck clearance, step 17 above.
19. Install new seal (32) through nut and screw (33) and around lever shaft (81). Crimp seal using pliers.
20. Install nut (31) on stop plate (28) and turn until it is about 1/2 in. (12.7 mm) from stop plate. Install lockwasher (30) against nut.
21. Install bridge (29) on stop plate (28) with counterbore (92) toward stop plate, and secure finger-tight with lock-washer (27) and nut (26).



**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED**

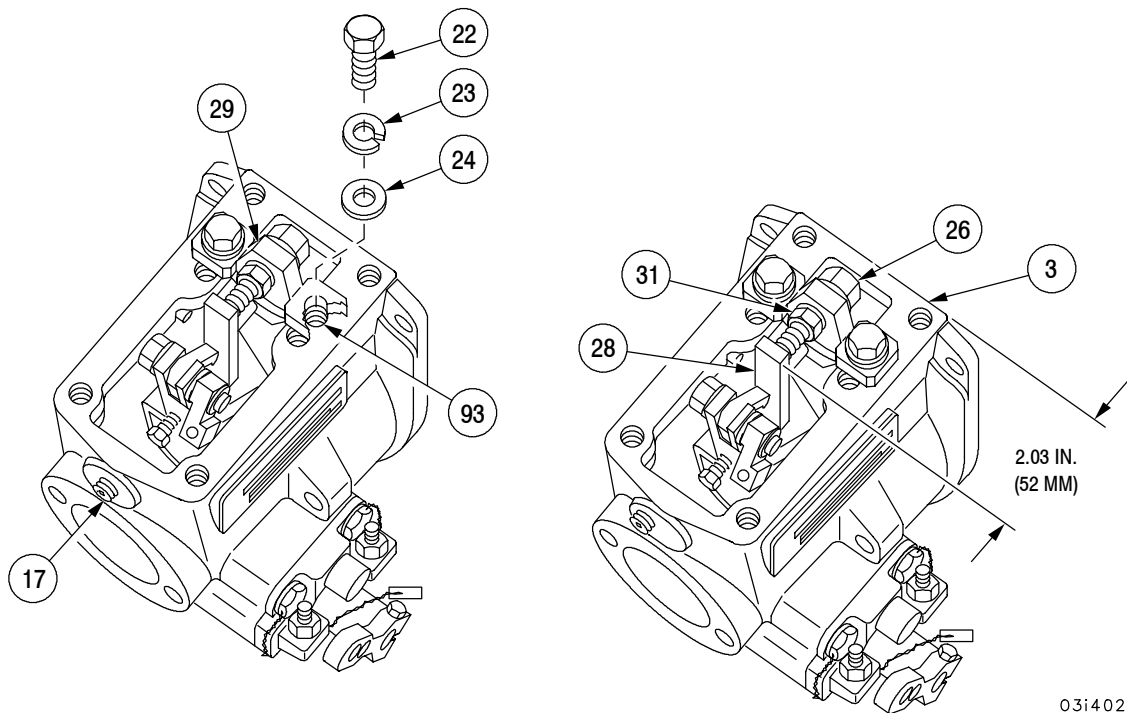
**0022 00**

**Assembly - Continued**

22. Position stop plate bridge (29) over tapped holes (93).
23. Install two flat washers (24), lockwashers (23), and screws (22), and torque screws to 50 to 60 lb-in. (6 to 7 N•m) using 7/16 in. socket and torque wrench.
24. Using 1/4 in. socket head screw key, install pipe plug (17) in governor housing.
25. Loosen nuts (26) and (31). Position stop plate (28) 2.03 in. (52 mm) from governor housing mounting flange (3). Tighten nuts finger-tight.

**NOTE**

Final stop plate adjustment will be made in WP 0013 00.



**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED**

**0022 00**

**Assembly - Continued**

- 26. Apply lubricant sparingly to sliding sleeve at pin grooves (94) and bore (95).
- 27. Install sliding sleeve (21) and engage fulcrum lever pins. Install oil baffle (20).

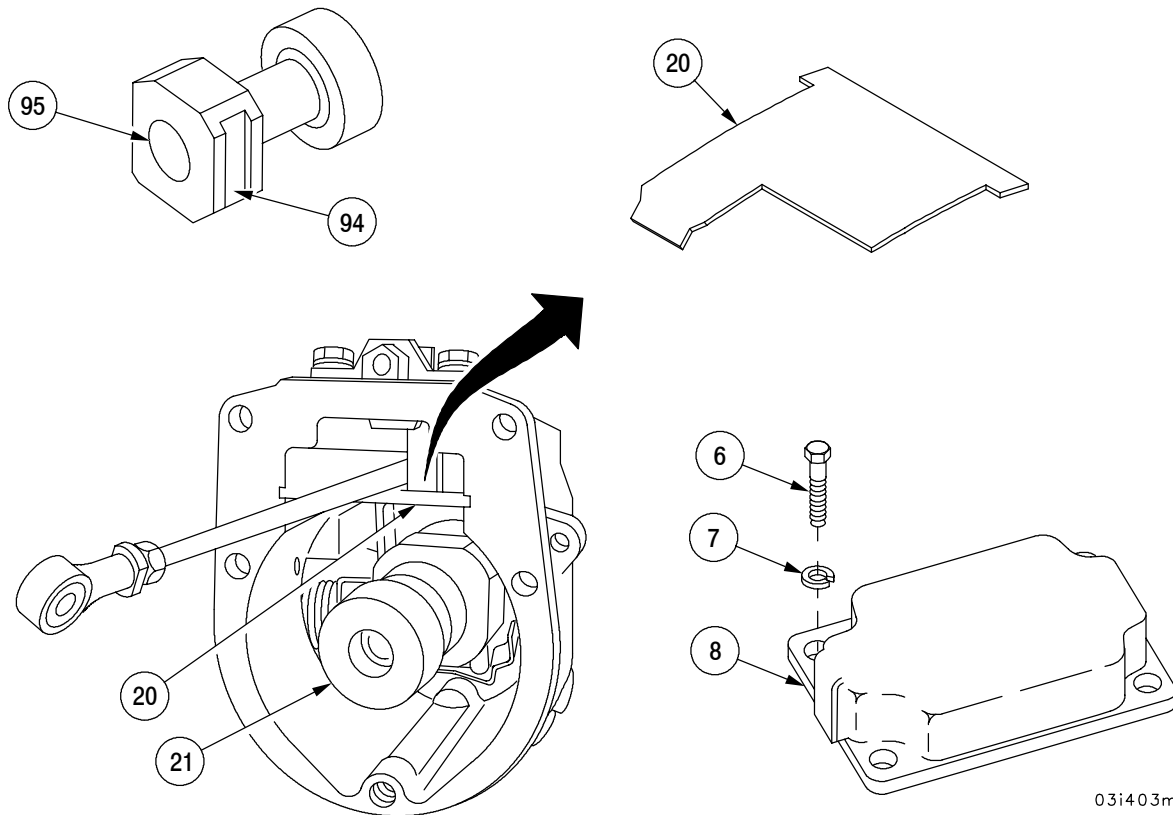
**NOTE**

Make sure rod is above baffle plate during assembly.

- 28. Set aside: cover (8), cap screws (6) and lockwashers (7) for later assembly.

**NOTE**

Governor springs, shims, and cap will be installed during lever assembly and yoke assembly repair, WP 0024 00.



03i403m

# GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED

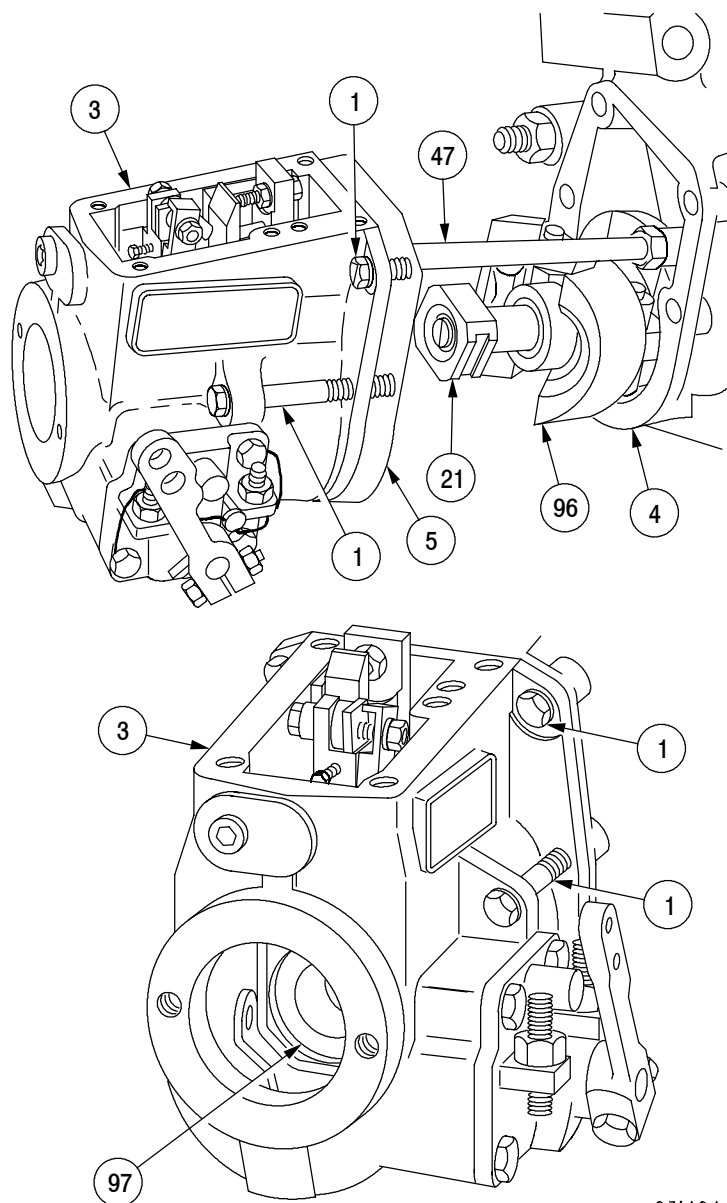
0022 00

## Installation

### NOTE

Coat all loose metal parts with light film of engine oil.

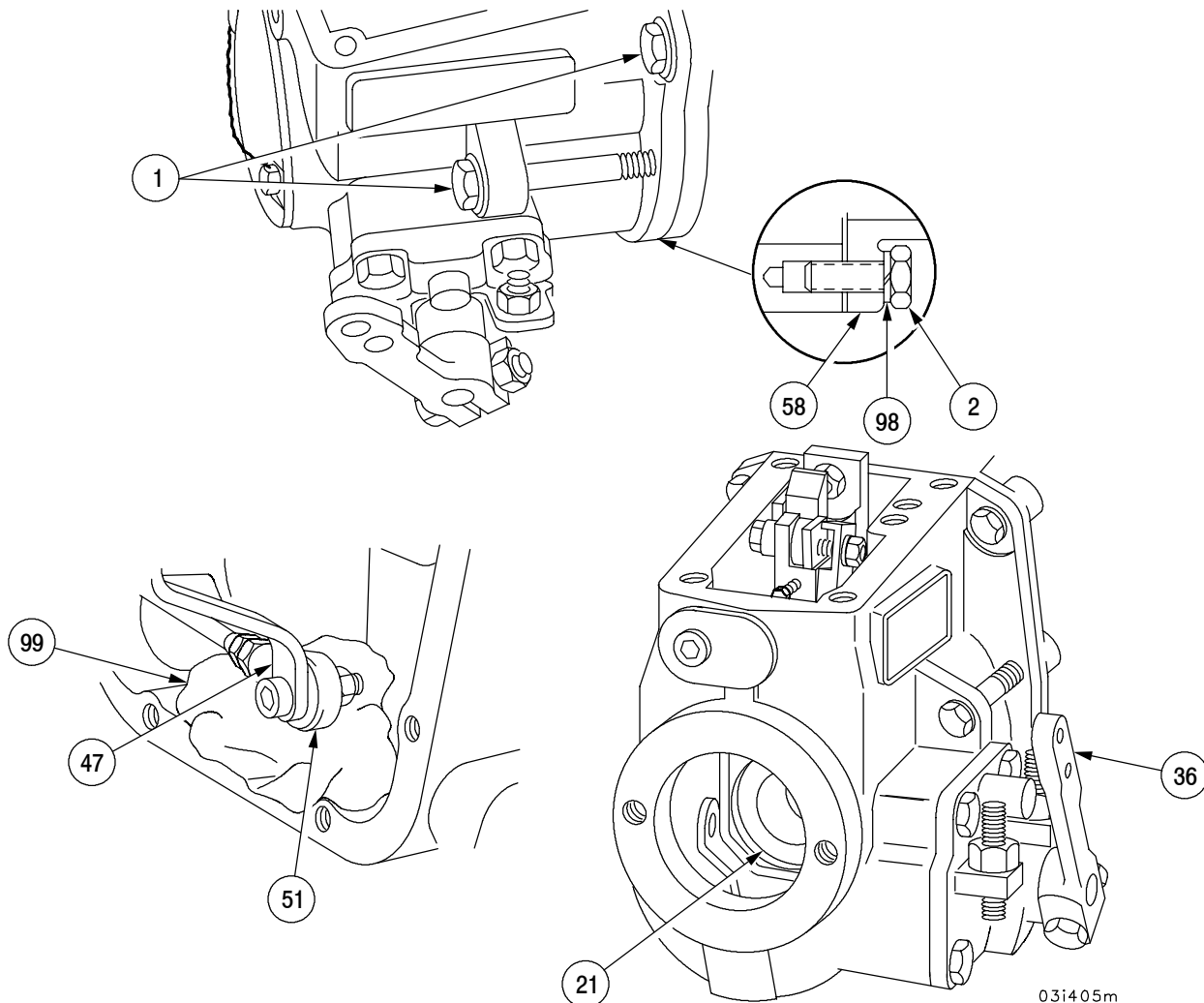
1. Insert two long screws and new lockwashers (1) and two short screws and new lockwashers (1) in governor housing (3).
2. Coat both sides of new gasket (5) sparingly with sealant. Install gasket over the screws.
3. Turn camshaft (with sliding sleeve) (21) until governor weight (96) split line is vertical, and spread weights apart.
4. Insert governor control rod (47) through opening in pump housing (4).
5. Align screws (1) with mating holes. Push governor housing assembly (3) toward pump housing (4).
6. Tighten four screws (1) finger-tight. Look through top of governor housing to be certain weights (96) are seated on sleeve (97) and sleeve engages fulcrum lever pins.



03i404m

**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED****0022 00****Installation - Continued**

7. Using 7/16 in. socket, extension, and torque wrench, tighten four screws (1) to 50 to 60 lb-in. (6 to 7 N•m).
8. Install screw (2) and new lockwasher (98) through pump housing flange (58) to governor housing and tighten snug-tight using 7/16 in. open-end wrench.
9. Place a clean lint-free cloth (99) below inner fuel control lever (47) to prevent parts from dropping into pump oil sump.
10. Align control rod assembly bearing (51) with inner fuel control lever (47).
11. Connect inner control lever (47) (WP 0023 00).
12. Remove cloth (99).
13. Move operating lever (36) toward front of pump as far as possible.
14. Push sleeve (21) in as far as possible.

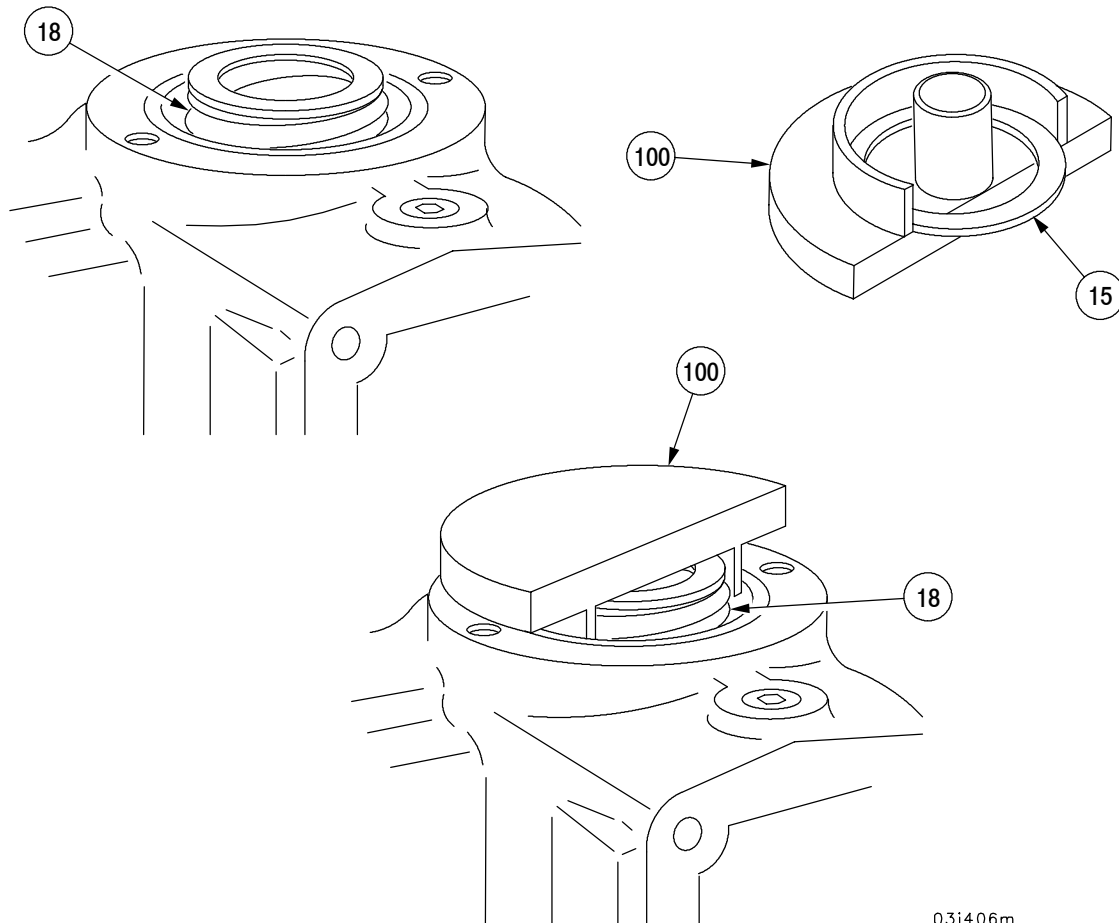




**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND  
ASSOCIATED PARTS REPAIR - CONTINUED****0022 00****Installation - Continued****NOTE**

Position pump and governor in a vertical position to install spring and shim packs. A vertical position assures a more accurate shim pack reading.

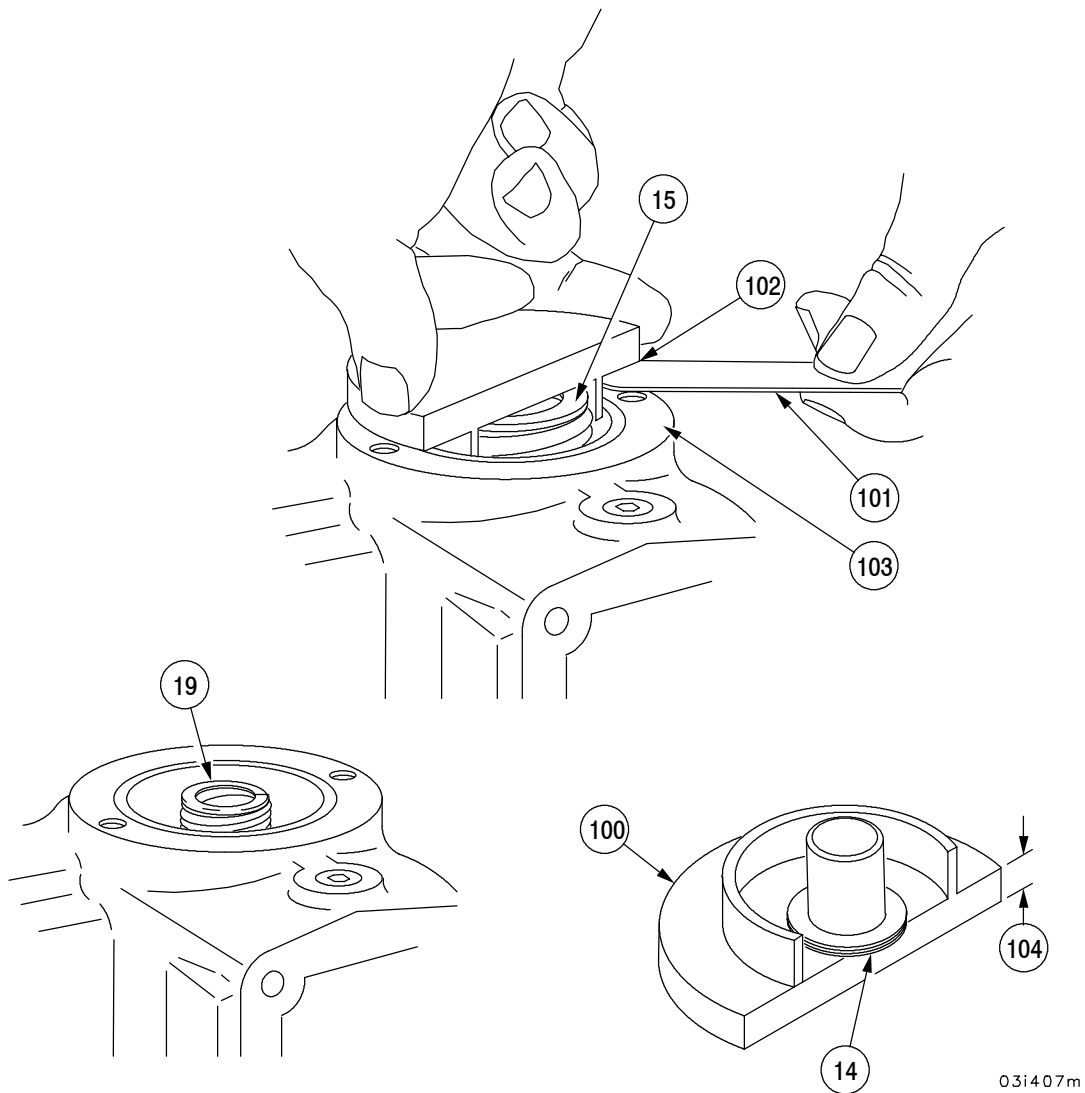
15. Place outer spring (18) on sleeve.
16. Select new outer shims (15) of the same thickness as those removed and discarded during disassembly.
17. Place outer shims (15) in spring gauge (99).
18. Place spring gauge (100) over outer spring (18).



03i406m

**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND  
ASSOCIATED PARTS REPAIR - CONTINUED****0022 00****Installation - Continued**

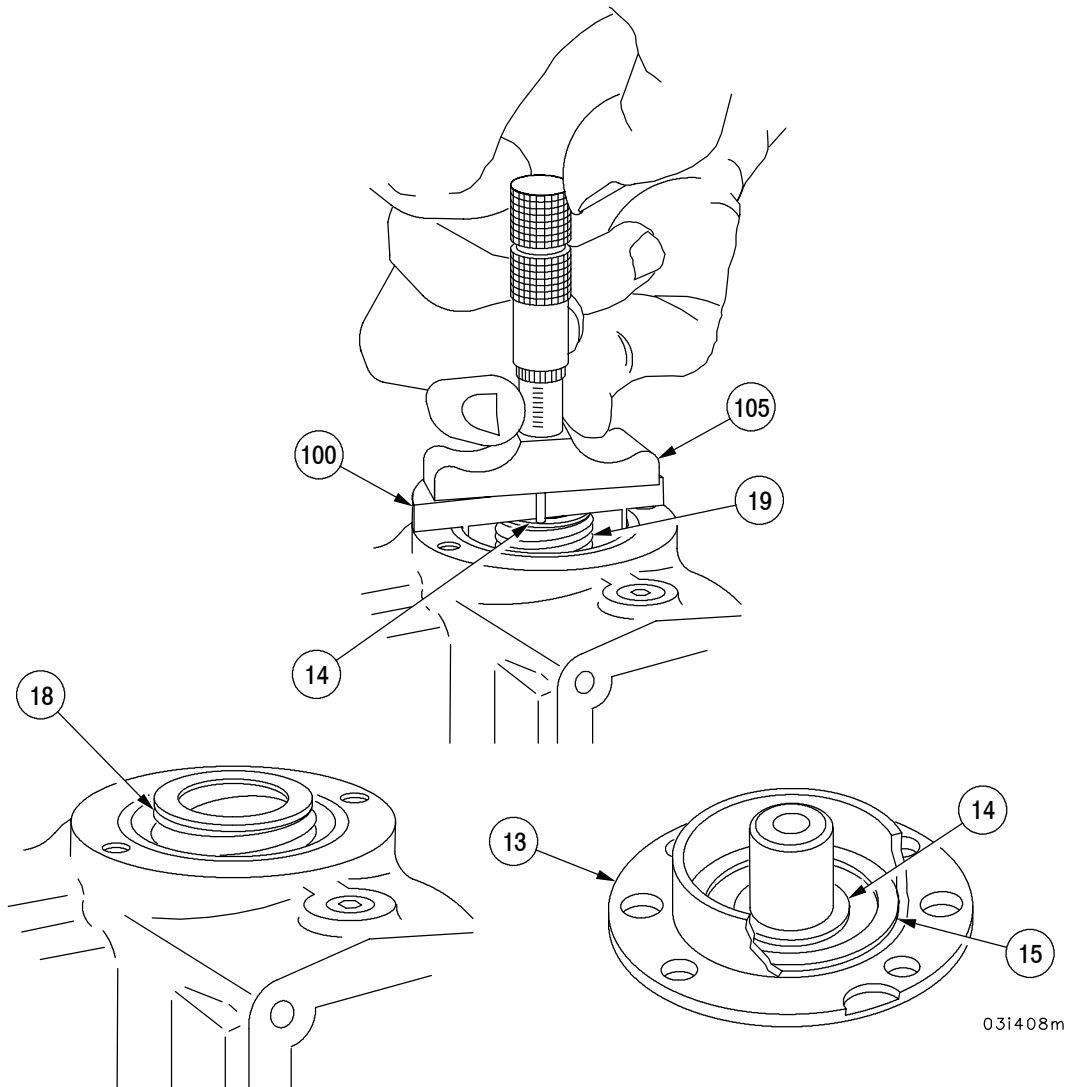
19. Using thickness gauge (101), measure distance between underside of gauge (102) and cap seating surface (103). Add or remove shims (15) to obtain 0.070 in. (1.77 mm) to 0.080 in. (2.00 mm) distance.
20. Place inner spring (19) on sleeve.
21. Select new inner shims (14), of the same thickness as those removed (and discarded during disassembly), and place in spring gauge (99).
22. Using micrometer, measure and record dimension (104).



03i407m

**GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED****0022 00****Installation - Continued**

23. Place spring gauge (100), with shims (14), on inner spring (19).
24. Using depth gauge (105), measure distance between underside of gauge (99) and shims (14).
25. Add or remove shims to obtain desired dimension, 0.110 in. to 0.130 in. (2.8 - 3.3 mm) plus dimension (104) from step 22.
26. Remove gauge (100) and install outer spring (18) in governor housing. Install inner shims (14) and outer shims (15) in governor cap (13).



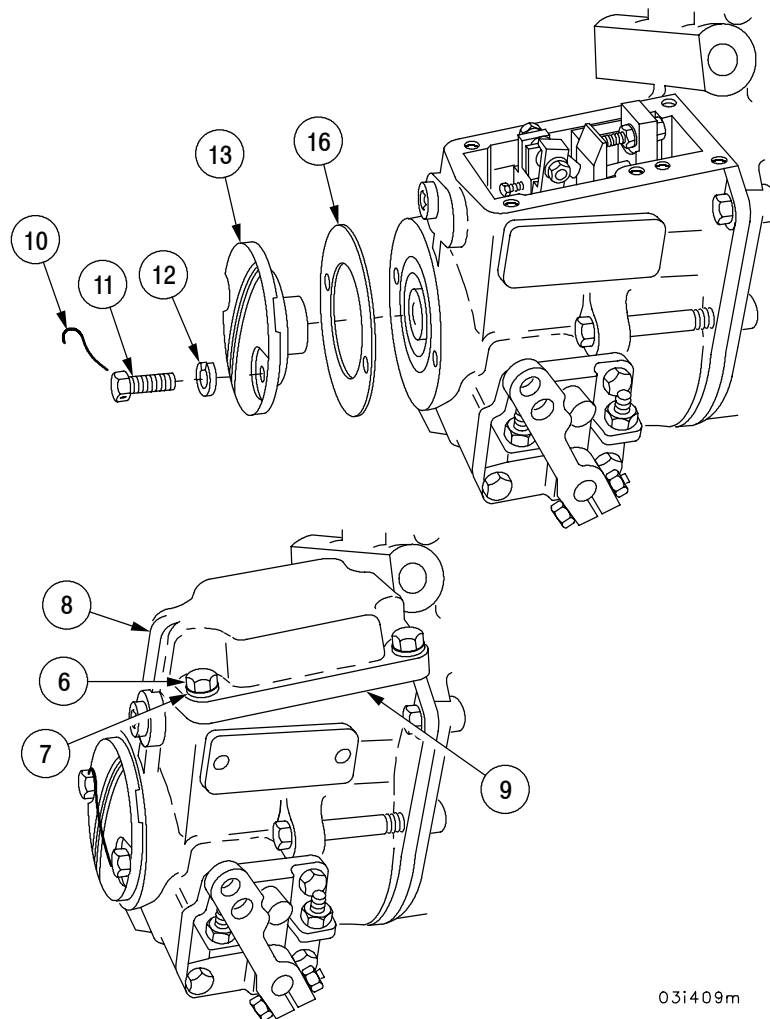
03i408m

## GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY AND ASSOCIATED PARTS REPAIR - CONTINUED

0022 00

### Installation - Continued

27. Coat one side of new cap gasket (16) with sealant.
28. Insert screws (11) with lockwashers (12) through cap. Place gasket (16) on screws with sealant toward cap (13).
29. Install cap (13) and gasket (16) on housing. Secure with two screws (11) and lockwashers (12). Torque screws to 50 to 60 lb-in. (6 to 7 N•m). Secure screws with twisted wire (10).
30. Install new gasket (9). Install governor cover (8), and secure with four machine bolts (6) and four new lockwashers (7). Tighten bolts finger-tight since they will be removed during testing.
31. Test pump (WP 0008 00).



### NOTE

#### FOLLOW-ON MAINTENANCE:

Reconnect governor rod assembly WP (0021 00)

**END OF WORK PACKAGE**

**LEVER ASSEMBLY AND YOKE ASSEMBLY REPAIR****0023 00****THIS WORK PACKAGE COVERS:**

Removal and Installation

**INITIAL SETUP:****Tools and Special Tools**

- General mechanic's tool kit (item 23, WP 0042 00)
- Automotive fuel and electrical system repair tool kit (item 56, WP 0042 00)
- Torque wrench (item 62, WP 0042 00)

**Materials/Parts**

- Wiping rags (item 4, WP 0041 00)
- Wire, non-electrical (item 10, WP 0041 00)
- Engine oil (item 3, WP 0041 00)
- Parts kit Part No. 5702765
- Preformed packing set, part No. 5702632

**Materials/Parts - Continued**

- Lubricant (item 1, WP 0041 00)
- Dry-cleaning solvent (item 7, WP 0041 00)
- Parts kit KT885
- Parts kit 5705051

**Equipment Conditions**

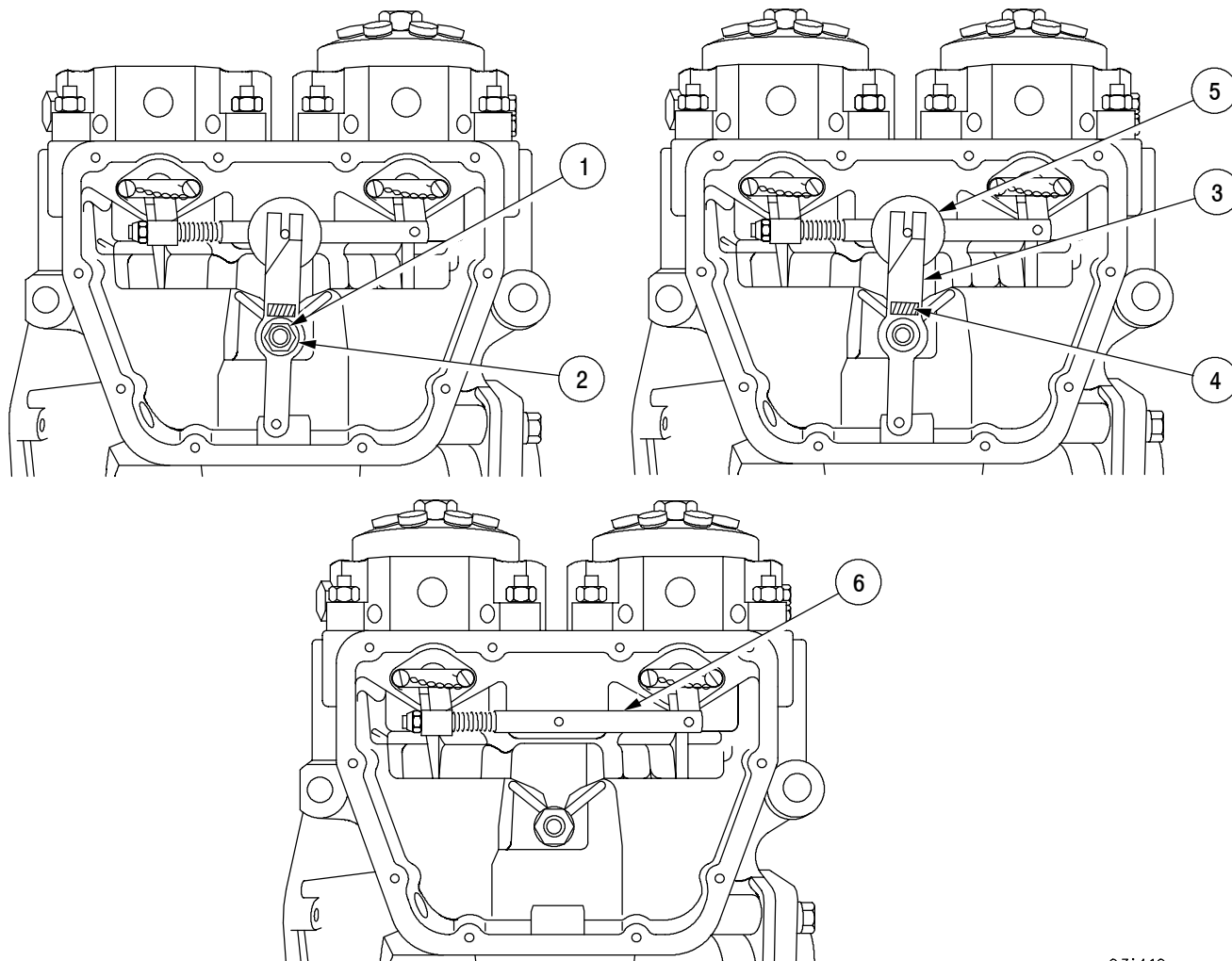
- Governor cover assembly removed (WP 0021 00)

**References**

- WP 0021 00

**Removal**

1. Using 7/16 in. wrench, remove nut (1) and flat washer (2). Discard nut and flat washer.
2. Remove lever assembly with spacer (3) including spring and seats (4). Discard levers, spacer, spring and seats. Remove and discard yoke spacer (5).
3. Remove and discard yoke assembly (6).

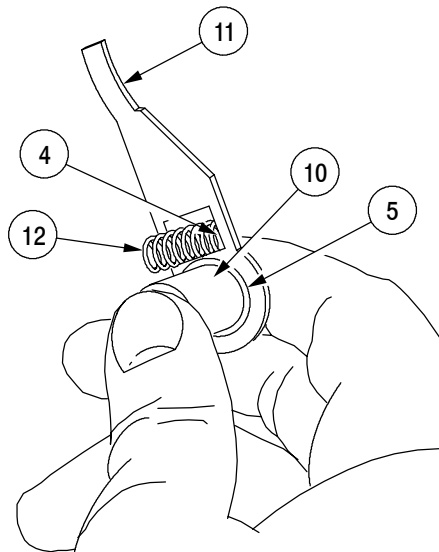
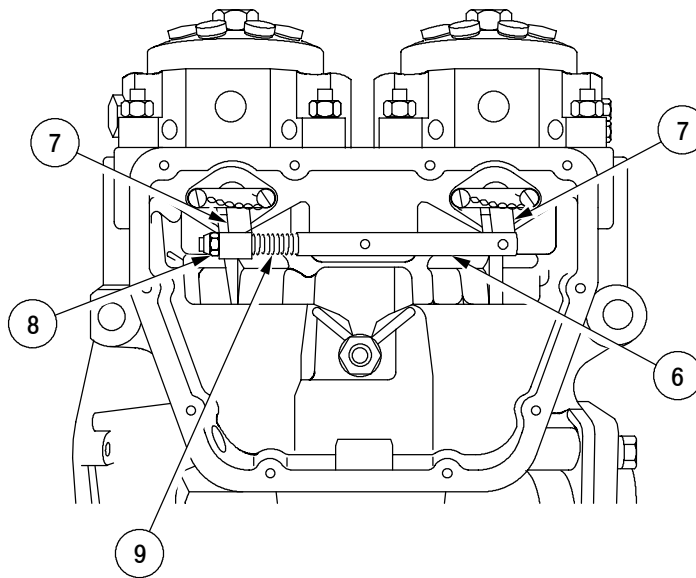


03i410m

**LEVER ASSEMBLY AND YOKE ASSEMBLY REPAIR - CONTINUED****0023 00****Installation****NOTE**

Coat all loose metal parts with light film of engine oil.

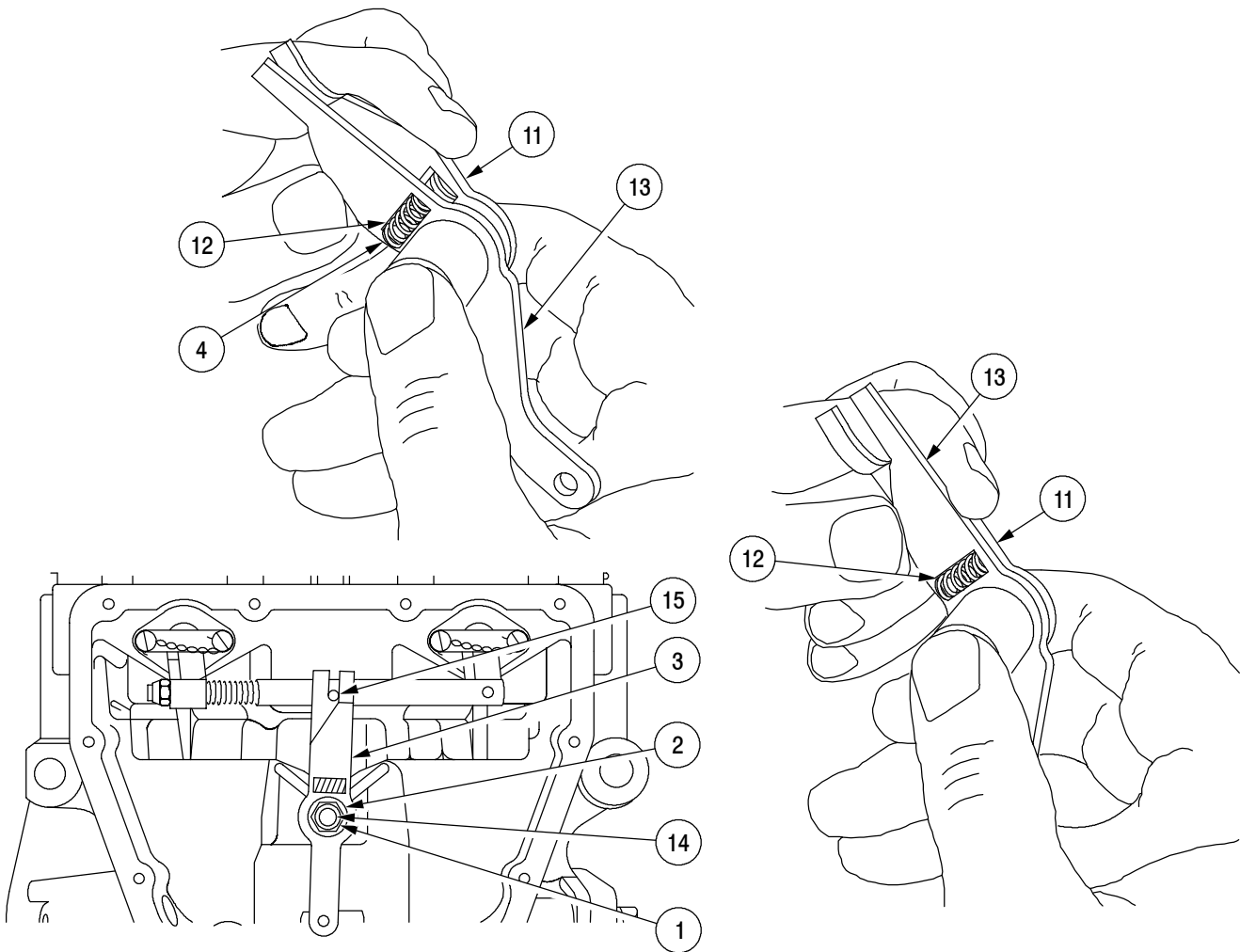
1. Install new yoke assembly (6) by inserting pins in fuel control levers (7), with adjusting nut (8) and spring (9) toward front of pump.
2. Apply lubricant to new lever pivot shaft (10).
3. Hold outer lever (11) with upper extension as shown. Place new spring (12) and new seat (4) in recess. Install new spacer (5).



03i411m

**LEVER ASSEMBLY AND YOKE ASSEMBLY REPAIR - CONTINUED****0023 00****Installation - Continued**

4. Place new inner lever (13) over spring (12), new seat (4) and outer lever (11).
5. Press outer lever (11) against inner lever (13) while turning outer lever counterclockwise to force spring (12) into recess of outer lever. Push levers together.
6. Install assembled levers (3) on fuel control lever screw (14), with yoke pin (15) between two lever extensions.
7. Secure levers with new flat washer (2) and nut (1). Using 7/16 in. socket and torque wrench, tighten nut to 50 to 60 lb-in. (6 to 7 N•m).



031245m

**LEVER ASSEMBLY AND YOKE ASSEMBLY REPAIR - CONTINUED**

**0023 00**

**Installation - Continued**

8. Move fuel control levers (7) away from pump while holding yoke (6) toward pump. Measure distance between inner lever (13) and yoke at yoke pin (15) using a feeler gauge (16).
9. Clearance must be 0.006 in. (0.15 mm) to 0.025 in. (0.64 mm). If clearance is within limits, task is complete. If clearance is not within limits, proceed with step 10 below.

**NOTE**

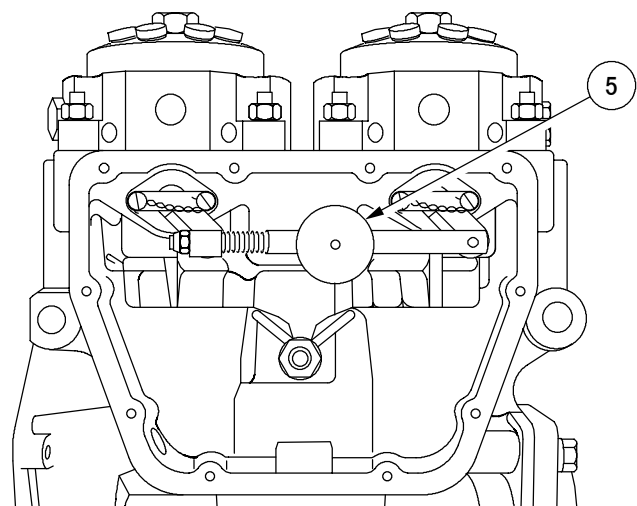
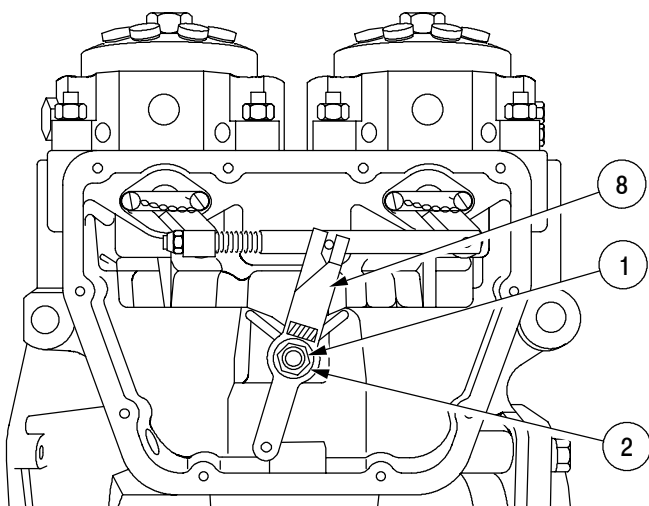
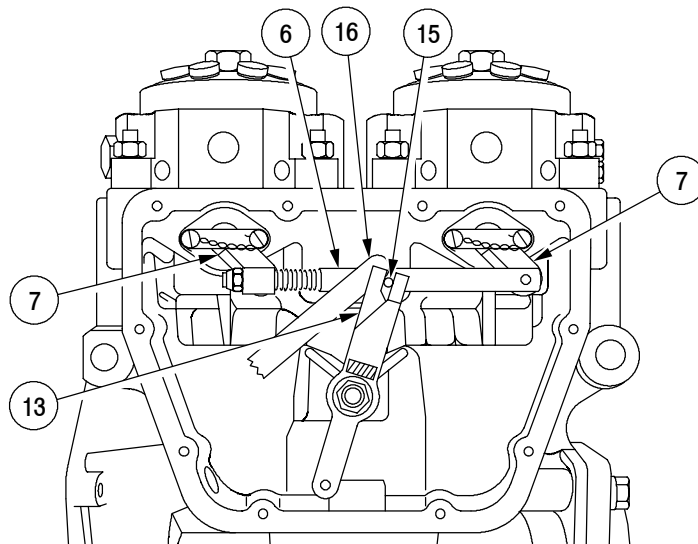
Spacers are available in 0.015 in. (0.38 mm) and 0.030 in. (0.76 mm) thicknesses.

10. If clearance is greater than 0.025 in. (0.64 mm), remove nut (1), washer (2), and lever assembly (8).

**NOTE**

Apply lubricant to both sides of spacer(s).

11. Install required new spacer (5) to bring clearance within limits.
12. Repeat steps 6 and 7.



03i412m

**NOTE**

**FOLLOW-ON MAINTENANCE:**

Install governor cover assembly (WP 0021 00)

**END OF WORK PACKAGE**



**FUEL CONTROL ASSEMBLIES AND ASSOCIATED PARTS REPAIR****0024 00****THIS WORK PACKAGE COVERS:**

Removal, Disassembly, Cleaning, Inspection, Assembly and Installation

**INITIAL SETUP:****Tools and Special Tools**

General Mechanic's tool kit (item 23, WP 0042 00)  
 Automotive fuel and electrical system repair tool kit  
 (item 56, WP 0042 00)  
 Machinist's vise with vise jaw caps (item 58,  
 WP 0042 00)  
 Torque wrench (item 62, WP 0042 00)  
 Telescope gauge (item 20, WP 0042 00)  
 Magnifying glass (item 24, WP 0042 00)  
 Micrometer, 1-in. OD (item 29, WP 0042 00)  
 Hole gauge (item 17, WP 0042 00)

**Materials/Parts**

Wiping rags (item 4, WP 0041 00)  
 Wire, nonelectrical (item 10, WP 0041 00)  
 Engine oil (item 3, WP 0041 00)

**Materials/Parts - Continued**

Dry-cleaning solvent (item 7, WP 0041 00)  
 Tape (item 9, WP 0041 00)  
 Parts kit, part No. 5705050 or  
 Preformed packing set, No. 5702632  
 Key washer and spacer from parts kit No. 5702765  
 Parts kit 5705050  
 Parts kit 5705051

**Equipment Conditions**

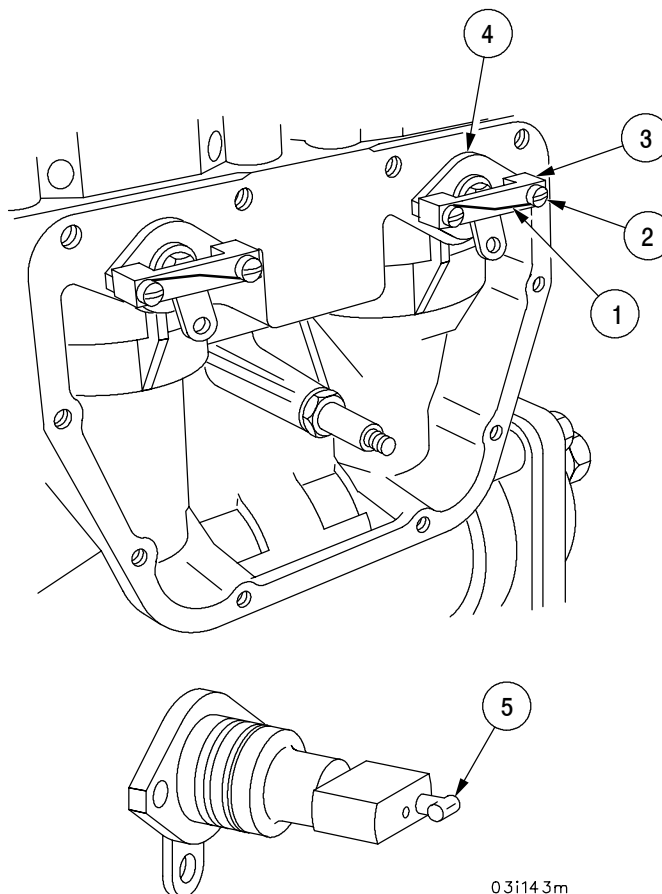
Lever and yoke assemblies removed (WP 0023 00)

**References**

WP 0023 00

**Removal**

- Using diagonal cutting pliers, cut and remove wire (1).
- Using screwdriver, remove two screws with lockwashers (2) and retainer (3).
- Remove control unit assembly (4). Tape shoulder pin (5) to control unit to prevent loss. Tag control unit assembly (4) with a number 1 or 2 for identification.
- Repeat steps 1 through 3 for the remaining retainer and control unit assembly.



03i143m

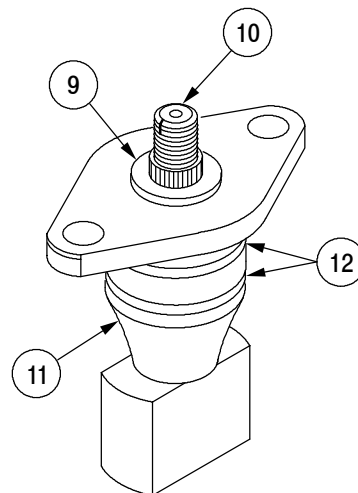
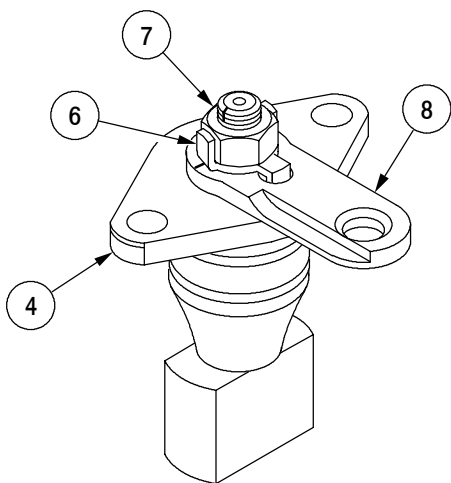
**FUEL CONTROL ASSEMBLIES AND ASSOCIATED PARTS REPAIR -  
CONTINUED****0024 00****Disassembly**

1. Place fuel control unit (4) in vise.
2. Using drive pin punch and hammer, straighten tabs of key washer (6).
3. Using 7/16 in. socket and ratchet handle, remove jam nut (7).
4. Remove and discard key washer (6).
5. Using screwdriver, carefully pry off control lever (8).
6. Remove control unit (4) from vise.
7. Remove and discard spacer (9).
8. Remove control shaft (10) from bushing (11).
9. Remove and discard two preformed packings (12).

**Cleaning****WARNING**

Cleaning solvent is flammable. Use only in well ventilated areas. Keep away from flame, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when using to prevent skin irritation.

1. Clean all parts in solvent.
2. Wipe dry with clean lint-free cloth.



03i184m

## FUEL CONTROL ASSEMBLIES AND ASSOCIATED PARTS REPAIR - CONTINUED

0024 00

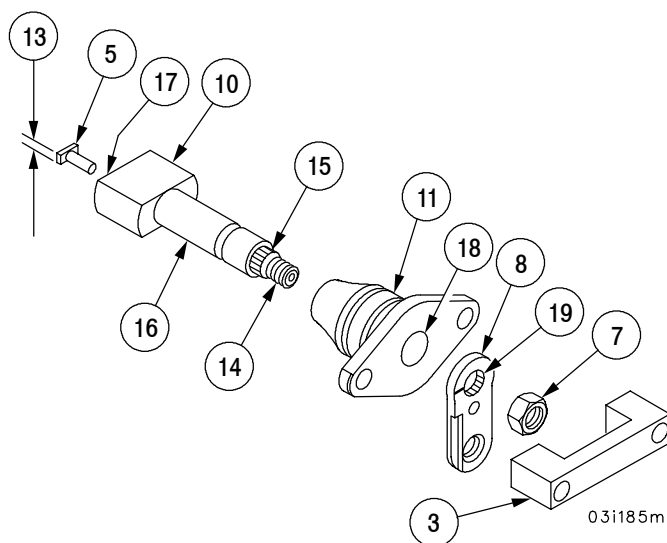
### Inspection

1. Inspect shoulder pin (5), control shaft (10), bushing (11), control lever (8), jam nut (7), and retainer (3) under magnifying glass and strong light for cracks, scoring, or raised metal. Replace pin if cracked or scored. Replace control unit assembly if other parts are cracked or scored.
2. Using micrometer, measure pin diameter (5). Replace pin if diameter is less than 0.1235 in. (3.14 mm). Using micrometer, measure thickness of pin flats (13). Replace pin if dimension is less than 0.0990 in. (2.51 mm).

### NOTE

Keep pin with control unit to prevent loss or damage.

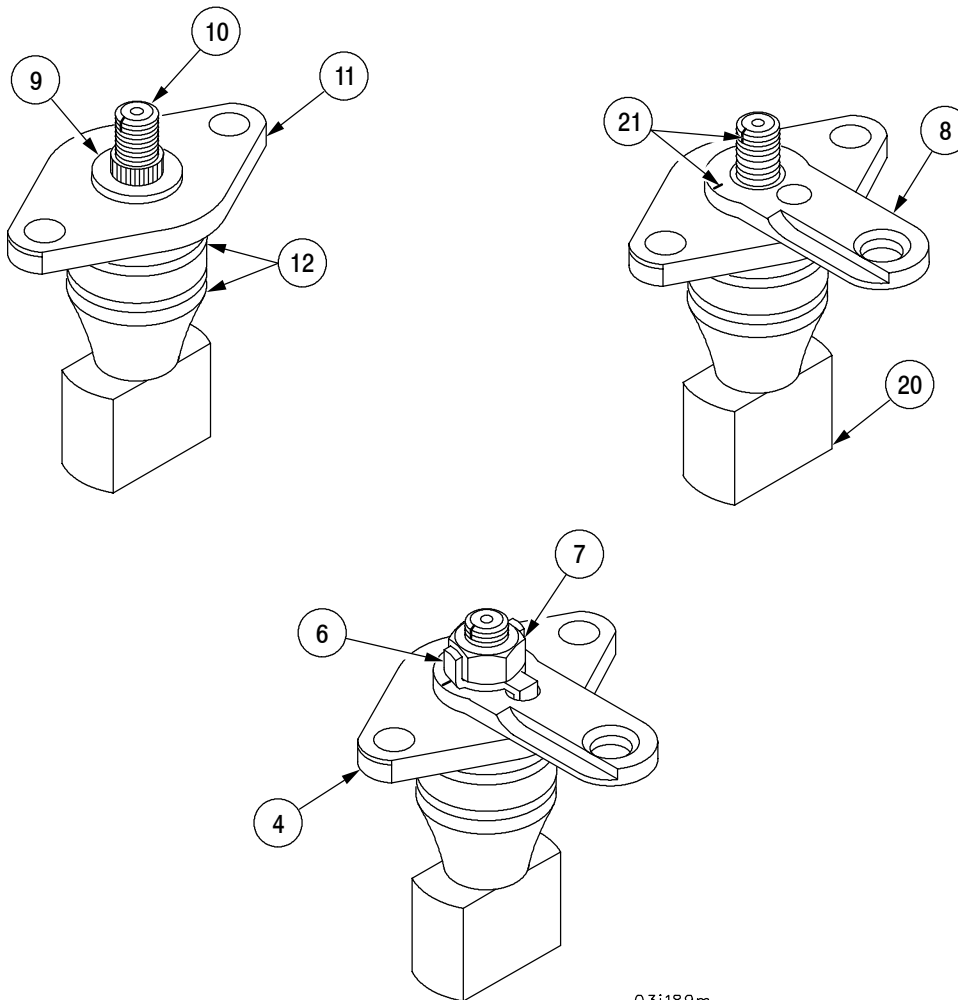
3. Inspect shaft threads (14) and spline (15) for galling. If shaft threads or spline are damaged, replace control unit assembly.
4. Inspect shaft (16) for cracks, scoring, or scratches using magnifying glass and strong light. Inspect for wear which will be indicated by ridges. If shaft is cracked, scored, scratched, or if ridges are found, replace control unit assembly.
5. Using hole gauge and micrometer, measure pin hole (17). If shaft hole diameter exceeds 0.1260 in. (3.20 mm), replace control unit assembly.
6. Using telescope gauge and micrometer, measure bushing shaft bore (18). If bushing bore diameter exceeds 0.323 in. (8.20 mm), replace control unit assembly.
7. Inspect spline (19) in control lever (8). If lever spline is damaged, replace control unit assembly.



**FUEL CONTROL ASSEMBLIES AND ASSOCIATED PARTS REPAIR -  
CONTINUED****0024 00****Assembly****NOTE**

Coat all metal parts with a light film of engine oil.

1. Install two new preformed packings (12) on bushing (11). Install control shaft (10) in bushing (11). Install new spacer (9) on shaft (10).
2. Position control lever (8) 90 degrees from centerline of flat area (20) on control shaft. Make sure alignment marks (21) on lever and shaft match. Press lever to shoulder on shaft.
3. Place partially assembled control unit (4) in vise.
4. Install new key washer (6) and jam nut (7). Using 7/16 in. socket and a torque wrench, torque nut to 60 to 65 lb-in. (6.8 to 7.3 N•m).
5. Using drive pin punch and hammer, bend tabs of key washer (6) against nut flats.

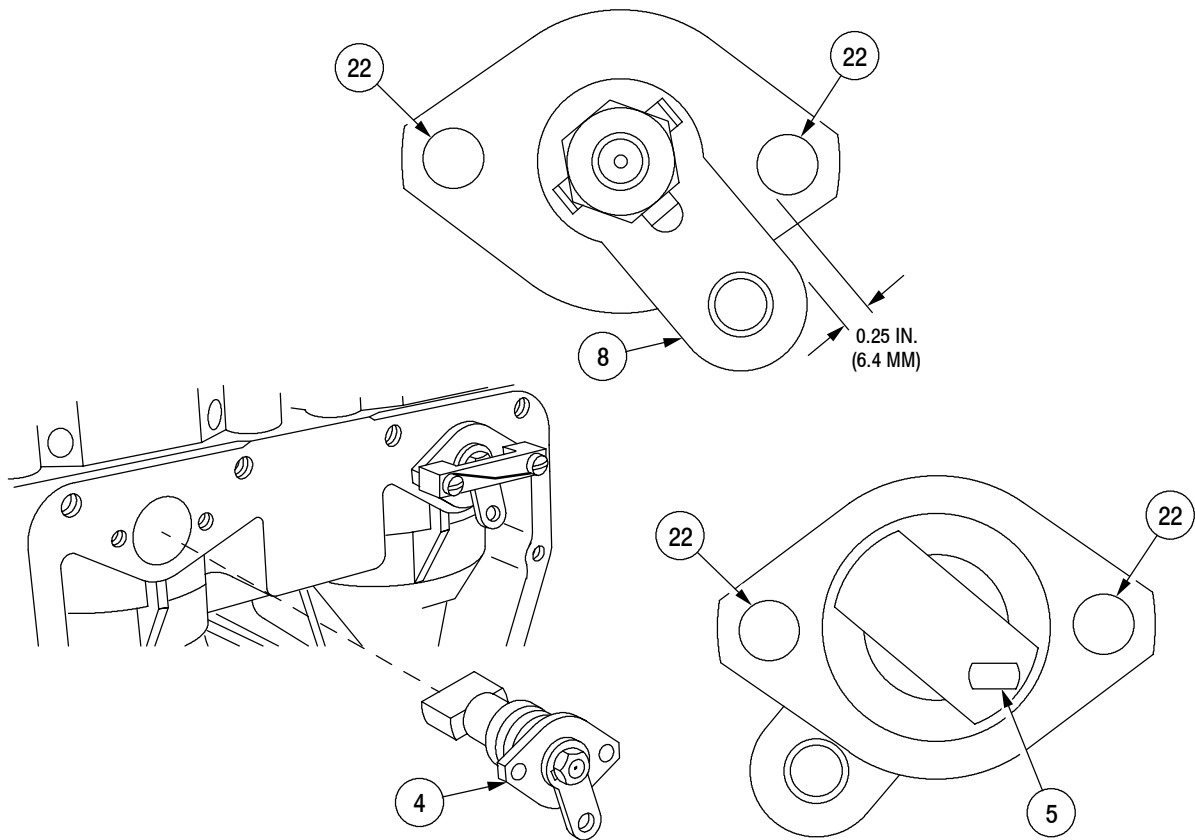


031189m

**FUEL CONTROL ASSEMBLIES AND ASSOCIATED PARTS REPAIR -  
CONTINUED****0024 00****Installation****NOTE**

Coat all loose metal parts with light film of engine oil.

1. Align control lever (8) in relation to unit securing holes (22) in bushing flange.
2. Position shoulder pin (5) so that flats are parallel with center line of mounting holes (22).
3. Install control unit assembly (4) in opening for head assembly No. 2 (right bank).



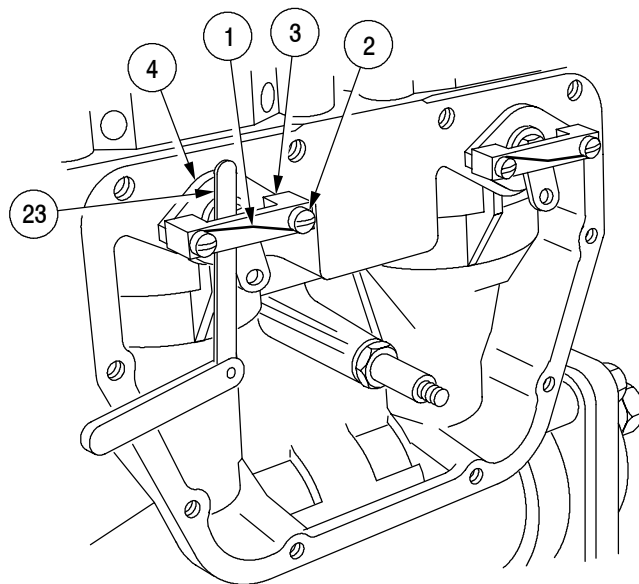
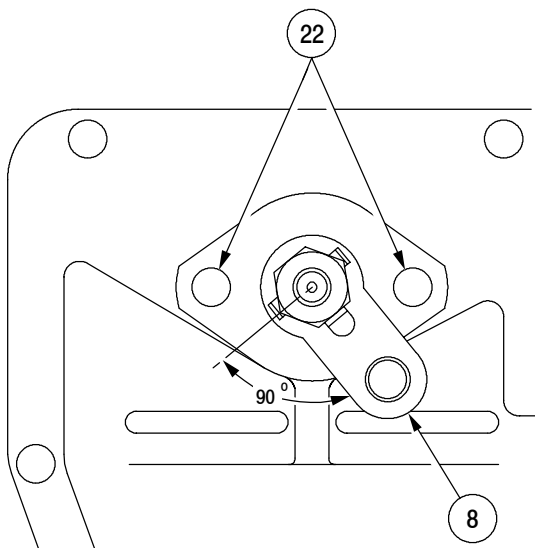
03i242m

## FUEL CONTROL ASSEMBLIES AND ASSOCIATED PARTS REPAIR - CONTINUED

0024 00

### Installation - Continued

4. To ensure that shoulder pin is seated in plunger sleeve slot, align holes (22) in bushing flange with mounting holes in housing and hold securely against housing. Rotate lever (8) 90 degrees and release. Lever should return to original position. If lever does not return to original position, remove unit, repeat steps 1 through 3, and repeat this procedure.
5. Install retainer (3) over control unit (4). Using screwdriver, secure retainer with two lockwashers and screws (2).
6. Using feeler gauge (23), check clearance between control shaft and retainer. Clearance between control shaft and retainer must be 0.006 to 0.017 in. (0.15 to 0.43 mm). If measurement is outside these limits, replace retainer and check measurement again.
7. Install fuel control unit for head assembly No. 1 (left bank) by repeating steps 1 through 6.
8. Secure screws (2) with twisted wire (1).



03i243m

### NOTE

#### FOLLOW-ON MAINTENANCE:

Install yoke and lever assemblies (WP 0023 00)

**END OF WORK PACKAGE**

**HEAD ASSEMBLY NO. 2 REPAIR****0025 00****THIS WORK PACKAGE COVERS:**

Removal, Disassembly, Cleaning, Inspection, Assembly and Installation

**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)  
 Automotive fuel and electrical system repair tool kit (item 56, WP 0042 00)  
 3/8 to 1/2 in. drive adapter (item 1, WP 0042 00)  
 Steel rod (fabricated tool) (item 4, WP 0042 00)  
 Socket, 1-1/16 in deep well (item 60, WP 0042 00)  
 Turning and holding wrench (item 64, WP 0042 00)  
 Spring tester (item 54, WP 0042 00)  
 Magnifying glass (item 24, WP 0042 00)  
 Wire probes (item 43, WP 0042 00)  
 Hole gauge, 0.200 to 0.300 in. (item 18, WP 0042 00)  
 Bristle brush (item 6, WP 0042 00)  
 Positioning fixture (item 15, WP 0042 00)  
 Micrometer, 1 in. OD (item 28, WP 0042 00)  
 Micrometer, 3 in. OD (item 31, WP 0042 00)  
 No. 38 twist drill (0.1015 in.) (item 12, WP 0042 00)

**Tools and Special Tools - Continued**

Torque wrench (item 63, WP 0042 00)  
 Arbor press and press plates (item 3, WP 0042 00)  
 Remover and replacer (item 46, WP 0042 00)  
 Machinist's vise with vise jaw caps (item 58, WP 0042 00)

**Materials/Parts**

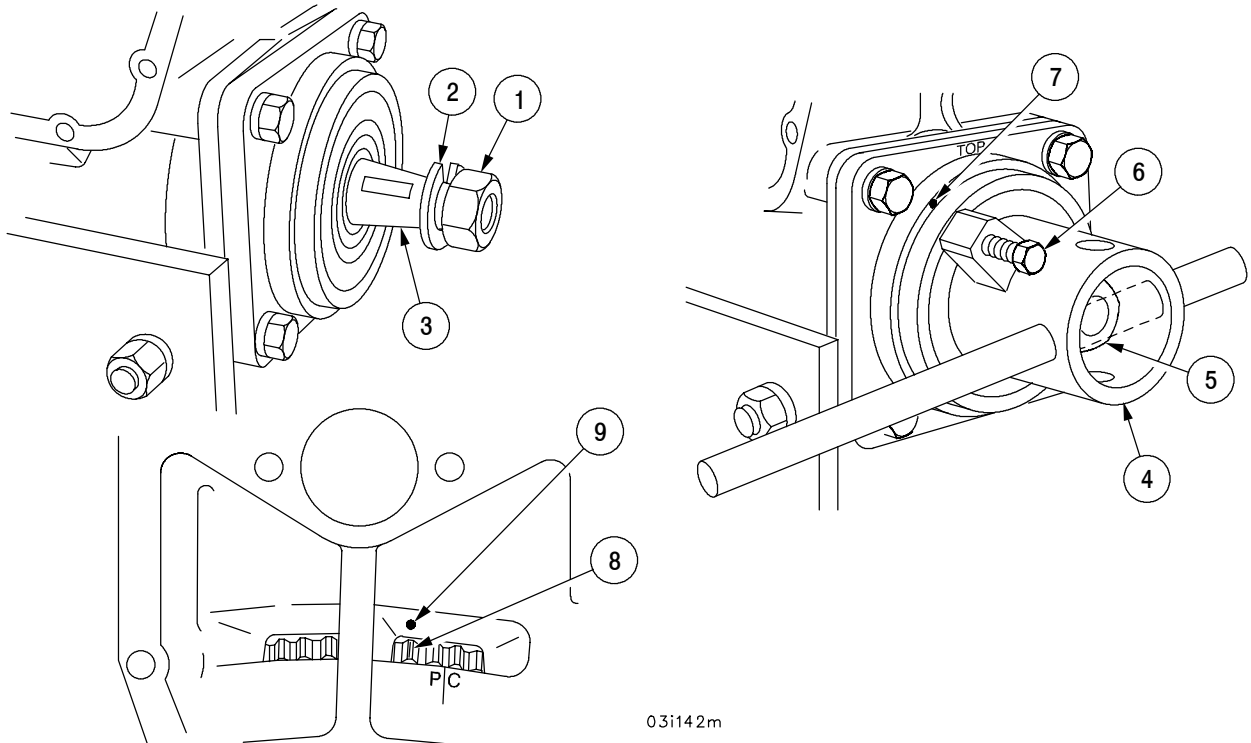
Engine oil (item 3, WP 0041 00)  
 Dry-cleaning solvent (item 7, WP 0041 00)  
 Tape (item 9, WP 0041 00)  
 Delivery valve screw gasket  
 Plunger bore screw gasket  
 Preformed packings (6) from gasket and preformed packing set, Part No. 5702632

**Equipment Conditions**

Control unit assemblies removed (WP 0024 00)

**Removal**

1. Remove nut (1) and lockwasher (2) from camshaft (3).
2. Align keyway slot in camshaft turning and holding wrench (4) with Woodruff key in camshaft, and install wrench on camshaft. Using 1 1/16 in. deep well socket and ratchet handle, secure wrench (4) with lockwasher and plain nut (5).
3. Using steel rod, turn wrench (4) counterclockwise to align locking screw (6) on wrench with No. 2 punch mark (7) on plate.
4. Check position of slotted tooth (8) on spur gear. The slotted gear tooth should be aligned with punch mark (9) in pump housing. If tooth is not aligned with punch mark, rotate wrench counterclockwise one complete turn to align the slotted tooth.
5. Using 7/16 in. box end wrench, tighten locking screw (6).

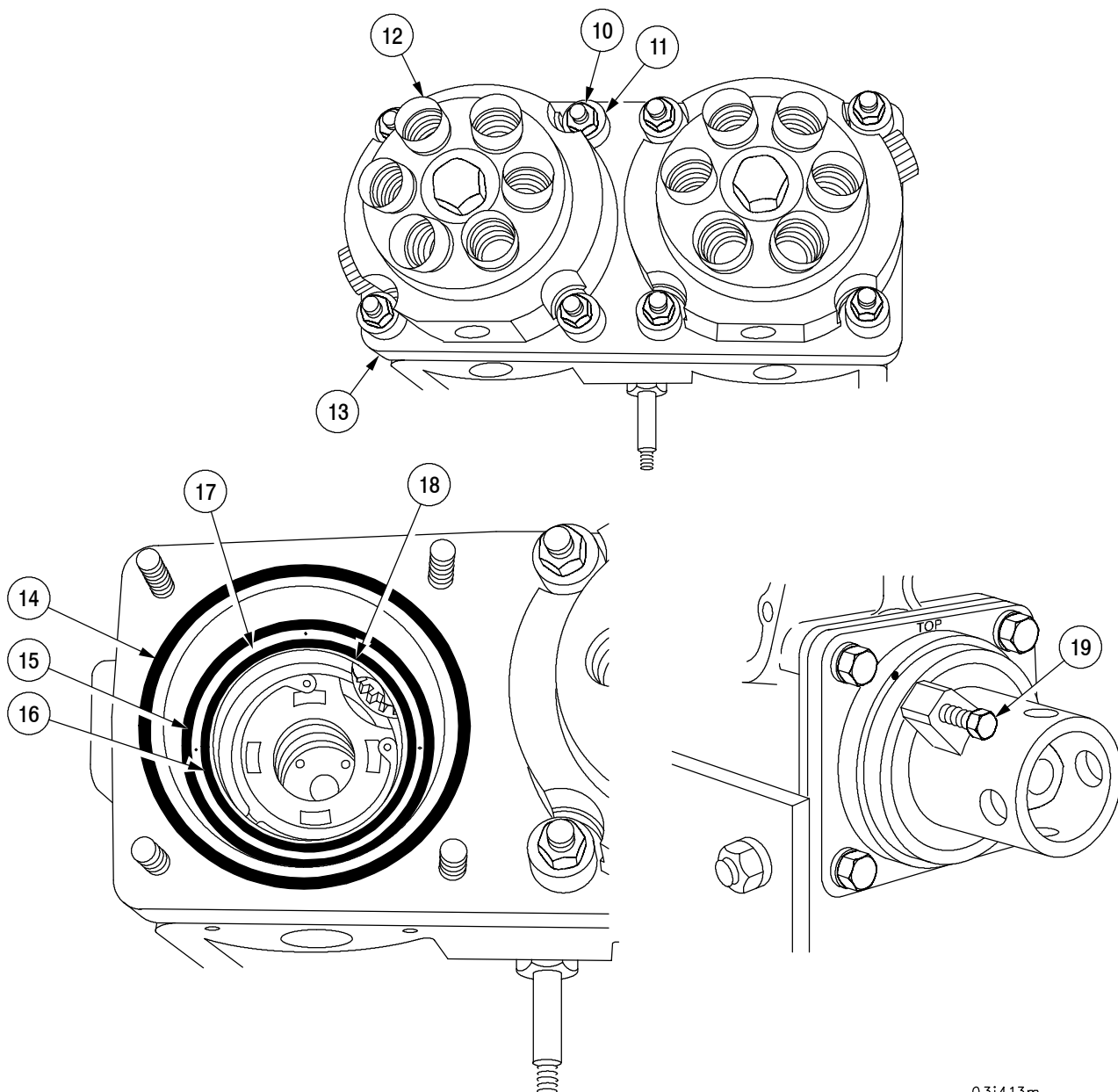


031142m

**HEAD ASSEMBLY NO. 2 REPAIR - CONTINUED****0025 00****Removal - Continued****NOTE**

The pump head assemblies are spring-loaded. Maintain pressure while removing nuts. Remove nuts alternately and evenly.

6. Using 1/2 in. deep well socket, ratchet handle, and extension, remove four nuts (10).
7. Remove four spacers (11).
8. Remove pump head assembly (12) from pump housing (13).
9. Remove and discard preformed packings (14),(15) and (16). Remove ring spacer (17). Remove spacer ring (18).
10. Using 7/16 in. box end wrench, loosen locking screw (19).

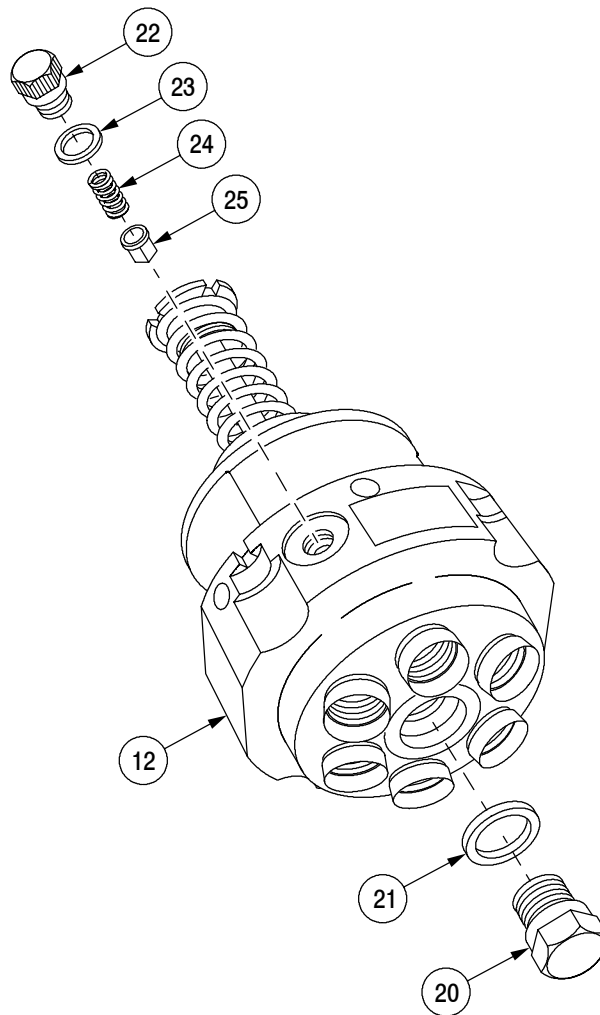


031413m



**HEAD ASSEMBLY NO. 2 REPAIR - CONTINUED****0025 00****Disassembly**

1. Place head assembly (12) in vise. Using 3/4 in. socket and ratchet handle, remove plunger bore screw (20). Remove and discard gasket (21) (for new style 11 mm pump).
2. Using 7/16 in. (3/4 in. for old style 11 mm pump) socket and ratchet handle, remove fuel delivery valve screw (22). Remove and discard gasket (23).
3. Remove spring (24) and delivery valve (25).



03i414m

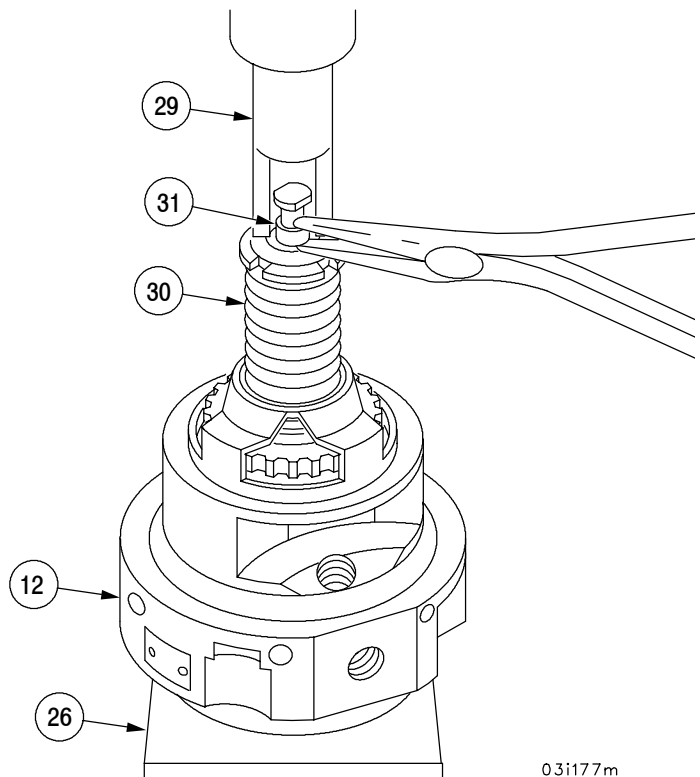
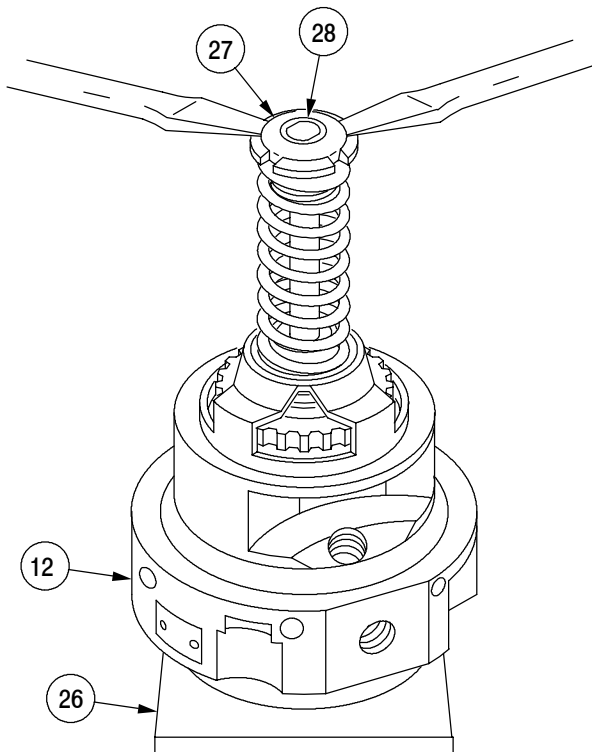
**HEAD ASSEMBLY NO. 2 REPAIR - CONTINUED****0025 00****Disassembly - Continued**

4. Place head assembly (12) on positioning fixture (26).
5. Using two flat tip screwdrivers, remove bottom retaining ring spring (27). Remove plunger button (28).
6. Place head assembly (12) and positioning fixture (26) on arbor press.
7. Using remover and replacer (29), compress spring (30) and remove two plunger locks (31) using needle nose pliers.

**WARNING**

Release spring tension gradually to avoid injury.

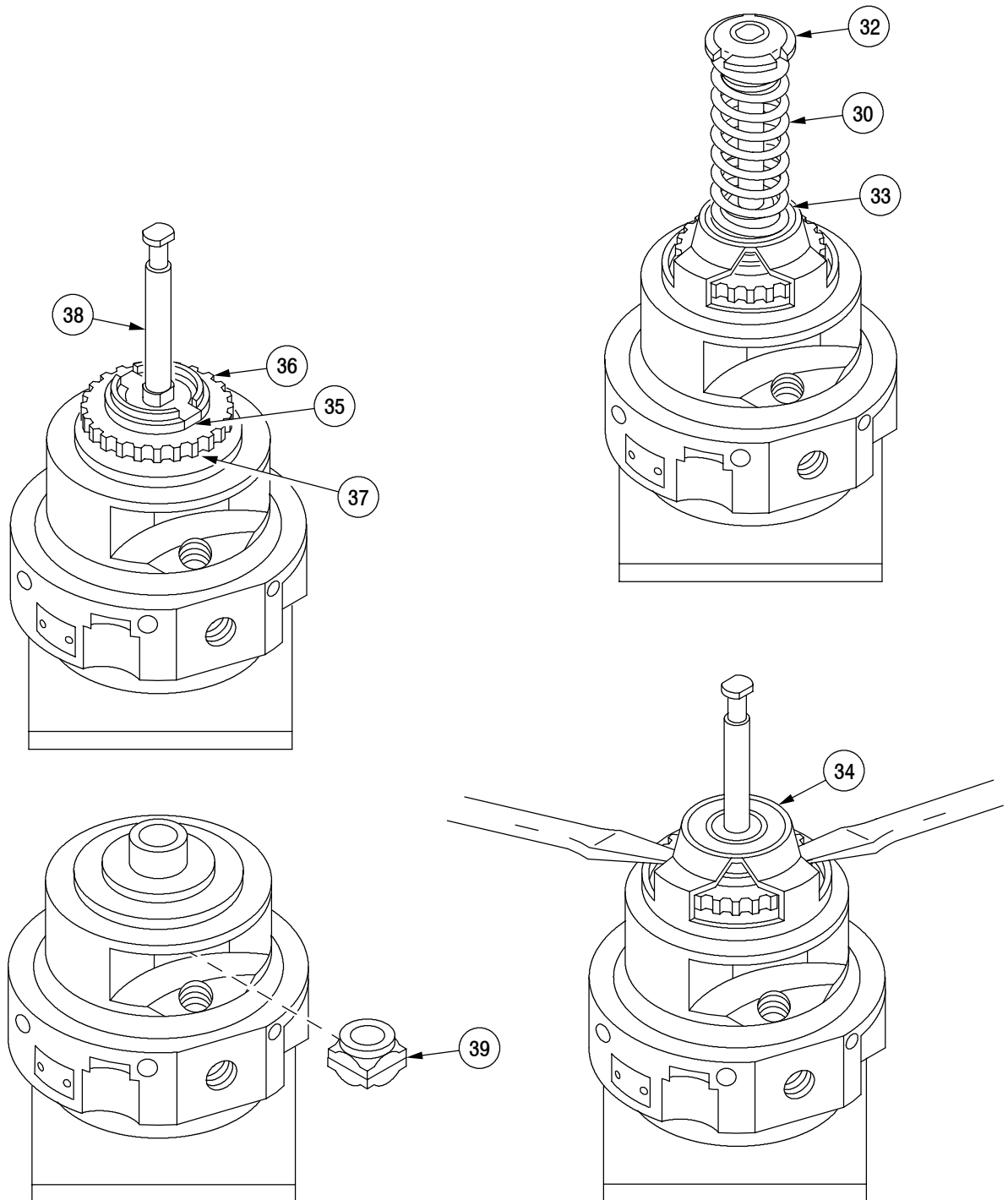
8. Slowly release tension on spring (30). Remove head assembly (12) and positioning fixture (26) from arbor press.



03i177m

**HEAD ASSEMBLY NO. 2 REPAIR - CONTINUED****0025 00****Disassembly - Continued**

9. Remove lower spring seat (32), spring (30) and upper spring seat (33).
10. Using two wide tip screwdrivers, remove gear retainer (34).
11. Remove plunger guide (bracket) (35), spur gear (36), thrust washer (37) and plunger (38).
12. Remove plunger sleeve (39).



031190m

**HEAD ASSEMBLY NO. 2 REPAIR - CONTINUED****0025 00****Cleaning****WARNING**

Cleaning solvent is flammable. Use only in well ventilated areas. Keep away from flame, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when using to prevent skin irritation.

1. Immerse head in solvent. Clean head using bristle brush. Clean fuel passages (40) and oil passages (41) using probes.

**WARNING**

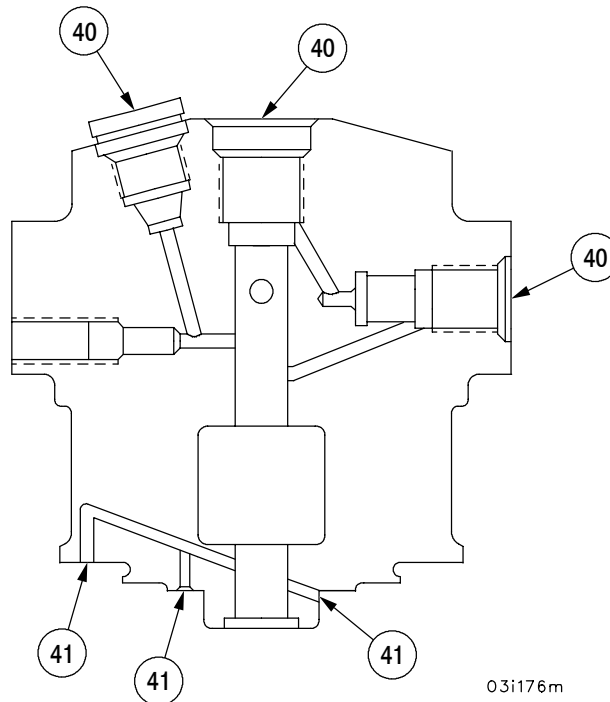
Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

2. Blow dry with compressed air.

**WARNING**

Cleaning solvent is flammable. Use only in well ventilated areas. Keep away from flame, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when using to prevent skin irritation.

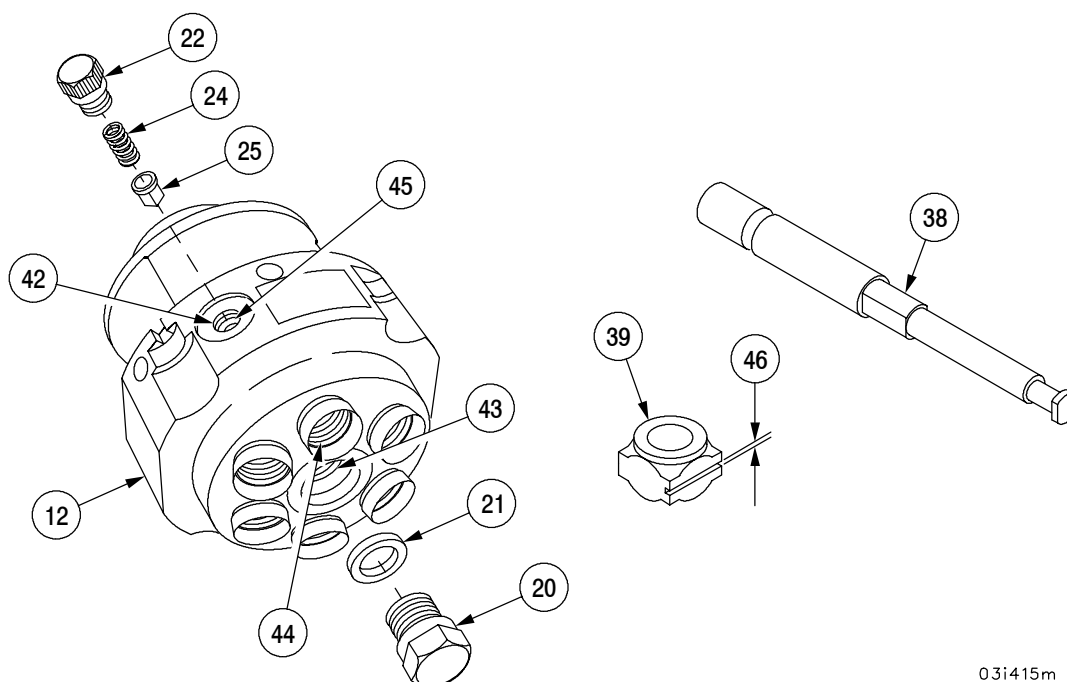
3. Clean remaining head parts using solvent. Wipe dry using clean lint-free cloth.



03i176m

**HEAD ASSEMBLY NO. 2 REPAIR - CONTINUED****0025 00****Inspection**

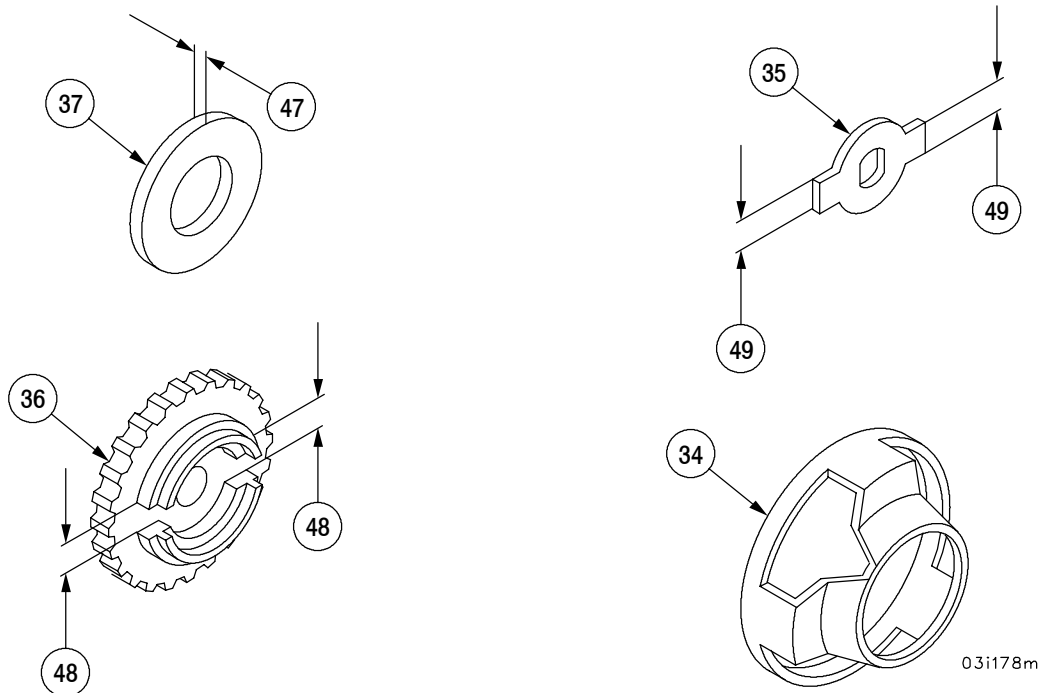
1. Inspect head (12) for cracks using magnifying glass and strong light. Inspect threads (42), (43), and (44) for damage.
2. Inspect delivery valve (25) and seat (45) for signs of wear or scoring.
3. Inspect spring (24) for nicks or cracks. Using 1-in. micrometer, measure free length of spring. Free length must be 0.780 to 0.954 in. (19.8 to 24.2 mm). Check spring load. Spring load must be 5.3 to 5.7 lb (2.4 to 2.6 kg) when compressed to 0.760 in. (19.3 mm) length. Replace spring if it does not meet all specified data.
4. Inspect delivery valve screw (22) for thread damage.
5. Replace head assembly if head (12) is cracked or if threads (42), (43), and (44) are damaged. Replace head assembly if delivery seat (45) or valve (25) shows evidence of scoring or improper seating.
6. Replace plunger bore screw (20), screw gasket (21) and delivery valve screw (22) if damaged.
7. Inspect plunger (38) and sleeve (39) for cracks, scoring, or scratches using magnifying glass and strong light. Measure width of slot (46) in sleeve using shank of a new No. 38 twist drill. Replace head assembly if drill shank can be inserted in sleeve slot (46) or if sleeve and plunger are cracked or damaged.



03i415m

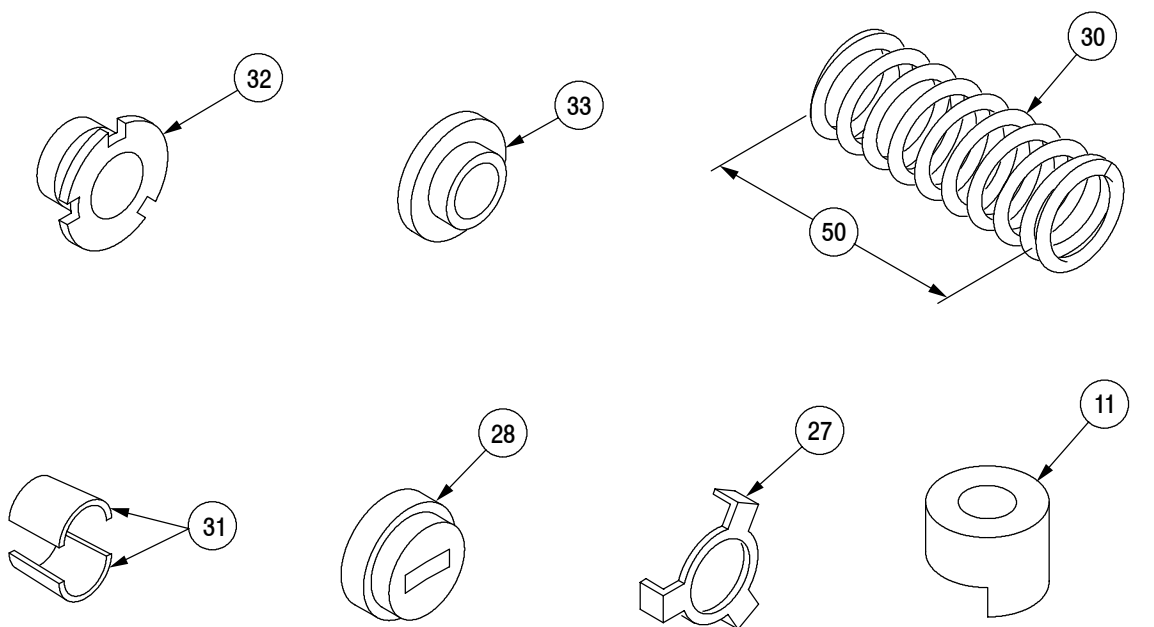
**HEAD ASSEMBLY NO. 2 REPAIR - CONTINUED****0025 00****Inspection - Continued**

8. Inspect thrust washer (37) for cracks, scoring, or signs of overheating. Using micrometer, measure thickness of washer. Replace washer if thickness (47) is less than 0.0200 in. (0.51 mm), or if there is evidence of scoring or overheating.
9. Inspect spur gear (36) for cracks, raised metal, or gear tooth damage using magnifying glass and strong light. Measure width of plunger guide slots (48) in gear using hole gauge and micrometer. Replace gear if dimension exceeds 0.2830 in. (7.19 mm). Replace gear if cracked or if there is evidence of gear tooth damage.
10. Inspect plunger guide (bracket) (35) for cracks, burrs, nicks, or raised metal using magnifying glass and strong light. Measure width of tangs (49) using a micrometer. Replace guide (bracket) if dimension is less than 0.2780 in. (7.06 mm). Replace guide (bracket) if cracked or damaged.
11. Inspect gear retainer (34) for cracks or raised metal. Replace retainer if cracked.



**HEAD ASSEMBLY NO. 2 REPAIR - CONTINUED****0025 00****Inspection - Continued**

12. Inspect lower spring seat (32) and upper spring seat (33) for cracks, raised metal, or scoring using magnifying glass and strong light. Replace seats if cracked or scored.
13. Inspect plunger spring (30) for cracks or nicks. Replace spring if nicked or scratched.
14. Using micrometer, measure free length of spring (50). Free length must be 2.18 to 2.66 in. (55.4 to 67.6 mm). Check spring load. Spring load must be 64.0 to 71.6 lbs (29 to 32 kg) at 2.014 in. (51.16 mm) length. Replace spring if it does not meet all specified data.
15. Inspect plunger locks (31), plunger bottom (28), ring spring (27) and four spacers (11) for cracks, scoring, raised metal and deformation. Replace parts if cracked, scored or deformed.

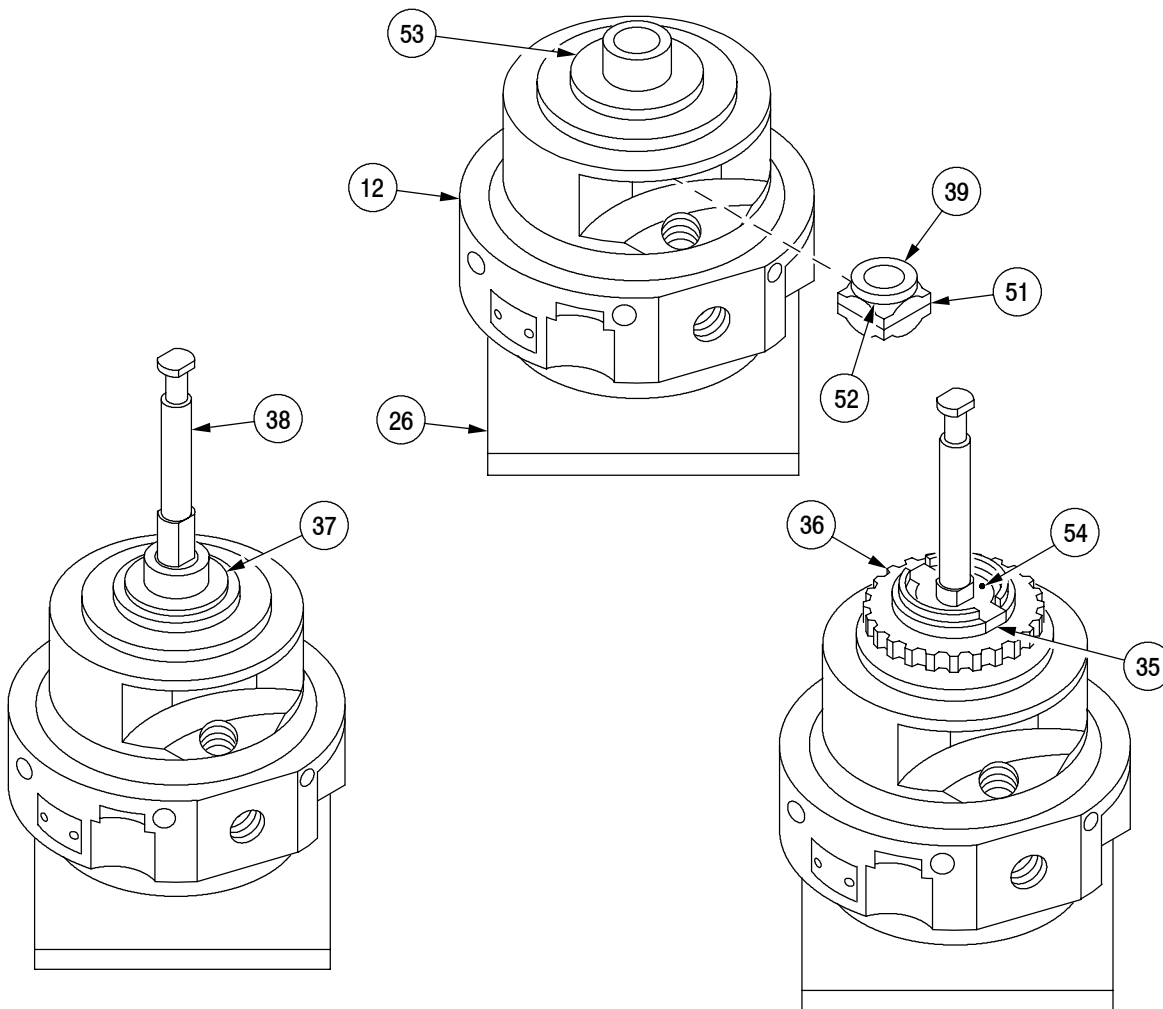


03i416m

**HEAD ASSEMBLY NO. 2 REPAIR - CONTINUED****0025 00****Assembly****NOTE**

Coat all parts with a light film of engine oil.

1. Place head (12) on positioning fixture (26).
2. Install plunger sleeve (39) in head cavity with slot side of sleeve (51) facing you, and the groove (52), (below the beveled edge) toward the spur gear bearing surface (53).
3. Align plunger sleeve bore with plunger bore in head and install plunger (38).
4. Install thrust washer (37), spur gear (36), and plunger guide (bracket) (35) with drill point (54) up.

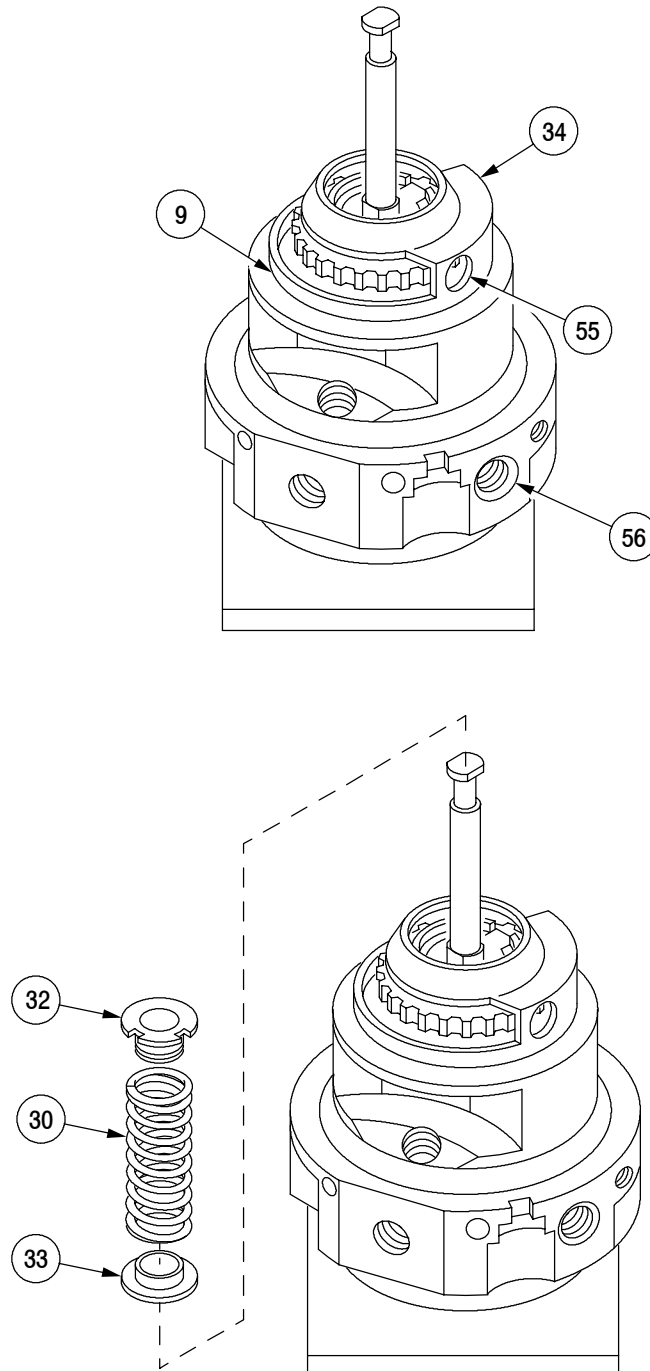


031192m



**HEAD ASSEMBLY NO. 2 REPAIR - CONTINUED****0025 00****Assembly - Continued**

5. Install gear retainer (34) with timing hole (55) aligned with delivery valve bore (56) and dimples aligned with notches in head. Tap retainer into place with plastic insert hammer.
6. Locate original stake marks (9) in three places around bottom edge of retainer. Using solid center punch and hammer, restake retainer in same three places.
7. Install upper spring seat (32), spring (30), and lower spring seat (33).



03i193m

**HEAD ASSEMBLY NO. 2 REPAIR - CONTINUED****0025 00****Assembly - Continued**

8. Place head assembly (12) and positioning fixture (26) on arbor press. Position remover and replacer (29) on lower spring seat (32).
9. Compress spring (30) far enough to install two plunger locks (31) using needle nose pliers.

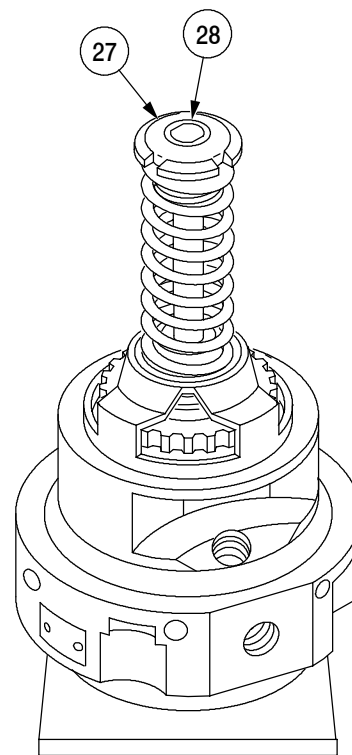
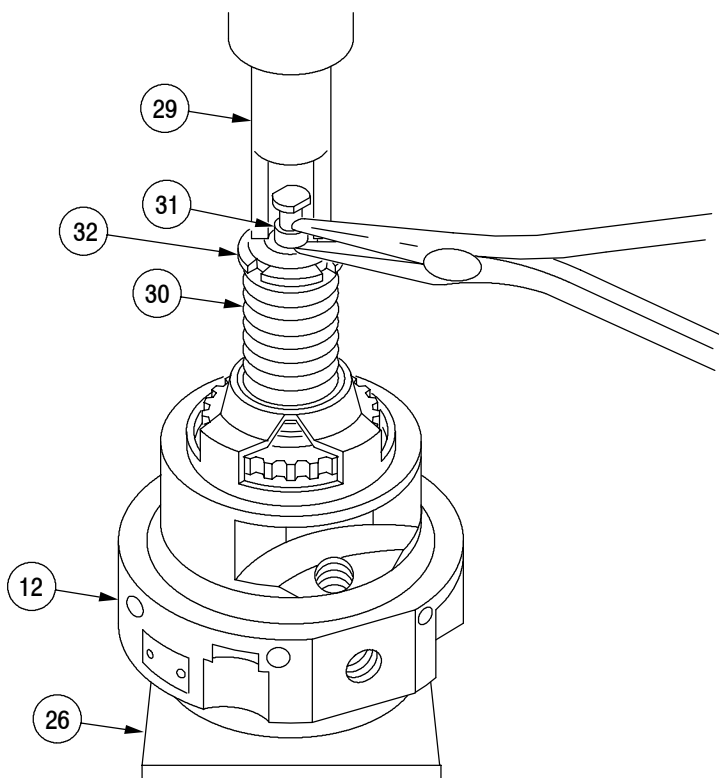
**WARNING**

Release spring tension slowly to avoid injury. Be certain locks are properly seated before releasing all spring tension.

10. Slowly release spring tension while observing that plunger locks (31) are properly seated.
11. Remove head assembly (12) and fixture (26) from press.
12. Install plunger button (28) and ring spring (27).

**NOTE**

It may be necessary to tap the ring spring lightly with a plastic insert hammer to seat the spring.



03i195m

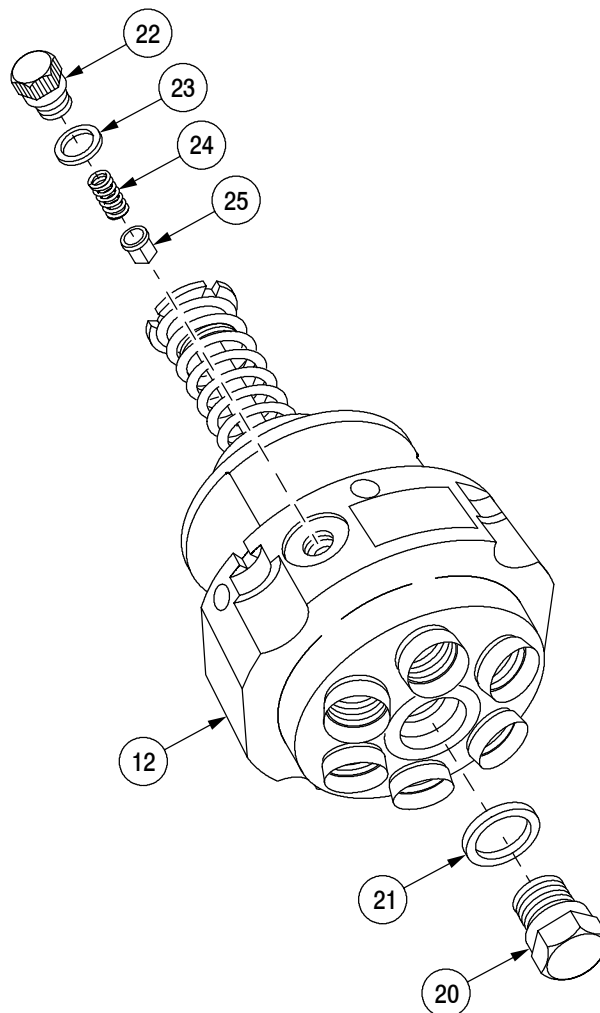
**HEAD ASSEMBLY NO. 2 REPAIR - CONTINUED****0025 00****Assembly - Continued**

13. Place head assembly (12) in vise.
14. New style 11 mm pump: Install new gasket (21). (Old style 11 mm pump has no gasket.)
15. Using 3/4 in. socket and torque wrench, install plunger bore screw (20).  
New style 11 mm pump: Torque screw 95 to 100 lb-ft (129 to 136 N•m).  
Old style 11 mm pump (no gasket): Torque screw 50 to 55 lb-ft (68 to 75 N•m).

**CAUTION**

Make certain delivery valve spring and gasket are centered before tightening to proper torque value.

16. Install delivery valve (25) and valve spring (24) in head assembly:  
New style 11 mm: Install new gasket (23). Using 7/16 in socket and torque wrench, install fuel delivery valve screw (22). Torque screw 50 to 55 lb-ft (68 to 75 N•m).  
Old style 11 mm (no gasket): Using 3/4 in. socket and torque wrench, tighten screw 50 to 55 lb-ft (68 to 75 N•m).



03i414m

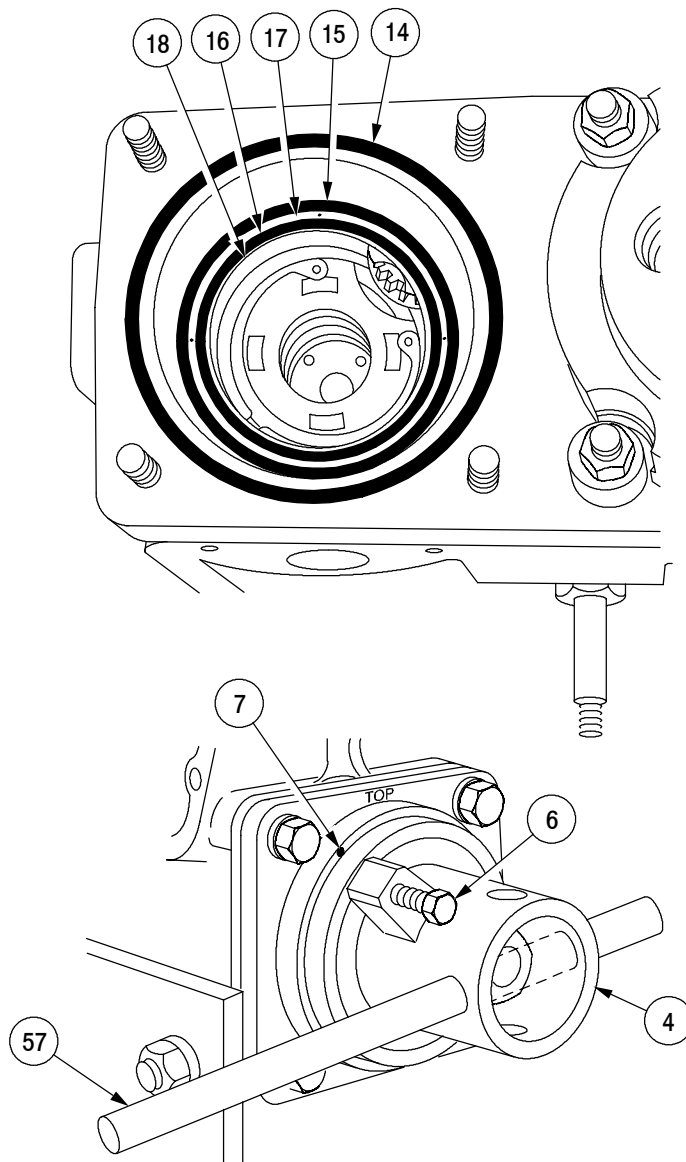
**HEAD ASSEMBLY NO. 2 REPAIR - CONTINUED****0025 00****Installation****NOTE**

Coat all loose metal parts with light film of engine oil.

1. Install spacer ring (18), new preformed packing (16), ring spacer (17), and new preformed packings (15) and (14) in bore for head assembly No. 2 (right bank).
2. Using steel rod (57) and turning and holding wrench (4), turn camshaft counterclockwise to align locking screw (6) with No. 2 punch mark (7) on bearing retaining plate.

**NOTE**

Alignment of turning and holding wrench locking screw with No. 2 punch mark on bearing retaining plate is an approximate alignment point. It may be necessary to rotate camshaft slightly in either direction to get head to seat against spring pressure.



03i237m

**HEAD ASSEMBLY NO. 2 REPAIR - CONTINUED****0025 00****Installation - Continued**

3. Install head assembly (12) in housing with delivery valve screw (22) toward front, and slotted tooth (8) on plunger drive gear aligned with punch mark (9) on underside of housing deck.

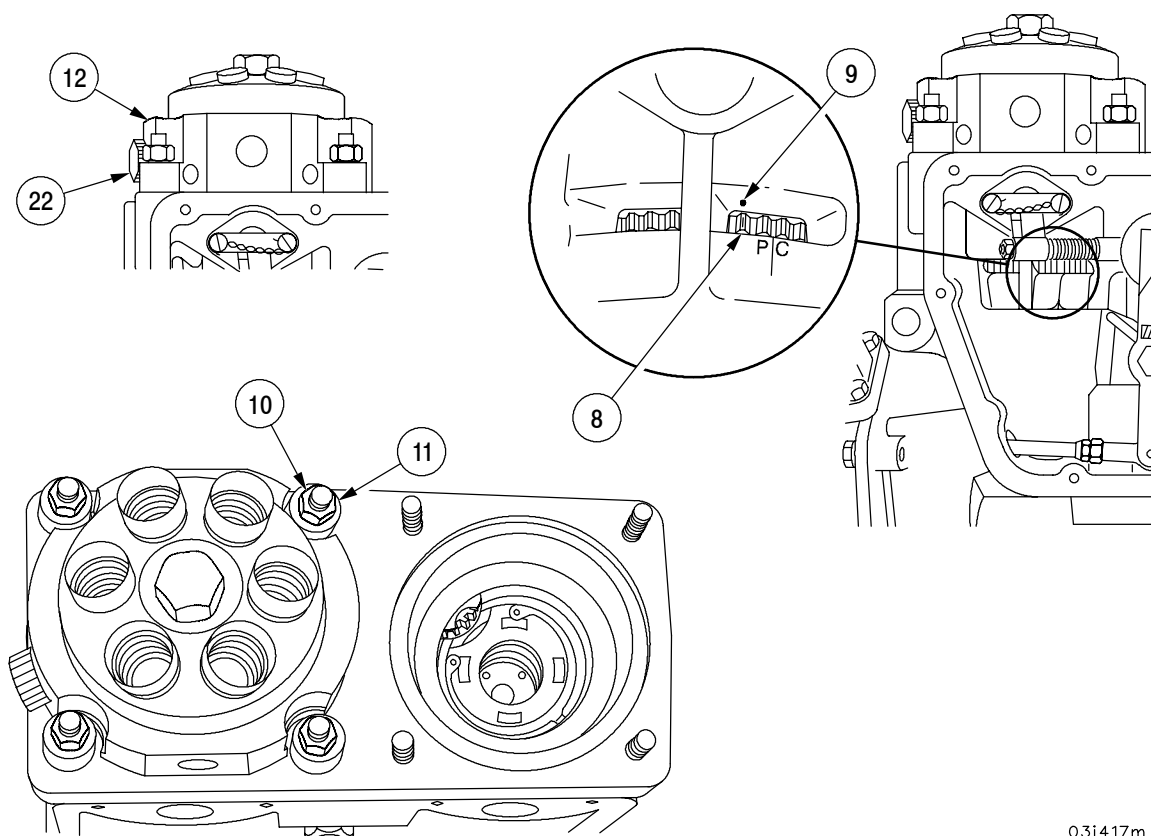
**CAUTION**

Using hand pressure, make sure that pump head assembly seats on pump housing deck (not on gears) before installing spacers and nuts. Improper seating will damage gear shaft.

4. Install four spacers (11) and four nuts (10) finger-tight.
5. For 11 mm pump: Using 1/2 in. deep well socket and torque wrench, alternately tighten four nuts (10) to 18 to 20 lb-ft (24.5 to 27 N•m).

**CAUTION**

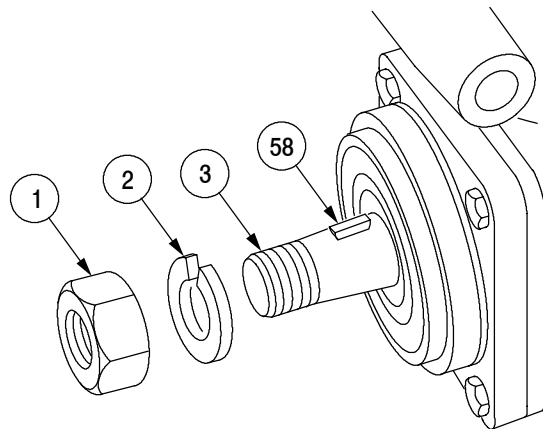
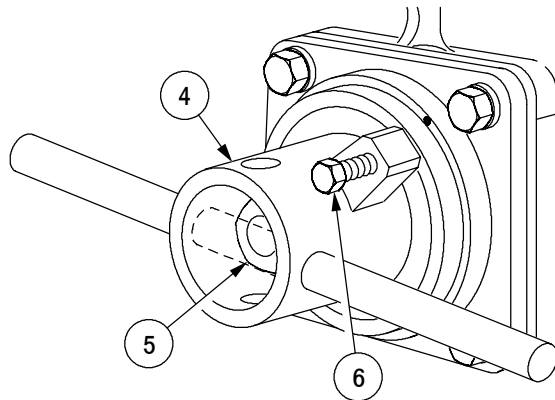
Nuts must be tightened alternately to avoid cocking head assembly in housing bore.



03i417m

**HEAD ASSEMBLY NO. 2 REPAIR - CONTINUED****0025 00****Installation - Continued**

6. Using 7/16 in. box end wrench, loosen turning and holding wrench locking screw (6).
7. Using 1-1/16 in. deep well socket, ratchet handle, and adapter, remove plain nut and lockwasher (5). Retain lockwasher and nut.
8. Using plastic insert hammer, remove wrench (4).
9. Install Woodruff key (58) in camshaft keyway and secure with tape.
10. Install lockwasher (2) and nut (1) on camshaft (3). Tighten finger-tight.



03i418M

**NOTE****FOLLOW-ON MAINTENANCE:**

Install control unit assemblies  
(WP 0024 00)

**END OF WORK PACKAGE**

**HEAD ASSEMBLY NO. 1 REPAIR****0026 00****THIS WORK PACKAGE COVERS:**

Removal, Disassembly, Cleaning, Inspection, Assembly and Installation

**INITIAL SETUP:****Tools and Special Tools**

- General mechanic's tool kit (item 23, WP 0042 00)
- Automotive fuel and electrical system repair tool kit (item 56, WP 0042 00)
- 3/8 to 1/2 in. drive adapter (item 1, WP 0042 00)
- Steel rod (fabricated tool) (item 47, WP 0042 00)
- Socket, 1 1/16 in. deep well (item 60, WP 0042 00)
- Wrench, turning and holding (item 64, WP 0042 00)
- Torque wrench (item 63, WP 0042 00)

**Materials/Parts**

- Wiping rags (item 4, WP 0041 00)

**Materials/Parts - Continued**

- Engine oil (item 3, WP 0041 00)
- Tape (item 9, WP 0041 00)
- Preformed packing (6) from gasket and preformed packing set, Part No. 5702632

**Equipment Conditions**

- Control unit assemblies removed (WP 0024 00)

**References**

- WP 0025 00
- WP 0024 00

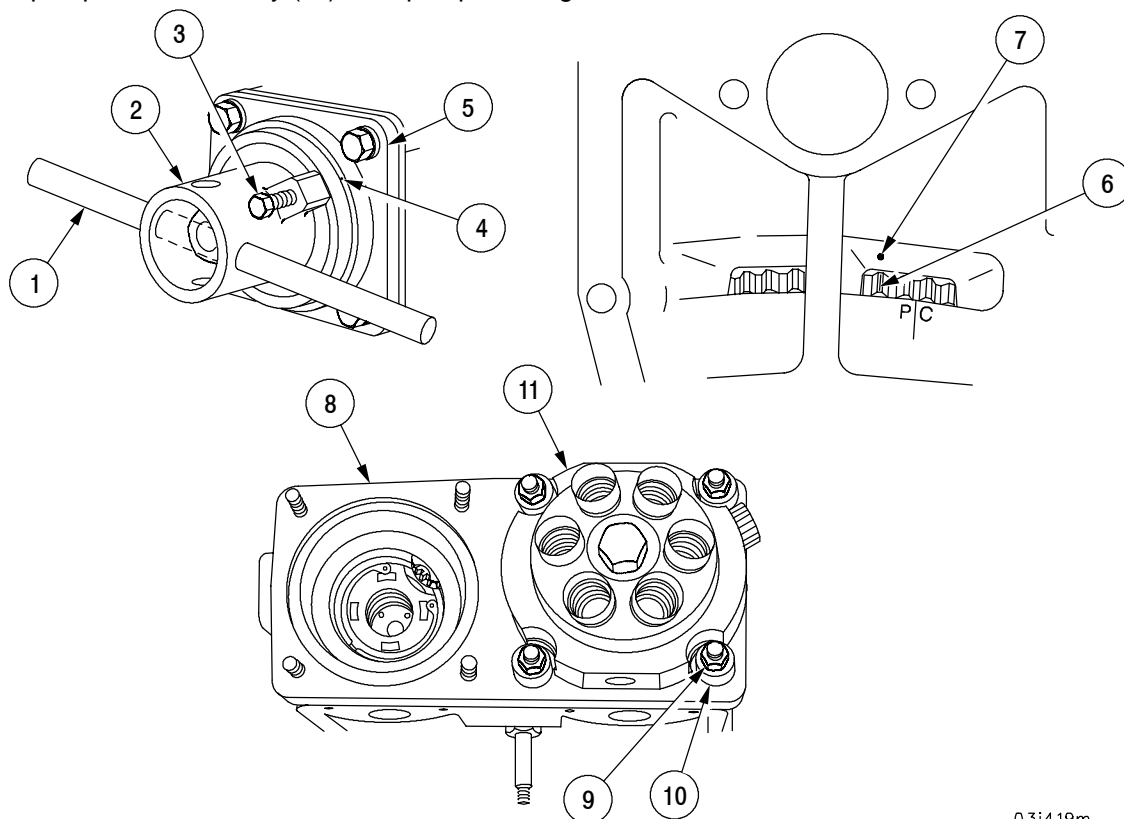
**Removal**

1. Using steel rod (1) and turning and holding wrench (2) turn camshaft clockwise 1/4 turn (90 degrees) until locking screw (3) is aligned with No. 1 punch mark (4) on bearing retaining plate (5).
2. Note position of slotted tooth (6) on spur gear. The slotted tooth will be aligned with punch mark (7) in the pump housing (8).
3. Using 7/16 in. box end wrench, tighten locking screw (3).

**NOTE**

The pump head assemblies are spring-loaded. Maintain pressure while removing nuts. Remove nuts alternately and evenly.

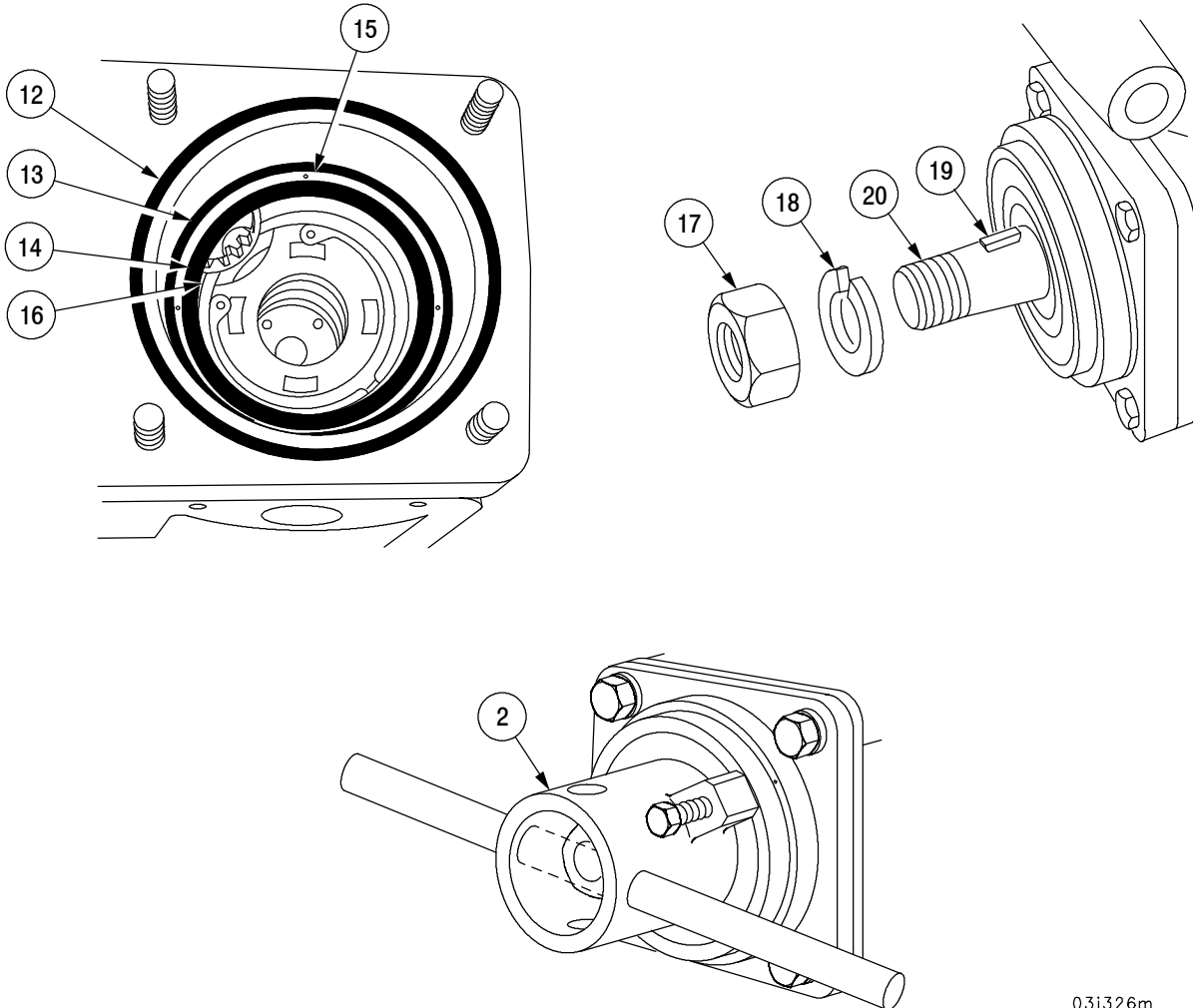
4. Using 1/2 in. deep well socket, ratchet handle and extension, remove four nuts (9).
5. Remove four spacers (10).
6. Remove pump head assembly (11) from pump housing.



03i419m

**HEAD ASSEMBLY NO. 1 REPAIR - CONTINUED****0026 00****Removal - Continued**

7. Remove and discard preformed packings (12), (13), and (14).
8. Remove ring spacer (15) and spacer ring (16).
9. Using adjustable wrench, 1-1/16 in. deep well socket, and ratchet handle, remove camshaft nut (17) and lockwasher (18).
10. Remove turning and holding wrench (2) by tapping with a plastic insert hammer.
11. Remove Woodruff key (19) from camshaft (20).



031326m



**HEAD ASSEMBLY NO. 1 REPAIR - CONTINUED****0026 00****Disassembly**

Disassemble head (WP 0025 00).

**Cleaning**

Cleaning head assembly (WP 0025 00).

**Inspection**

Inspect head assembly (WP 0025 00).

**Assembly**

Assemble head assembly (WP 0025 00).

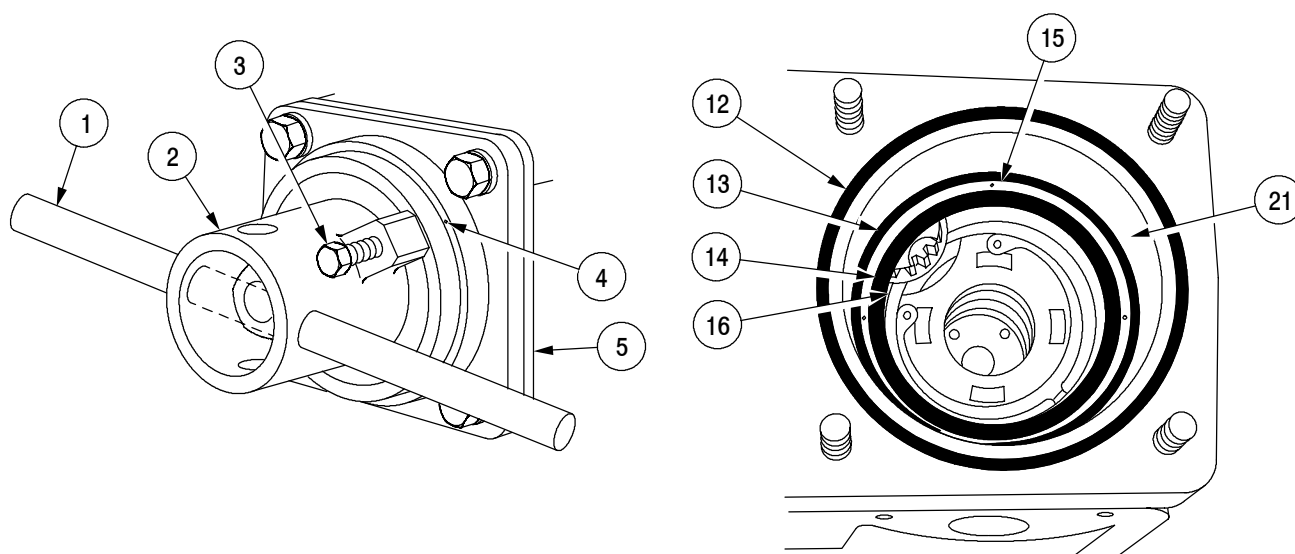
**Installation**

Install head assembly (WP 0025 00).

**NOTE**

Coat all loose metal parts with a light coat of engine oil.

1. Using steel rod (1) and turning and holding wrench (2) turn camshaft (20) (hidden) clockwise 1/4 turn (90 degrees) until locking screw (3) is aligned with No. 1 punch mark (4) on bearing retaining plate (5).
2. Using 7/16 in. box end wrench, tighten locking screw (3).
3. Install spacer ring (16), new preformed packing (14), spacer ring (15), and new preformed packings (12) and (13) in bore (21).



03i327m

**HEAD ASSEMBLY NO. 1 REPAIR - CONTINUED****0026 00****Installation - Continued****NOTE**

Alignment of turning and holding wrench locking screw with No. 1 punch mark on bearing retaining plate is an approximate alignment point. It may be necessary to rotate camshaft slightly in either direction to get head to seat against spring pressure.

4. Install pump head assembly (11) in pump housing (8) with delivery screw (22) toward the rear and slotted tooth (6) on plunger drive gear aligned with punch mark (7) on underside of housing deck.

**CAUTION**

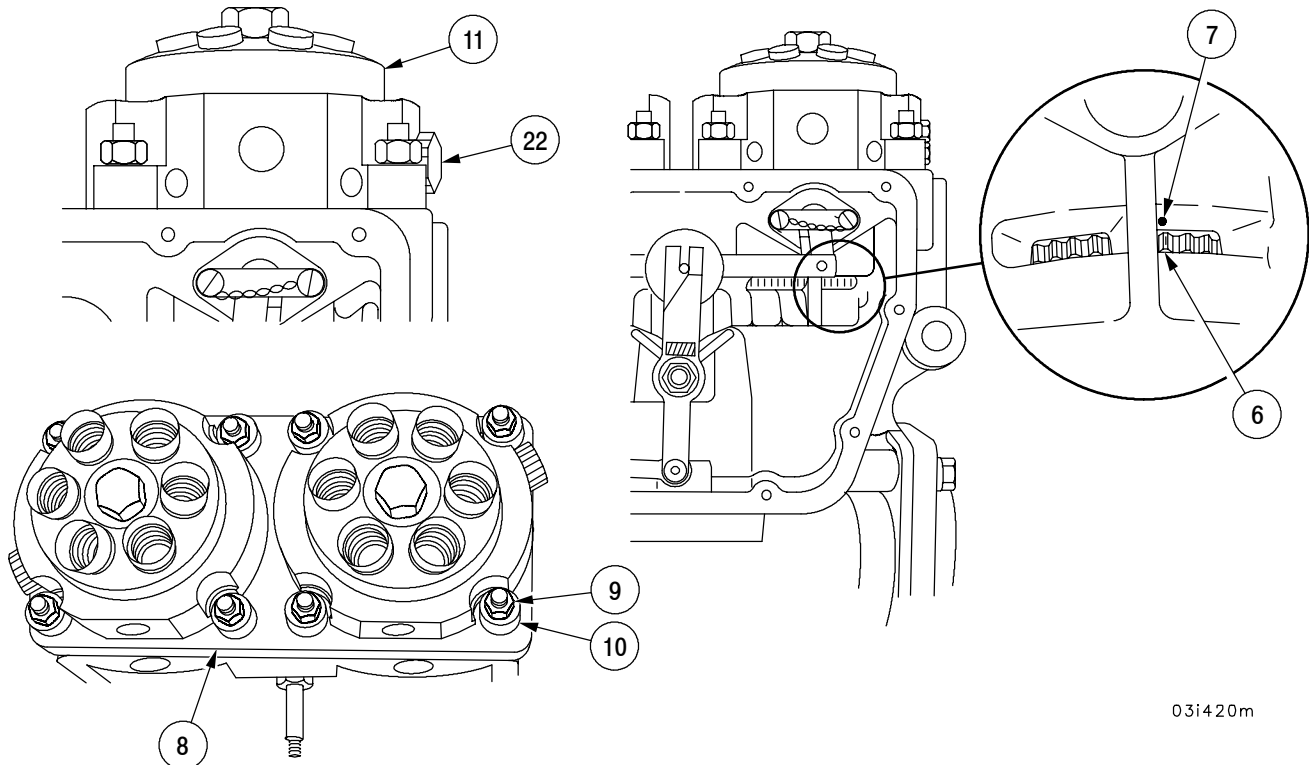
Using hand pressure, make sure that pump head assembly seats on pump housing deck (not on gears) before installing spacers and nuts. Improper seating will damage gear shaft.

5. Install four spacers (10) and four nuts (9) finger-tight.

**CAUTION**

Nuts must be tightened alternately to avoid cocking head assembly in housing bore.

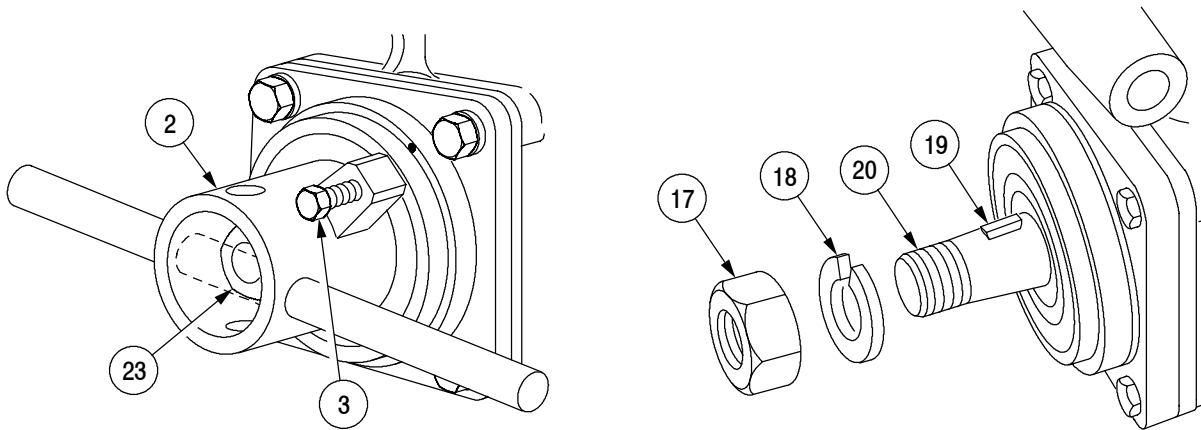
6. Using 1/2 in. deep well socket and torque wrench, alternately tighten four nuts (9) to 18 to 20 lb-ft (24.5 to 27 N•m).



03i420m

**HEAD ASSEMBLY NO. 1 REPAIR - CONTINUED****0026 00****Installation - Continued**

7. Using a 7/16 in. box end wrench, loosen locking screw (3).
8. Using 1-1/16 in. deep well socket, ratchet handle and adapter, remove nut, lockwasher, retaining lockwasher and nut (23).
9. Using plastic hammer, remove turning and holding wrench (2).
10. Install Woodruff key (19) on camshaft (20).
11. Install lockwasher (18) and nut (17) on camshaft (20).



03i4 21m

**NOTE**

**FOLLOW-ON MAINTENANCE:**  
Install control unit assemblies (WP 0024 00)

**END OF WORK PACKAGE**



**TAPPET ASSEMBLIES REPAIR****0027 00****THIS WORK PACKAGE COVERS:**

Removal, Disassembly, Cleaning, Inspection, Repair, Assembly and Installation

**INITIAL SETUP:****Tools and Special Tools**

Automotive fuel and electrical system repair tool kit  
(item 56, WP 0042 00)  
Internal retaining ring pliers (item 38, WP 0042 00)  
Spring seat compressor (item 8, WP 0042 00)  
Spring tester (item 54, WP 0042 00)  
Magnifying glass (item 24, WP 0042 00)  
Micrometer, 2 in. OD (item 30, WP 0042 00)  
Micrometer, 3 in. OD (item 31, WP 0042 00)  
Fine mill file (item 13, WP 0042 00)

**Materials/Parts**

Engine oil (item 3, WP 0041 00)  
Dry-cleaning solvent (item 7, WP 0041 00)  
Wiping rags (item 4, WP 0041 00)  
Retaining rings (2) (item 38, WP 0041 00)

**Equipment Conditions**

Head assemblies removed (WP 0025 00 or  
WP 0026 00)

**References**

WP 0025 00  
WP 0026 00

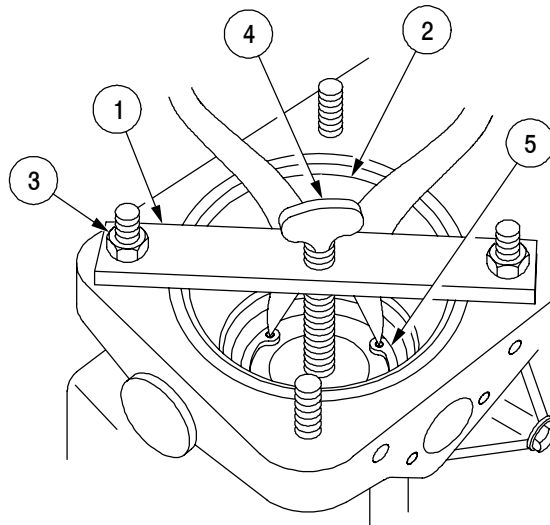
**Removal**

1. Place spring seat compressor (1) over head assembly No. 2 bore (2). Secure compressor to pump housing with two head assembly hold-down nuts (3) finger-tight.
2. Turn compressor thumb screw (4) slowly clockwise until retaining ring (5) is free. Using internal retaining ring pliers, remove retaining ring (5). Discard retaining ring.

**WARNING**

The spring seat assembly is under spring tension and must be removed slowly to prevent injury. Center the spring seat to make sure it does not catch in retaining ring groove during removal.

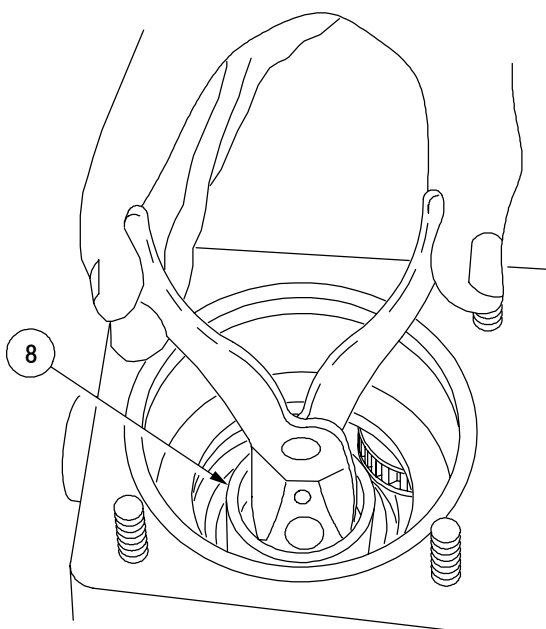
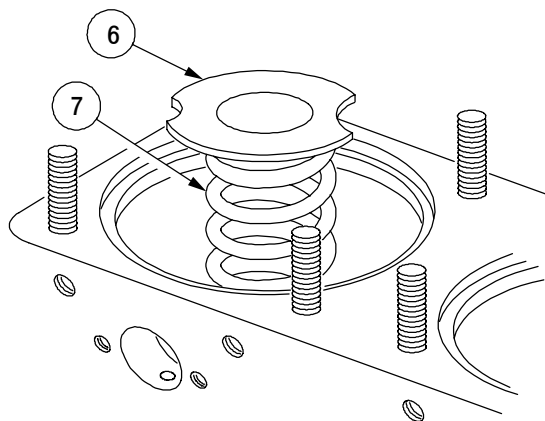
3. Loosen thumb screw (4) by turning counterclockwise. Remove nuts (3) and compressor (1).



03i146m

**TAPPET ASSEMBLIES REPAIR - CONTINUED****0027 00****Removal - Continued**

4. Remove tappet spring seat (6) and spring (7).
5. Using internal retaining ring pliers, remove tappet assembly (8).
6. Repeat steps 1 through 5 to remove tappet from head assembly No. 1 bore.



03i150m

**TAPPET ASSEMBLIES REPAIR - CONTINUED****0027 00****Disassembly**

1. Remove roller pin (9).
2. Separate tappet assembly roller (10) from tappet guide assembly (11).

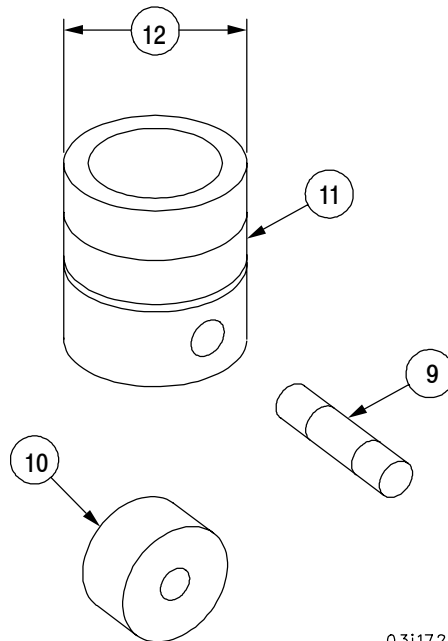
**Cleaning****WARNING**

Cleaning solvent is flammable. Use only in well ventilated areas. Keep away from flame, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when using to prevent skin irritation.

1. Clean all parts using solvent.
2. Wipe dry with clean lint-free cloth.

**Inspection**

1. Inspect pins (9), rollers (10), and guides (11) for cracks, scratches or scoring using magnifying glass and strong light. Inspect for wear, which will be indicated by ridges. Replace tappet assembly if ridges are found.
2. Using micrometer, measure diameter of tappet guide (12). Replace tappet assembly if guide diameter is less than 1.6225 in. (41.21 mm).



03i172m

**TAPPET ASSEMBLIES REPAIR - CONTINUED****0027 00****Inspection - Continued**

3. Inspect spring (7) for cracks or nicks. Replace spring if nicked or scratched.
4. Using micrometer, measure free length of spring (13). Free length must be 2.500 to 2.558 in. (63.50 to 64.97 mm).
5. Check spring load. Spring load for 11 mm pumps must be: 54 to 65.4 lb (24.5 to 30 kg) at 2.105 in. (53.47 mm) length and 96.2 to 106.2 lb (44 to 48 kg) at 1.830 in. (46.48 mm) length. Replace spring if it does not meet all specified data.

Spring load for 13 mm pumps must be 127 to 153 lb (57.7 to 69.5 kg) at 1.848 in. (46.94 mm) length, and 192 to 224 lb (87.2 to 101.2 kg) at 1.592 in. (40.44 mm) length. Replace spring if it does not meet all specified data.

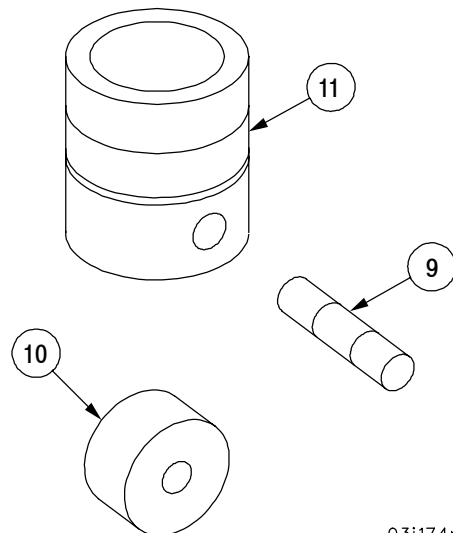
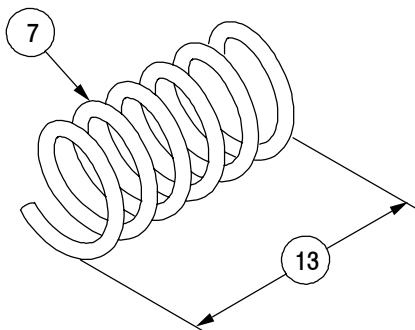
**Repair**

1. Smooth small nicks or raised metal on guide assembly (11), pin (9), and roller (10) using a fine mill file.
2. No other repairs are authorized for these parts.

**Assembly****NOTE**

Coat all parts with a light film of engine oil.

1. Install roller (10) in guide (11).
2. Align bores and install pin (9).



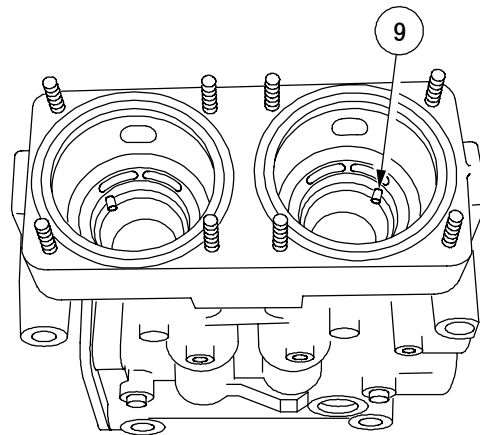
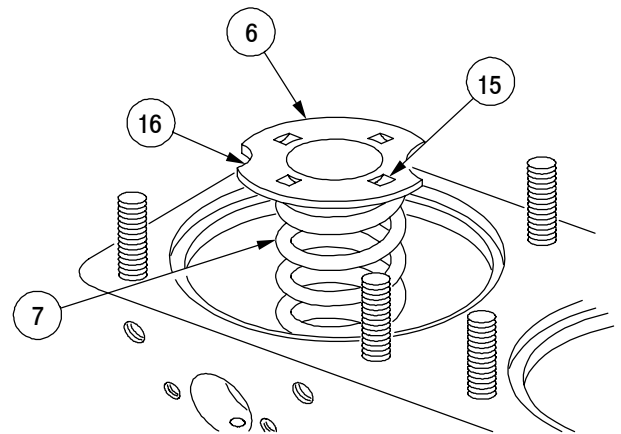
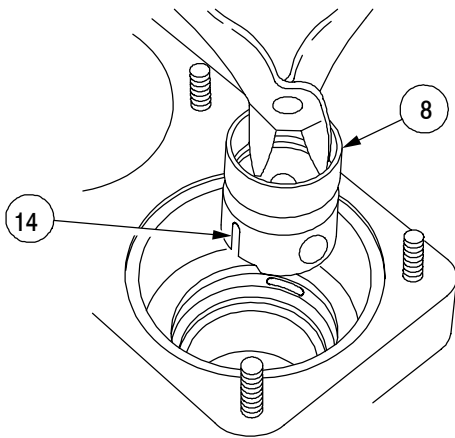
03i174m



**TAPPET ASSEMBLIES REPAIR - CONTINUED****0027 00****Installation****NOTE**

Coat all loose metal parts with light film of engine oil.

1. Using internal retaining ring pliers, install tappet assembly (8) for No. 2 head assembly (right bank) in housing with guide slot (14) aligned with tappet guide pin.
2. Position spring seat (6) over spring (7) with spring locators (15) down (facing spring).
3. Align notch (16) in spring seat with tappet roll pin (9).
4. Install spring (7) and seat (6). Center seat on spring.



03i235m

**TAPPET ASSEMBLIES REPAIR - CONTINUED****0027 00****Installation - Continued**

5. Place spring seat compressor (1) over head assembly bore.
6. Secure compressor (1) to pump housing with two head assembly hold-down nuts (3) finger-tight.

**NOTE**

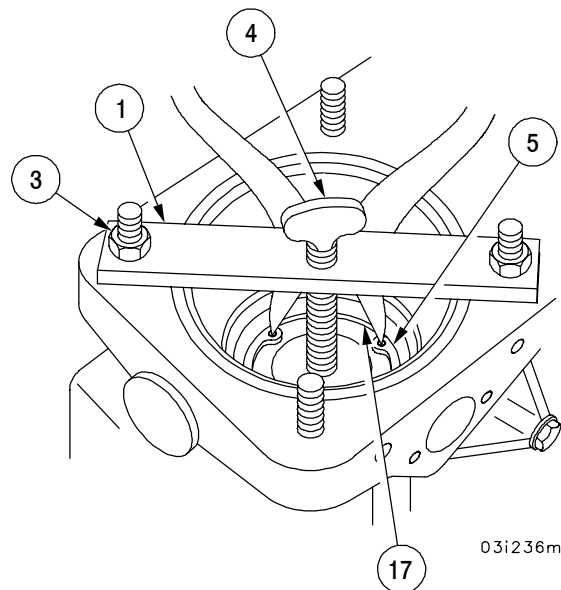
Spring seat may bind or catch in retaining ring groove. Use screwdriver to center and guide spring seat as required.

7. Turn compressor thumbscrew (4) slowly clockwise until seat retaining ring groove (17) is fully exposed.
8. Using internal retaining ring pliers, install new retaining ring (5). Be certain retaining ring is properly seated in retaining ring groove.

**WARNING**

Be certain retaining ring is properly seated in groove before removing compressor.

9. Loosen thumbscrew (4) by turning counterclockwise. Remove nuts (3) and compressor (1).
10. Install tappet assembly, spring, seat, and new retaining ring for No. 1 head assembly (left bank) by repeating steps 1 through above.

**NOTE****FOLLOW-ON MAINTENANCE:**

Install head assemblies (WP 0025 00 or WP 0026 00)

**END OF WORK PACKAGE**

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**GOVERNOR WEIGHTS AND SPIDER ASSEMBLIES REPAIR**

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**0028 00****THIS WORK PACKAGE COVERS:**Removal, Disassembly, Cleaning, Inspection, Repair, Assembly and Installation

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**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)  
Automotive fuel and electrical system repair tool kit  
(item 56, WP 0042 00)  
Mechanical puller (item 45, WP 0042 00)  
Remover and replacer (item 46, WP 0042 00)  
Manual control lever (item 27, WP 0042 00)  
Magnifying glass (item 24, WP 0042 00)  
Micrometer, 1-in. OD (item 29, WP 0042 00)  
Micrometer, 1-in. ID (item 28, WP 0042 00)  
Arbor press and press plates (item 3, WP 0042 00)  
Machinist's vise with vise jaw caps (item 58, WP  
0042 00)  
Holding bar (fabricated item) (item 65, WP 0042 00)  
Torque wrench (item 63, WP 0042 00)  
Fine mill file (item 13, WP 0042 00)  
Spring scale (item 50, WP 0042 00)

**Tools and Special Tools - Continued**

Adapter kit (item 1, WP 0042 00)  
Dial indicator with magnetic base (item 11,  
WP 0042 00)  
Holding plate (item 25, WP 0042 00)

**Materials/Parts**

Engine oil (item 3, WP 0041 00)  
Dry-cleaning solvent (item 7, WP 0041 00)  
Wiping rags (item 4, WP 0041 00)  
Metering and distributing parts kit, Part No. 5704369  
Flat washers (as required)  
Pencil  
Paper

**Equipment Conditions**

Governor housing removed (WP 0022 00)

**References**WP 0022 00

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**Removal****CAUTION**

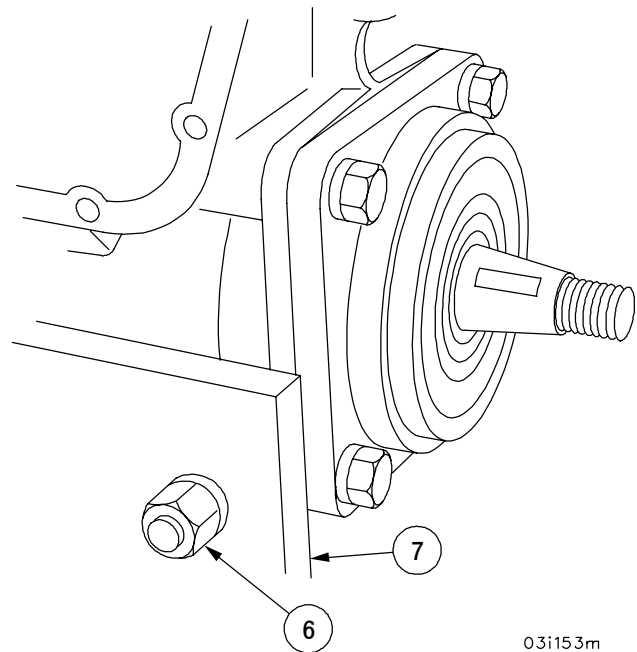
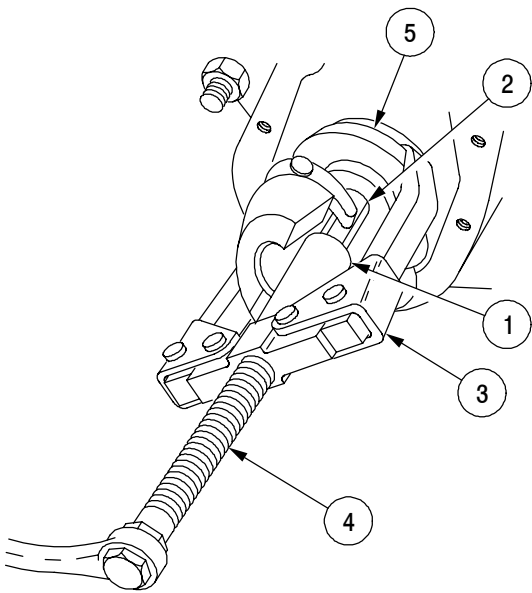
Use extreme care when positioning mechanical puller and remover and replacer to prevent damage to the camshaft extension and the governor weight and spider assembly.

1. Position remover and replacer (1) so it is seated against the camshaft (2).

**NOTE**

If the remover and replacer does not clear the weight and spider assembly fingers, rotate the camshaft until the tool can be properly seated.

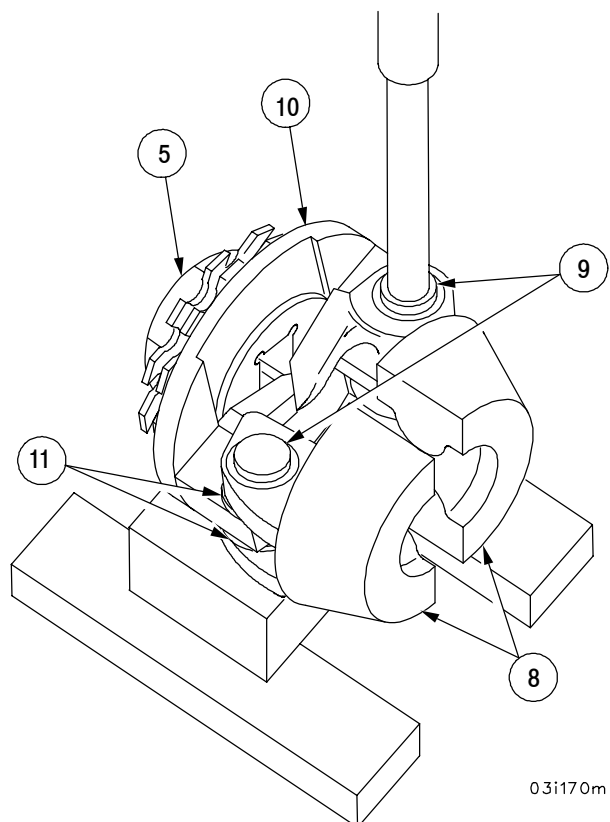
2. Install mechanical puller (3) and, using a 9/16 in. box end wrench, turn puller screw (4) slowly clockwise until weight and spider assembly (5) is removed.
3. Remove pump and holding plate from vise. Remove two nuts, lockwashers, flat washers and bolts (6), and remove holding plate (7).



03i153m

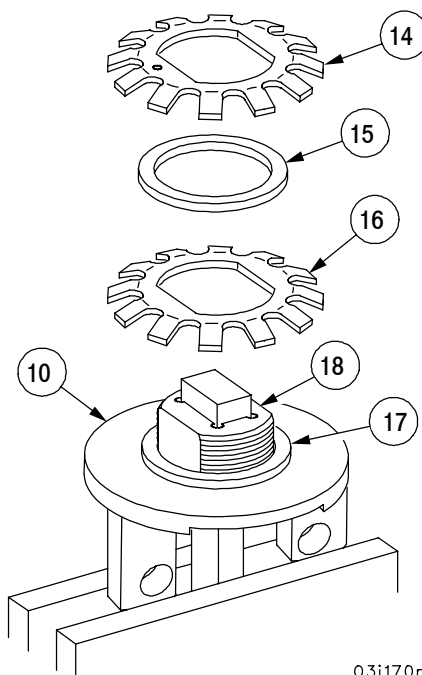
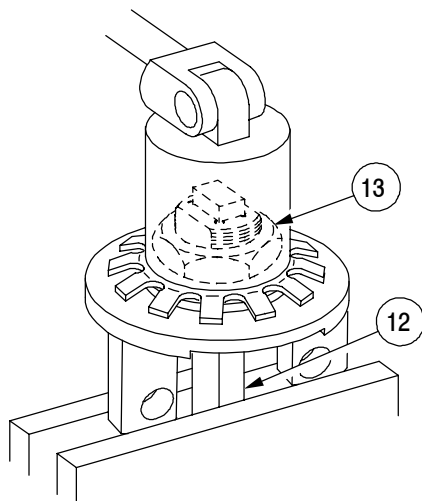
**GOVERNOR WEIGHTS AND SPIDER ASSEMBLIES REPAIR - CONTINUED****0028 00****Disassembly**

1. Place weight and spider assembly (5) on arbor press with press plates supporting the weight assemblies (8).
2. Using an arbor, press weight pins (9) from spider (10) and weights (8).
3. Remove weights (8) and flat washers (11). Discard flat washers.



**GOVERNOR WEIGHTS AND SPIDER ASSEMBLIES REPAIR - CONTINUED****0028 00****Disassembly - Continued**

4. Place holding bar (12) in vise. Place spider (10) over bar.
5. Using 1-3/8 in. socket and handle, remove adjusting nut (13).
6. Remove outer disk (14), ring spacer (15), and inner disk (16).
7. Remove ring spacers (17). Using outside micrometer, measure and record total thickness of spacers. Discard spacers.
8. Remove spider (10) from hub (18).



031170ma

**Cleaning****WARNING**

Cleaning solvent is flammable. Use only in well ventilated areas. Keep away from flame, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when using to prevent skin irritation.

1. Clean all parts using solvent.
2. Wipe dry with clean lint-free cloth.

**Inspection**

1. Inspect nut (13), spider (2), hub (3), weights (8), and pins (9) for cracks, scratches, scoring, or raised metal using magnifying glass and strong light.
2. Inspect threads on nut (13) and hub (3). Inspect face (19) of spider (2) for evidence of wear pattern. Replace parts if cracked or if threads are damaged. Replace spider if wear pattern is evident.

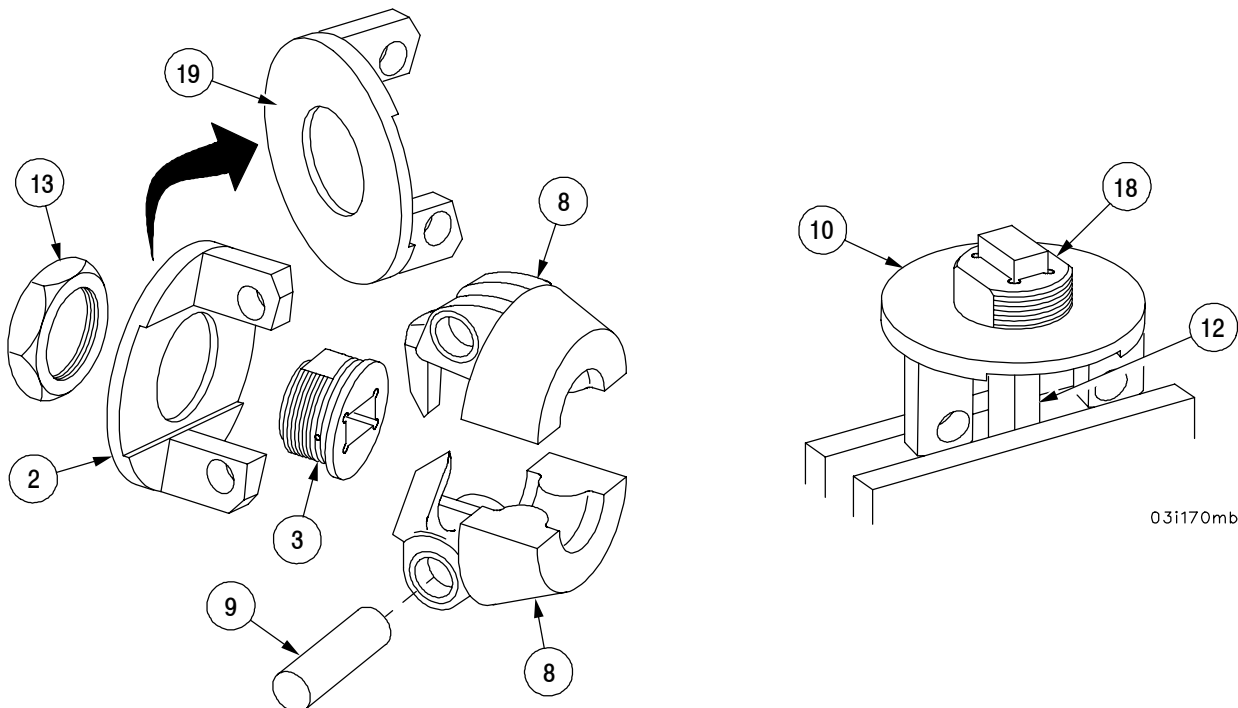
**Repair**

1. Smooth small nicks or raised metal using a fine mill file.
2. No other repairs are authorized for these parts.

**Assembly****NOTE**

Coat all parts with a light film of engine oil.

1. Place holding bar (12) in vise.
2. Place hub (18) on bar (12). Place spider (10) on hub (18).



031170mb

## Assembly - Continued

**NOTE**

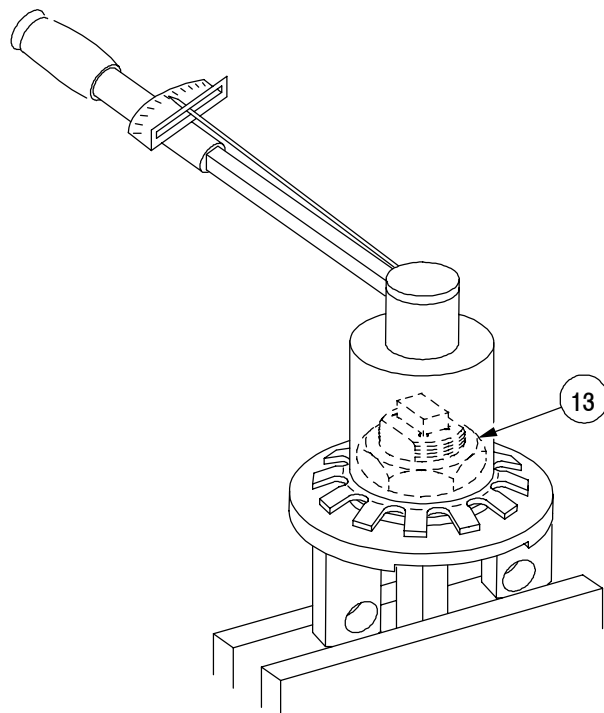
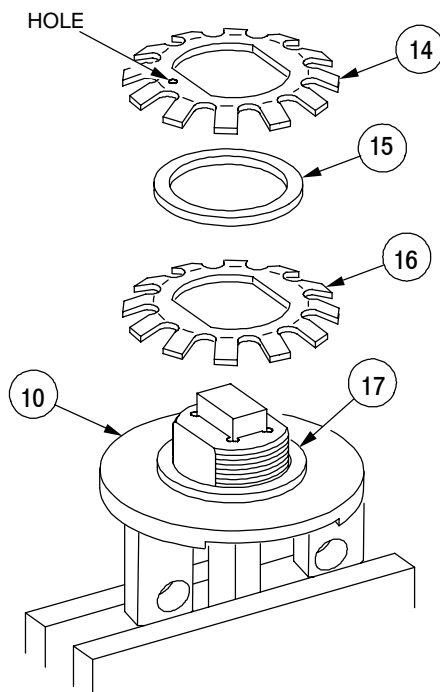
Ring spacers are available in seven different thicknesses ranging from 0.005 to 0.065 in. (0.127 to 1.65 mm).

3. Install new spacers (15), of the same thickness (recorded at disassembly) as the ones removed.

**NOTE**

The outer disk can be identified by the 1/8 in. (3.18 mm) hole.

4. Install new inner disk (16) on spider (10).
5. Install new 0.035 in. (0.89 mm) thick ring spacer (15) on inner disk (16).
6. Install new outer disk (14) over ring spacer (15).
7. Using 1-3/8 in. socket, torque wrench, and adapter, install adjusting nut (13). Torque to 80 to 85 lb-ft (108 to 115 N•m).

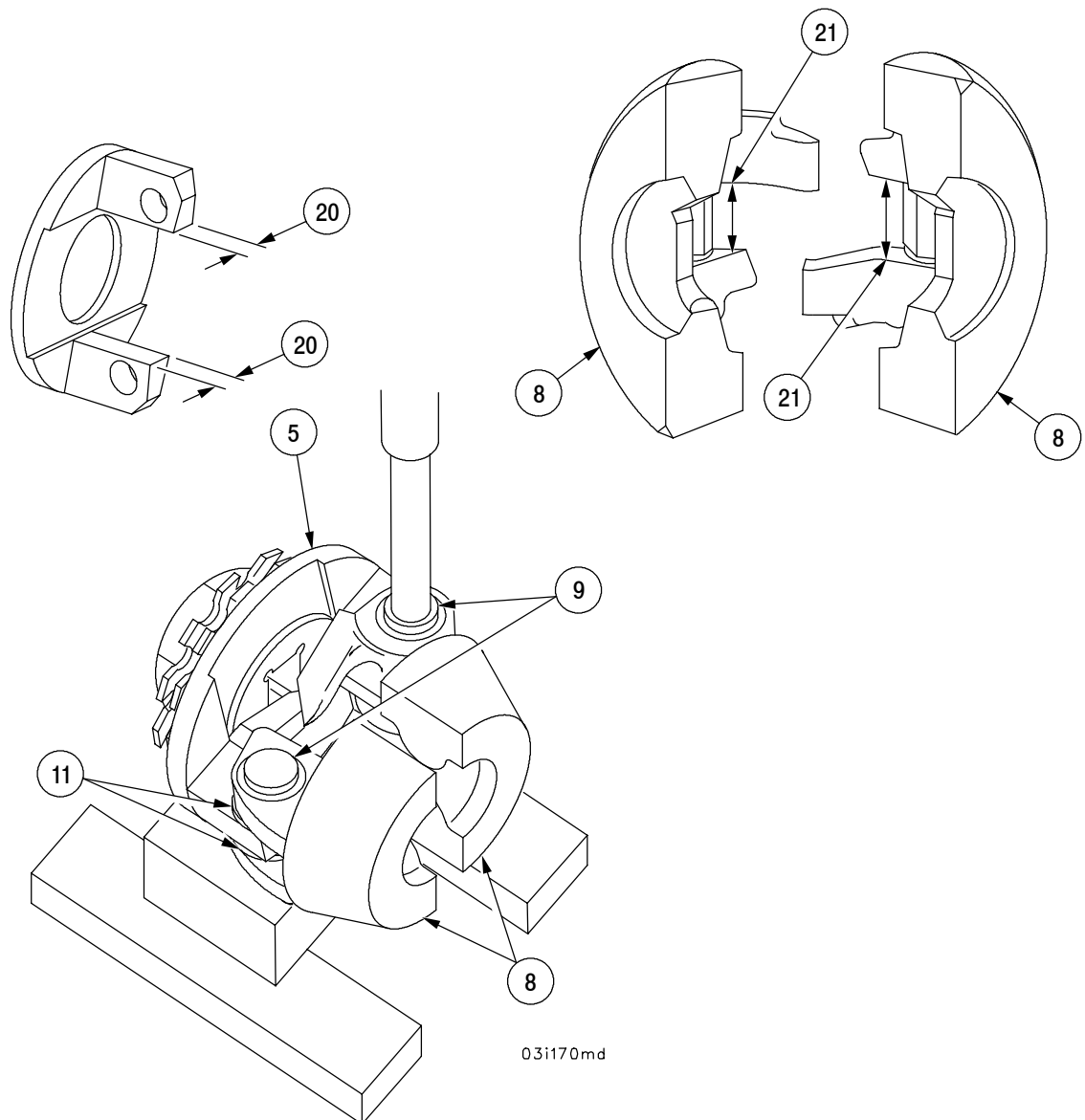


03i170mc



**GOVERNOR WEIGHTS AND SPIDER ASSEMBLIES REPAIR - CONTINUED****0028 00****Assembly - Continued**

8. Using outside micrometer, measure and record thickness of legs (20) on spider.
9. Using inside micrometer, measure and record recess (21) between weight extensions of weights (8).
10. Subtract leg dimension from weight recess dimension. The resulting dimension is total clearance between spider and weight.
11. Select new flat washers to obtain thickness of 0.004 to 0.006 in. (0.10 to 0.15 mm) less than resulting total clearance determined in step above.
12. Place spider assembly (5) on arbor press.
13. Position weight (8) on spider (5) and slide one preselected flat washer (11) on each side of spider leg. Align flat washers so that weight pins (9) can be pressed through spider and weights.
14. Using an arbor, install pin (9) and press pin until it is centered on weights (equal extension both sides).
15. Repeat steps 1 through 5 to install remaining pin and washer.



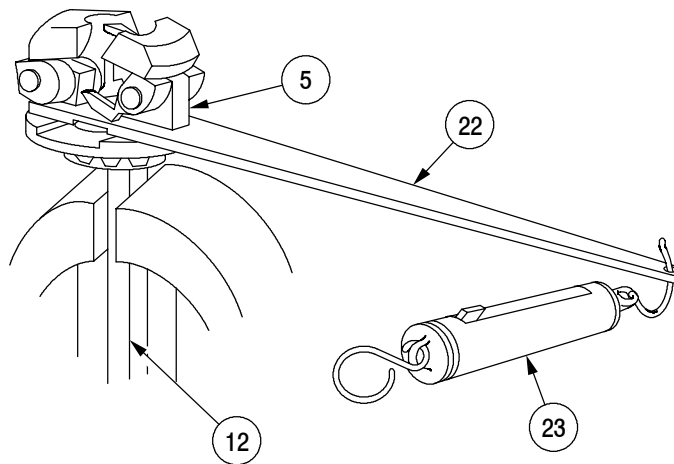
**GOVERNOR WEIGHTS AND SPIDER ASSEMBLIES REPAIR - CONTINUED****0028 00****Assembly - Continued**

16. Place holder bar (12) in vise. Place governor weight and spider assembly (5) on bar.
17. Using authorized manual torque lever (22) and calibrated spring scale (23), turn spider (5) one complete revolution (360 degrees) with a steady pull. Read scale with torque lever in motion. New assembled and/or reassembled units, the scale must read between 6.0-8.0 lb (2.72-3.63 kg). As these units run through various stages of calibration and field use, the mating contact parts (hub, friction spider, and spring toes) burnish themselves to each other resulting in a slight settle down of friction resistance. An acceptable service check would be 3.75-6.0 lb (1.70-2.72 kg).

**NOTE**

Rotating parts must be coated with engine oil to assure accuracy of friction resistance.

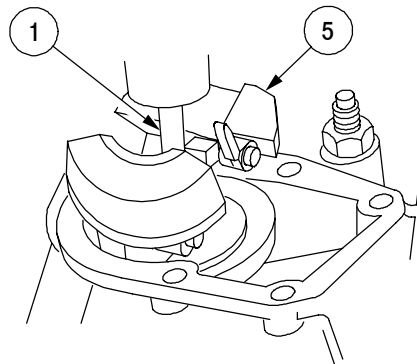
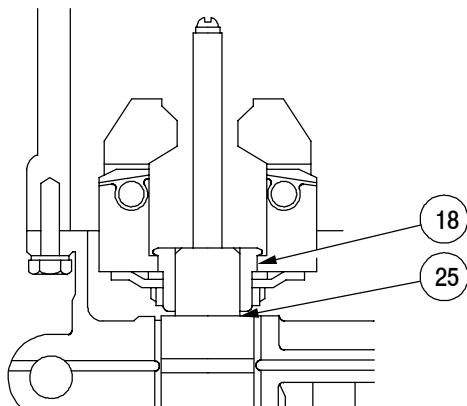
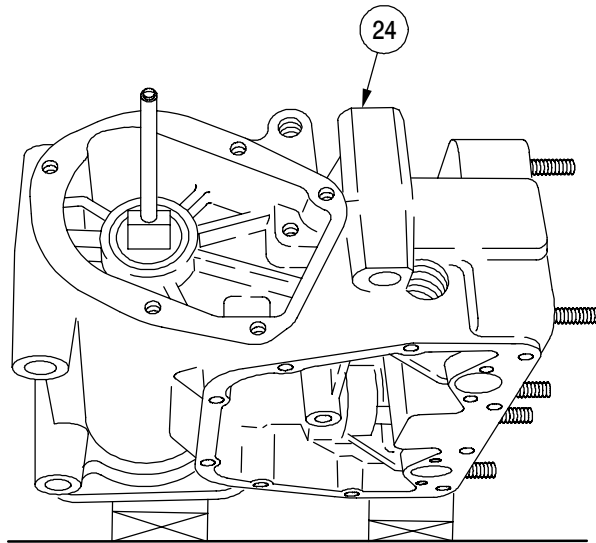
18. If scale reading is more than 8.0 lb (3.63 kg) on a reassembled unit, disassemble and use a thicker ring spacer (assembly steps 3 through 7).
19. If reading is less than 6.0 lb (2.72 kg) on a reassembled unit, or 3.75 lb (1.70 kg) in a service check of a previously run unit, disassemble and use a thicker ring spacer (assembly steps 3 through 7).
20. Repeat steps 15 through 18 until correct scale reading is obtained.



03i173m

**GOVERNOR WEIGHTS AND SPIDER ASSEMBLIES REPAIR - CONTINUED****0028 00****Installation**

1. Using press plates, position pump housing (24) on arbor press with rear (camshaft drive) end down. Position plates on each side of camshaft.
2. Position weight and spider (5) on governor end of camshaft.
3. Using remover and replacer (1), press weight and spider on governor end of camshaft until governor hub (18) contacts camshaft shoulder (25).



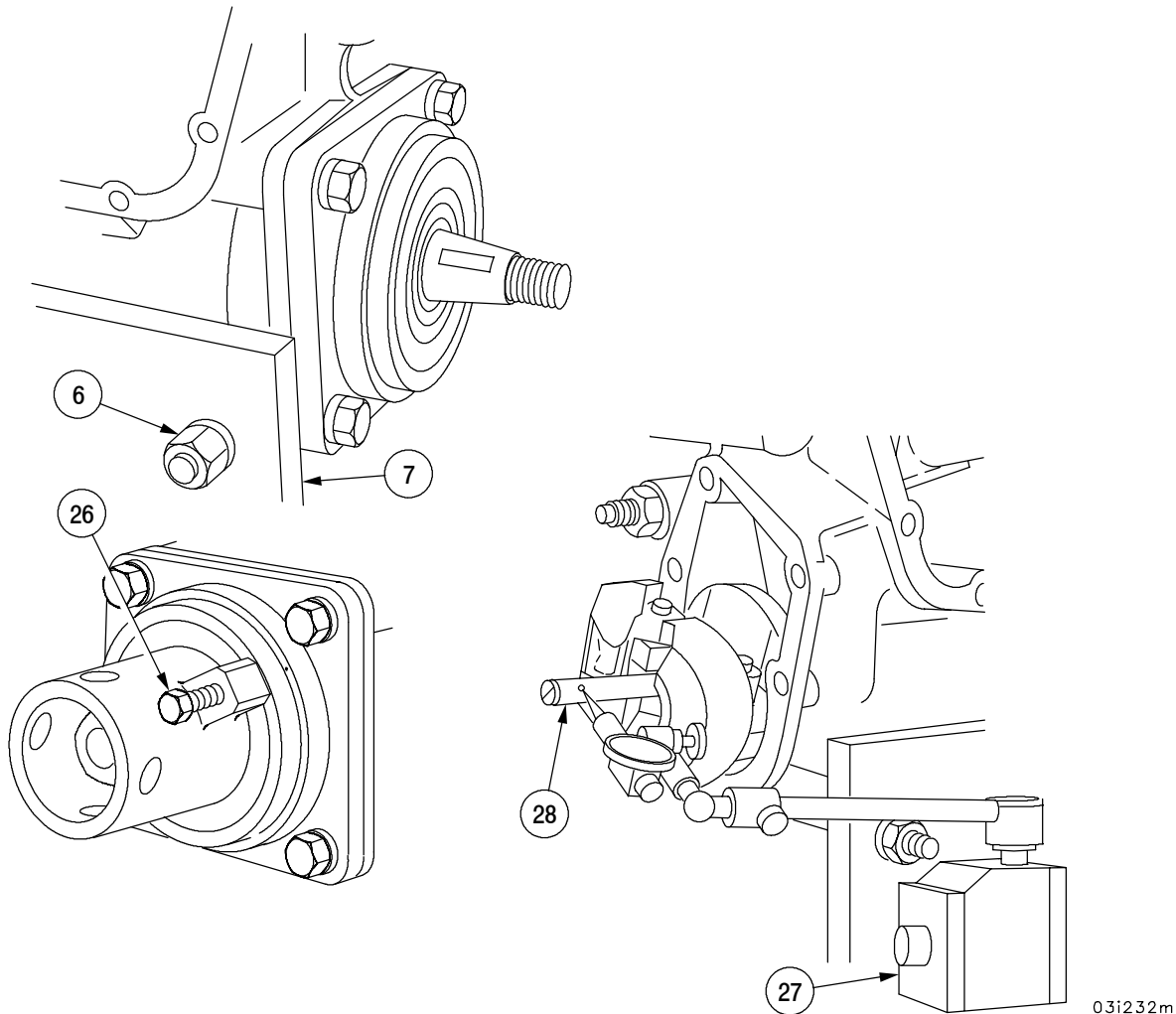
03i233m

**GOVERNOR WEIGHTS AND SPIDER ASSEMBLIES REPAIR - CONTINUED****0028 00****Installation - Continued**

4. Place holding plate (7) on pump housing front mounting holes.
5. Install two bolts, flat washers, lockwashers, and nuts (6). Using 1/2 in. box end wrench, tighten nuts.
6. Place holding plate (and housing) in vise.
7. Using 7/16 in. box end wrench, loosen locking screw (26).
8. Mount dial indicator (27) on holding plate, with indicator against governor end of camshaft (28). Adjust dial to zero.
9. Rotate camshaft and note dial reading. Proceed with assembly procedure if runout does not exceed 0.003 in. (0.08 mm). If runout is up to 0.004 in. (0.10 mm), try to straighten shaft by tapping gently with plastic insert hammer. If shaft cannot be straightened to 0.003 in. (0.08 mm) or less, replace camshaft (WP 0032 00).

**NOTE**

Do not attempt to straighten camshaft if runout exceeds 0.004 in. (0.10 mm).

**NOTE**

**FOLLOW-ON MAINTENANCE:**  
Install governor housing (WP 0022 00)

**END OF WORK PACKAGE**

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**GEAR SHAFT ASSEMBLIES AND PLUGS REPAIR**

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**0029 00****THIS WORK PACKAGE COVERS:**Removal, Disassembly, Cleaning, Inspection, Repair, Assembly, Installation

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**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)  
Automotive fuel and electrical system repair tool kit  
(item 56, WP 0042 00)  
Mechanical puller (item 45, WP 0042 00)  
Remover and replacer (item 46, WP 0042 00)  
Magnifying glass (item 24, WP 0042 00)  
Micrometer, 1 in. OD (item 29, WP 0042 00)  
Arbor press and press plates (item 3, WP 0042 00)  
Torque wrench (item 63, WP 0042 00)  
Fine mill file (item 13, WP 0042 00)  
Telescope gauge (item 21, WP 0042 00)  
External retaining ring pliers (item 38, WP 0042 00)  
Socket wrench (item 13, WP 0042 00)  
Turning and holding wrench (item 64, WP 0042 00)  
Steel rod (item 47, WP 0042 00)

**Materials/Parts**

Engine oil (item 3, WP 0041 00)  
Dry-cleaning solvent (item 7, WP 0041 00)  
Wiping rags (item 4, WP 0041 00)  
Bearing plate wire (item 11, WP 0041 00)  
Retaining ring  
Preformed packing (2) and flat washer (2) from gasket  
and preformed packing set, Part No. 5702632

**Equipment Conditions**

Head assembly removed (WP 0025 00 or  
WP 0026 00)  
Governor housing removed (WP 0022 00)

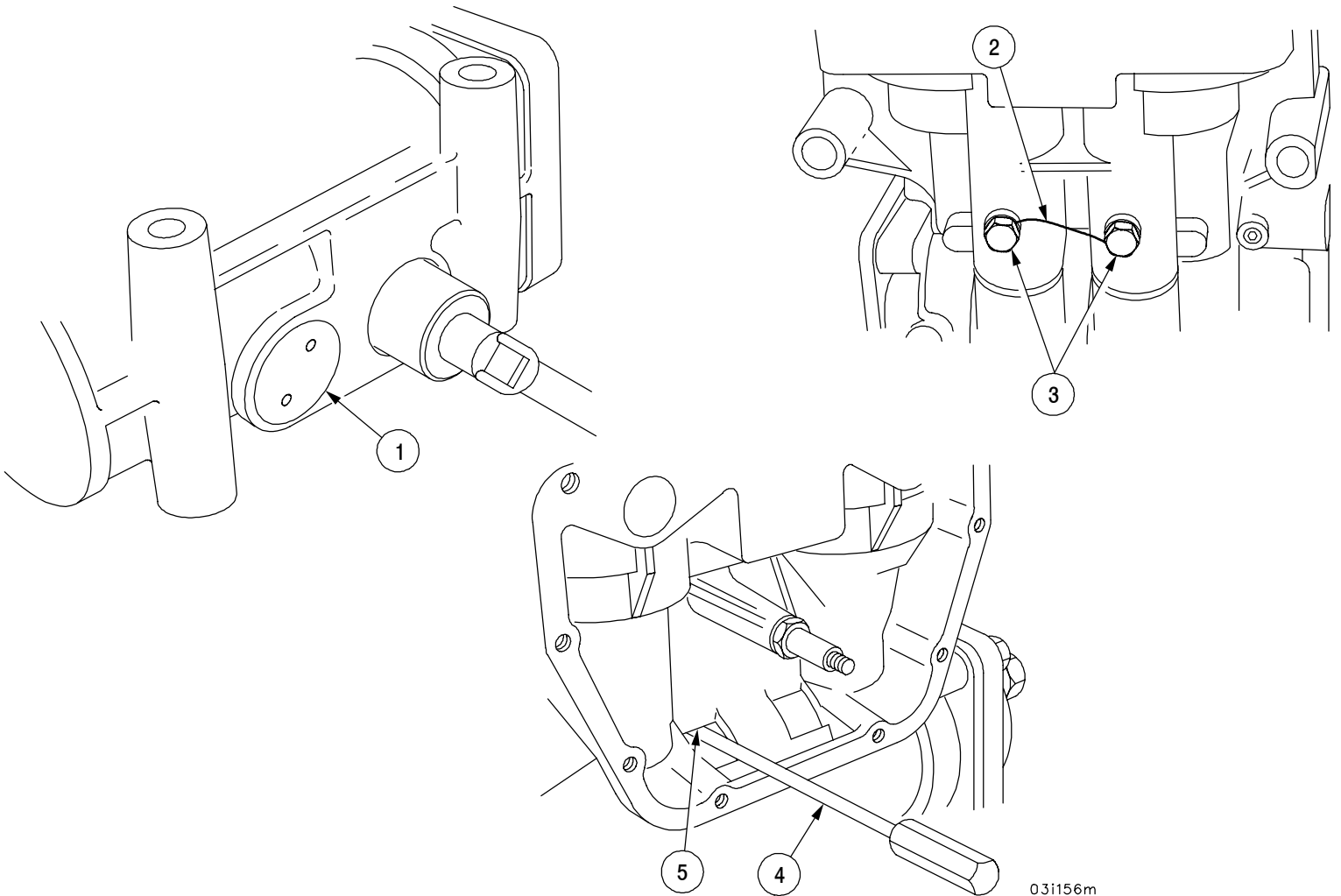
**References**

WP 0022 00  
WP 0025 00  
WP 0026 00

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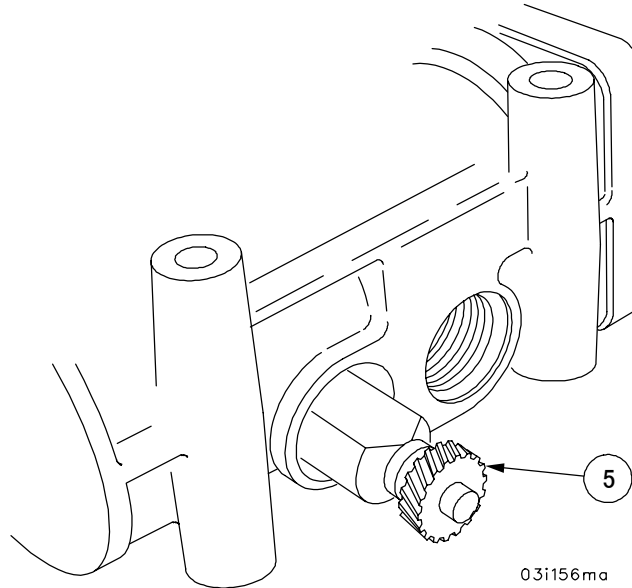
**GEAR SHAFT ASSEMBLIES AND PLUGS REPAIR - CONTINUED****0029 00****Removal**

1. Using face wrench socket and handle, remove two gear shaft assembly plugs (1). Remove and discard two pre-formed packings.
2. Using diagonal cutting pliers, cut and remove wire (2).
3. Using 7/16 in. box end wrench, remove two machine bolts and flat washers (3). Discard flat washers.
4. Using flat tip screwdriver (4), position flat side of gear shaft assembly (5) toward front of pump.



**GEAR SHAFT ASSEMBLIES AND PLUGS REPAIR - CONTINUED****0029 00****Removal - Continued**

5. Remove No. 2 (governor end) gear shaft assembly (5).
6. Remove No. 1 drive end gear shaft assembly by repeating steps 1 through 5.



**GEAR SHAFT ASSEMBLIES AND PLUGS REPAIR - CONTINUED****0029 00****Disassembly**

1. Using retaining ring pliers, remove and discard retaining ring (6).

**NOTE**

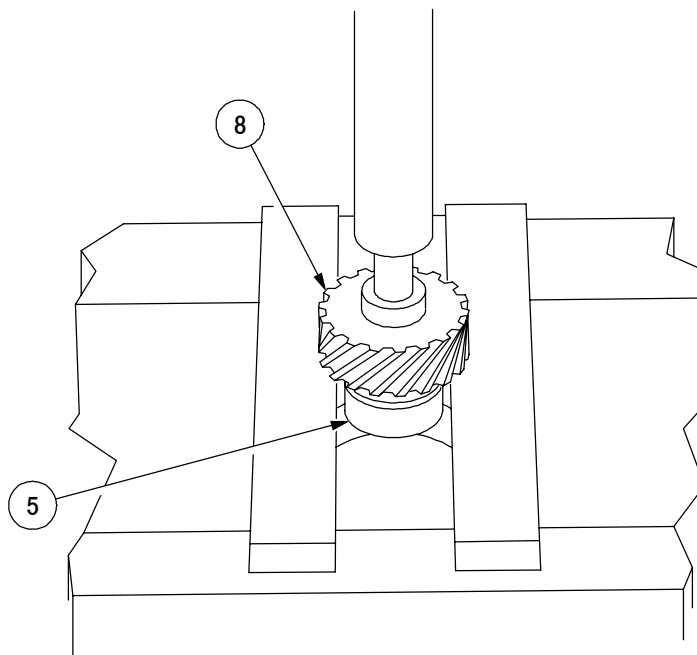
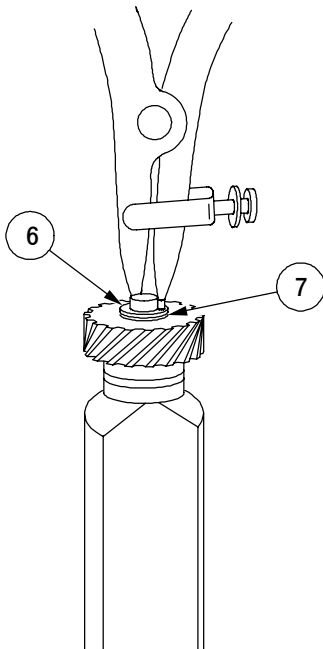
Gear shaft assembly may or may not have a ring spacer.

2. Remove retaining ring spacer (7).

**NOTE**

The driven helical gear is identified as the gear at grooved end of bushing assembly.

3. Place gear shaft assembly (5) on arbor press with press plates under driven gear (8).
4. Using arbor, press shaft from gear (8).



03i167m



**GEAR SHAFT ASSEMBLIES AND PLUGS REPAIR - CONTINUED****0029 00****Disassembly - Continued**

5. Remove Woodruff key (9) from shaft (5).
6. Remove shaft (5) from bushing assembly (10).

**Cleaning****WARNING**

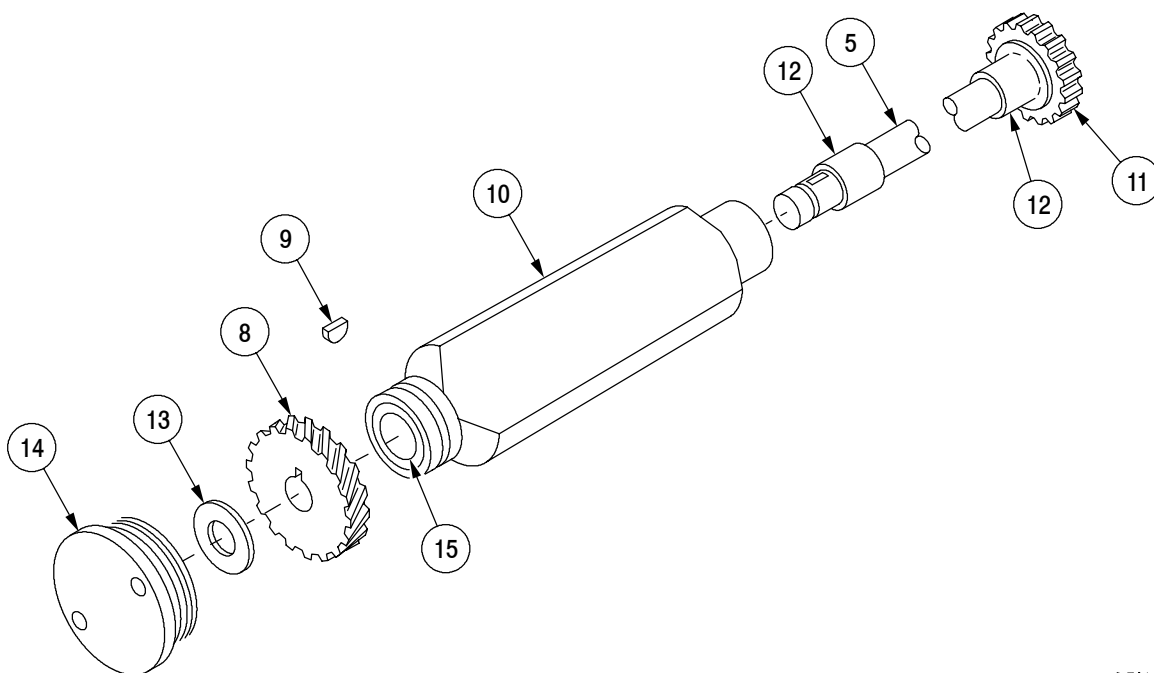
Cleaning solvent is flammable. Use only in well ventilated areas. Keep away from flame, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when using to prevent skin irritation.

1. Clean all parts using solvent.
2. Wipe dry using clean lint-free cloth.

**Inspection****NOTE**

Ring spacer may or may not be present.

1. Inspect shaft (5), bushing assembly (10), and gears (8) and (11) for cracks, scratches or scoring using a magnifying glass and strong light. Inspect bearing journals (12), gears (8) and (11), key (9), and spacer (13) for damage. Replace gear shaft assembly if any parts are damaged.
2. Measure shaft bearing journal diameters (12) using a micrometer. Replace gear shaft assembly (5) if journal diameter is less than 0.4370 in. (11.1 mm).
3. Inspect key (9) for damage. Inspect plug (14) for damaged threads. Replace damaged key or plug.
4. Measure bushing sleeve bearing bore diameter (15) using telescope gauge and micrometer. Replace gear shaft assembly if bore diameter exceeds 0.440 in. (11.18 mm).



03i168m

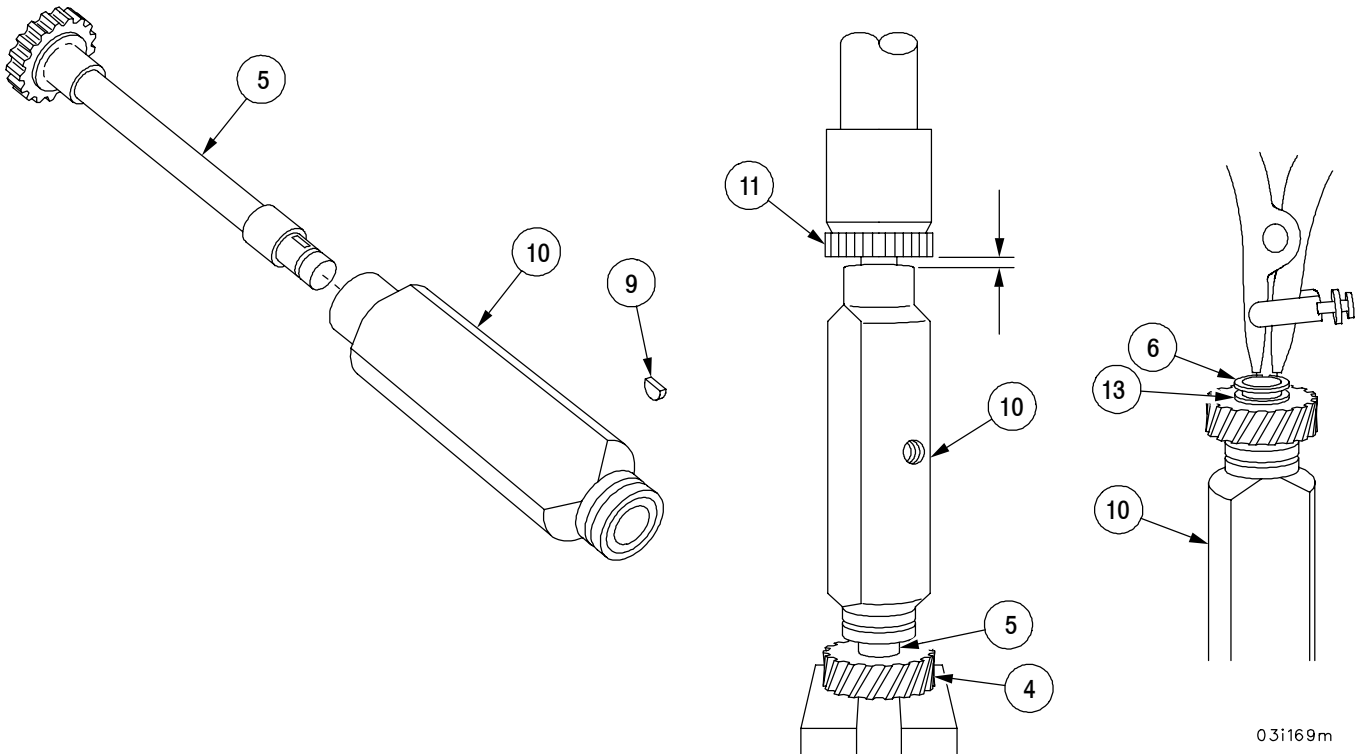
**GEAR SHAFT ASSEMBLIES AND PLUGS REPAIR - CONTINUED****0029 00****Repair**

1. Smooth small nicks or raised metal using a fine mill file.
2. No other repairs are authorized for these parts.

**Assembly****NOTE**

Coat all parts with a light film of engine oil.

1. Install shaft (5) in plain (ungrooved) end of bushing assembly (10).
2. Install Woodruff key (9) in shaft (5).
3. Place driven gear (8) on arbor press with identifying surface face down. Align key (9) with keyway in driven gear (8).
4. Using arbor press, press shaft (5) into gear (8). Using a feeler gauge, maintain 0.0010 to 0.0085 in. (0.025 to 0.216 mm) clearance between drive gear (11) and bushing (10).
5. Install spacer (13) on shaft, if applicable. Using retaining ring pliers, install new retaining ring (6).

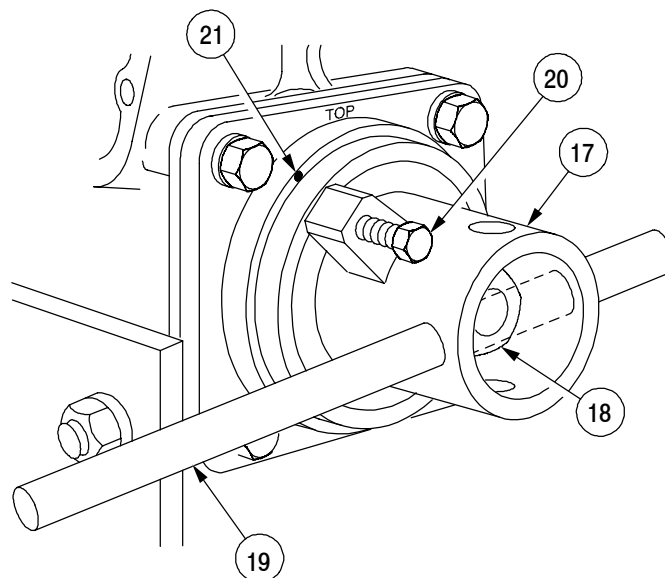
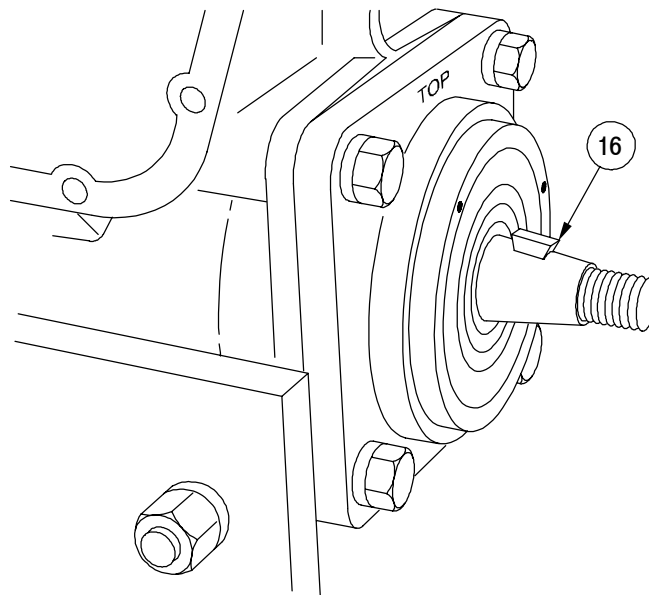


## Installation

**NOTE**

Coat all loose metal parts with light film of engine oil.

1. Install Woodruff key (16) in camshaft.
2. Align keyway slot in camshaft turning and holding wrench (17) with Woodruff key (16) and install wrench on camshaft. Using 1 1/16 in. deep well socket, ratchet handle, and adapter, secure wrench with lockwasher and plain nut (18).
3. Using steel rod (19), turn wrench (17) counterclockwise to align locking screw (20) on wrench with No. 2 punch mark (21) on bearing retaining plate. Using 7/16 in. box end wrench, tighten locking screw (20).



03i254m

**GEAR SHAFT ASSEMBLIES AND PLUGS REPAIR - CONTINUED**

**0029 00**

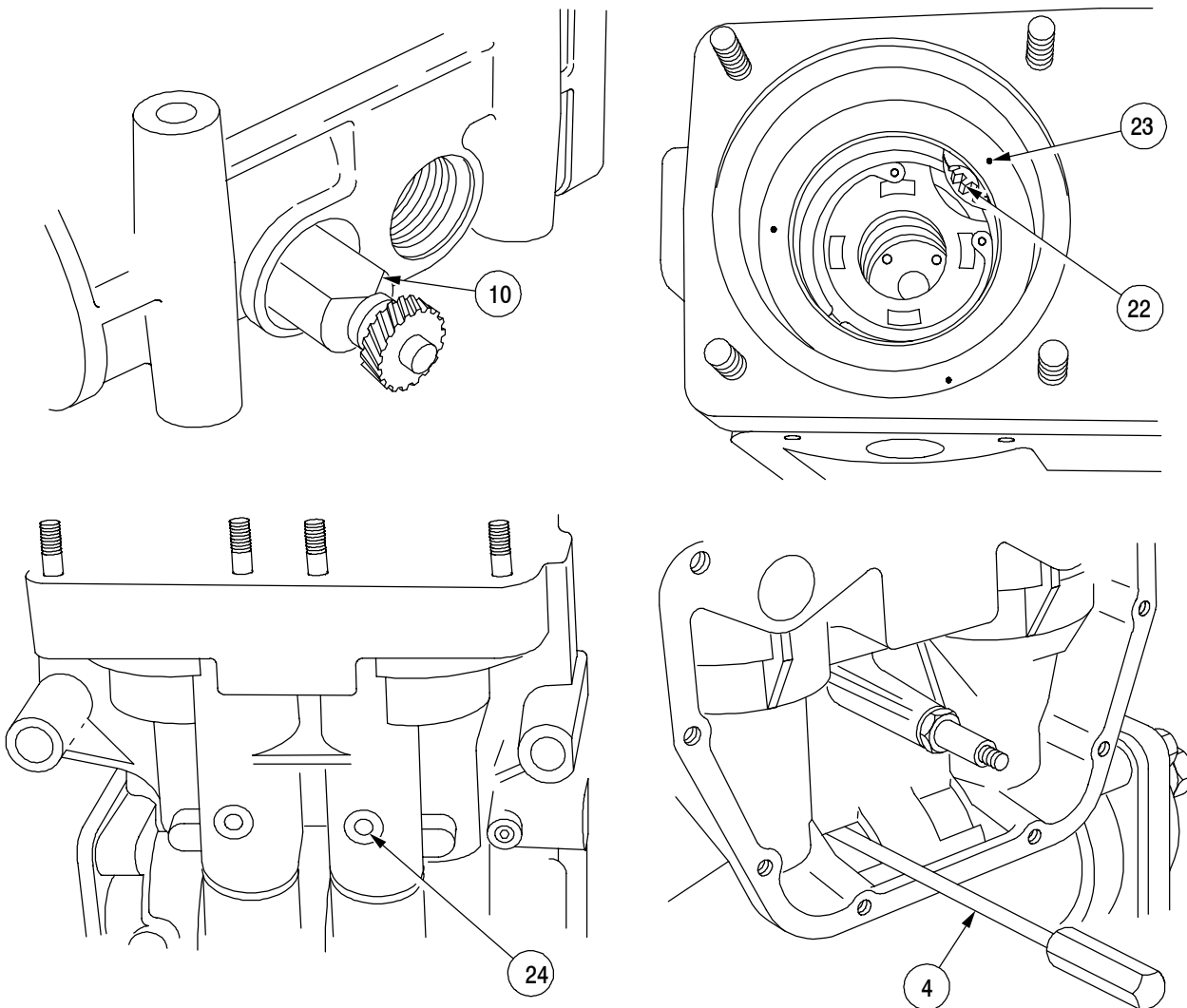
**Installation - Continued**

4. Install fixed gear end of gear shaft assembly for No. 2 head assembly (right bank) in housing, with flat side of bushing (10) toward right side of pump.

**NOTE**

It may be necessary to remove the holding plate before installing gear shafts.

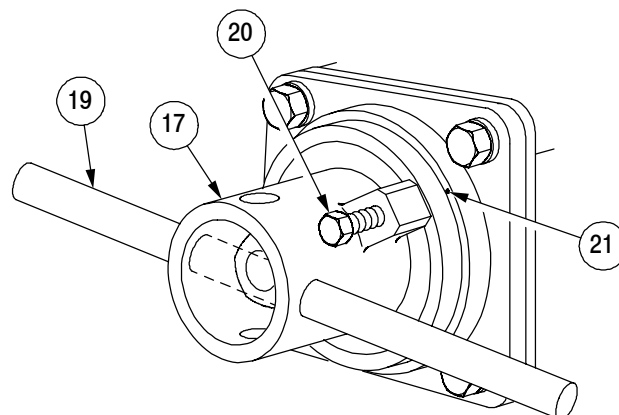
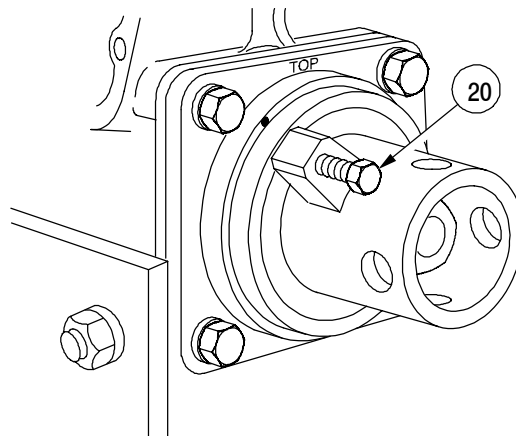
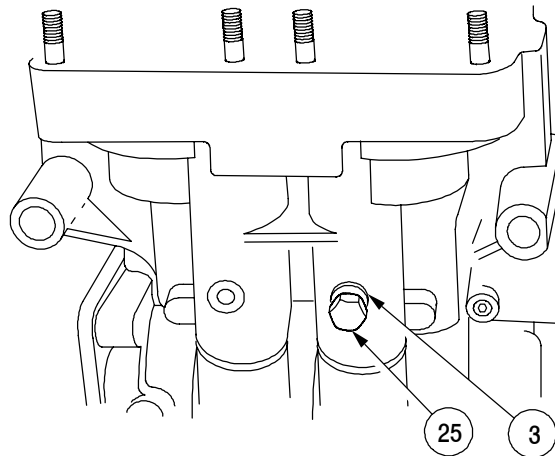
5. While viewing gear shaft from top of pump, align exposed tooth (22) with punch mark (23) in the head assembly opening.
6. While maintaining this gear position (22), use screwdriver (4) to rotate gear shaft bushing until threaded hole in bushing is aligned with attaching hole (24) in rear of pump housing.



031229m

**GEAR SHAFT ASSEMBLIES AND PLUGS REPAIR - CONTINUED****Installation - Continued**

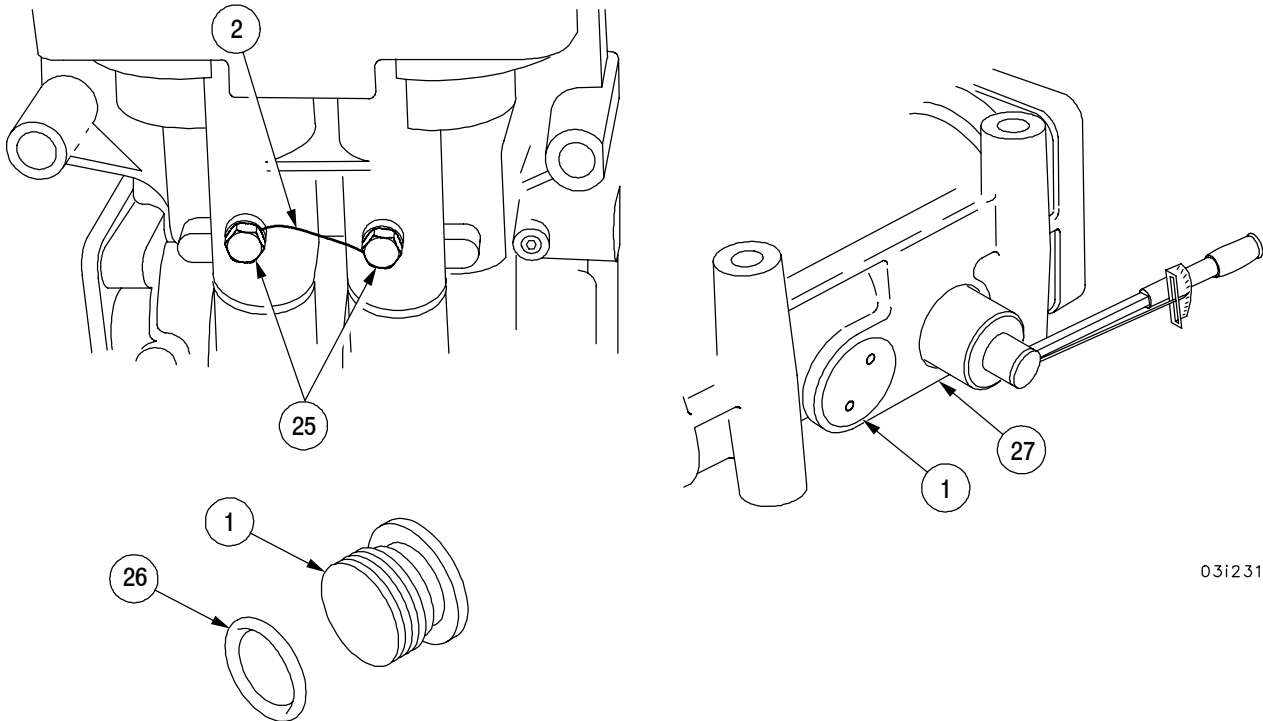
7. Install new flat washer (3) and machine bolt (25) finger-tight.
8. Using 7/16 in. box end wrench, loosen locking screw (20).
9. Using rod (19), turn wrench (17) clockwise 1/4 turn (90 degrees) until locking screw (20) is aligned with No. 1 punch mark (21) on bearing retaining plate.
10. Using 7/16 in. box end wrench, tighten locking screw (20).
11. Install gear shaft assembly for No. 1 head assembly (left bank) by repeating steps 1 through 10 above.



03i230m

**GEAR SHAFT ASSEMBLIES AND PLUGS REPAIR - CONTINUED****0029 00****Installation - Continued**

12. Using 7/16 in. socket and torque wrench, tighten bolts (25) to 80 to 90 lb-ft (109 to 122 N•m).
13. Secure bolts (25) with twisted wire (2).
14. Install new preformed packing (26) on both quill shaft plugs (1) and install in bottom of pump housing (27).
15. Using face wrench socket and torque wrench, tighten plugs (1) to 90 to 95 lb-ft (122 to 129 N•m).



03i231m

**NOTE****FOLLOW-ON MAINTENANCE:**

Install governor housing (WP 0022 00)

Install head assemblies (WP 0025 00 or WP 0026 00)

**END OF WORK PACKAGE**

**RETAINING PLATE AND SEAL REPAIR****0030 00****THIS WORK PACKAGE COVERS:**

Removal, Disassembly, Cleaning, Inspection, Repair, Assembly, Installation

**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)  
Automotive fuel and electrical system repair tool kit  
(item 56, WP 0042 00)  
Magnifying glass (item 24, WP 0042 00)  
Arbor press and press plates (item 3, WP 0042 00)  
Bristle brush (item 6, WP 0042 00)  
Fine mill file (item 13, WP 0042 00)  
Torque wrench (item 63, WP 0042 00)

**Materials/Parts**

Engine oil (item 3, WP 0041 00)  
Dry cleaning solvent (item 7, WP 0041 00)  
Seal from gasket and preformed packing set, Part No.  
5702632

**Equipment Conditions**

Injection pump housing removed (WP 0031 00)

**References**

WP 0031 00

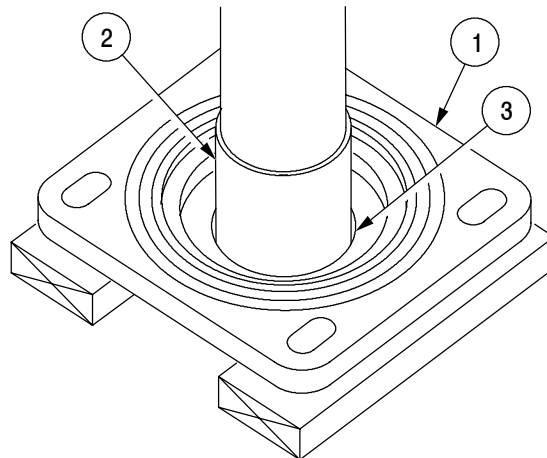
WP 0032 00

**Removal**

Remove retaining plate (1) (WP 0032 00).

**Disassembly**

1. Place retaining plate (1) on arbor press.
2. Using a 1-1/2 in. diameter pressing arbor (2), press seal (3) from plate. Discard seal.



03i162mb

**RETAINING PLATE AND SEAL REPAIR - CONTINUED****0030 00****Cleaning****WARNING**

Cleaning solvent is flammable. Use only in well ventilated areas. Keep away from flame, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when using to prevent skin irritation.

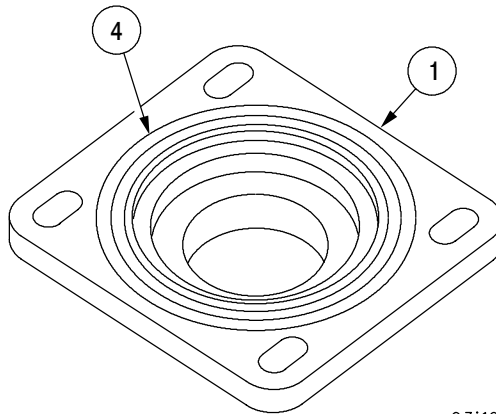
1. Clean plate using bristle brush moistened with solvent.
2. Wipe dry with clean lint-free cloth.

**Inspection**

1. Inspect plate (1) for cracks using strong light and magnifying glass.
2. Look for raised metal, distorted, or warped mounting flange (4).
3. Replace plate if cracked, or if mounting flange is distorted.

**Repair**

1. Smooth small nicks or raised metal with a fine mill file.
2. No other repairs are authorized.



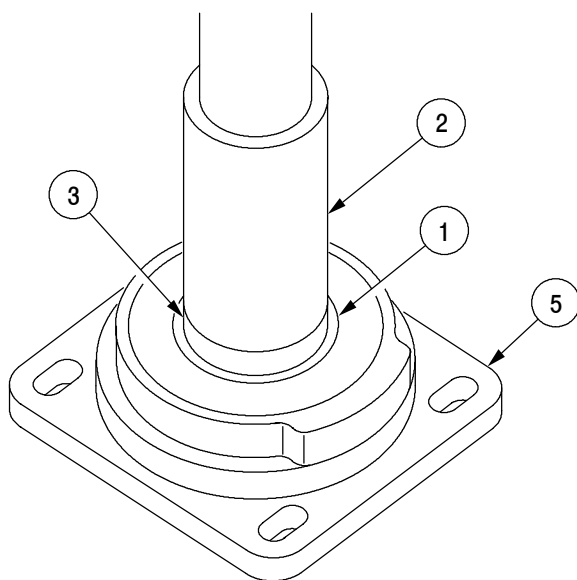
03i162m



**RETAINING PLATE AND SEAL REPAIR - CONTINUED****0030 00****Assembly****NOTE**

Coat plate seal, preformed packing and shaft with a light film of engine oil.

1. Place plate on arbor press with mounting flange (5) down.
2. Place new seal (3) over bore with metal face up.
3. Using 1-1/2 in. diameter pressing arbor (2), press seal until flush with top surface of plate (1).



03i422m

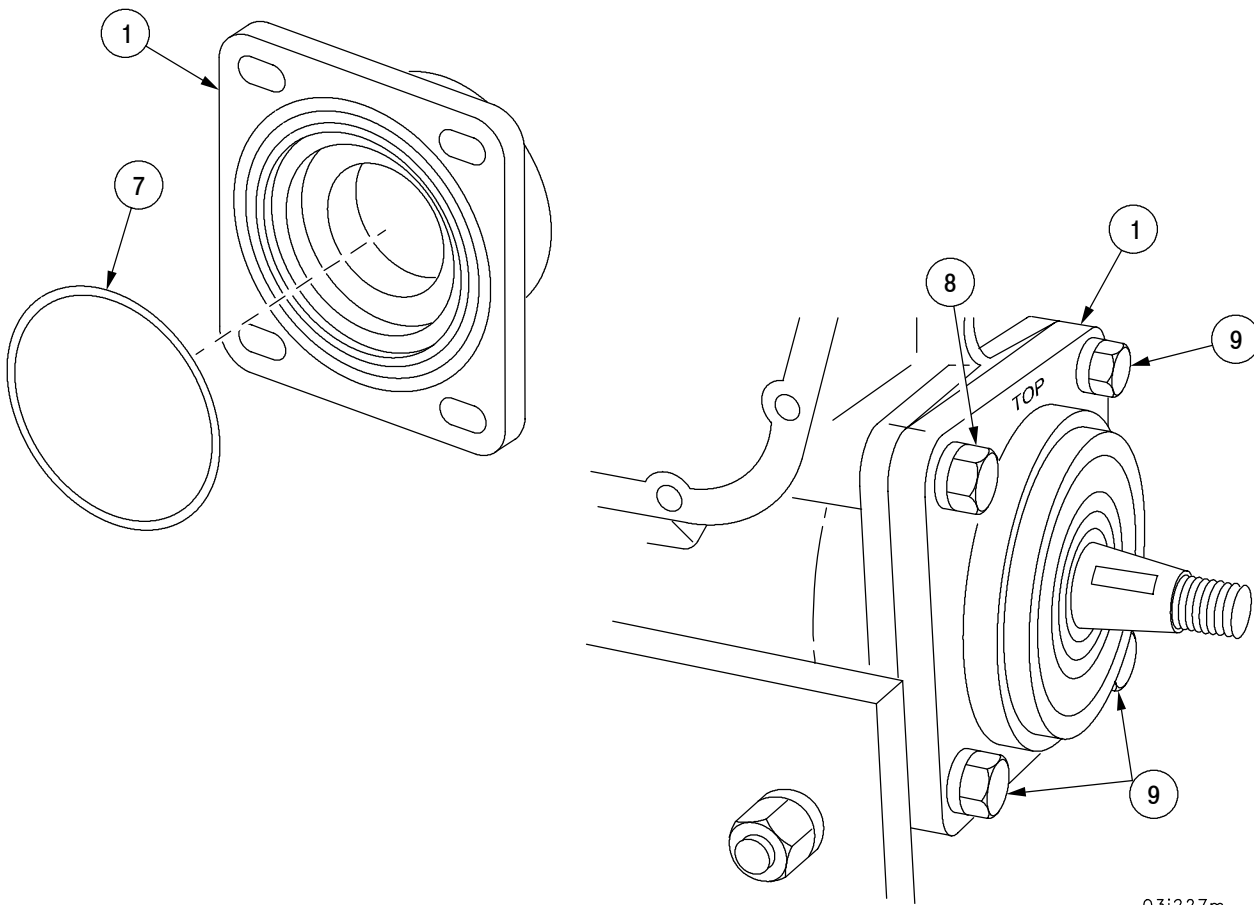
**RETAINING PLATE AND SEAL REPAIR - CONTINUED****0030 00****Installation**

1. Install new preformed packing (7) in groove in bearing retaining plate (1).
2. Install plate (with seal) (1) on pump with word "TOP" in upper position.

**NOTE**

Coat shouldered bolt, standard bolts, and lockwashers with a light film of engine oil.

3. Install one shouldered bolt and lockwasher (8) in upper left bolt hole. Install three standard bolts and lockwashers (9) in remaining holes.
4. Tighten bolts evenly and torque to 18 to 20 lb-ft (24.5 to 27 N•m) using 9/16 in. socket, extension, and torque wrench.



03i227m

**NOTE**

**FOLLOW-ON MAINTENANCE:**  
Install injection pump housing (WP 0031 00)

**END OF WORK PACKAGE**

**INJECTION PUMP HOUSING REPAIR****0031 00****THIS WORK PACKAGE COVERS:**

Disassembly, Cleaning, Inspection, Repair, Assembly

**INITIAL SETUP:****Tools and Special Tools**

General mechanic's tool kit (item 23, WP 0042 00)  
 Automotive fuel and electrical system repair tool kit  
 (item 56, WP 0042 00)  
 Telescope gauge (item 21, WP 0042 00)  
 Magnifying glass (item 24, WP 0042 00)  
 Micrometer, 2 in. OD (item 30, WP 0042 00)  
 Arbor press and press plates (item 3, WP 0042 00)  
 Fine mill file (item 13, WP 0042 00)  
 Bristle brush (item 6, WP 0042 00)  
 Wire probe (item 43, WP 0042 00)  
 Machinist's vise with vise jaw caps (item 58,  
 WP 0042 00)  
 Tap and die set (item 55, WP 0042 00)  
 Remover and replacer (item 46, WP 0042 00)  
 Wood blocks (item 5, WP 0042 00)

**Materials/Parts**

Engine oil (item 3, WP 0041 00)  
 Dry-cleaning solvent (item 7, WP 0041 00)  
 Wiping rags (item 4, WP 0041 00)  
 Lever screw from parts kit, Part No. 5702765

**Materials/Parts - Continued**

Ring spacer from gasket and preformed packing set,  
 Part No. 5702632  
 Sleeve bearing (if required)

**Equipment Conditions**

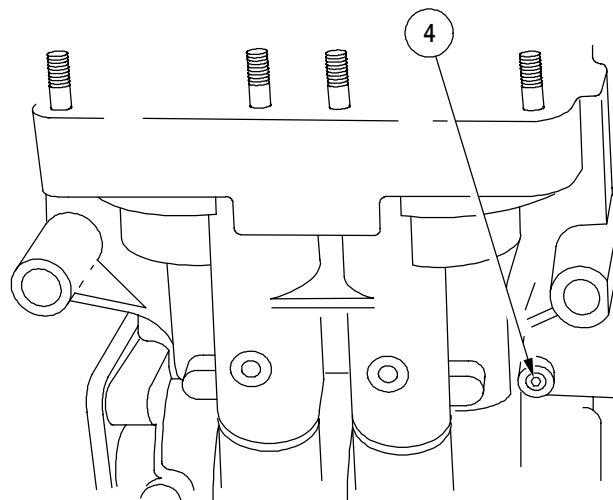
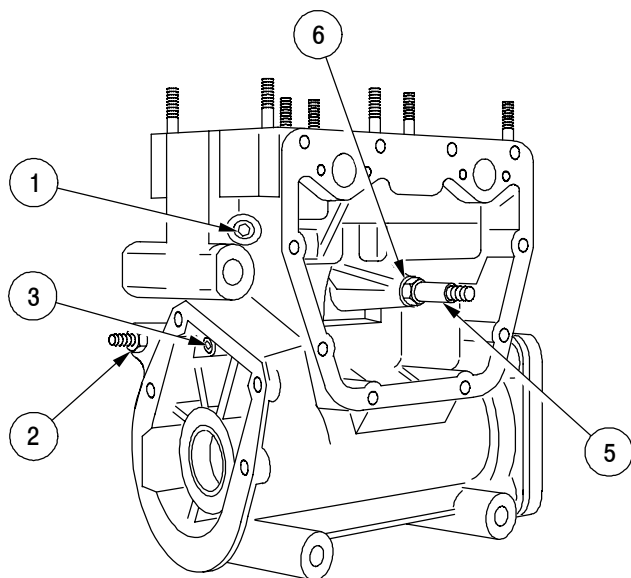
Housing and valve assembly disconnected and bleeder  
 valve stems removed (WP 0019 00)  
 Filter assembly and bleeder valve stems removed  
 (WP 0020 00)  
 Governor housing removed (WP 0022 00)  
 Head assembly No. 1 removed (WP 0026 00)  
 Head assembly No. 2 removed (WP 0025 00)  
 Camshaft and retaining plate removed (WP 0032 00)  
 Remote lever assembly and yoke removed  
 (WP 0023 00)  
 Control unit assemblies removed (WP 0024 00)

**References**

WP 0019 00	WP 0025 00
WP 0020 00	WP 0026 00
WP 0022 00	WP 0032 00
WP 0023 00	WP 0043 00
WP 0024 00	

**Disassembly**

- Using a 1/4 in. socket head screw key, remove timing screw plug (1).
- Remove and discard ring spacer.
- Using 11/16 in. box end wrench, remove oil inlet adapter (2).
- Using 5/32 in. socket head screw key, remove two pipe plugs (3) and (4).
- Using 5/8 in. deep well socket, remove and discard lever screw (5). Remove flat washer (6).



031154m

**INJECTION PUMP HOUSING REPAIR - CONTINUED****0031 00****Cleaning****WARNING**

Cleaning solvent is flammable. Use only in well ventilated areas. Keep away from flame, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when using to prevent skin irritation.

1. Immerse housing in solvent. Clean housing using bristle brush. Clean oil passages (7) with probes.

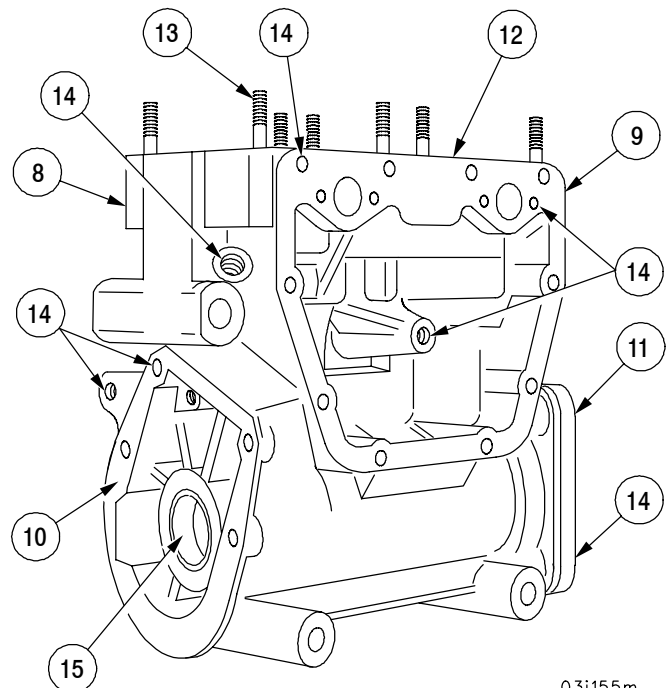
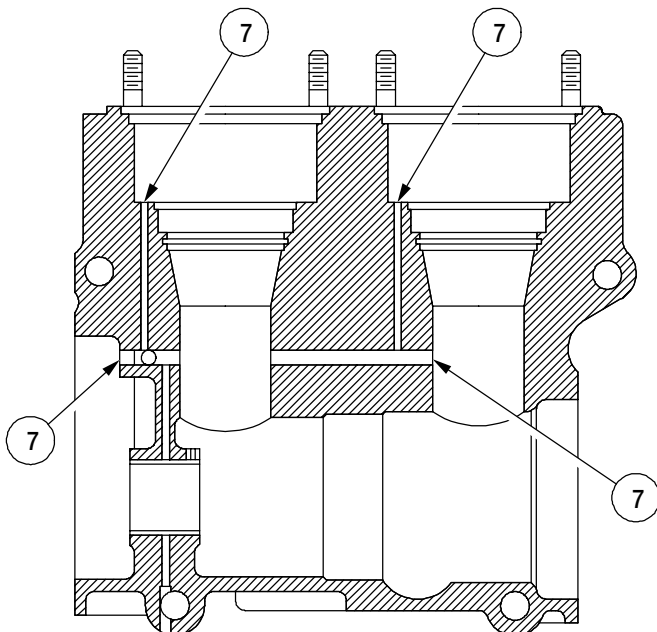
**WARNING**

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

2. Blow dry with compressed air.

**Inspection**

1. Inspect housing (8) for cracks using a strong light and magnifying glass. Look for raised metal, distorted or warped mounting flanges (9), (10), (11), and (12). Replace housing if cracked, or if mounting flanges are distorted.
2. Inspect housing (8) for missing, broken, loose, or damaged studs (13). Inspect tapped holes (14) for thread damage. Replace housing if studs are damaged, loose or missing.
3. Inspect camshaft sleeve bearing bore (15) for scratches, scoring, or looseness. Measure bore diameter (15) using telescope gauge and micrometer. Replace damaged bearing. Replace bearing if diameter exceeds 1.1920 in. (30.28 mm).



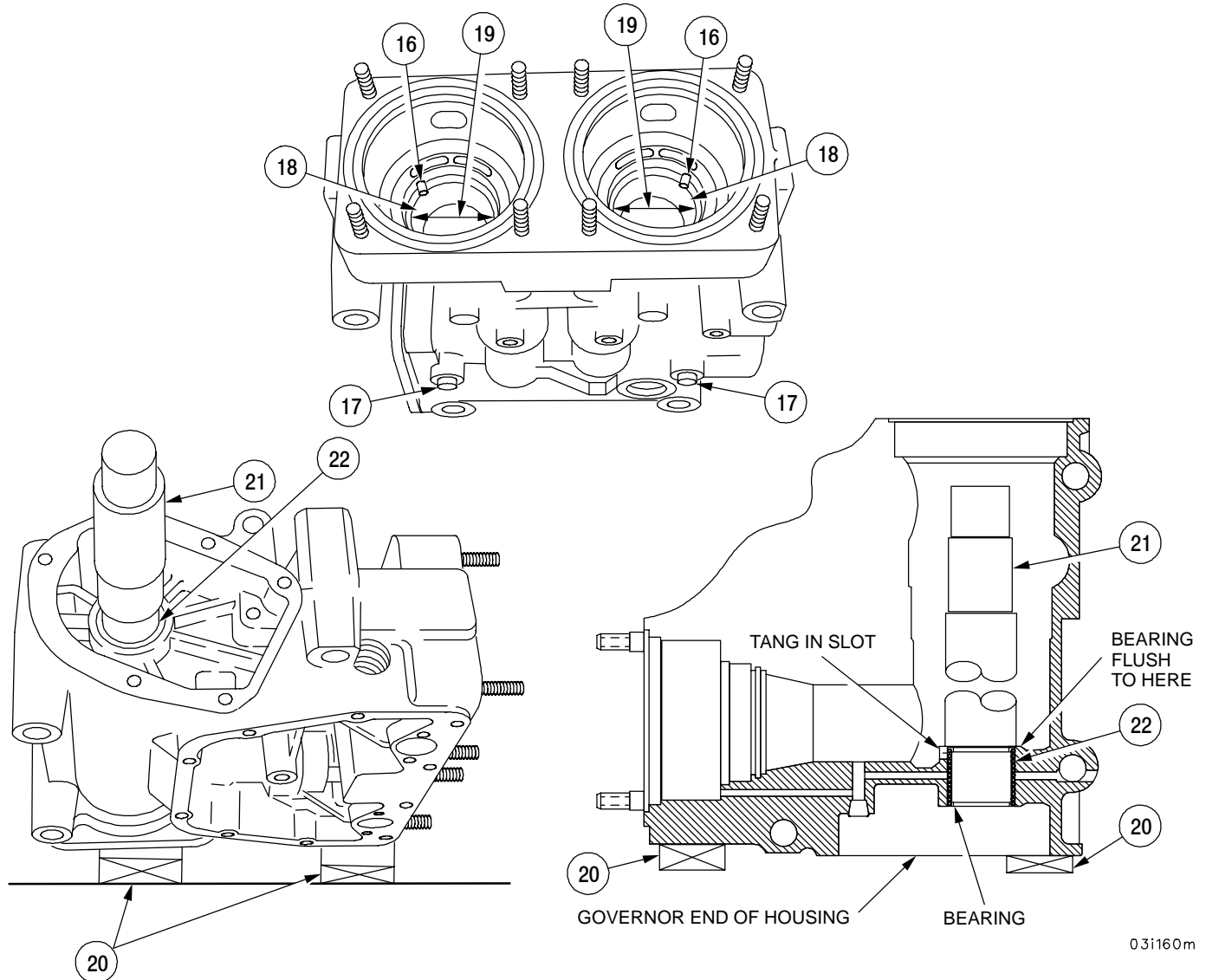
03i155m

**INJECTION PUMP HOUSING REPAIR - CONTINUED****Inspection - Continued**

4. Inspect tappet roll pins (16) for looseness. Replace housing if roll pins are loose or missing.
5. Inspect for loose or damaged dowel pins (17). Replace housing if dowel pins are loose or missing.
6. Inspect tappet bores (18) for scratches or scoring. Measure bores (19) using telescope gauge and micrometer. Replace housing if tappet bore diameter exceeds 1.6300 in. (41.40 mm).

**Repair**

1. Smooth small nicks or raised metal with a fine mill file.
2. Repair minor straight thread damage in tapped holes using a thread tap.
3. Replace worn or damaged sleeve bearing as follows:
  4. Using wood blocks (20) to support housing, place housing on an arbor press with governor end up.
  5. Using remover and replacer (21), press sleeve bearing (22) from bore. Discard bearing.
  6. Remove remover and replacer (21). Using wood blocks (20) to support housing, place housing on arbor press with the governor end down.
  7. Place new bearing (22) over bore, with tang aligned with slot in bearing boss.
  8. Using remover and replacer (21), press bearing into bore. The bearing must be flush with boss inner face.



031160m

**INJECTION PUMP HOUSING REPAIR - CONTINUED****0031 00****Repair - Continued**

9. Bearing must be line bored. Have a machinist line bore the bearing in accordance with specifications provided in WP 0043 00.

**WARNING**

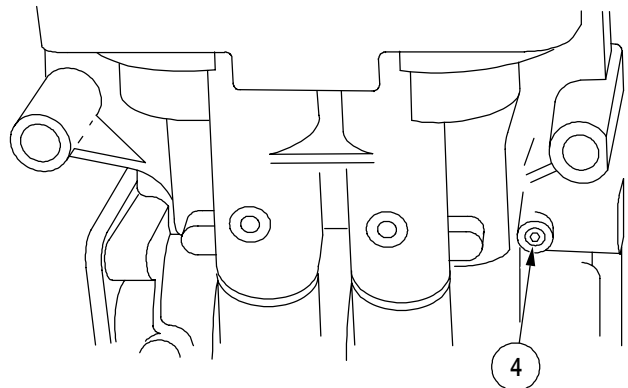
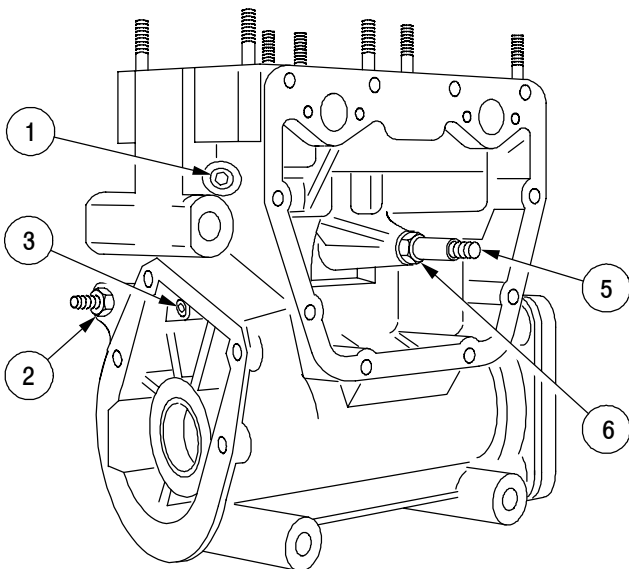
Cleaning solvent is flammable. Use only in well ventilated areas. Keep away from flame, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when using to prevent skin irritation.

10. Clean housing using solvent. Wipe dry with clean, lint free cloth.

**Assembly****NOTE**

Coat all parts with a light film of engine oil.

1. Install flat washer (6).
2. Using 5/8 in. deep well socket, install new lever screw (5).
3. Using 5/32 in. socket head screw key, install two pipe plugs (3) and (4).
4. Using 11/16 in. box end wrench, install oil inlet adapter (2).
5. Using 1/4 in. socket head screw key, install timing screw plug (1) with new ring spacer.



03i161m

**NOTE****FOLLOW-ON MAINTENANCE:**

- Install control unit assemblies (WP 0024 00)
- Install remove lever assembly and yoke (WP 0023 00)
- Install camshaft and retaining plate (WP 0032 00)
- Install head assembly 1 (WP 0026 00)
- Install head assembly 2 (WP 0025 00)
- Install governor housing (WP 0022 00)
- Install valve assembly and bleeder valve stems (WP 0019 00)
- Install filter assembly and bleeder valve stems (WP 0020 00)
- Install housing and bleeder valve stems and connect valve assembly (WP 0019 00)

**END OF WORK PACKAGE**

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**CAMSHAFT AND ASSOCIATED PARTS REPAIR**

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**0032 00****THIS WORK PACKAGE COVERS:**Removal, Disassembly, Cleaning, Inspection, Repair, Assembly, Installation

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**INITIAL SETUP:****Tools and Special Tools**

General Mechanic's tool kit (item 23, WP 0042 00)  
Automotive fuel and electrical system repair tool kit  
(item 56, WP 0042 00)  
Mechanical puller (item 45, WP 0042 00)  
Magnifying glass (item 24, WP 0042 00)  
Micrometer, 2 in. OD (item 30, WP 0042 00)  
Arbor press and press plates (item 3, WP 0042 00)  
Fine mill file (item 13, WP 0042 00)  
Bristle brush (item 6, WP 0042 00)  
Wire probe (item 43, WP 0042 00)  
Spanner wrench (item 61, WP 0042 00)  
Machinist's vise with vise jaw caps (item 58,  
WP 0042 00)  
Steel bar (2) (item 4, WP 0042 00)  
Holding plate (item 25, WP 0042 00)  
Holding plate (item 36, WP 0042 00)

**Materials/Parts**

Engine oil (item 3, WP 0041 00)  
Dry-cleaning solvent (item 7, WP 0041 00)  
Retaining ring  
Seal from gasket and preformed packing set, Part no.  
5702632  
Key washer

**Equipment Conditions**

Injection pump housing removed (WP 0031 00)

**References**

TM 9-214  
WP 0030 00  
WP 0031 00

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**CAMSHAFT AND ASSOCIATED PARTS REPAIR - CONTINUED****0032 00****Removal**

1. Using 9/16 in. socket wrench and ratchet handle, remove shoulder screw and lockwasher (1).
2. Remove the remaining three capscrews and lockwashers (2).

**CAUTION**

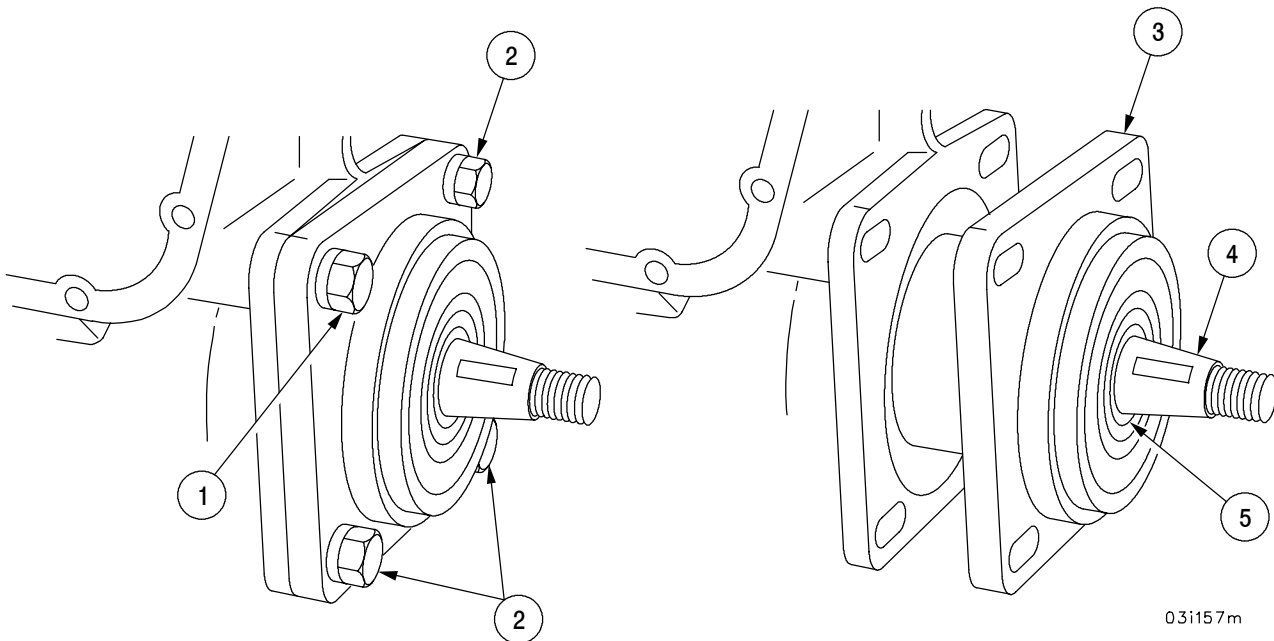
Remove camshaft with care to prevent damage to governor end of camshaft.

3. Remove retaining plate (3) and camshaft (4) as an assembly. Remove preformed packing from groove in retaining plate. Discard preformed packing.

**NOTE**

Retaining plate may have to be tapped with a plastic hammer in order to be removed.

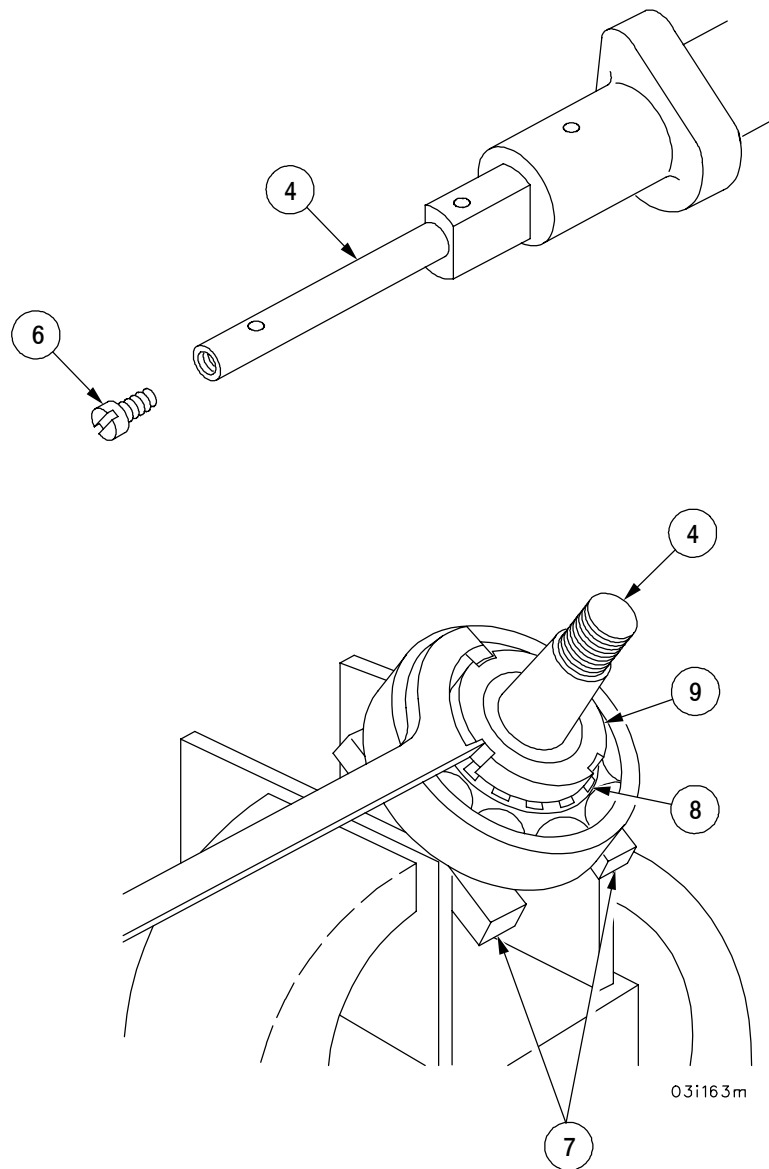
4. Remove camshaft (4) from retaining plate seal (5).





**CAMSHAFT AND ASSOCIATED PARTS REPAIR - CONTINUED****0032 00****Disassembly**

1. Remove screw (6) from camshaft (4).
2. Using two steel bars (7), place camshaft (4) in vise.
3. Using drift, straighten tabs of key washer (8).
4. Using spanner wrench, remove nut (9). Remove and discard key washer (8).



**CAMSHAFT AND ASSOCIATED PARTS REPAIR - CONTINUED****0032 00****Disassembly - Continued**

5. Place camshaft on arbor press with press plates supporting ball bearing (10). Using arbor, press camshaft (4) from bearing.

**Cleaning**

1. Clean ball bearing (10) in accordance with TM 9-214. Wrap clean bearing in a clean oiled cloth.

**WARNING**

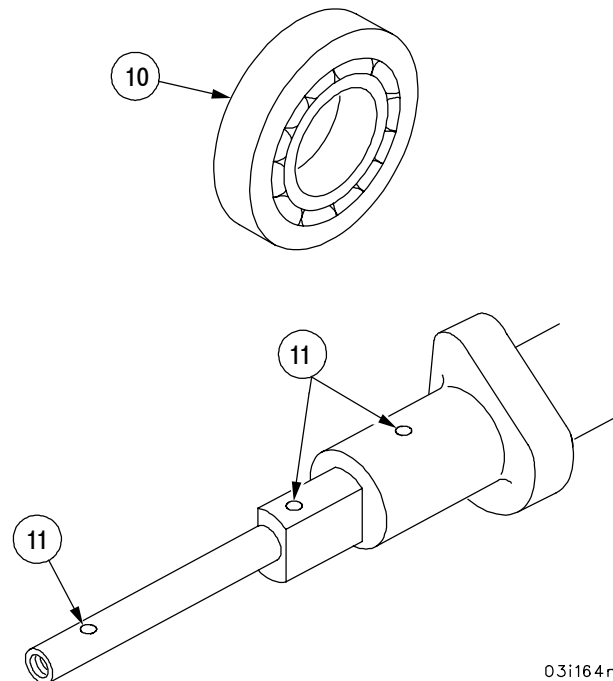
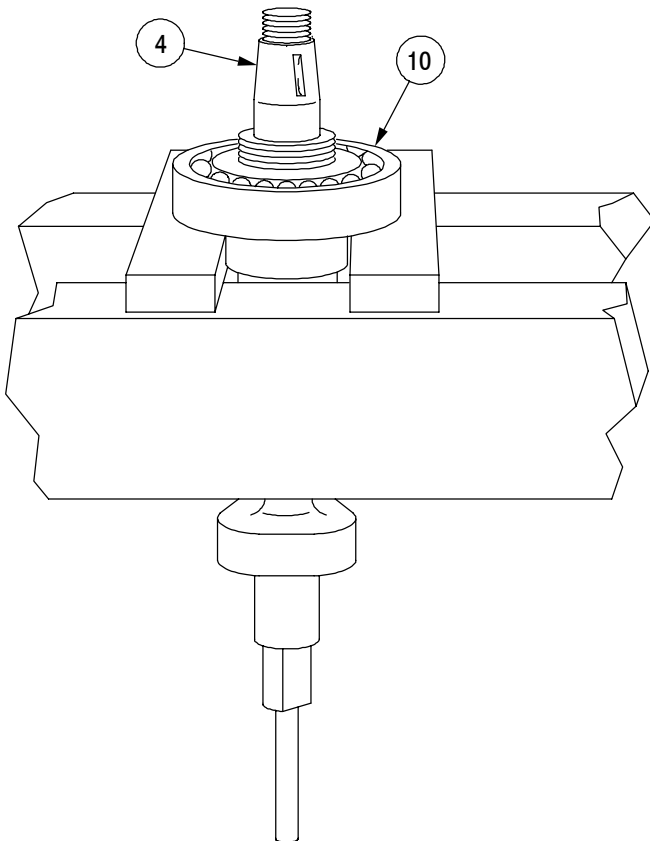
Cleaning solvent is flammable. Use only in well ventilated areas. Keep away from flame, sparks, or heat. Do not smoke while using. Prevent contact with eyes, mouth, and/or skin. Wear rubber gloves when using to prevent skin irritation.

2. Clean all parts using solvent. Clean camshaft oil holes (11) with probe and solvent.

**WARNING**

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

3. Blow dry with compressed air, or wipe dry with clean, lint-free cloth.



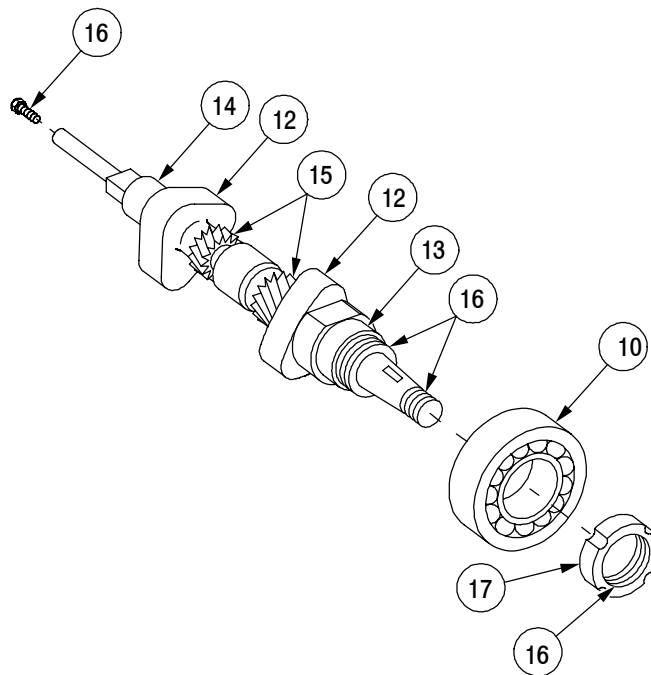
03i164m

**CAMSHAFT AND ASSOCIATED PARTS REPAIR - CONTINUED****0032 00****Inspection**

1. Inspect camshaft for cracks scratches or scoring.
  - a. Using magnifying glass and strong light, inspect cams (12), bearing journals (13) and (14), and gears (15) for damage.
  - b. Inspect threads (16) for damage. Replace camshaft if threads are damaged.
2. Measure camshaft bearing journal (14) using micrometer. Replace camshaft if journal diameter is less than 1.1860 in. (30.12 mm).
3. Inspect nut (17) for damage. Replace damaged nut.
4. Refer to TM 9-214 for inspection of ball bearing (10). Replace damaged bearing.

**Repair**

1. Smooth small nicks or raised metal on areas other than bearing journal and cams using a fine mill file.
2. No other repairs are authorized for these parts.

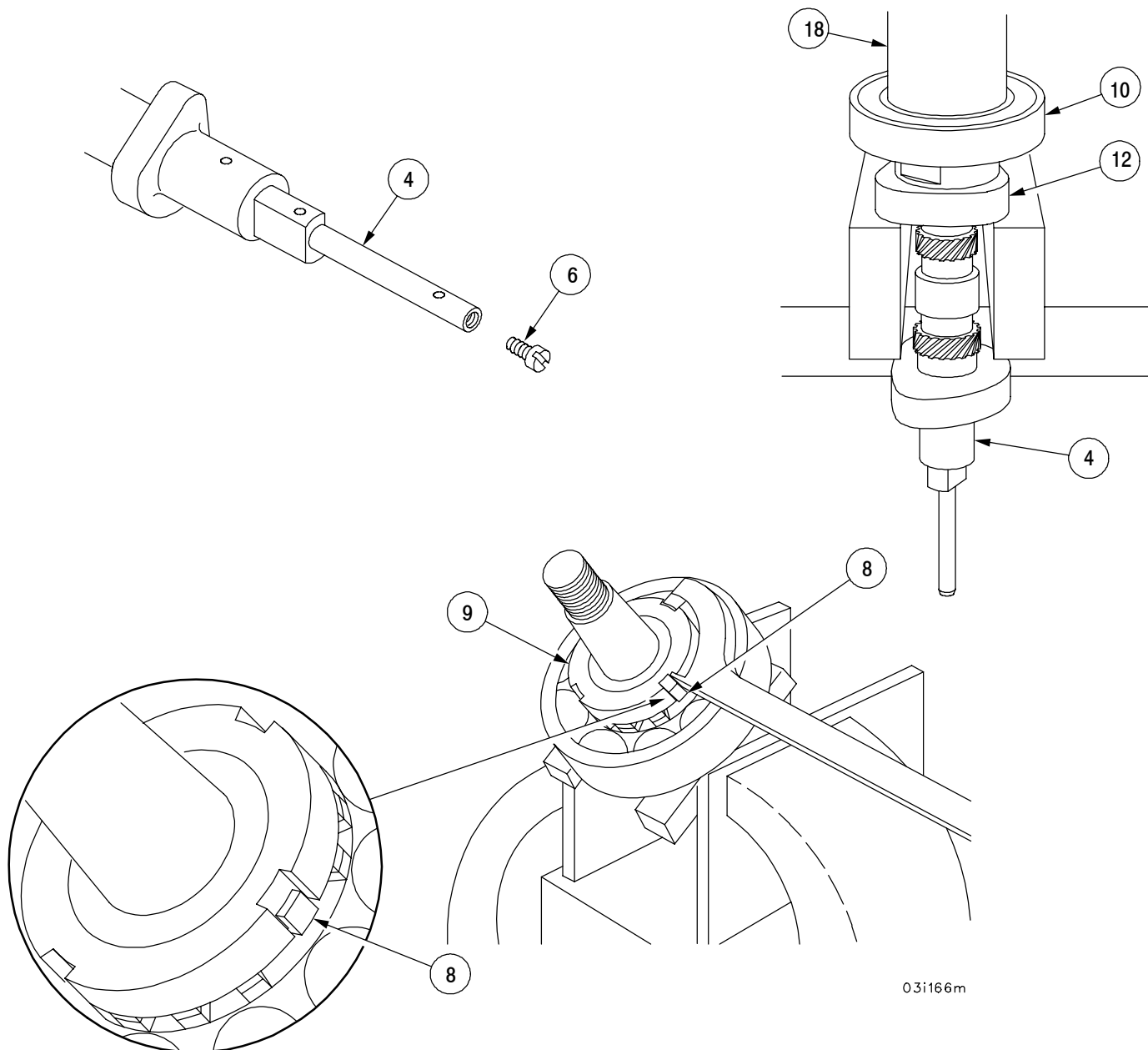


03i165m

**CAMSHAFT AND ASSOCIATED PARTS REPAIR - CONTINUED****0032 00****Assembly****NOTE**

Coat all parts with a light film of engine oil.

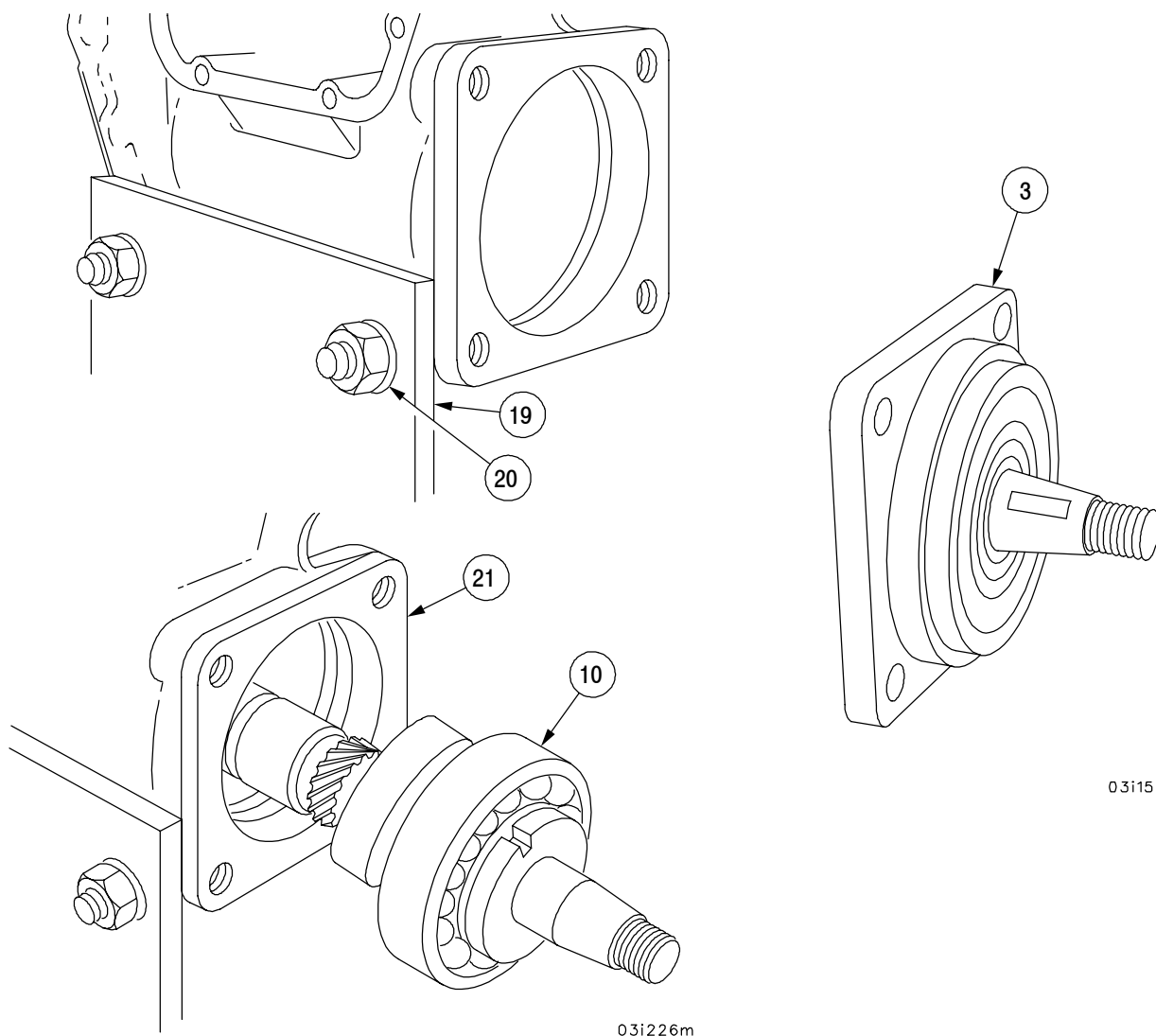
1. Install assembled washer screw (6) in camshaft (4).
2. Place camshaft (4) on arbor press with support plates under drive end cam (12).
3. Place bearing (10) on camshaft with bearing identification name and part number up.
4. Using hollow arbor (18), press on inner race of bearing (10) until it bottoms.
5. Using two steel bars, place camshaft in vise.
6. Install new key washer (8). Install nut (9) with beveled side facing key washer.
7. Using spanner wrench, tighten nut (9).
8. Find nut slot aligned with one of the tabs on key washer (8). Using a drift, bend key washer tab against slot in nut (9).



03i166m

**CAMSHAFT AND ASSOCIATED PARTS REPAIR - CONTINUED****0032 00****Installation**

1. Place holding plate (19) on pump housing front mounting holes. Using 1/2 in. box end wrench, secure with two bolts, flat washers, lockwashers, and nuts (20).
2. Place holding plate (19) and housing (21) in vise.
3. Install assembled camshaft and bearing (10) in housing (21). Push camshaft and bearing in place by hand.
4. Install retaining plate (3) (WP 0030 00).
5. Remove holding plate (19) and housing (21) from vise.
6. Remove two bolts, two flat washers, two lockwashers, two nuts (20) and holding plate (19) from housing (21).

**NOTE**

**FOLLOW-ON MAINTENANCE:**  
Install injection pump housing (WP 0031 00)

**END OF WORK PACKAGE**



## **CHAPTER 6**

# **TESTING, CALIBRATION, PRESERVATION, AND PACKAGING AFTER REPAIR**





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**TESTING****0033 00**

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**THIS WORK PACKAGE COVERS:**Testing

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**INITIAL SETUP:****Equipment Conditions**

Fuel pump mounted on A8020 test stand  
(WP 0007 00)

**References**

WP 0008 00  
WP 0009 00  
WP 0010 00

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**Testing**

1. Test for fuel leakage or delivery valve malfunction in heads (WP 0008 00).
2. Test bleeder valve (WP 0009 00).
3. Test flow timing in pump head assemblies (WP 0010 00).

**END OF WORK PACKAGE**



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**CALIBRATION****0034 00**

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**THIS WORK PACKAGE COVERS:**Calibration

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**INITIAL SETUP:****Equipment Conditions**

Fuel pump mounted on A8020 test stand  
(WP 0007 00)

**References**

WP 0010 00  
WP 0011 00  
WP 0012 00  
WP 0013 00  
WP 0014 00  
WP 0015 00  
WP 0016 00  
WP 0017 00

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**Calibration**

1. Perform precalibration procedure (WP 0010 00).
2. Adjust main fuel flow for No. 1 head assembly (left bank) (WP 0011 00).
3. Balance fuel flow from head assemblies (WP 0012 00).
4. Adjust high idle fuel flow and fuel cutoff (WP 0013 00).
5. Adjust droop screw (WP 0014 00).
6. Check cranking fuel flow (WP 0016 00).
7. Adjust idle speed (WP 0015 00).
8. Check electric and manual fuel shutoff (WP 0017 00).

**END OF WORK PACKAGE**



**PRESERVATION**

**0035 00**

**THIS WORK PACKAGE COVERS:**

Preservation

**INITIAL SETUP:**

**Tools and Special Tools**

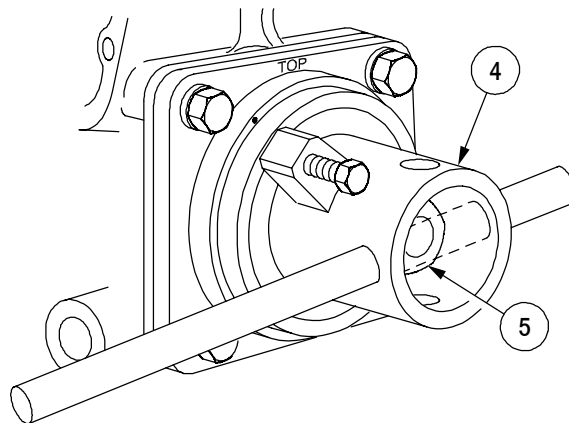
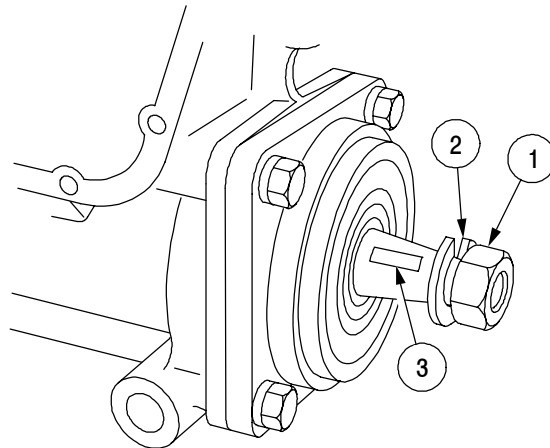
- Automotive fuel and electrical system repair tool kit (item 56, WP 0042 00)
- Turning and holding wrench (item 64, WP 0042 00)
- Steel rod (item 47, WP 0042 00)
- 3/8 to 1/2 in. drive adapter (item 1, WP 0042 00)

**Materials/Parts**

- Lubricating oil (VV-L-800) (item 5, WP 0041 00)

**Preservation**

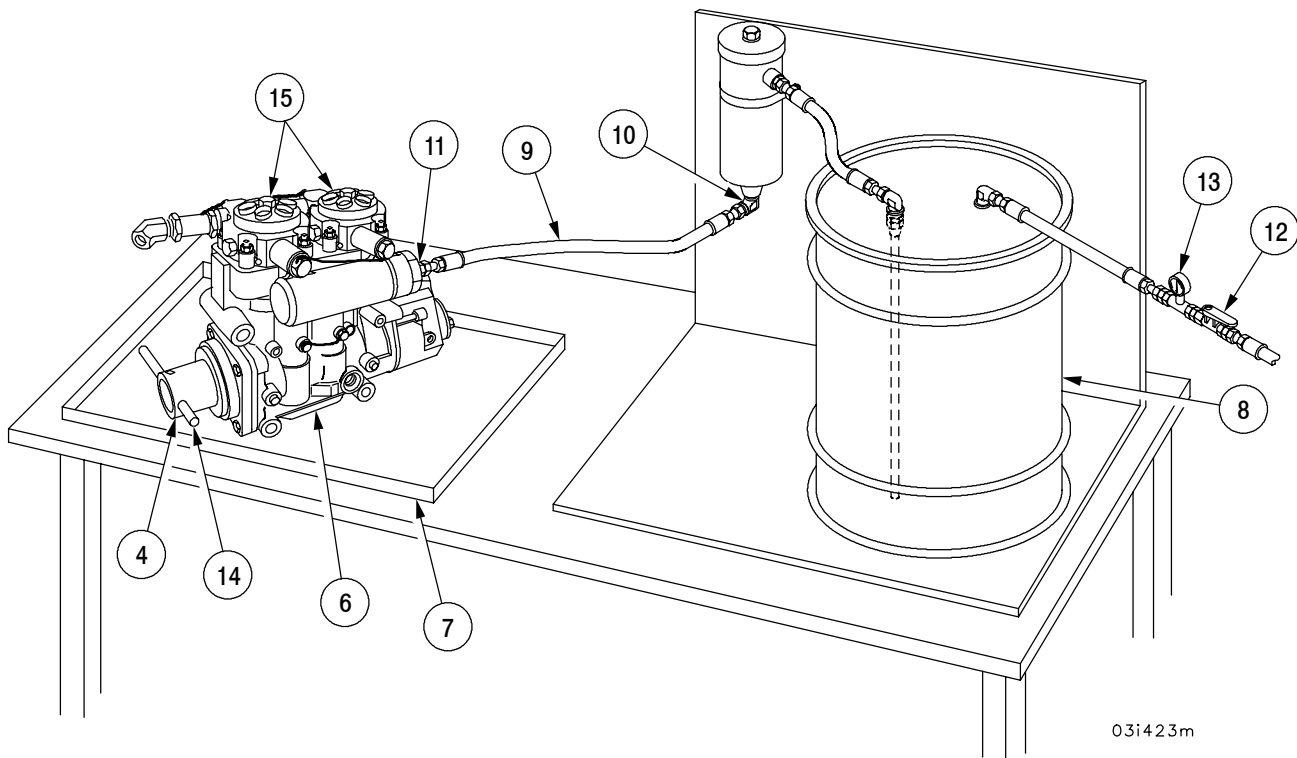
1. Remove nut (1) and lockwasher (2).
2. Remove tape from Woodruff key (3).
3. Align keyway with Woodruff key and install turning and holding wrench (4). Secure wrench with lockwasher and nut (5). Using 1-1/16 in. deep well socket, adapter and ratchet handle, tighten nut.



03i181m

**PRESERVATION - CONTINUED****0035 00****Preservation - Continued**

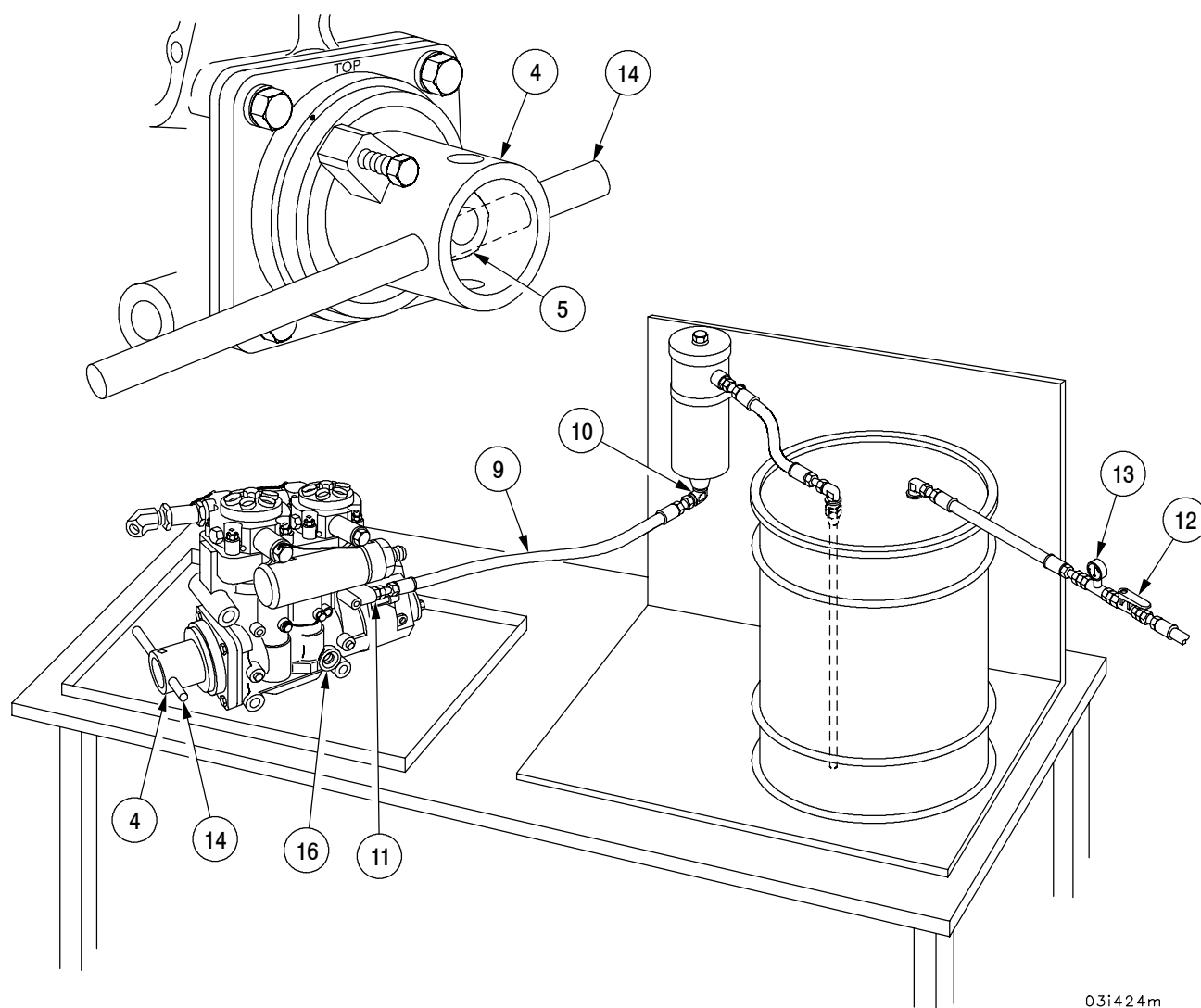
4. Place pump (6) on drip tray (7) as illustrated.
5. Fill reservoir (8) with 10 gallons of lubricating oil.
6. Connect 3/8 in. oil outlet hose (9) to oil filter outlet elbow (10) and pump fuel filter inlet adapter (11).
7. Open shutoff valve (12) and adjust air pressure to 2 to 4 psi (14 to 28 kPa) on the air pressure regulator (13).
8. Using steel bar (14) and turning and holding wrench (4), turn camshaft to the right and observe oil discharge from pump head assembly outlet ports (15). Continue to turn camshaft until oil has been discharged from all 12 outlet ports.
9. Close shutoff valve (12).
10. Disconnect 3/8 in. oil outlet hose (9) from pump fuel filter inlet adapter (11), and filter outlet elbow (10).



03i423m

**PRESERVATION - CONTINUED****0035 00****Preservation - Continued**

11. Connect 1/4 in. oil outlet hose (9) to oil inlet adapter (11), and filter outlet elbow (10).
12. Open shutoff valve (12) and adjust air pressure to 2 to 4 psi (14 to 28 kPa) on air pressure regulator (13).
13. Using steel rod (14) and turning and holding wrench (4), turn camshaft to the right four revolutions and observe oil draining from oil return port (16).
14. Close shutoff valve (12).
15. Disconnect 1/4 in. hose (9) from oil inlet adapter (11) and elbow (10).
16. Remove steel rod (14) from turning and holding wrench (4).
17. Using 1-1/16 in. deep well socket, adapter, and ratchet handle, remove plain nut and lockwasher (5). Using plastic insert hammer, remove turning and holding wrench (4).



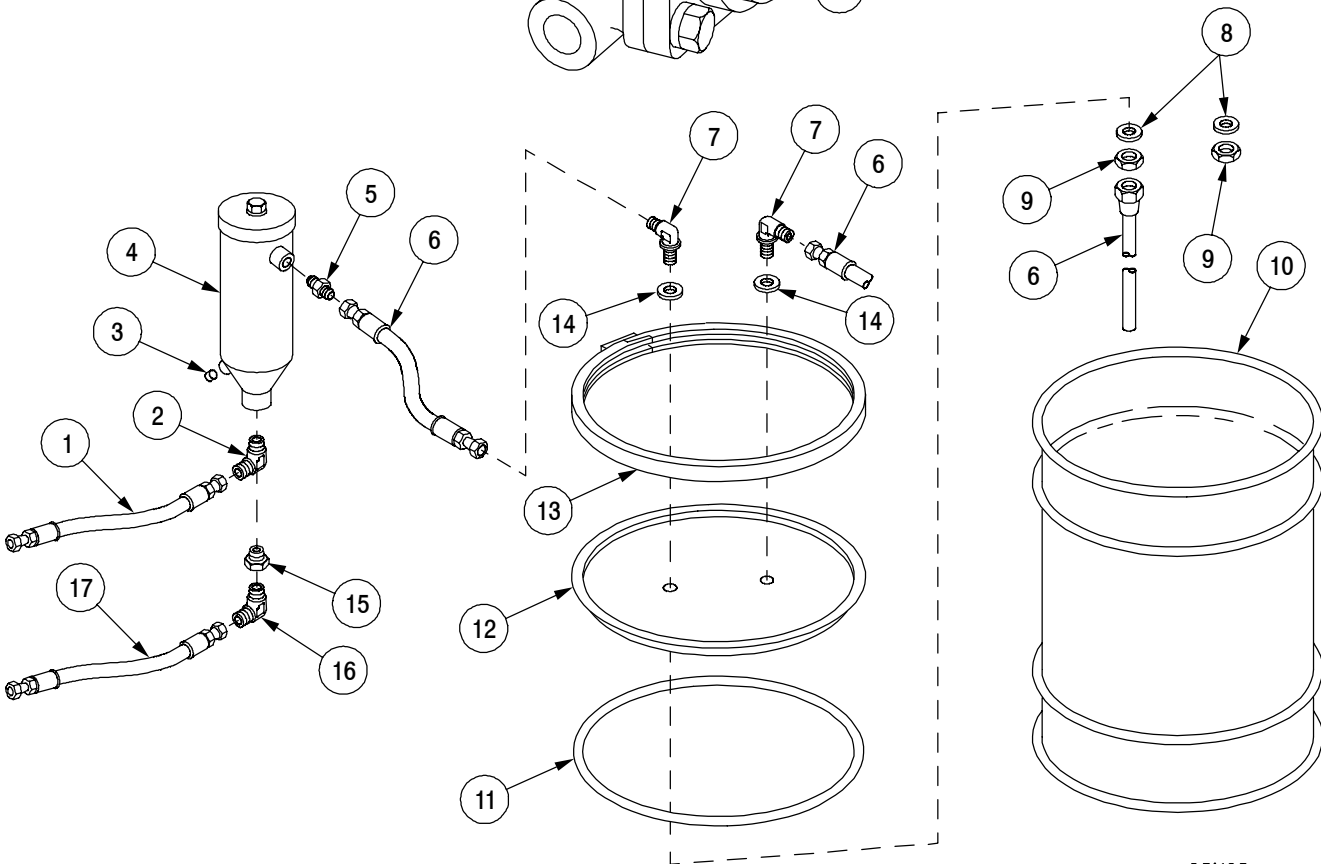
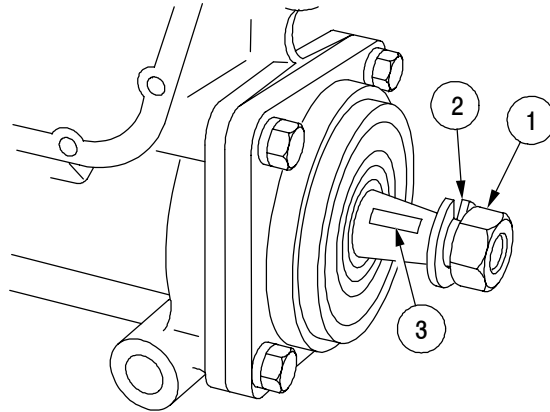
03i424m

**PRESERVATION - CONTINUED**

**0035 00**

**Preservation - Continued**

18. Install lockwasher (2) and nut (1). Install Woodruff key (3) in keyway slot.
19. Turn pump over two times slowly to permit residual oil to drain from pump.
20. Apply a light film of lubricating oil to all exterior surfaces of pump.



03i198m

- |                          |                                 |
|--------------------------|---------------------------------|
| 1. Hose assembly         | 10. Drum                        |
| 2. Elbow                 | 11. Gasket                      |
| 3. Pipe plug             | 12. Cover                       |
| 4. Pressure fluid filter | 13. Lock ring                   |
| 5. Adapter               | 14. Flat washer                 |
| 6. Hose assembly         | 15. Bushing (used with item 16) |
| 7. Bulkhead elbow        | 16. Elbow                       |
| 8. Lockwasher            | 17. Hose assembly               |
| 9. Plain nut             |                                 |

**Preservation Bench Components.**



**PRESERVATION - CONTINUED****0035 00**

Preservation - Continued

**PRESERVATION BENCH BILL OF MATERIALS**

<b>Item</b>	<b>Description</b>	<b>Part No.</b>	<b>Quantity</b>
1.	Hose Assembly, 3/8 in. ID, 33 in. long	MS28741-8-0330	1
2.	Elbow, 90°, 3/8-18 NPTF to 3/4-16UNF-2A flare	MS51504-B8	1
3.	Plug, pipe, 1/4-18 NPTF (filter drain)	MS49005-4	1
4.	Filter, Fluid, Pressure	11610297	1
5.	Adapter, 3/8-18 NPTF to 3/4-16UNF-2A flare	MS51500-B8	1
6.	Hose Assembly, 3/8 in. ID, 16 in. long	MS28741-8-0160	3
7.	Elbow, Bulkhead, 90°, 3/8 in.	MS24394-8	2
8.	Washer, Lock	MS35335-40	2
9.	Nut, Plain	AN924-8	2
10.	Drum, 16 gal	MS27683-1	1
11.	Gasket	MS27683-90	1
12.	Cover	MS27683-60	1
13.	Lock Ring	MS27683-80	1
14.	Washer, Flat	MS27183-23	2
15.	Bushing, 3/8 to 1/4 in. NPTF	*MS51847-2	1
16.	Elbow, 90°, 1/4-18 NPTF to 7/16-20UNF-2A flare	*MS51504-B4-4	1
17.	Hose Assembly, 1/4 in. ID, 33 in. long	MS28741-5-0330	1

\*Used with 1/4 in. hose assembly only (item 17).

**END OF WORK PACKAGE**



**PACKAGING**

**0036 00**

**THIS WORK PACKAGE COVERS:**

Packaging

**INITIAL SETUP:**

**Tools and Special Tools**

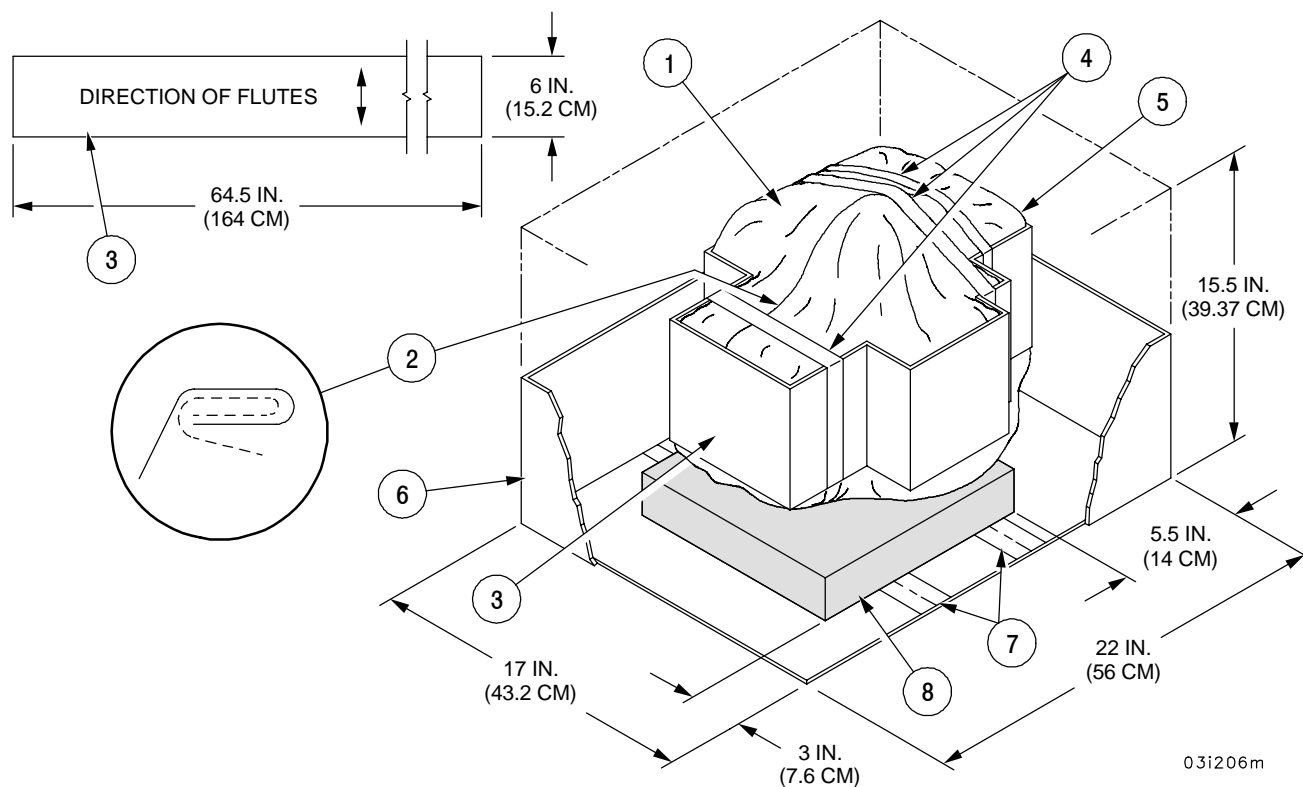
- General mechanic's tool kit (item 23, WP 0042 00)
- Hand saw, cross cut, medium blade (item 49, WP 0042 00)

**Materials/Parts**

- Steel strapping (item 12, WP 0041 00)
- Strapping seals (item 13, WP 0041 00)

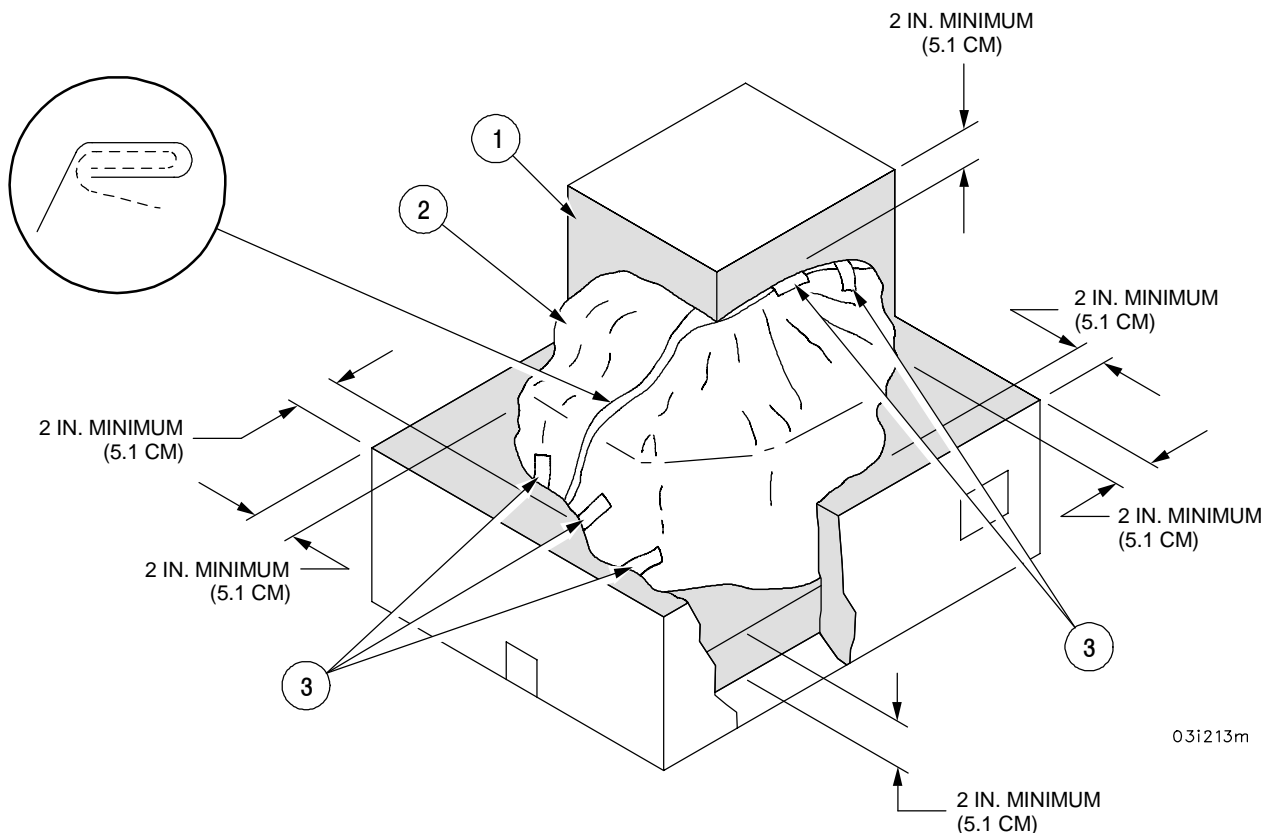
**Packaging**

1. Secure Woodruff key to camshaft by wrapping with intimate wrap, MIL-B-121, Type II, Grade A, Class 2, and taping with 1/2 in. wide tape, PPP-T-97, Type II.
2. Intimate wrap (1), MIL-B-121, Type 1, Grade C, Class 1, shall be applied with face (wax-free) surface toward pump. Wrap shall be applied in such a manner to conform to contour of pump, and shall be tightly applied. Overlaps (2) shall be rolled and pressed to ensure that foam does not enter wrap or contact pump.
3. Cushioning sleeve (3), PPP-F-320, Type CF, Grade V3c, Class W/R, shall be positioned around intimate wrap. Ends shall be overlapped and securely joined with tape, PPP-T-97, Type II, or by staples and clinched. The sleeve shall be positioned and secured so that cut line, will be located at the approximate center of the width of the sleeve. The sleeve shall be secured in place with tape (4), PPP-T-97, Type II. Adequate tension shall be applied to tape to draw sleeve tight against the package (5).
4. The outer wrap, (2), UU-P-268, Type I, Grade B, shall be applied in the same manner as intimate wrap. Overlaps shall be rolled and pressed. Apply tape PPP-T-97, Type II, along seam. Folds at each end of package shall be secured with tape, (3) PPP-T-97, Type II, to prevent foam penetration.



**PACKAGING - CONTINUED****0036 00****Packaging - Continued**

5. Fiberboard box (6), PPP-B-636, Style RSC, Type CF, Grade W6C, Class W/R, shall have bottom inner flaps taped to outer flaps (7).
6. Support block (8), MIL-P-21929, Class 1, shall be laminated to bottom of box. A commercial grade of adhesive conforming to Specification MMM-A-1058 (adhesive, rubber base in pressurized containers) shall be used for lamination.
7. Polyurethane foam (1), MIL-P-21929, Class 1, shall be fire-resistant.
  - a. Physical properties:
    - (1) Compressive strength, parallel to direction of rise 30 psi (207 kPa) minimum; perpendicular to direction of rise, 15 psi (103 kPa) minimum.
    - (2) Unicellularity, percent open cells, 10% maximum.
    - (3) Density, pounds per cubic foot  $2.0 + 0.2, - 0.1$  (grams per cubic centimeter,  $0.032 + 0.003, - 0.002$ ).
  - b. Chemical properties:
    - (1) Toxicity. Foam shall be formulated to produce minimum toxic effects consistent with performance. Toluene diisocyanate (TDI) type foam and foam with similar toxic side affects shall not be used.
    - (2) Foam systems. Foam formulation shall be of the two component system with a mix ratio by weight or volume, as applicable, of 1:1 equal parts according to manufacturer's recommendation. Foam shall be capable of being hand or machine mixed and poured in accordance with manufacturer's instructions.



**PACKAGING - CONTINUED****0036 00****Packaging - Continued**

8. Place a restraining device around the box. Place package on support block, in the box with minimum clearance of 2 in. (5.1 cm) all around the package. Mix the two chemical components as prescribed by manufacturer to completely surround package and fill all voids. Box distortion exceeding 0.25 in. (6 mm) for each 12 in. (30.5 mm) of surface length shall be cause for rejection.
9. Seal flaps using pressure sensitive tape (1), PPP-TP-60, Type III, Class I.
10. Identify box (2) with National Stock Number, Part Number, and Part Name.
11. The following opening instructions label (3) shall be provided. Information to be shown on label shall be as follows:

**OPENING INSTRUCTIONS:**

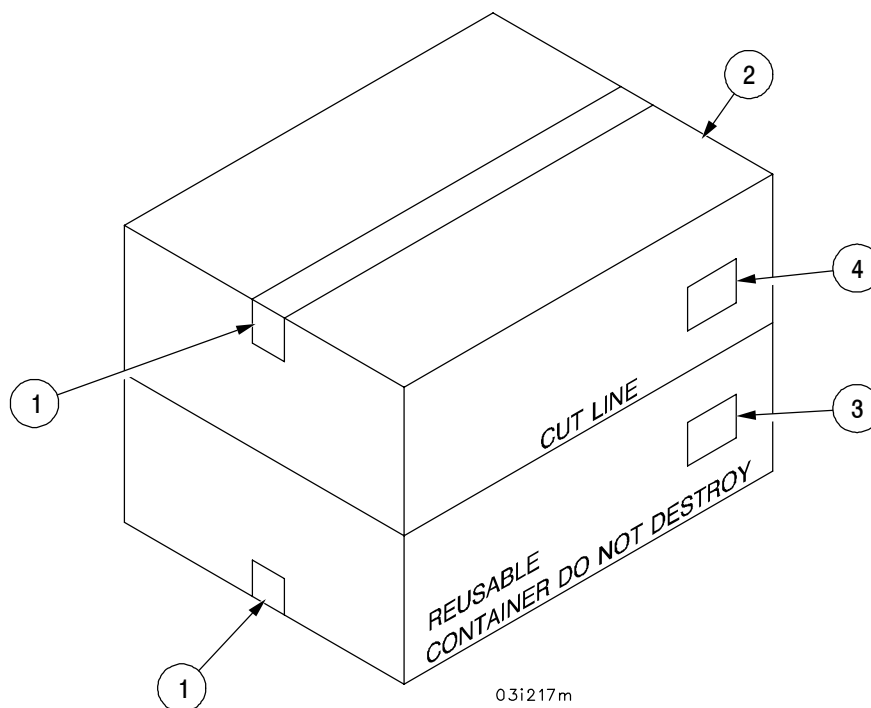
- a. Box shall be opened by cutting along cut line using either of the following methods:

- (1) Make initial cut with a hand saw. Cut though remainder of polyurethane foam with hand saw or knife;
- (2) Or use a hand saw for whole operation.

**CAUTION**

Do not jam blade through sleeve.

- b. Using either method, make cut continuous around perimeter of box. When using hand saw, cut through box and into foam using sabre saw cutting technique until blade reaches protective sleeve.
  - c. After cutting, remove top half of box. To aid removal, use two flat steel strips or angle irons 3 in. (76 mm) wide and long enough to extend at least 12 in. (30.5 cm) beyond initial separation. Exert pressure at both ends simultaneously.
  - d. Remove pump from lower half of box carefully. Do not fracture foam.
12. The following reusability instruction label (4), shall be provided. Information to be shown on label shall be as follows:



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**PACKAGING - CONTINUED**

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**0036 00****Packaging - Continued**

## REUSABILITY INSTRUCTIONS:

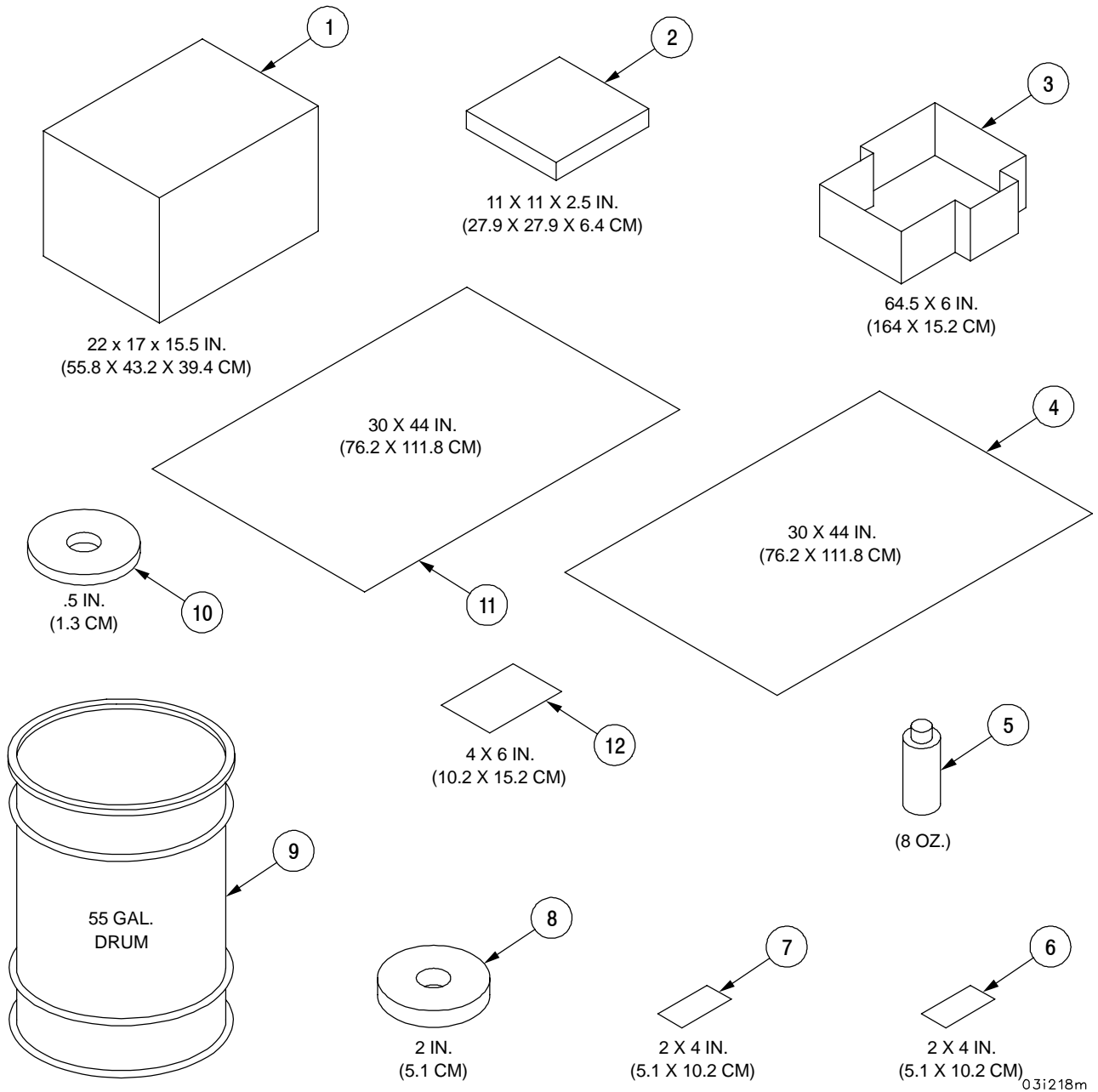
- a. Box shall be reused for shipments of pump scheduled for repair or rebuild.
- b. Prepare for shipment as follows:
  - (1) Place pump in cavity of bottom section of box.
  - (2) Position top section of box over pump.

<b>CAUTION</b>
----------------

Fill void areas with cushioning material, packaging NSN 8135-00-855-6969. If large voids exist due to foam removal, do not reuse.

- (3) Secure top to bottom by placing two steel straps around sides, top and bottom of box. Position adjacent to inside edges of skids. Tighten straps and secure strap seals.
- (4) Remove or obliterate obsolete marking and apply appropriate marking.

Packaging - Continued



- 1. Fiberboard box
- 2. Support block
- 3. Cushioning fiberboard sleeve
- 4. Outer wrap
- 5. Adhesive
- 6. Reusability label
- 7. Opening label
- 8. Pressure sensitive tape
- 9. Polyurethane foam
- 10. Pressure sensitive tape
- 11. Intimate wrap
- 12. Intimate wrap

**Packaging Components.**

**PACKAGING - CONTINUED****0036 00**

## Packaging - Continued

**PACKAGING BILL OF MATERIALS**

<b>Item Number</b>		<b>Size</b>	<b>Specification Data</b>	<b>Qty</b>
1.	Box, Fiberboard	22 x 17 x 15 1/2 in. (55.8 x 43.2 x 39.4 cm)	PPP-B-636, Style RSC, Type CF, Grade W6C, Class W/R	1 ea.
2.	Support Block	11 x 11 x 2 1/2 in. (27.9 x 27.9 x 6.4 cm)	MIL-P-21929, Class 1	1 ea
3.	Sleeve, Cushioning Fiberboard	6 x 64 1/2 in. (15.2 x 164 cm)	PPP-F-320, Type CF, Grade W6C, Class W/R	1 ea
4.	Wrap, Outer	44 x 30 in. (111.8 x 76.2 cm)	UU-P-268, Type I Grade B, Min Basis Wt. 40 Lbs.	1 ea
5.	Adhesive		MMM-A-1058	As Req'd
6.	Label, Reusability	As Required	MIL-STD-129	1 ea
7.	Label, Opening	As Required	MIL-STD-129	1 ea
8.	Tape, Pressure Sensitive	2 x 28 in. (5.1 x 71.1 cm)	PPP-T-60, Type III, Class 1	2 ea
9.	Foam, Polyurethane		MIL-P-21929, Class 1	7.50 Lbs.
10.	Tape, Pressure Sensitive, Filament Reinforced	1/2 in. (1.3 cm) wide by length as required	PPP-T-97, Type II	1 ea
11.	Wrap, Intimate	44 x 30 in. (111.8 x 76.2 cm)	MIL-B-121, Type I, Grade C, Class 1	1 ea
12.	Wrap, Intimate	4 x 6 in. (10.2 x 15.2 cm)	MIL-B-121, Type II, Grade A, Class 2	1 ea

END OF WORK PACKAGE



**ILLUSTRATED LIST OF MANUFACTURED ITEMS**

**0037 00**

**THIS WORK PACKAGE COVERS:**

Scope, Part Number List and complete instructions, illustrations and all materials necessary for support items to be manufactured or fabricated at DS/GS Maintenance Level.

**SCOPE**

This work package includes complete instructions for making items authorized to be manufactured or fabricated at DS/GS maintenance level. A part number list is provided for cross-referencing the item to be manufactured to the figure which covers fabrication criteria. All bulk materials needed for manufacture of an item are listed in a tabular list on the illustration.

**SCOPE**

**PART NUMBER LIST**

<u>ITEM</u>	<u>PART NUMBER</u>	<u>REFERENCE</u>
Rod, Steel	-----	Figure 1
Tube	-----	Figure 2
Cover		Figure 3
Bar, Steel		Figure 4
Bar, Holding		Figure 5
Protractor		Figure 6
Remover and Replacer		Figure 7
Plate, Holding (not used with A8020 test stand)		Figure 8
Plate, Holding		Figure 9

ILLUSTRATED LIST OF MANUFACTURED ITEMS - CONTINUED

0037 00

MATERIAL:  
SEA 1020 THRU 1025  
CARBURIZE, HARDEN  
BLACK OXIDE FINISH

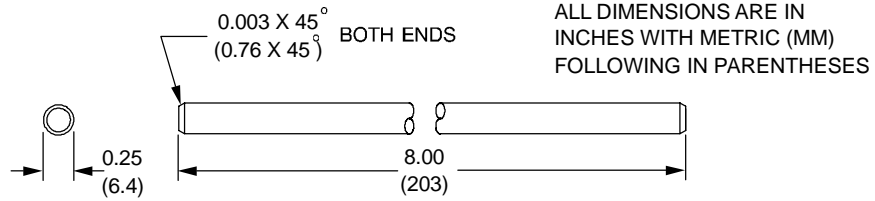


Figure 1. Steel Rod.

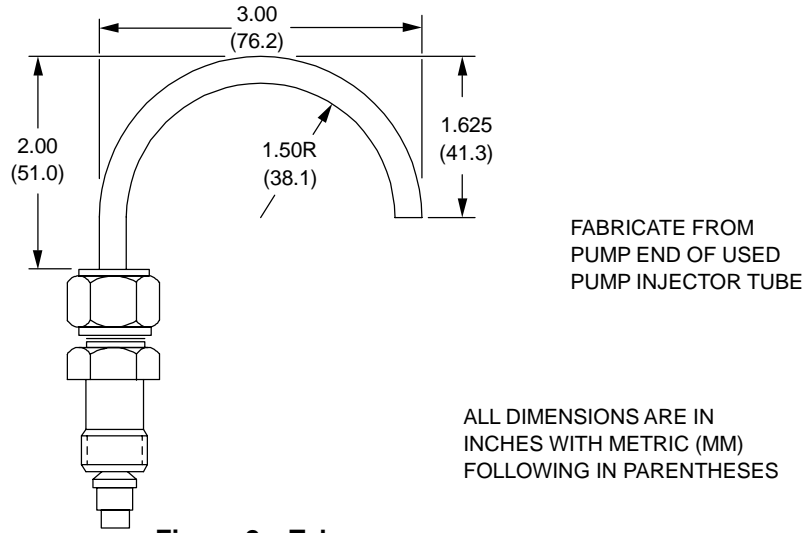


Figure 2. Tube.

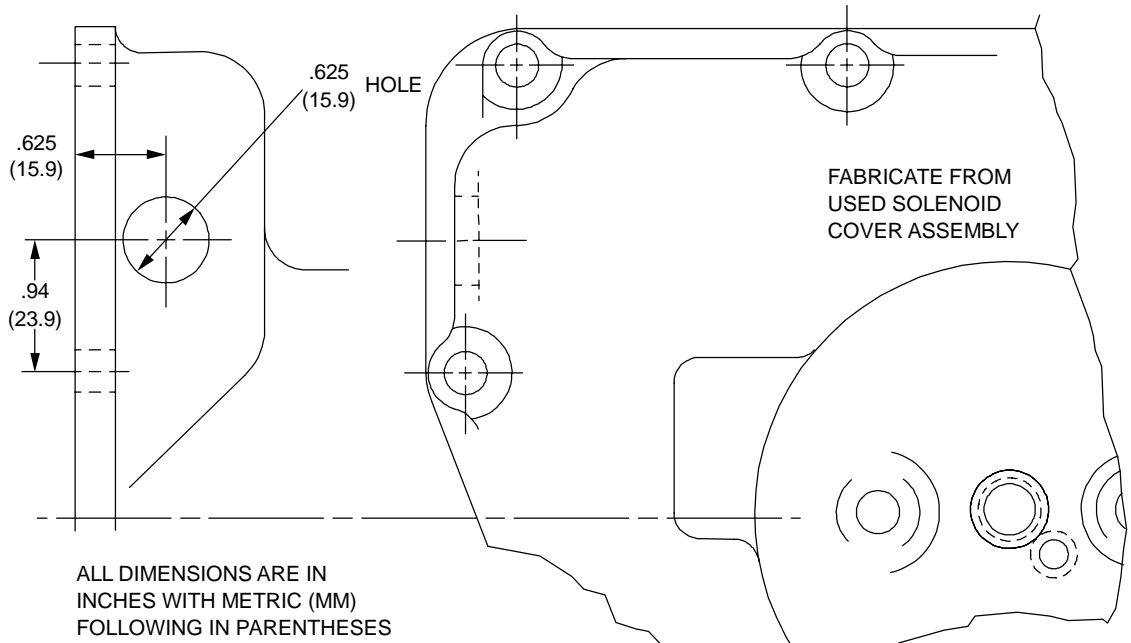


Figure 3. Cover.

03i117m

ILLUSTRATED LIST OF MANUFACTURED ITEMS - CONTINUED

0037 00

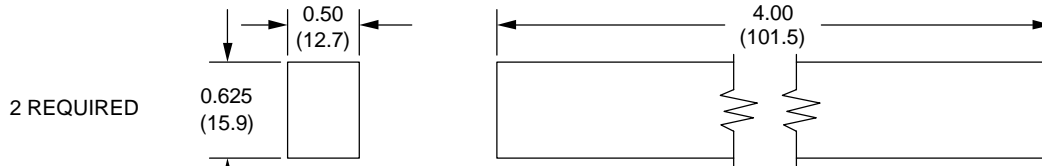


Figure 4. Steel Bar.

ALL DIMENSIONS ARE IN INCHES WITH METRIC (MM) FOLLOWING IN PARENTHESES

MATERIAL:  
SAE 1020 THRU 1025  
CARBURIZE, HARDEN  
BLACK OXIDE FINISH

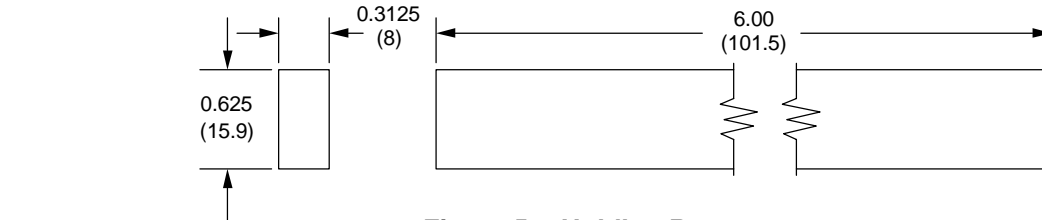


Figure 5. Holding Bar.

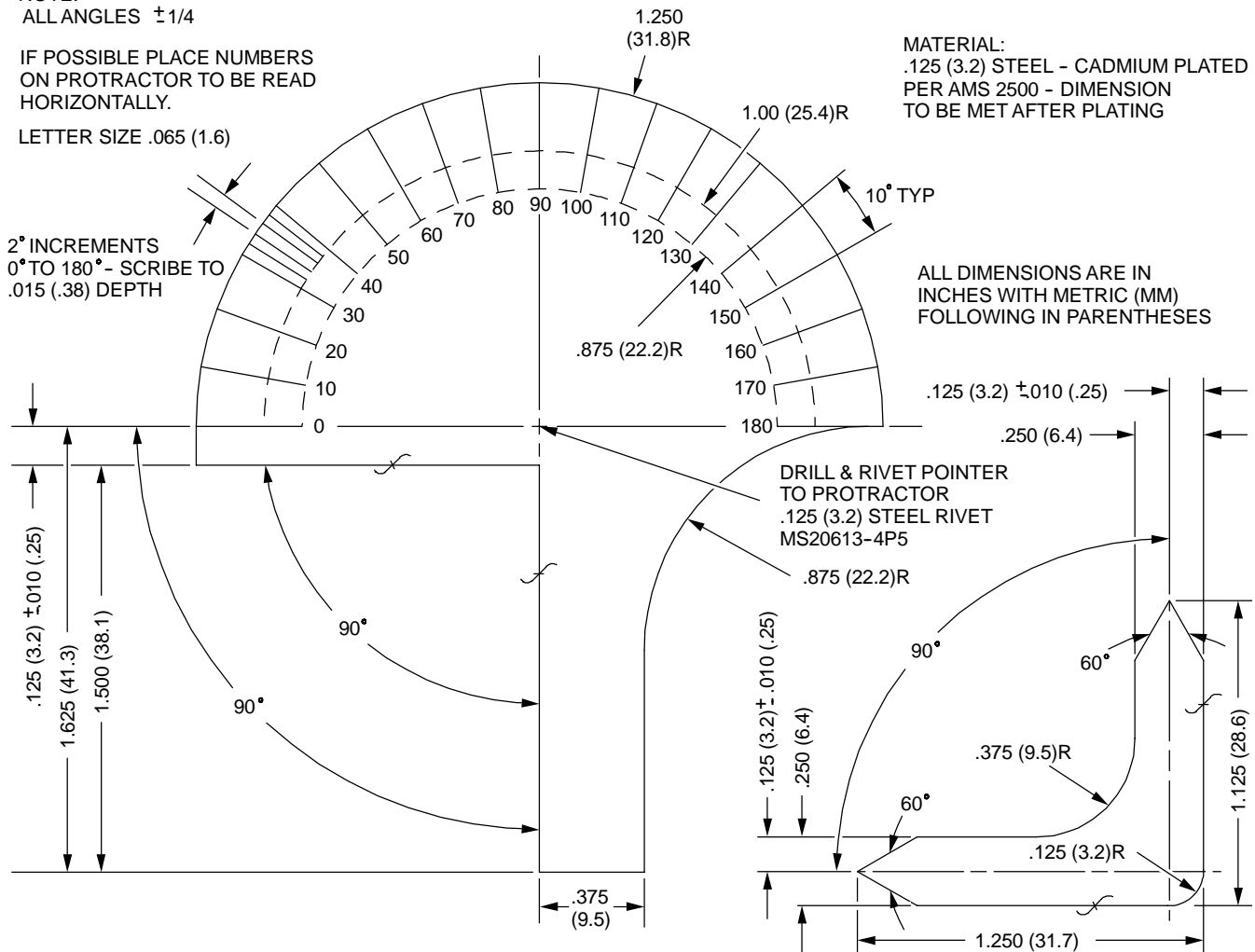
NOTE:  
ALL ANGLES  $\pm 1/4$

IF POSSIBLE PLACE NUMBERS ON PROTRACTOR TO BE READ HORIZONTALLY.

LETTER SIZE .065 (1.6)

2° INCREMENTS 0° TO 180° - SCRIBE TO .015 (.38) DEPTH

MATERIAL:  
.125 (3.2) STEEL - CADMIUM PLATED  
PER AMS 2500 - DIMENSION TO BE MET AFTER PLATING



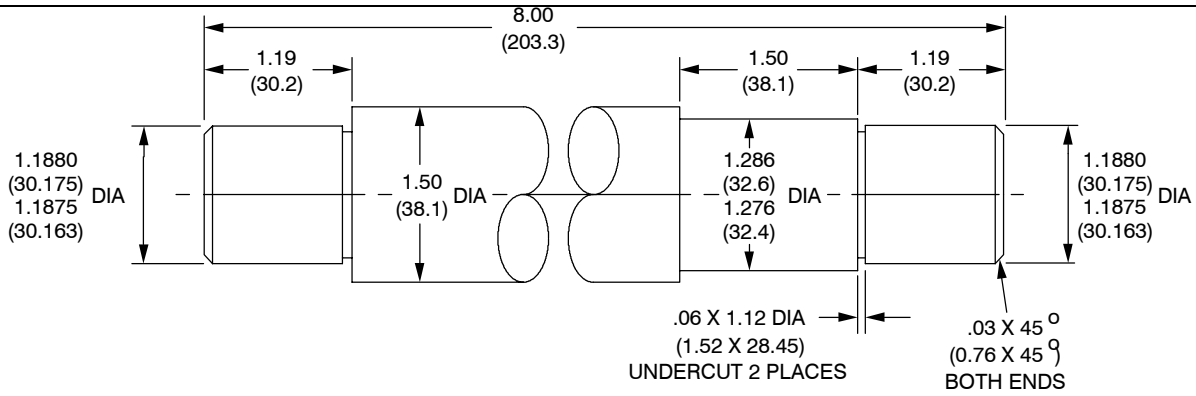
ALL DIMENSIONS ARE IN INCHES WITH METRIC (MM) FOLLOWING IN PARENTHESES

Figure 6. Protractor.

031118m

ILLUSTRATED LIST OF MANUFACTURED ITEMS - CONTINUED

0037 00

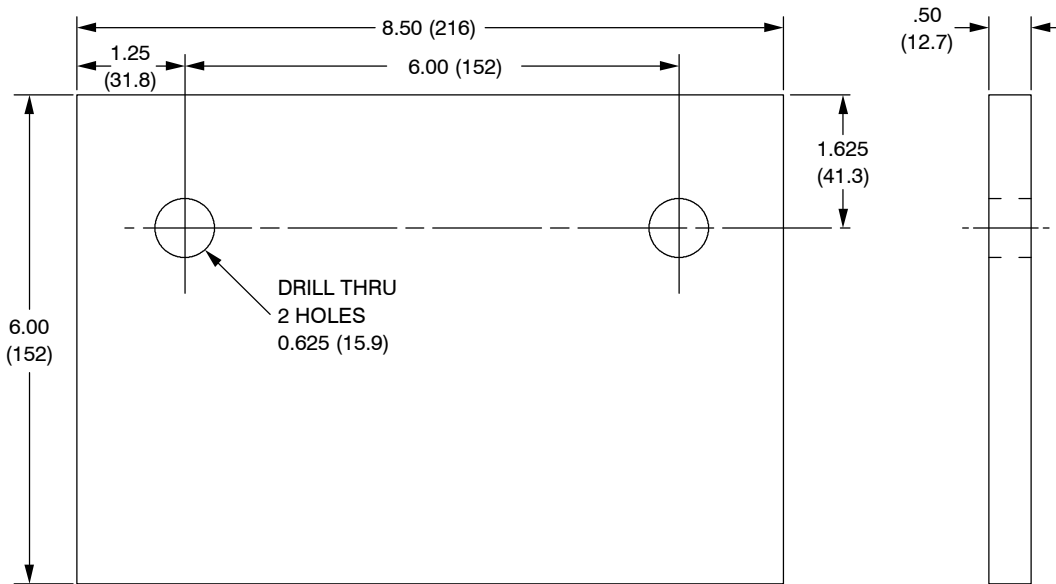


MATERIAL:

SAE 1020 THRU 1025  
 CARBURIZE, HARDEN AND GRIND  
 BLACK OXIDE FINISH

ALL DIMENSIONS ARE IN  
 INCHES WITH METRIC (MM)  
 FOLLOWING IN PARENTHESES

Figure 7. Remover and Replacer.



MATERIAL:

SAE 1020 THRU 1025  
 CARBURIZE, HARDEN AND GRIND  
 BLACK OXIDE FINISH

ALL DIMENSIONS ARE IN  
 INCHES WITH METRIC (MM)  
 FOLLOWING IN PARENTHESES

ATTACHING HARDWARE:

- 2 BOLTS MS90725-400
- 2 LOCKWASHERS MS35338-48
- 2 FLAT WASHERS MS27183-18
- 2 NUTS MS51967-14

Figure 8. Holding Plate (Not used with A8020 Test Stand).

26i036m

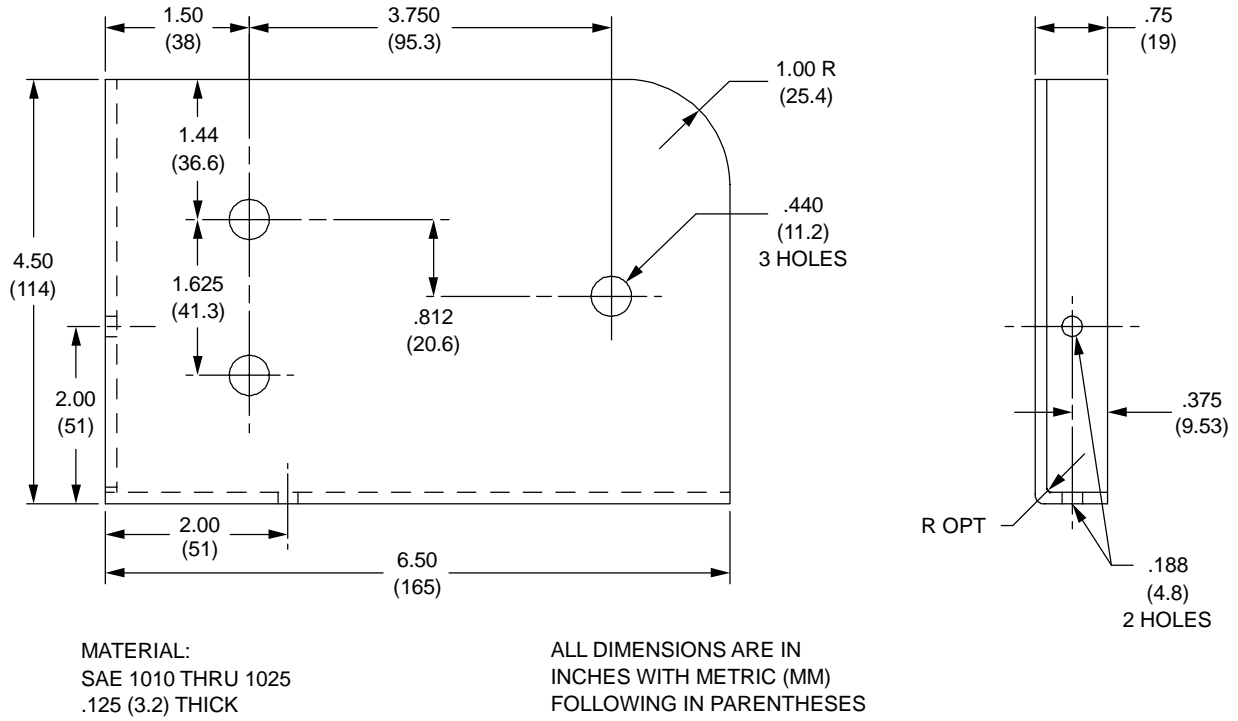


Figure 9. Holding Plate.

26i037m

END OF WORK PACKAGE



**TORQUE LIMITS****0038 00****THIS WORK PACKAGE COVERS:**

Scope, Torque Limits, How to use Torque Table, Tightening Metal Fasteners, Fastener Size and Thread Pattern, and Fastener Grade

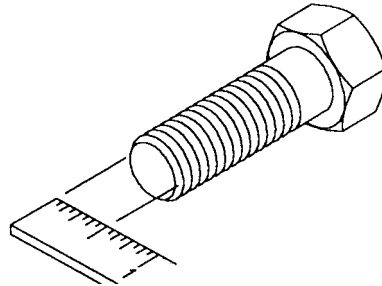
**SCOPE**

This work package provides general torque limits for screws used on the fuel metering pump. Special torque limits are indicated in the maintenance procedures for applicable components. The general torque limits given in this work package shall be used when specific torque limits are not indicated in the maintenance procedure.

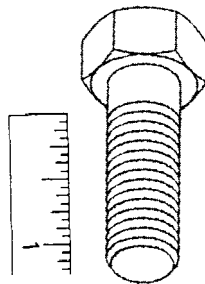
These general torque limits shall not be applied to screws that retain rubber components. The rubber components may be damaged before the correct torque limit is reached. If a special torque limit is not given in the maintenance instructions for rubber components, tighten the screw or nut until it touches the metal, then tighten it one more turn.

**TORQUE LIMITS**

Table 1 lists dry torque limits. Dry torque limits are used on screws that do not have lubricants applied to the threads. Table 2 lists wet torque limits. Wet torque limits are used on screws that have high-pressure lubricants applied to the threads.

**HOW TO USE TORQUE TABLE**

- a. Measure the diameter of the screw you are installing.



- b. Count the number of threads per inch or use a pitch gauge.
- c. Under the heading SIZE, look down the left hand column until you find the diameter of the screw you are installing (there will usually be two lines beginning with the same size).
- d. In the second column under SIZE, find the number of threads per inch that matches the number of threads you counted in step b.

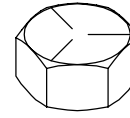
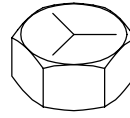
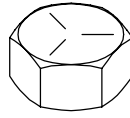
**TORQUE LIMITS - CONTINUED**

**0038 00**

**HOW TO USE TORQUE TABLE - CONTINUED**

**CAPSCREW HEAD MARKINGS**

Manufacturer's marks may vary. These are all SAE Grade 5 (3 line)

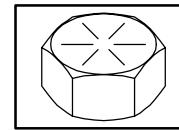
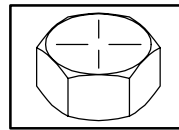
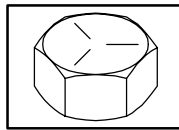
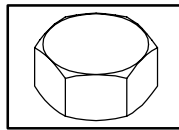


26PH007m

- e. To find the grade screw you are installing, match the markings on the head to the correct picture of CAPSCREW HEAD MARKINGS on the torque table.
- f. Look down the column under the picture you found in step e. until you find the torque limit in (lb-ft or N·m) for the diameter and threads per inch of the screw you are installing.

**Table 1. Torque Limits for Dry Fasteners.**

**SAE CAPSCREW HEAD MARKINGS**



26PH006m

SIZE			TORQUE							
			SAE GRADE No. 1 or 2		SAE GRADE No. 5		SAE GRADE No. 6 or 7		SAE GRADE No. 8	
DIA. INS.	THREADS PER INCH	MMs	POUND- FEET	N-m	POUND- FEET	N-m	POUND- FEET	N-m	POUND- FEET	N-m
1/4	20	6.35	5	6.78	8.0	10.85	10	13.56	12.0	16.27
1/4	28	6.35	6	8.14	10.0	13.56	—	—	14.0	18.98
5/16	18	7.94	11	14.92	17.0	23.05	19	25.76	24.0	32.52
5/16	24	7.94	13	17.63	19.0	25.76	—	—	27.0	36.61
3/8	16	9.53	18	24.41	31.0	42.04	34	46.10	44.0	59.66
3/8	24	9.53	20	27.12	35.0	47.46	—	—	49.0	66.44
7/16	14	11.11	28	37.97	49.0	66.44	55	74.58	70.0	94.92
7/16	20	—	30	40.68	55.0	74.58	—	—	78.0	105.77
1/2	13	12.70	39	52.88	75.0	101.70	85	115.26	105.0	142.38
1/2	20	—	41	55.60	85.0	115.26	—	—	120.0	162.78
9/16	12	14.29	51	69.16	110.0	149.16	120	162.72	155.0	210.18
9/16	18	—	55	74.58	120.0	162.72	—	—	170.0	230.52
5/8	11	15.88	63	85.43	150.0	203.40	167	226.45	210.0	284.76
5/8	18	—	95	128.82	170.0	230.52	—	—	240.0	325.44
3/4	10	19.05	105	142.38	270.0	366.12	280	379.68	375.0	508.50
3/4	16	—	115	155.94	295.0	400.02	—	—	420.0	596.52
7/8	9	22.23	160	216.96	395.0	535.62	440	596.64	605.0	820.38
7/8	14	—	175	237.30	435.0	589.86	—	—	675.0	915.30
1	8	25.40	235	318.66	590.0	800.04	660	894.96	910.0	1233.96
1	14	—	250	339.00	660.0	894.96	—	—	990.0	1342.44
1-1/8	—	25.58	—	—	800.0	1064.8	—	—	1280.0	1735.7
					880.0	1193.3			1440.0	1952.8
1-1/4	—	31.75	—	—	—	—	—	—	1820.0	2467.9
									2000.0	2712.0
1-3/8	—	34.93	—	—	1460.0	1979.8	—	—	2380.0	3227.3
					1680.0	2278.1			2720.0	3688.3
1-1/2	—	38.10	—	—	1940.0	2630.6	—	—	3160.0	4285.0
					2200.0	2983.2			3560.0	4827.4



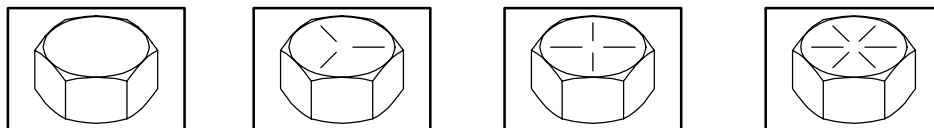
**TORQUE LIMITS - CONTINUED**

**0038 00**

**HOW TO USE TORQUE TABLE - CONTINUED**

**Table 2. Torque Limits for Wet Fasteners.**

**SAE CAPSCREW HEAD MARKINGS**



26PH006m

SIZE			TORQUE							
			SAE GRADE No. 1 or 2		SAE GRADE No. 5		SAE GRADE No. 6 or 7		SAE GRADE No. 8	
DIA. INS.	THREADS PER INCH	MMs	POUND- FEET	N-m	POUND- FEET	N-m	POUND- FEET	N-m	POUND- FEET	N-m
1/4	20	6.35	4.9	6.10	7.2	9.76	9.0	12.20	10.8	14.64
1/4	28	6.35	5.4	7.33	9.0	12.20	—	—	12.6	17.08
5/16	18	7.94	9.9	13.34	15.3	22.54	17.1	23.18	21.6	29.27
5/16	24	7.94	11.7	15.87	17.1	23.18	—	—	24.3	32.95
3/8	16	9.53	16.2	21.97	27.9	37.84	30.6	41.49	39.6	53.69
3/8	24	9.53	18.0	24.41	31.5	42.71	—	—	44.1	59.80
7/16	14	11.11	25.2	34.17	44.1	59.80	49.5	67.12	63.0	85.42
7/16	20	—	27.0	36.61	49.5	67.12	—	—	70.2	95.19
1/2	13	12.70	35.1	47.59	67.5	91.53	76.5	103.73	94.5	128.14
1/2	20	—	36.9	50.04	76.5	103.73	—	—	108.0	146.50
9/16	12	14.29	45.9	62.24	99.0	134.24	108.0	146.45	139.5	189.16
9/16	18	—	49.5	67.12	108.0	146.45	—	—	153.0	207.47
5/8	11	15.88	56.7	76.89	135.0	183.06	150.3	203.80	189.0	256.28
5/8	18	—	85.5	115.94	153.0	207.47	—	—	216.0	296.90
3/4	10	19.05	94.5	128.14	243.0	329.51	252.0	341.71	337.5	457.65
3/4	16	—	103.5	140.35	265.5	360.2	—	—	378.0	536.87
7/8	9	22.23	144.0	195.26	355.5	482.06	396.0	536.98	544.5	738.34
7/8	14	—	157.5	213.57	391.5	530.87	—	—	607.5	823.77
1	8	25.40	211.5	286.79	531.0	720.04	594.0	805.46	819.0	1110.56
1	14	—	225.0	305.10	594.0	805.46	—	—	891.0	1208.20
1-1/8	—	25.58	—	—	720.0	976.32	—	—	1152.0	1562.13
					792.0	1073.97			1296.0	1757.52
1-1/4	—	31.75	—	—	—	—	—	—	—	2221.11
										2440.80
1-3/8	—	34.93	—	—	1314.0	1781.82	—	—	2142.0	2904.57
					1512.0	2050.29			2448.0	3319.47
1-1/2	—	38.10	—	—	1746.0	2367.54	—	—	2844.0	3856.5
					1980.0	2684.88			3204.0	4344.66

**TIGHTENING METAL FASTENERS**

When torquing a fastener, select a torque wrench whose range (Table 3) fits the required torque value. A torque wrench is most accurate from 25% to 75% of its stated range. A torque wrench with a stated range of 0 to 100 will be most accurate from 25 to 75 Pound-Feet. The accuracy of readings will decrease as you approach 0 Pound-Feet or 100 Pound-Feet. The following ranges (Table 3) are based on this principle.

**TIGHTENING METAL FASTENERS - CONTINUED**

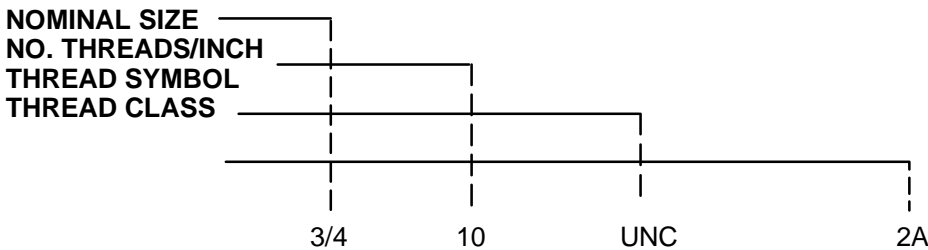
Table 3. Torque Ranges.	
STATED RANGE	MOST EFFECTIVE RANGE
0-2000 lb-in	4-13 lb-ft
0-600 lb-ft	50-450 lb-ft
0-170 lb-ft	44-131 lb-ft
15-75 lb-ft	30-60 lb-ft

**FASTENER SIZE AND THREAD PATTERN**

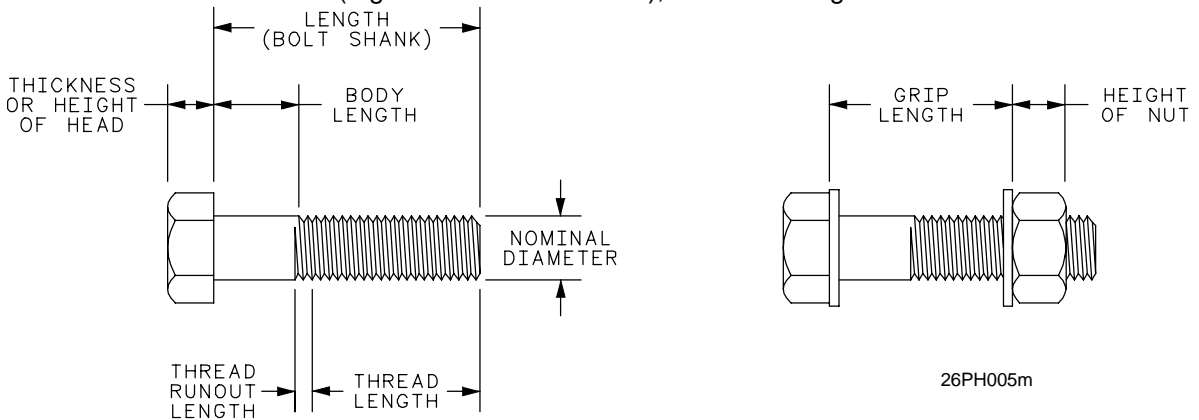
Threaded fasteners are categorized according to diameter of the fastener shank. Thread styles are divided into broad groups, the two most common being coarse (Unified Coarse-UNC) and fine (Unified Fine-UNF). These groups are defined by the number of threads per inch on the bolt shanks. In addition, threads are categorized by thread class (Table 4), which is a measure of the degree of fit between the threads of the bolt or screw (external threads) and the threads of the attaching nut or tapped hole (internal threads). The most common thread class for bolts and screws is Class 2.

Table 4. Thread Classes And Description.		
EXTERNAL	INTERNAL	FIT
1A	1B	LOOSE FIT
2A	2B	MEDIUM FIT
3A	3B	CLOSE FIT

Thread patterns are designed as follows:



NOTE: Unless followed with -LH (e.g. 3/4-10 UNC-2A-LH), threads are right hand.



**TORQUE LIMITS - CONTINUED**

**0038 00**

**FASTENER GRADE**

In addition to being classified by thread type, threaded fasteners are also classified by material. The most familiar fastener classification system is the SAE grading system (Table 5).

<b>Table 5. SAE Screw and Bolt Markings.</b>	
<b>SCREWS</b>	<b>BOLTS</b>
SAE GRADE 2 NO MARKING	SAE GRADE 6 4 RADIAL DASHES 90° APART
SAE GRADE 3 2 RADIAL DASHES 180° APART	SAE GRADE 7 5 RADIAL DASHES 72° APART
SAE GRADE 5 3 RADIAL DASHES 120° APART	SAE GRADE 8 6 RADIAL DASHES 60° APART

**Markings On Hex Locknuts**

GRADE A - No Marks

GRADE B - 3 Marks

GRADE C - 6 Marks

GRADE A - No Mark

GRADE B - Letter B

GRADE C - Letter C

GRADE A - No Notches

GRADE B - One Notch

GRADE C - Two Notches

**END OF WORK PACKAGE**



**CHAPTER 7**

**SUPPORTING  
INFORMATION**



**REFERENCES****0039 00****SCOPE**

The information contained in this work package has been prepared as a reference list of those army publications pertinent to the operation and maintenance of the vehicle/weapons systems incorporating the material supported by this publication.

**PUBLICATION INDEXES**

The following indexes should be consulted frequently for latest changes or revisions or references given in this work package and for new publications relating to material covered in this technical manual:

DA PAM 25-30 .....	Index of Administrative Publications
DA PAM 750-8 .....	The Army Maintenance Management System (TAMMS) Operators Manual

**MAINTENANCE FORMS AND RECORDS**

DA Form 2028 .....	Recommended Changes to Publications
DA Form 2404 .....	Equipment, Inspection, and Maintenance Worksheet
DA Form 2407 .....	Maintenance Requests
DD Form 1397 .....	Processing and Deprocessing for Shipment, Storage and Issue of Vehicles and Spare Engines
SF 368 .....	Quality Deficiency Report

**REGULATIONS**

AR-385-40 .....	Accident Reporting and Records
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**TECHNICAL MANUALS**

FM 4-25.11 .....	First Aid for Soldiers
FM 9-207 .....	Operation and Maintenance of Ordnance Materiel in Cold Weather (0° to -65°F) (-18° to -54°C)
TM 9-214 .....	Inspection, Care and Maintenance of Antifriction Bearings
TM 9-247 .....	Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordnance Materiel
TM 9-2815-200-35 .....	Direct Support, General Support and Depot Maintenance Manual (Including Repair Parts and Special Tools Lists) for Engine, AVDS-1790-2A
TM 9-2815-220-34 .....	Direct Support and General Support Maintenance Manual for Engine, AVDS-1790-2C, AVDS-1790-2D and AVDS-1790-2DR
TM 9-2815-247-34 .....	Direct Support and General Support Maintenance Manual for Engine, AVDS-1790-8CR
TM 9-2815-220-34P .....	Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Engines, AVDS-1790-2C, AVDS-1790-2D and AVDS-1790-2DR
TM 9-2815-247-34P .....	Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Engine, AVDS-1790-8CR
TM 9-2350-215-20-1-4 .....	Organizational Maintenance, Tank Combat, Full-Tracked: 105-MM Gun, M60A1 and M60A1/AOS (Hull)

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**REFERENCE WORK PACKAGE - CONTINUED**

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**0039 00**

**TEST ACCESSORIES**

TM 9-4910-387-14&P ..... Operator, Organizational, Direct Support, and General Support Maintenance Manual (Including Repair Parts and Special Tools List) for Tester, Fuel Injection: Single End Drive, 150 to 3,300 RPM (4910-00-817-7431) with Adapter Kit, Fuel Injector: (4910-00-763-7495)

**SUPPLY CATALOGS**

SC 5180-95-CL-B08 ..... Tool Kit, Automotive Fuel and Electrical System Repair: (5180-00-754-0655) (W32456)

SC 5180-90-CL-N26 ..... Tool Kit, General Mechanic's: Automotive (5180-00-177-7033) (W33004)

**END OF WORK PACKAGE**



**DIRECT SUPPORT AND  
GENERAL SUPPORT MAINTENANCE  
REPAIR PARTS AND SPECIAL TOOLS LIST**

**INTRODUCTION**

**SCOPE**

This Work Package lists repair parts and special tools required for the performance of direct and general support maintenance of the American Bosch Fuel Metering and Distributing Pump. It authorizes the requisitioning and issue of repair parts as indicated by the source and maintenance codes.

**GENERAL**

In addition to the Introduction, this work package is divided into the following areas.

1. Repair Parts List - lists spares and repair parts authorized for use in the performance of maintenance. This work package 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.
2. Special Tools List - lists special tools authorized for the performance of maintenance.
3. Cross-reference Index - There are two cross-reference indexes in this work package: the National Stock Number (NSN) and the Part Number (P/N) index. The National Stock Number Index refers you to the figure and item number. The Part Number Index refers you to the figure and item number.

**EXPLANATION OF COLUMNS IN THE REPAIR PARTS AND SPECIAL TOOLS LIST**

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

**SMR CODE** (Column (2)). The SMR code containing supply/requisitioning information, maintenance level authorization criteria, and disposition instruction, as shown in the following breakout:

<u>Source Code</u>	<u>Maintenance Code</u>	<u>Recoverability Code</u>
<u>XXxxx</u>	<u>xxXXX</u>	<u>xxxxX</u>
1 <sup>st</sup> two positions: How to get an item.	3 <sup>rd</sup> position: Who can install, replace, or use the item.	4 <sup>th</sup> position: Who can do complete repair* on the item.
		5 <sup>th</sup> position: Who determines disposition action on unserviceable items.

\*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.

**Source Code.** The source code tells you how you get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follow:

**Source Code**

PA  
PB  
PC  
PD  
PE  
PF  
PG

**Application/Explanation**

Stock items; use the applicable NSN to requisition/request items with these source codes. They are authorized to the level indicated by the code entered in the 3<sup>rd</sup> position of the SMR code.

## EXPLANATION OF COLUMNS IN THE REPAIR PARTS AND SPECIAL TOOLS LIST - CONTINUED

## NOTE

Items coded PC are subject to deterioration.

KD	Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance level indicated in the 3 <sup>rd</sup> position of the SMR code. The complete kit must be requisitioned and applied.
KF	
KB	
MO-Made at unit/ AVUM level	Items with these codes are not to be requisitioned/requested individually. They must be made from bulk material which is identified by the P/N in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the bulk material group work package of the RPSTL. If the item is authorized to you by the 3 <sup>rd</sup> position code of the SMR code, but the source code indicates it is made at higher level, order the item from the higher level of maintenance.
MF-Made at DS/ AVILM level	
MH-Made at GS level	
ML-Made at SRA	
MD-Made at depot	
AO-Assembled by unit/AVUM level	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 3 <sup>rd</sup> position of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.
AF-Assembled by DS/AVIM level	
AH-Assembled by GS level	
AL-Assembled by SRA	
AD-Assembled by depot	
XA	Do not requisition an "XA" coded item. Order the next higher assembly. (Refer to NOTE below.)
XB	If an item is not available from salvage, order it using the CAGEC and P/N.
XC	Installation drawings, diagrams, instruction sheets, field service drawings; identified by manufacturer's P/N.
XD	Item is not stocked. Order an XD-coded item through normal supply channels using the CAGEC and P/N 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 items source coded "XA" or those aircraft support items restricted by requirements of AR 750-1.

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

**Third Position.** 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:

**RPSTL WORK PACKAGE - CONTINUED****0040 00****EXPLANATION OF COLUMNS IN THE REPAIR PARTS AND SPECIAL TOOLS LIST - CONTINUED****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.

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

**NOTE**

Some limited repair may be done on the item at the lower level of maintenance, if authorized by the 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 maintenance of "B" coded item. However, the item may be reconditioned by adjusting, lubricating, etc., at the user level.

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

**Recoverability****Code****Application/Explanation**

Z	-	Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in the third position of the SMR code.
O	-	Reparable item. When uneconomically repairable, condemn and dispose of the item at the unit level.
F	-	Reparable item. When uneconomically repairable, condemn and dispose of the item at the direct support level.
H	-	Reparable item. When uneconomically repairable, 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 is not authorized below depot level.
L	-	Reparable item. Condemnation and disposal not authorized below Specialized Repair Activity (SRA).

**RPSTL WORK PACKAGE - CONTINUED****0040 00****EXPLANATION OF COLUMNS IN THE REPAIR PARTS AND SPECIAL TOOLS LIST - CONTINUED**

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

**NSN** (Column (3)). The NSN for the item is listed in this column.

**CAGEC** (Column (4)). The Commercial and Government Entity Code (CAGEC) is a five-digit code which is used to identify the manufacturer, distributor, or Government agency/activity that supplies the item.

**PART NUMBER** (Column (5)). 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 P/N from the number listed.

**DESCRIPTION AND USABLE ON CODE (UOC)** (Column (6)). This column includes the following information:

1. The federal item name, and when required, a minimum description to identify the item.
2. P/Ns of bulk materials are referenced in this column in the line entry to be manufactured or fabricated.
3. Hardness Critical Item (HCI). A support item that provides the equipment with special protection from Electromagnetic Pulse (EMP) damage during a nuclear attack.
4. The statement END OF FIGURE appears just below the last item description in column (6) for a given figure in both the repair parts list and special tools list.

**QTY** (Column (7)). 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 quantity may change from application to application.

**EXPLANATION OF CROSS-REFERENCE INDEX FORMAT AND COLUMNS**

1. National Stock Number (NSN) Index.

**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.

NSN  
(e.g., 5385-01-574-1476)  
NIIN

When using this column to locate an item, ignore the first four digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

**FIG.** Column. This column lists the number of the figure where the item is identified/located. The figures are in numerical order in the repair parts list and special tools list.

**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.

2. Part Number (P/N) Index. P/Ns in this index are listed in ascending numeric-alpha sequence (vertical arrangement of number and letter combinations which places the first digit or letter of each group in order 0 through 9, followed by the letters A through Z and each following digit or letter in like order).

**PART NUMBER** Column. Indicates the P/N assigned to the item.

**FIG.** Column. This column lists the number of the figure where the item is identified/located in the repair parts list and special tools list.

**ITEM** Column. The item number is in the number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

**RPSTL WORK PACKAGE - CONTINUED****0040 00****SPECIAL INFORMATION**

**UOC.** The UOC appears in the lower left corner of the Description Column heading. Usable on codes are shown as "UOC:..." in the Description Column (justified left) on the first line under the applicable item/nomenclature. Uncoded items are applicable to all models. Identification of the UOCs used in the RPSTL are:

<u>Code</u>	<u>USED ON</u>
A	Old 11 mm Metering Pump
B	New 11 mm Metering Pump

**Fabrication Instructions.** Detailed fabrication instructions for items source coded to be manufactured or fabricated are found in WP WP 0037 00.

**Item 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 NSN / P/N index and the bulk material list in the repair parts list.

**HOW TO LOCATE REPAIR PARTS**

1. When NSNs or P/Ns are not known.

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

Second. Find the figure covering the functional group or the subfunctional group to which the item belongs.

Third. Identify the item on the figure and note the number(s).

Fourth. Look in the repair parts list work packages for the figure and item numbers. The NSNs and part numbers are on the same line as the associated item numbers.

2. When NSN is known.

First. If you have the NSN, look in the Stock Number column of the NSN index. The NSN is arranged in NIIN sequence. Note the figure and item number next to the NSN.

Second. Turn to the figure and locate the item number. Verify that the item is the one you are looking for.

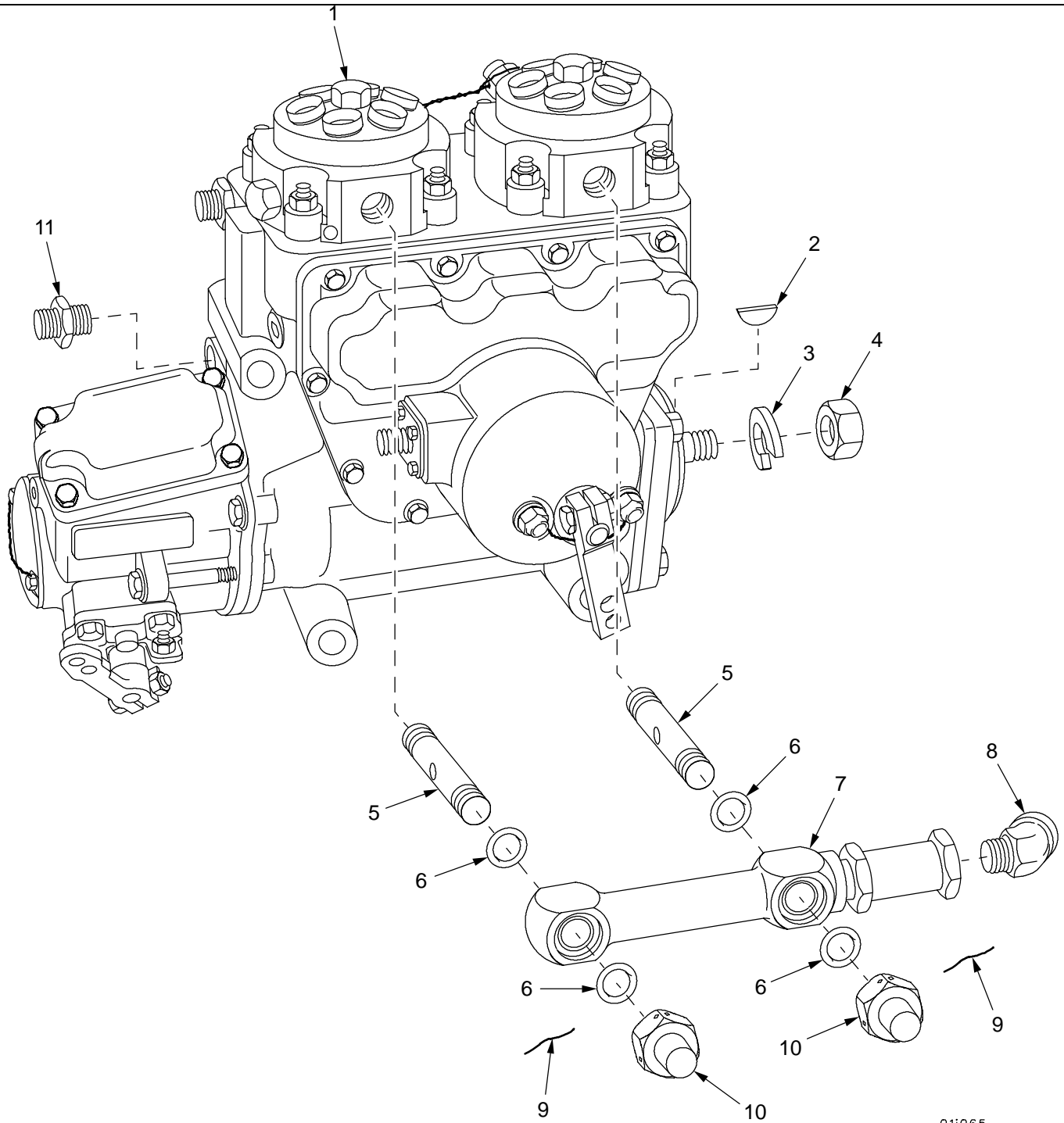
3. When P/N is known.

First. If you have the P/N and not the NSN, look in the Part Number column of the P/N index. Identify the figure and item number.

Second. Look up the item on the figure in the applicable repair parts list.

**ABBREVIATIONS**

<u>Abbreviation</u>	<u>Explanation</u>
FIG	Figure
NSN	National Stock Number
RPSTL	Repair Parts and Special Tools List
SMR	Source, Maintenance, and Recoverability
TMDE	Test, Measurement, and Diagnostic Equipment
UOC	Usable on Code



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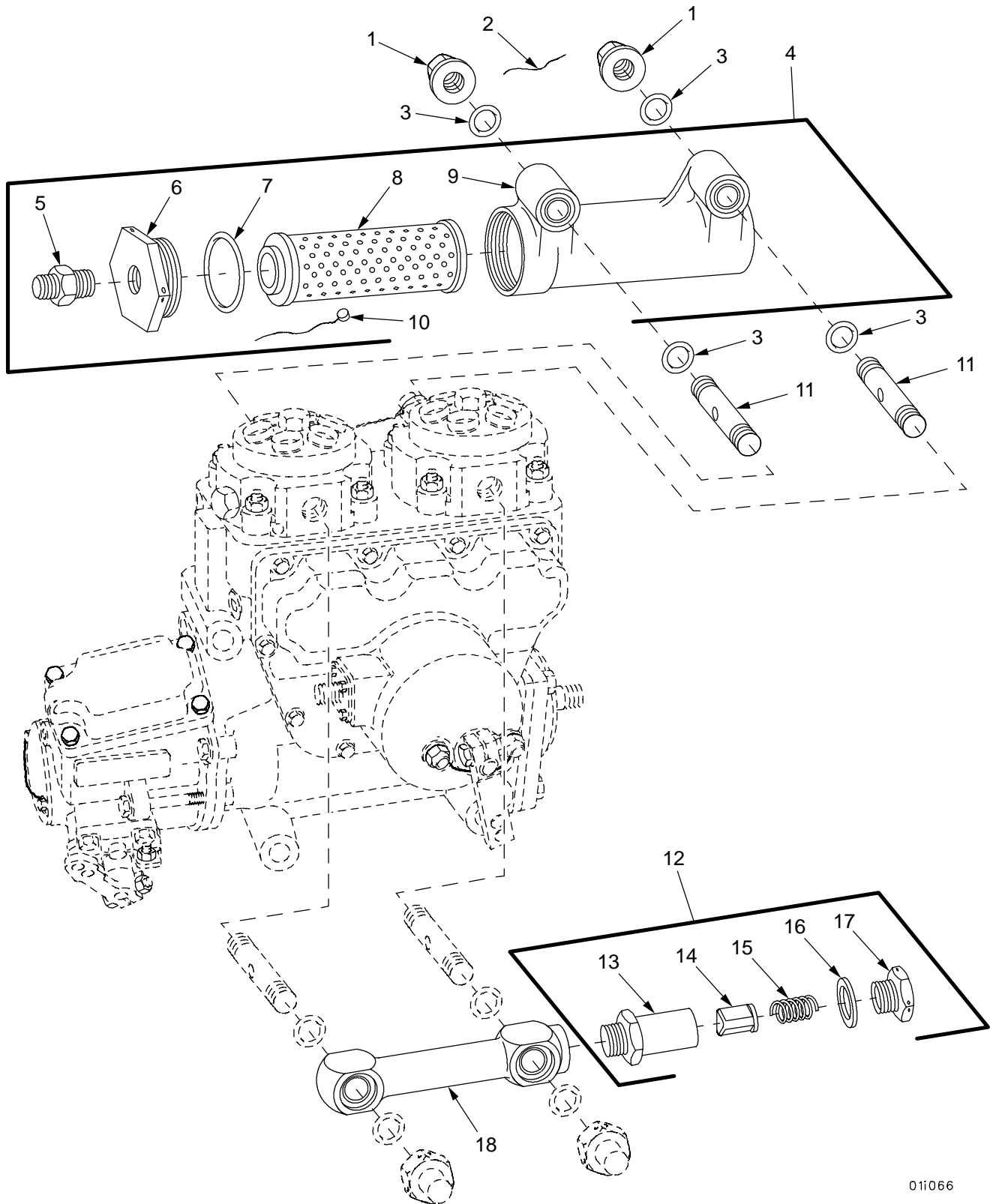
Figure 1. Bleeder Housing, Valve Assembly and Associated Parts.

RPSTL WORK PACKAGE - CONTINUED

0040 00

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 03 FUEL PUMP	
					GROUP 0302 FUEL PUMP	
					FIGURE 1 BLEEDER HOUSING, VALVE ASSEMBLY AND ASSOCIATED PARTS	
1	XAFHD		19207	11668626-1	PUMP, FUEL, METERING 11MM. ....	1
2	PAFZZ	5315-00-282-0341	19207	8761412	KEY, WOODRUFF PUMP DRIVE COUPLING TO PUMP DRIVE SHAFT. ....	1
3	PAFZZ	5310-00-584-7888	96906	MS35338-51	WASHER, LOCK PUMP DRIVE SHAFT. ....	1
4	PAFZZ	5310-00-655-9590	19207	7340058	NUT, PLAIN, HEXAGON PUMP DRIVE SHAFT.	1
5	PAFZZ	4820-00-678-4724	19207	7320493	STEM, FLUID VALVE PUMP HEAD TO BLEEDER VALVE HOUSING. ....	2
6	PAFZZ	5330-00-579-3156	96906	MS28775-116	PACKING, PREFORMED FUEL RETURN HOUSING TO STEMS(2), CAP NUTS(2) PART OF KIT P/N 5702632. ....	4
7	PFFFF	2910-00-475-3463	19207	11684115	HOUSING AND VALVE FUEL RETURN AND BLEEDER SEE FIGURE 2 FOR PARTS BREAKOUT. ....	1
8	PAFZZ	4730-00-595-1868	81336	454098	ELBOW, PIPE FUEL RETURN. ....	1
8	PAFZZ	4730-00-555-1764	96906	MS51504A8	UOC: A, ELBOW, PIPE TO TUBE. ....	1
9	MFZZ		96906	MS20995NC40-12	UOC: B, WIRE, NONELECTRICAL BLEEDER VALVE TO CAP NUT TO CAP NUT FABRICATE FROM WIRE, NONELECTRICAL 9525-00-990-7799 2 PCS. 12 IN. LG. REQUIRED. ....	2
10	PAFZZ	5310-00-655-9593	19207	7340055	NUT, PLAIN, CAP FUEL RETURN TO STEM.	2
11	PAFZZ	4730-00-800-2830	19207	10865239	ADAPTER, STRAIGHT, PI OIL INLET HOSE. UOC: A,	1
11	PAFZZ	4730-01-434-5207	01843	AD882	ADAPTER, STRAIGHT, PI OIL INLET HOSE. UOC: B,	1

END OF FIGURE



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Figure 2. Filter Assembly, Bleeder Valve Assembly and Associated Parts.

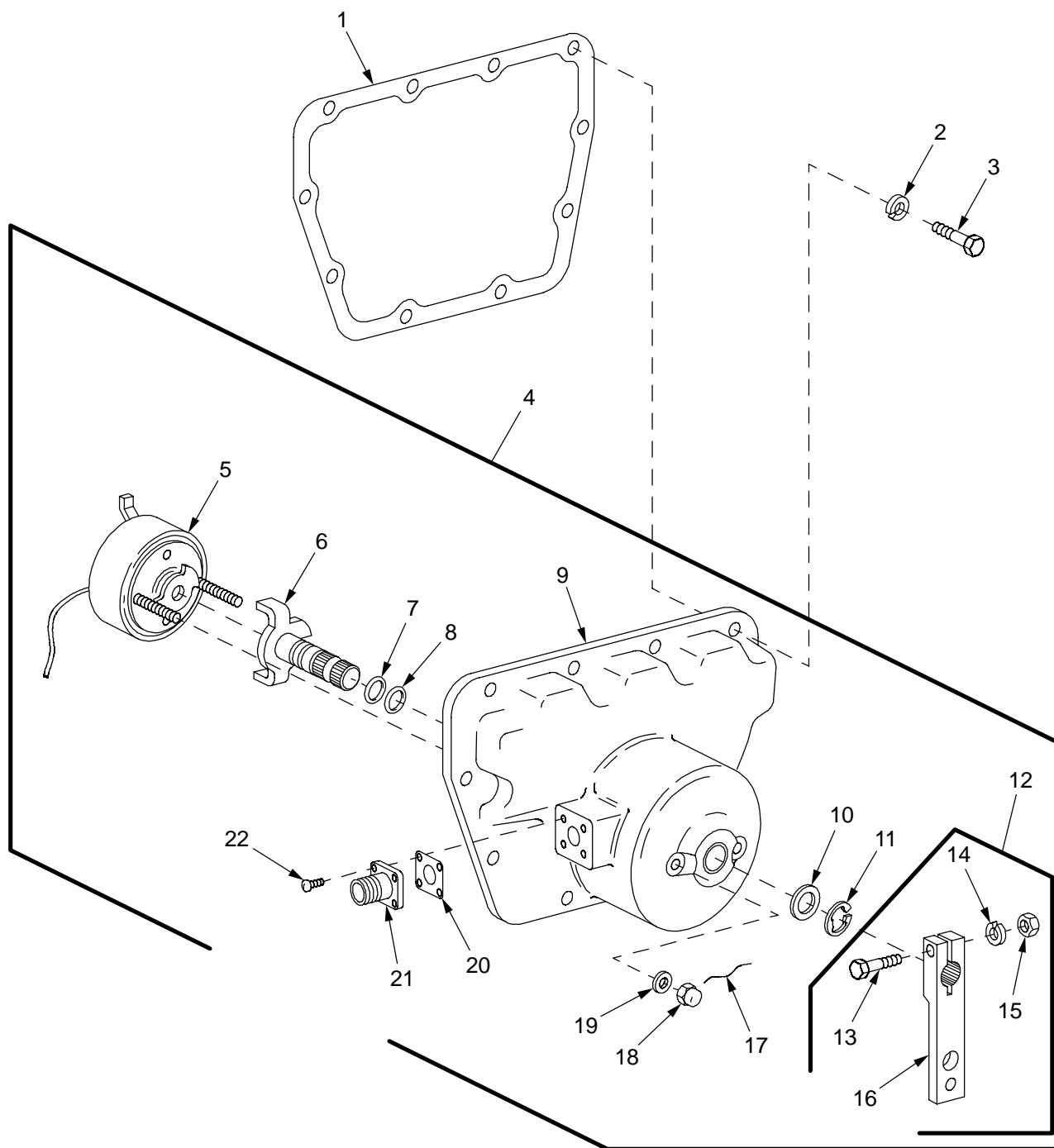


RPSTL WORK PACKAGE - CONTINUED

0040 00

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0302 FUEL PUMP FIGURE 2 FILTER ASSEMBLY, BLEEDER VALVE ASSEMBLY AND ASSOCIATED PARTS	
1	KFHZZ		01843	NT888	NUT, CAP FILTER ASSEMBLY TO STEMS. .	2
2	MHHZZ		96906	MS20995NC40-12	PART OF KIT P/N 5704356. . . . . WIRE, NONELECTRICAL CAP NUT TO CAP. .	1
3	PAFZZ	5330-00-579-3156	96906	MS28775-116	NUT FABRICATE FROM WIRE, NONELECTRICAL 9525-00-990-7799, 1 PC. 12 IN. LG. REQUIRED. . . . .	4
4	KFFFF		01843	FE882A	PACKING, PREFORMED FILTER ASSEMBLY TO STEMS (2), CAP NUTS (2) PART OF KIT P/N 5704356, 5702632. . . . .	1
5	PAFZZ	4730-00-402-5143	02978	10951334	FILTER ASSEMBLY FUEL INLET PART OF KIT P/N 5704356. . . . . . ADAPTER, STRAIGHT, PI FUEL FILTER INLET. . . . .	1
6	XAFZZ		01843	CP883	. CAP FILTER INLET HOUSING. . . . .	1
7	PAFZZ	5330-00-819-5111	96906	MS28778-24	. PACKING, PREFORMED FUEL INLET HOUSING CAP PART OF KIT P/N 5702739	1
8	KFFZZ		19207	10951481	. FILTER ELEMENT PART OF KIT P/N 5702739. . . . .	1
9	XAFZZ		01843	HG8817	. HOUSING, MANIFOLD FUEL INLET. . . . .	1
10	PAFZZ	5340-00-902-0426	96906	MS51938-6	. SEAL, ANTI PILFERAGE FILTER INLET HOUSING CAP PART OF KIT P/N 5705050	1
11	PAFZZ	4820-00-678-4724	19207	7320493	STEM, FLUID VALVE PUMP HEAD TO FILTER ASSEMBLY. . . . .	2
12	PFFFF	4820-00-613-6297	19207	11684114	VALVE, SAFETY RELIEF BLEEDER. . . . .	1
13	XAFZZ	4820-01-296-9362	19207	10951144	. HOUSING, BLEEDER VALVE. . . . .	1
14	XAFZZ		19207	10951143	. VALVE, BLEEDER. . . . .	1
15	PADZZ	5340-00-510-4117	19207	11684113	. SPRING, HELICAL, COMP BLEEDER VALVE.	1
16	PAFZZ	5365-00-655-9589	19207	7340054	. SPACER, RING RETAINER. . . . .	1
17	PAFZZ	5340-00-678-4727	19207	8682456	. RETAINER, HELICAL, CO. . . . .	1
18	PBFZZ	2910-01-298-5376	19207	10935512	HOLDER, FUEL INJECTO. . . . .	1

END OF FIGURE



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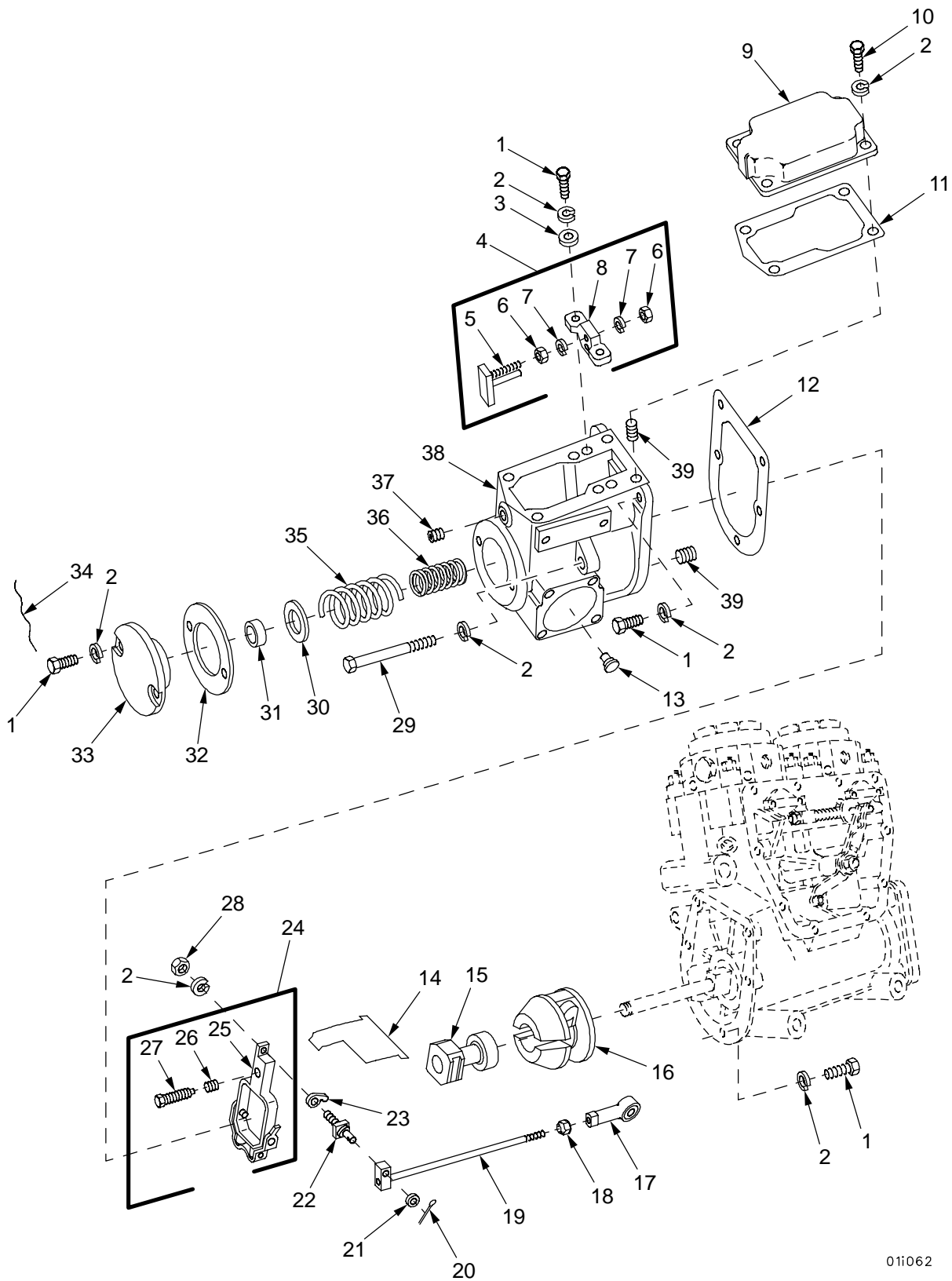
Figure 3. Cover and Solenoid Assembly.

RPSTL WORK PACKAGE - CONTINUED

0040 00

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0302 FUEL PUMP FIGURE 3 COVER AND SOLENOID ASSEMBLY	
1	PAHZZ	5330-00-786-0190	01843	GA8814	GASKET SOLENOID COVER ASSEMBLY PART OF KIT P/N 5702632. ....	1
2	PAHZZ	5310-00-582-5965	80205	MS35338-44	WASHER, LOCK PART OF KIT P/N 5705050. , 5705051. ....	10
3	PAHZZ	5306-00-816-5803	01843	SC1110	BOLT, MACHINE. ....	10
4	PFHHH	2910-00-466-7473	01843	CV8816A	COVER AND SOLENOID MANUAL SHUT-OFF.	1
5	PFHZZ	2920-00-449-0107	01843	S0882A	. SOLENOID, ELECTRICAL. ....	1
6	PAHZZ	2910-00-467-2582	02978	679672	. LEVER ASSEMBLY, SHUT. ....	1
7	PAHZZ	5330-00-310-6559	01843	GA401346	. GASKET PART OF KIT P/N 5705050, 5702632. ....	1
8	PAHZZ	5330-00-583-3473	01843	GA1144	. PACKING, PREFORMED PART OF KIT P/N 5705050, 5702632. ....	1
9	XAHZZ		01843	CV8817A	. COVER. ....	1
10	PAHZZ	5310-00-166-1412	0AHP5	27D123	. WASHER, FLAT. ....	1
11	PAHZZ	5365-01-012-7353	02978	RG886	. RING, RETAINING. ....	1
12	PBHHH	3040-00-466-7469	02978	679671	. LEVER, REMOTE CONTRO. ....	1
13	PAHZZ	5306-00-366-8857	01843	SC7961	. . BOLT, MACHINE. ....	1
14	PAHZZ	5310-00-582-5965	80205	MS35338-44	. . WASHER, LOCK PART OF KIT P/N 5705050. ....	1
15	PAHZZ	5310-01-493-5390	96906	MS35691-5	. . NUT, PLAIN, HEXAGON. ....	1
16	XAHZZ		01843	LE8839	. . LEVER. ....	1
17	PAHZZ	2990-00-977-2591	6N299	4506994-5	. WIRE BEARING PLATE. ....	1
18	PAHZZ	5310-01-112-7922	01843	NT886	. NUT, PLAIN, CAP. ....	1
19	PFHZZ	5310-00-253-8721	82254	CFN70306	. WASHER, FLAT SOLENOID CAP NUT. ....	2
20	PAHZZ	5330-00-827-5635	19207	7383426	. GASKET CONNECTOR RECEPTACLE PART OF KIT 5702632. ....	1
21	PAHZZ	5935-00-810-8094	96906	MS3102R8S1P	. CONNECTOR, RECEPTACL. ....	1
22	PAHZZ	5305-00-810-8093	21450	420429	. SCREW, ASSEMBLED WAS CONNECTOR RECEPTACLE. ....	4

END OF FIGURE



01i062

Figure 4. Governor Housing, Fulcrum Lever, Sleeve Assembly, Weight and Spider Assembly and Associated Parts.

RPSTL WORK PACKAGE - CONTINUED

0040 00

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0302 FUEL PUMP FIGURE 4 GOVERNOR HOUSING, FULCRUM LEVER, SLEEVE ASSEMBLY, WEIGHT AND SPIDER ASSEMBLY AND ASSOCIATED PARTS	
1	XAHZZ		21450	454724	SCREW, CAP, HEXAGON H. ....	7
2	PAHZZ	5310-00-582-5965	80205	MS35338-44	WASHER, LOCK PART OF KIT P/N 5705050, 5705051. ....	14
3	PAHZZ	5310-00-515-3030	19204	5153030	WASHER, FLAT STOP PLATE BRIDGE TO GOVERNOR HOUSING. ....	2
4	PAHZZ	2910-00-064-6267	19207	10885779	BRIDGE, STOP PLATE. ....	1
5	XAHZZ		01843	PL79123A	PLATE ASSEMBLY, STOP. ....	1
6	PAHZZ	5310-01-493-5390	96906	MS35691-5	NUT, PLAIN, HEXAGON STOP PLATE. ....	2
7	PAHZZ	5310-00-582-5965	80205	MS35338-44	WASHER, LOCK STOP PLATE. ....	2
8	XAHZZ		01843	BK7938C	BRIDGE STOP, PLATE. ....	1
9	XAHZZ		01843	CV9032C	COVER, GOVERNOR. ....	1
10	XDHZZ	5306-00-816-5803	01843	SC1110	BOLT, MACHINE GOVERNOR COVER TO HOUSING. ....	4
11	PAHZZ	5330-00-310-6556	01843	GA908	GASKET GOVERNOR COVER, PART OF KIT P/N 5705050, 5705051. ....	1
12	KFHZZ		01843	GA8813	GASKET GOVERNOR HOUSING, PART OF KIT P/N 5702632. ....	1
13	KFHZZ		01843	PN901A	PIN, PIVOT FULCRUM LEVER BRACKET, PART OF KIT P/N 5705051. ....	1
14	XAHZZ		01843	8A881	BAFFLE, OIL GOVERNOR HOUSING. ....	1
15	KFHZZ		19207	7748546	SLEEVE ASSEMBLY GOVERNOR, PART OF KIT P/N 8705051. ....	1
16	PAHHZ	2990-00-562-1146	01843	WT9025A	WEIGHT AND SPIDER A SEE FIGURE 5 FOR PARTS BREAKOUT	1
17	PAHZZ	3120-00-845-5726	19207	7748622	BEARING, PLAIN, ROD E GOVERNOR CONTROL ROD. ....	1
18	PAHZZ	5310-00-902-6676	96906	MS21083N3	NUT, SELF-LOCKING, HE GOVERNOR CONTROL END. ....	1
19	KFHZZ		19207	10951322	ROD CONTROL ASSEMBL PART OF KIT P/N 5705051. ....	1
20	KFHZZ		21450	137128	PIN, COTTER CONTROL ROD TO FULCRUM LEVER, PART OF KIT P/N 5705051. ....	1
21	KFHZZ		19207	7748547	WASHER CONTROL ROD TO FULCRUM LEVER PART OF KIT P/N 5705051. ....	1
22	XAHZZ	5305-01-504-7169	01843	SC8814	SCREW SMOKE LIMIT CAM. ....	1
23	KFHZZ	3040-00-362-7035	01843	CA401255	CAM, SMOKE LIMIT PART OF KIT P/N 5705051	1
24	KFHZZ	2390-01-491-4821	01843	LE8856A	FULCRUM LEVER ASSEM GOVERNOR, PART OF KIT, P/N 5705051. ....	1
25	XAHZZ		01843	LE8855A	FULCRUM LEVER. ....	1
26	PAHZZ	5325-01-214-7758	01843	IT1011	INSERT, SCREW THREAD HELICAL COIL. ...	1
27	PAHZZ	5305-01-170-8472	01843	SC8830	DROOP SCREW. ....	1
28	PAHZZ	5310-01-493-5390	96906	MS35691-5	NUT, PLAIN, HEXAGON SMOKE LIMIT CAM, PART OF KIT P/N 5705051. ....	1
29	XAHZZ		01843	SC1877	SCREW GOVERNOR HOUSING TO INJECTION PUMP HOUSING. ....	2

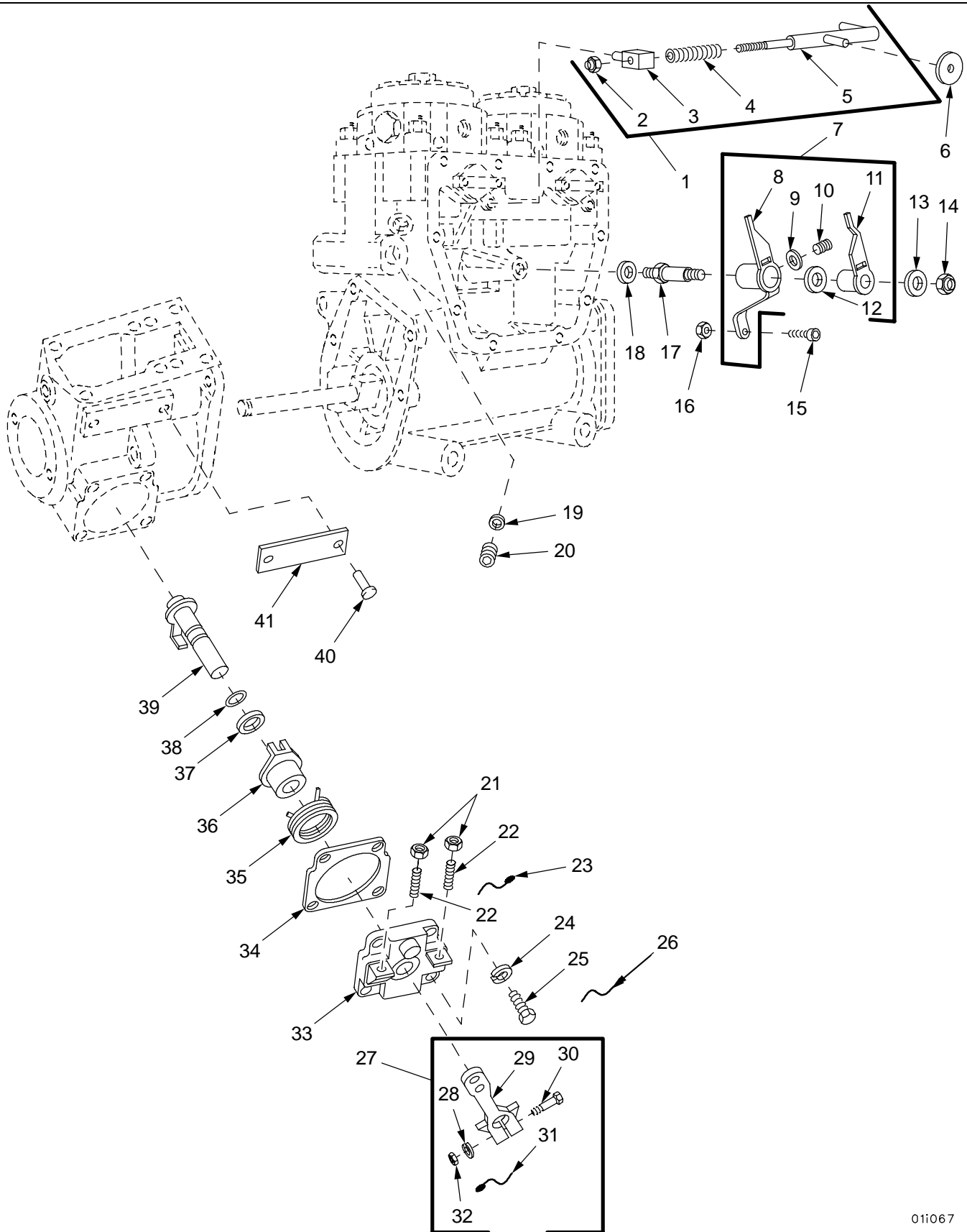
RPSTL WORK PACKAGE - CONTINUED

0040 00

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
30	PAHZZ	5310-00-595-5313	01843	SR400440	WASHER, FLAT 0.042 IN THK, GOVERNOR OUTER SPRING, PART OF KIT P/N 5702638	1
30	PAHZZ	5310-00-595-6391	01843	SR400441	WASHER, FLAT 0.058 IN THK, GOVERNOR OUTER SPRING, PART OF KIT P/N 5702638	1
30	PAHZZ	5310-00-262-5646	01843	SR400442	WASHER, FLAT 0.083 IN THK, GOVERNOR OUTER SPRING, PART OF KIT P/N 5702638	1
30	PAHZZ	5310-00-362-7092	01843	SR7914-1	WASHER, FLAT 0.020 IN THK, GOVERNOR OUTER SPRING, PART OF KIT P/N 5702638	1
30	KFHZZ		01843	SR7914-5	SPACER, ADJUSTING 0.156 IN THK, GOVERNOR OUTER SPRING, PART OF KIT P/N 5702638.	1
30	KFHZZ		01843	SR7914-6	SPACER, ADJUSTING 0.030 IN THK, GOVERNOR OUTER SPRING, PART OF KIT P/N 5702638.	1
31	PAHZZ	5365-00-362-7089	01843	SR400410	SPACER, GOVERNOR FUE 0.042 IN THK, GOVERNOR INNER SPRING, PART OF KIT P/N 5702638.	1
31	PAHZZ	5310-00-167-0823	81343	AN960-816	WASHER, FLAT 0.058 IN THK, GOVERNOR INNER SPRING, PART OF KIT P/N 5702638	1
31	PAHZZ	5310-00-595-5315	01843	SR400412	WASHER, FLAT 0.083 IN THK, GOVERNOR INNER SPRING, PART OF KIT P/N 5702638	1
31	KFHZZ		01843	SR799-5	SPACER, ADJUSTING 0.177 IN THK, GOVERNOR INNER SPRING, PART OF KIT P/N 5702638.	1
31	KFHZZ		01843	SR799-6	SPACER, ADJUSTING 0.276 IN THK, GOVERNOR INNER SPRING, PART OF KIT P/N 5702638.	1
31	PAHZZ	5310-00-362-7088	99066	SR799-1	WASHER, FLAT 0.020 IN THK, GOVERNOR INNER SPRING, PART OF KIT P/N 5702638	1
32	PAHZZ	5330-00-640-9587	01843	GA902	GASKET PART OF KIT P/N 5705051, 5702632.	1
33	PAHZZ	3040-01-378-6184	01843	CP901	CAP, LINEAR ACTUATIN.	1
34	PAHZZ	2990-00-977-2591	6N299	4506994-5	WIRE BEARING PLATE GOVERNOR CAP.	1
35	PAHZZ	5340-00-830-3882	01843	SP7951-13	SPRING, HELICAL, COMP GOVERNOR CAP.	1
36	PAHZZ	5360-00-785-6358	01843	SP7950/3	SPRING, HELICAL, COMP INNER, GOVERNOR.	1
37	PAHZZ	4730-00-954-1281	81348	WW-P-471ACACBCB	PLUG, PIPE GOVERNOR HOUSING ACCESS.	1
38	XAHZZ		01843	HG8822A	HOUSING, GOVERNOR.	1
39					HELICOIL, 2.50-20 UNC S/N S 8F7790.	5

END OF FIGURE





011067

Figure 5. Yoke Assembly, Lever Assembly, Operating Lever Assembly and Associated Parts.



RPSTL WORK PACKAGE - CONTINUED

0040 00

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0302 FUEL PUMP FIGURE 5 YOKE ASSEMBLY, LEVER ASSEMBLY, OPERATING LEVER ASSEMBLY AND ASSOCIATED PARTS	
1	KFH HH		01843	Y0881A	YOKE ASSEMBLY PART OF KIT P/N 5705051.....	1
2	XAHZZ		01843	NT1218	. NUT.....	1
3	XAHZZ		01843	PN8821	. PIN, YOKE.....	1
4	PAHZZ	5340-00-529-6945	01843	SP9014	. SPRING, HELICAL, COMP.....	1
5	XAHZZ		01843	RD883A	. ROD, YOKE.....	1
6	KFHZZ		01843	SR8811-1	SPACER PART OF KIT P/N 5705051.....	1
6	KFHZZ		01843	SR8811-2	SPACER PART OF KIT P/N 5705051.....	1
7	KFH HH		01883	LE409004	LEVER ASSEMBLY, FUEL PART OF KIT P/N 5702765.....	1
8	XAHZZ		01843	LE409078	. LEVER, FUEL CONTROL.....	1
9	PAHZZ	5340-01-449-1424	01843	GU408541	. SEAT.....	1
10	PAHZZ	5360-01-433-8974	01843	SP408500	. SPRING, HELICAL, COMP.....	1
11	XAHZZ		01843	LE409077	. LEVER, FUEL CONTROL.....	1
12	PAHZZ	5365-01-450-0691	01843	SR8812	. SPACER.....	1
13	KFHZZ		01843	WA1806	WASHER PART OF KIT P/N 5702765.....	1
14	PAHZZ	5310-00-176-6677	01843	NT1161	NUT, PLAIN, SINGLE BA PART OF KIT P/N 5702765.....	1
15	PAHZZ	5305-00-983-6652	96906	MS16998-29	SCREW, CAP, SOCKET HE GOVERNOR ..... CONTROL ROD TO LEVER.....	1
16	PAHZZ	5310-00-902-6676	96906	MS21083N3	NUT, SELF-LOCKING, HE GOVERNOR ..... CONTROL ROD TO LEVER.....	1
17	KFHZZ		21843	SC8825	SCREW PART OF KIT P/N 5702675.....	1
18	XAHZZ		01843	WA22-108L	WASHER FUEL CONTROL LEVER SCREW....	1
19	PAHZZ	5365-00-245-5420	01843	GA7965	SPACER, RING PART OF KIT P/N 5702632.....	1
20	PAHZZ	5365-01-172-1823	01843	PG886	PLUG, MACHINE THREAD.....	1
21	PAHZZ	5310-00-768-0319	96906	MS51968-2	NUT, PLAIN, HEXAGON IDLE AND FULL SPEED, PART OF KIT P/N 5705050.....	1
22	PAHZZ	5305-01-227-8675	19207	11621586	SETSCREW IDLE AND FULL SPEED ADJUSTING SCREW, PART OF KIT P/N 5705050.....	2
23	PAHZZ	5340-00-902-0426	96906	MS51938-6	SEAL, ANTIPI LFERAGE IDLE AND FULL SPEED ADJUSTING SCREW NUT, PART OF KIT P/N 5705050.....	1
24	PAHZZ	5310-00-582-5965	80205	MS35338-44	WASHER, LOCK BEARING PLATE TO GOVERNOR HOUSING, PART OF KIT P/N 5705050.....	1
25	KFHZZ		19207	11621881	SCREW, CAP, HEXAGON H BEARING PLATE TO GOVERNOR HOUSING, PART OF KIT P/N 5705050.....	4

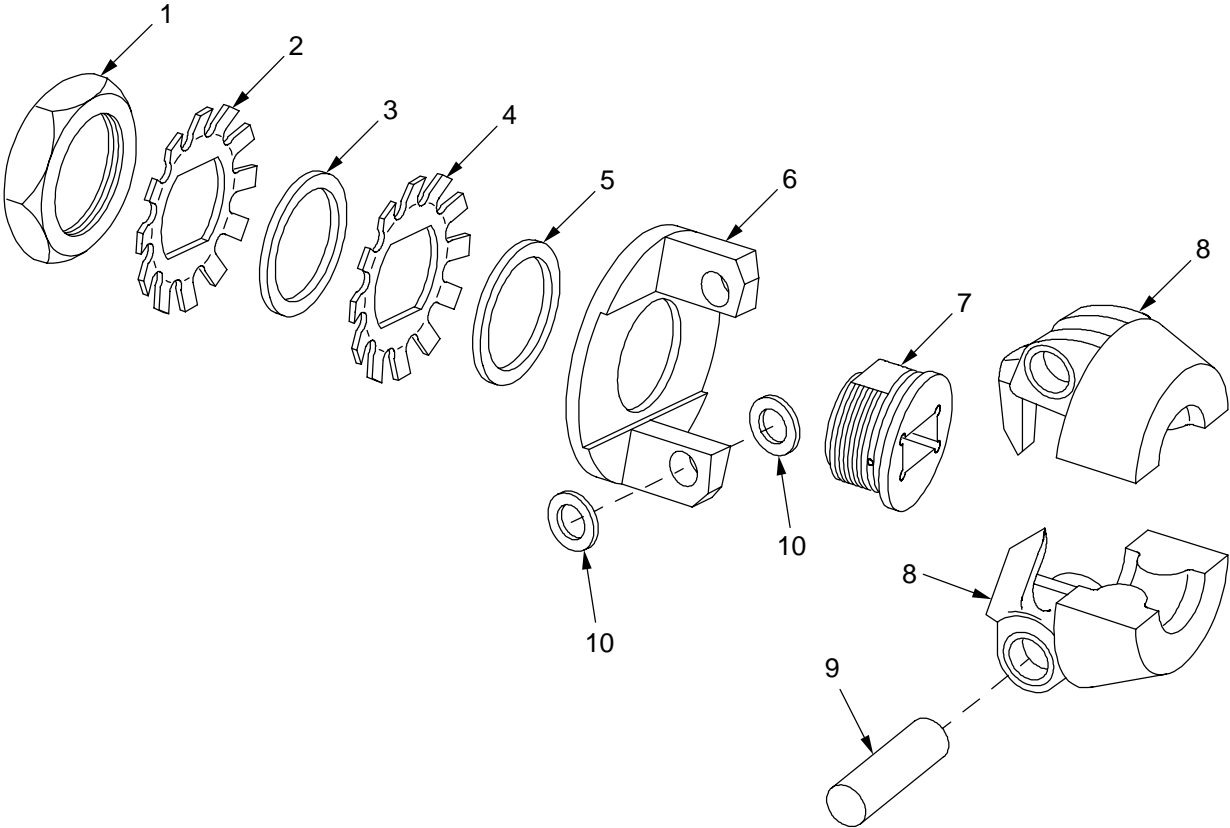
RPSTL WORK PACKAGE - CONTINUED

0040 00

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
26	PAHZZ	2990-00-977-2591	6N299	4506994-5	WIRE BEARING PLATE.....	2
27	PAHHH	2910-00-871-5429	01843	LE9093A	LEVER ASSEMBLY, OPER.....	1
28	PAHZZ	5310-00-582-5965	80205	MS35338-44	. WASHER, LOCK PART OF KIT P/N 5705050.....	1
29	XAHZZ		01843	LE9083A	. LEVER, OPERATING.....	1
30	XAHZZ		01883	SC9043	. SCREW OPERATING LEVER.....	1
31	PAHZZ	5340-00-902-0426	96906	MS51938-6	. SEAL, ANTIPI LFERAGE OPERATING LEVER NUT, PART OF KIT P/N 5705050.....	1
32	PAHZZ	5310-00-655-9484	10001	43N71918-10	. NUT, PLAIN, CASTELLAT OPERATING LEVER.....	1
33	KFHZZ		01843	BG8823	BEARING PLATE OPERATING LEVER, PART OF KIT P/N 5705050.....	1
34	PAHZZ	5330-00-406-7316	01843	GA9031	GASKET PART OF KIT P/N 5705050.....	1
35	PAHZZ	5360-00-785-6345	19207	7383472	SPRING, HELICAL, TORS PART OF KIT P/N 5705050, 5702632.....	1
36	KFHZZ		01843	PL8832A	PLATE ASSEMBLY, SPR OPERATING LEVER. PART OF KIT P/N 5705050.....	1
37	PAHZZ	5330-00-583-3473	01843	GA1144	PACKING, PREFORMED PART OF KIT P/N 5705050.....	1
38	PAHZZ	5330-00-310-6559	01843	GA401346	GASKET PART OF KIT P/N 5705050.....	1
39	PAHZZ	3040-01-265-4021	01843	SH8834A	SHAFT ASSEMBLY, OPER PART OF KIT P/N 5705050, 5702632.....	1
40	PAHZZ	2910-00-886-5371	01843	SC400-698	RI VET, DR I VE I DENTI FI CATI ON PLATE...	2
41	XAHZZ		01843	NP904	PLATE, I DENTI FI CATI O.....	1

END OF FIGURE





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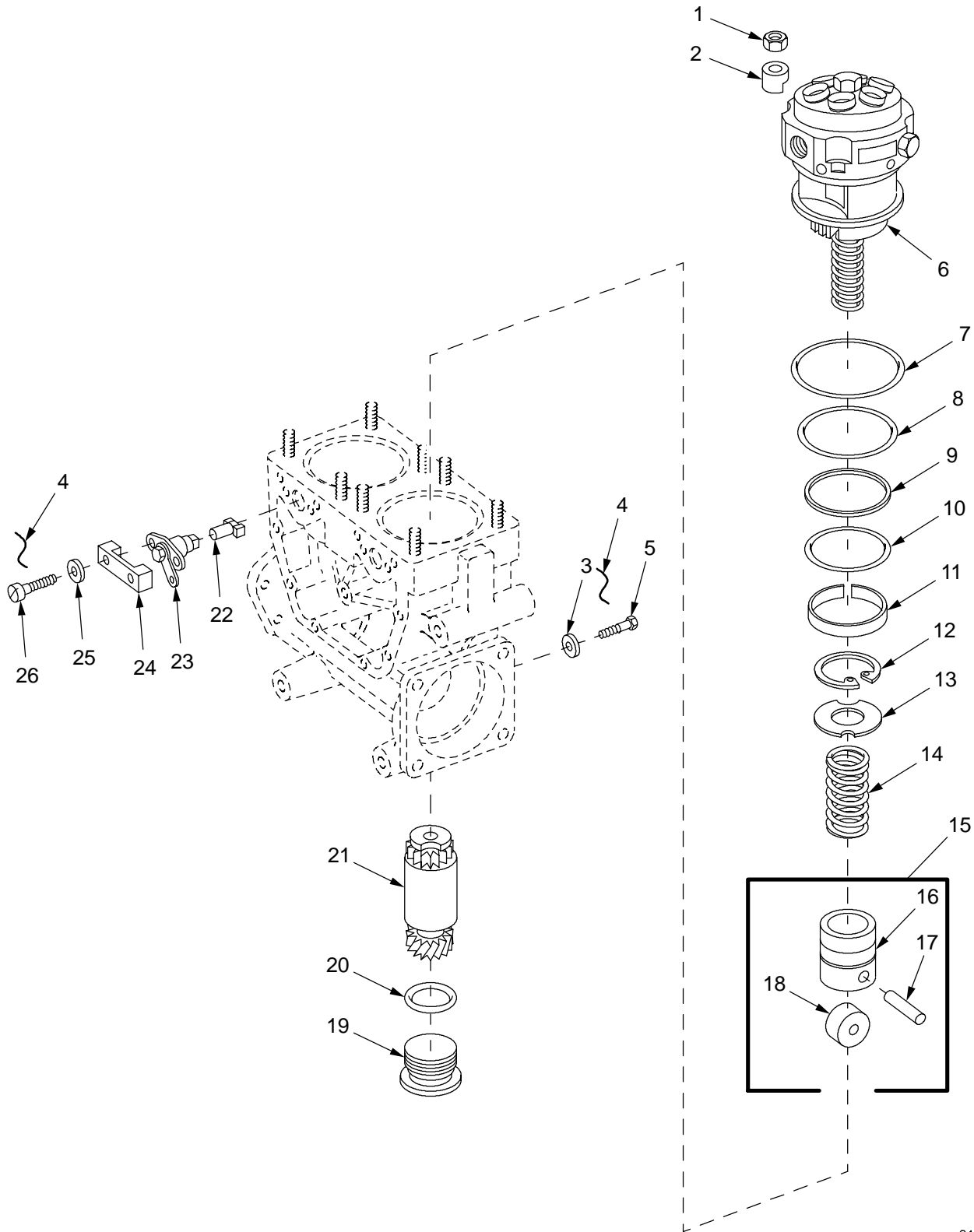
Figure 6. Weight and Spider Assembly.

RPSTL WORK PACKAGE - CONTINUED

0040 00

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0302 FUEL PUMP FIGURE 6 WEIGHT AND SPIDER ASSEMBLY	
1	XAHZZ		01843	NT1261	NUT, ADJUSTING HUB.....	1
2	KFHZZ		01843	DC797	DISK OUTER, PART OF KIT P/N 5704369.	1
3	PAHZZ	5365-00-274-9575	01843	SR402771	SPACER, RING PART OF KIT P/N 5704369.	1
4	KFHZZ		01843	DC796	DISK INNER, PART OF KIT P/N 5704369.	1
5	PAHZZ	5365-00-595-6388	01843	SR402773	SPACER, RING 0.065 IN THK, PART OF KIT P/N 5704369.....	1
5	PAHZZ	5365-00-595-5318	01843	SR794-2	SPACER, RING 0.049 IN THK, PART OF KIT P/N 5704369.....	1
5	PAHZZ	5365-00-951-4318	01843	SR794-4	SPACER, RING 0.020 IN THK, PART OF KIT P/N 5704369.....	1
5	PAHZZ	5365-01-158-6753	01843	SR794-5	SPACER, RING 0.015 IN THK, PART OF KIT P/N 5704369.....	1
5	PAHZZ	5365-01-161-9993	01843	SR794-6	SPACER, RING 0.010 IN THK, PART OF KIT P/N 5704369.....	1
5	KFHZZ		01843	SR794-7	SPACER, RING 0.005 IN THK, PART OF KIT P/N 5704369.....	1
6	XAHZZ		01883	HP9025	SPI DER FRICTI ON DRIVE.....	1
7	XAHZZ		01843	HB9036	HUB FRICTI ON DRIVE.....	1
8	XAHZZ		01843	WT9027A	WEI GHT ASSEMBLY GOVERNOR.....	2
9	PAHZZ	5315-01-164-0635	01843	PN402687	UOC: B, PIN, WEI GHT.....	2
10	PAHZZ	5310-00-038-0751	01843	WA1448-1	WASHER, FLAT 0.036 IN THK, GOVERNOR WEI GHT PIN.....	1
10	PAHZZ	5310-00-038-0752	01843	WA1448-2	WASHER, FLAT 0.038 IN THK, GOVERNOR WEI GHT PIN.....	1
10	PAHZZ	5310-00-038-0753	01843	WA1448-3	WASHER, FLAT 0.040 IN THK, GOVERNOR WEI GHT PIN.....	1
10	PAHZZ	5310-00-038-0755	01843	WA400108	WASHER, FLAT 0.048 IN THK, GOVERNOR WEI GHT PIN.....	1
10	PAHZZ	5310-00-166-1412	0AHP5	27D123	WASHER, FLAT 0.044 IN THK, GOVERNOR WEI GHT PIN.....	1

END OF FIGURE



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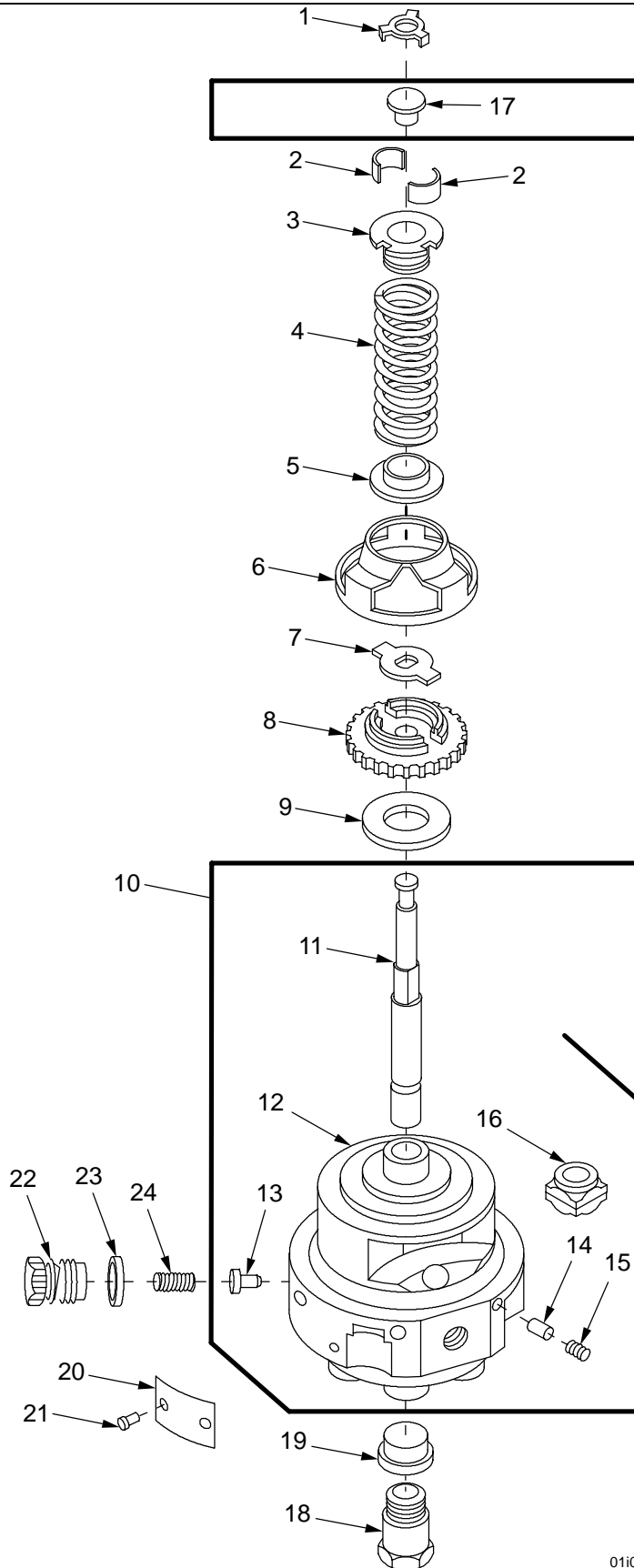
Figure 7. Head Assembly, Tappet Assembly, Gear Shaft Assembly, Control Unit Assembly and Associated Parts.

RPSTL WORK PACKAGE - CONTINUED

0040 00

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0302 FUEL PUMP FIGURE 7 HEAD ASSEMBLY, TAPPET ASSEMBLY, GEAR SHAFT ASSEMBLY, CONTROL UNIT ASSEMBLY AND ASSOCIATED PARTS	
1	PAHZZ	5310-00-880-7746	96906	MS51968-5	NUT, PLAIN, HEXAGON PUMP HEAD TO PUMP HOUSING. ....	8
					UOC: A, B,	
2	XAHZZ		01843	SV888	SPACER, RETAINING RI PUMP HEAD TO PUMP HOUSING. ....	8
					UOC: A, B,	
3	PAHZZ	5310-00-599-5616	01843	GA401271	WASHER, FLAT QUILL GEAR SHAFT RETAINING BOLT, PART OF KIT P/N 5702632. ....	2
4	PAHZZ	2990-00-977-2591	6N299	4506994-5	WI RE BEARING PLATE GEARSHAFT ASSEMBLY (1) CONTROL UNIT ASSEMBLY (2) ....	3
5	PAHZZ	5306-00-816-5803	01843	SC1110	BOLT, MACHINE QUILL GEAR SHAFT RETAINING. ....	2
6	PAHHZ	2910-00-722-3536	19207	7748811	HEAD ASSEMBLY, FUEL SEE FIGURE 8 FOR PARTS BREAKOUT. ....	2
					UOC: B,	
6	PAHHH		01843	HD410304	HEAD ASSEMBLY, " 11MM". ....	
					UOC: A,	
7	PAHZZ	5330-00-608-6432	96906	MS28775-237	PACKING, PREFORMED PART OF KIT P/N 5702632. ....	2
8	PAHZZ	5330-00-576-9733	96906	MS28775-234	PACKING, PREFORMED PART OF KIT P/N 5702632. ....	2
9	PAHZZ	5365-00-785-6355	02978	676679	SPACER, RING HEAD ASSEMBLY. ....	2
10	PAHZZ	5330-00-982-4259	96906	MS28775-230	PACKING, PREFORMED HEAD ASSEMBLY, PART OF KIT P/N 5702632. ....	2
11	PAHZZ	4310-01-353-8446	01843	RG882	RING, PISTON HEAD ASSEMBLY. ....	2
12	PAHZZ	5365-00-804-2774	96906	MS16625-1212	RING, RETAINING TAPPET SPRING. ....	2
13	XDHZZ	2910-00-247-6774	01843	GU887	SEAT, TAPPET SPRING OUTER. ....	2
					UOC: A, B,	
14	PAHZZ	5340-00-785-6360	01843	SP8819	SPRING, HELI CAL, COMP TAPPET. ....	2
					UOC: A, B,	
15	PAHZZ	2910-00-785-6350	01843	TP881A	TAPET ASSEMBLY, FUE. ....	2
					UOC: A, B	
16	XAHZZ		01843	GU888A	. GUI DE ASSEMBLY. ....	2
					UOC: A, B,	
17	XAHZZ		01843	PN8824	. PIN, ROLLER. ....	2
					UOC: A, B,	
18	XAHZZ		01843	RL883A	. ROLLER. ....	2
					UOC: A, B,	
19	XAHZZ		01843	PG887	PLUG, QUI LL SHAFT. ....	2
20	PAHZZ	5330-00-584-0263	96906	MS28775-218	PACKING, PREFORMED QUI LL SHAFT PLUG PART OF KIT P/N 5702632. ....	2
21	PAHZZ		01843	SH8821A	GEARSHAFT ASSEMBLY QUI LL SEE FIGURE 8 FOR PARTS BREAKOUT. ....	2
22	PAHZZ	5315-00-785-6352	01843	PN9023	PIN, SHOULDER, HEADLE CONTROL UNIT. ...	2
23	PAHZZ	2910-00-786-0191	01843	CU881A	CONTROL UNIT ASSEMB FUEL SEE FIGURE 9 FOR PARTS BREAKOUT. ....	2
					UOC: A, B,	
24	XAHZZ		01843	RN887	RETAINER CONTROL UNIT ASSEMBLY. ....	2
25	PAHZZ	5310-01-022-8946	01843	WA406076	WASHER, LOCK. CONTROL UNI T RETAINER.	4
26	XAHZZ		01843	SC8817	SCREW CONTROL UNIT RETAINER. ....	4

END OF FIGURE



011069

Figure 8. Hydraulic Head Assembly.

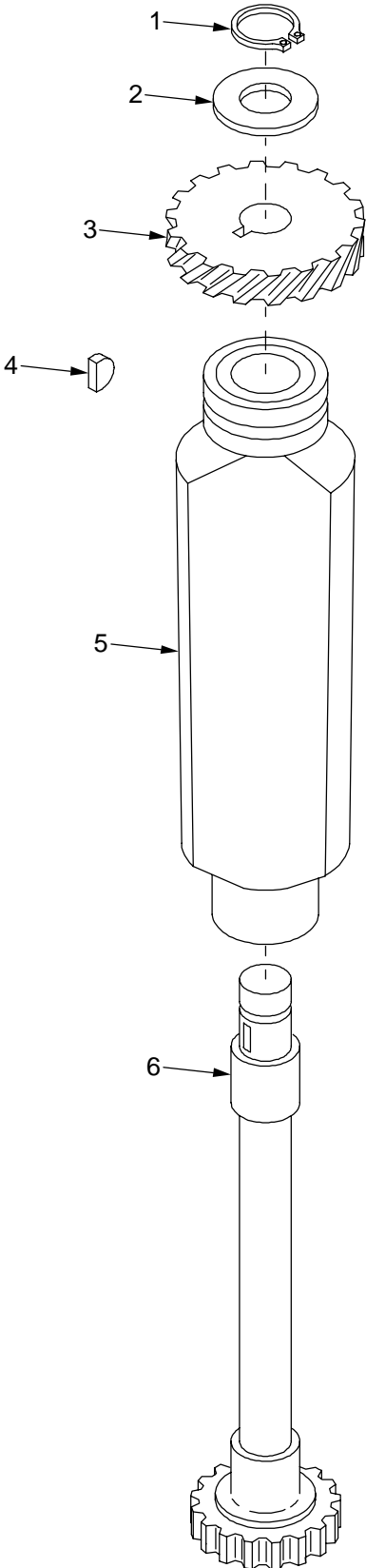


RPSTL WORK PACKAGE - CONTINUED

0040 00

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0302 FUEL PUMP FIGURE 8 HYDRAULIC HEAD ASSEMBLY	
1	PAHZZ		01843	RG883	RING, BUTTON, RETAINI . . . . .	2
2	XAHZZ		01843	HP885	LOCK, PLUNGER. . . . .	4
3	XAHZZ		01843	GU8810	SEAT, SPRING LOWER. . . . .	2
4	PAHZZ		01843	SP8821	SPRING, HELI CAL, COMP TAPPET. . . . .	2
5	XAHZZ		01843	GU889	SEAT, SPRING UPPER. . . . .	2
6	XAHZZ		01843	RN889	RETAINER, SPUR GEAR. . . . .	2
7	PAHZZ	5340-00-786-0186	01843	GU8812	BRACKET, MOUNTING. PLUNGER GUIDE. . . . .	2
8	XAHZZ		01843	GE882	GEAR, SPUR. . . . .	2
9	XAHZZ		01843	WA1804	WASHER, THRUST SPUR GEAR. . . . .	2
10	XAHZZ		01843	HD410303	HEAD HYDRAULIC ASSEMBLY. . . . .	2
10	XAHZZ		01843	HD8822A	UOC: A, HEAD, HYDRAULIC ASSEMBLY. . . . .	2
11	XAHZZ		01843	PC885	UOC: B, PLUNGER. . . . .	2
12	XAHZZ		01843	HD8815	HEAD, HYDRAULIC. . . . .	2
13	XAHZZ		01843	VA885	VALVE, DELIVERY. . . . .	2
14	XAHZZ		01843	PG889	. PLUG, SEALING. . . . .	12
15	XAHZZ		01843	SC1961	. SETSCREW SEALING PLUG. . . . .	12
16	XAHZZ		01843	SV887	. SLEEVE, PLUNGER. . . . .	2
17	PAHZZ		01843	B0881	BUTTON, PLUNGER. . . . .	2
18	XAHZZ		01843	SC8813	UOC: A, B, SCREW, PLUNGER BORE. . . . .	2
18	XAHZZ		01843	SC8829	UOC: B, SCREW, PLUNGER BORE. . . . .	2
18	PAHZZ		01843	GA409963	UOC: A, GASKET, PLUNGER BORE SCREW. . . . .	2
19	PAHZZ	5330-01-433-8436	01843	GA410154	UOC: A, GASKET, PLUNGER BORE SCREW. . . . .	2
20	XAHZZ		01843	NP409942	UOC: B, PLATE, IDENTIFICATION. . . . .	2
20	XAHZZ		01843	NP906	UOC: A, PLATE, IDENTIFICATION. . . . .	2
21	PAHZZ	2910-00-886-5371	01843	SC400-698	UOC: B, RIVET, DRIVE. . . . .	4
22	XAHZZ		01843	SC8815	SCREW, DELIVERY VALV. . . . .	2
22	XAHZZ		01843	SC8828	UOC: B, SCREW, DELIVERY VALV. . . . .	2
23	PAHZZ	5330-01-433-8434	01843	GA9035	UOC: A, GASKET PART OF KIT P/N 5702632. . . . .	2
24	PAHZZ	5340-00-785-6339	01843	SP8820	UOC: A, SPRING, HELI CAL, COMP DELIVERY VALVE. . . . .	2

END OF FIGURE



01i056

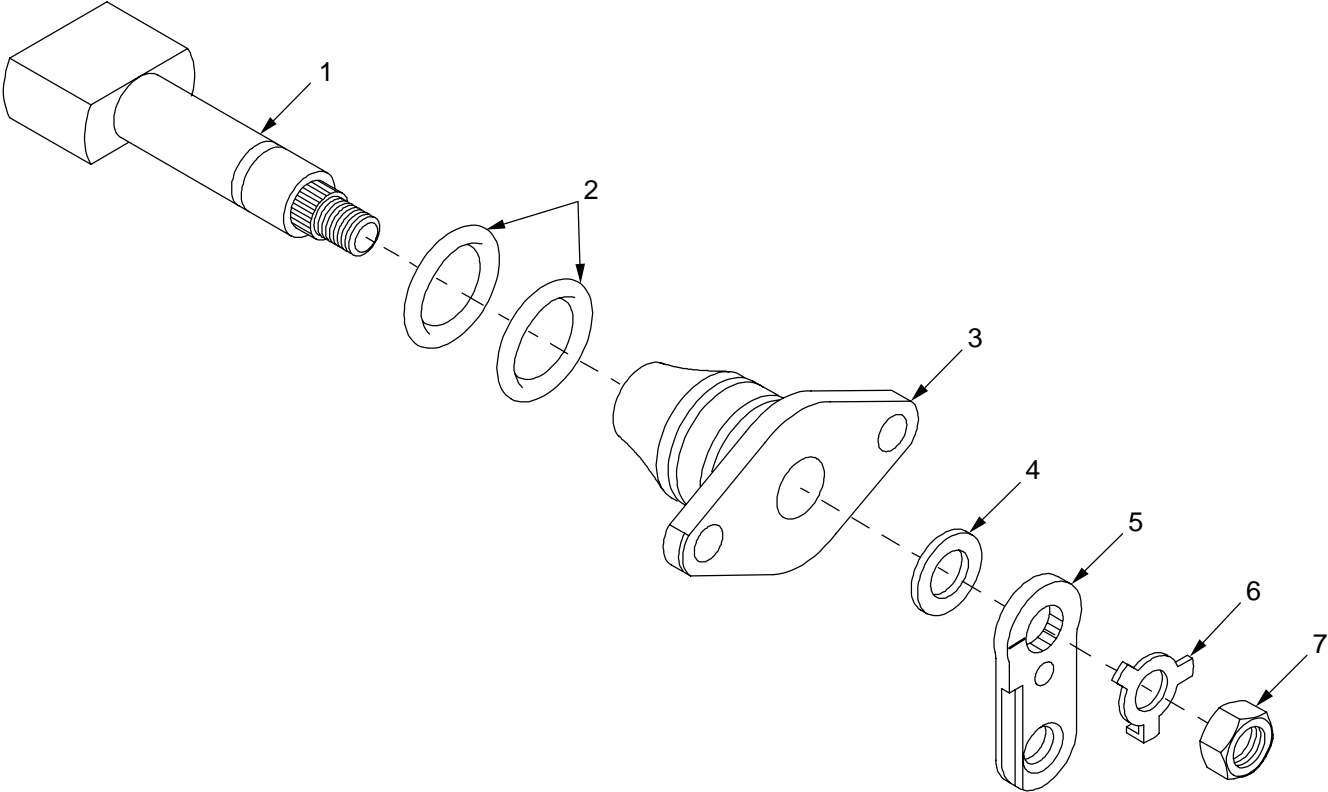
Figure 9. Gear Shaft Assembly.

RPSTL WORK PACKAGE - CONTINUED

0040 00

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0302 FUEL PUMP FIGURE 9 GEAR SHAFT ASSEMBLY	
1	PAHZZ	5365-00-715-1152	96906	MS16624-1037	RING, RETAINING QUIL SHAFT GEAR. . . . .	2
2	XAHZZ		01843	SR888	SPACER, RETAINING RI. . . . .	2
3	XAHZZ		01843	GE881	GEAR, HELI CAL. . . . .	2
4	PAHZZ	5315-00-687-5218	96906	MS35756-3	KEY, WOODRUFF. . . . .	2
5	XAHZZ		01843	BG8813A	BUSHING ASSEMBLY. . . . .	2
6	XAHZZ		01843	SH8821A	SHAFT. . . . .	2

END OF FIGURE



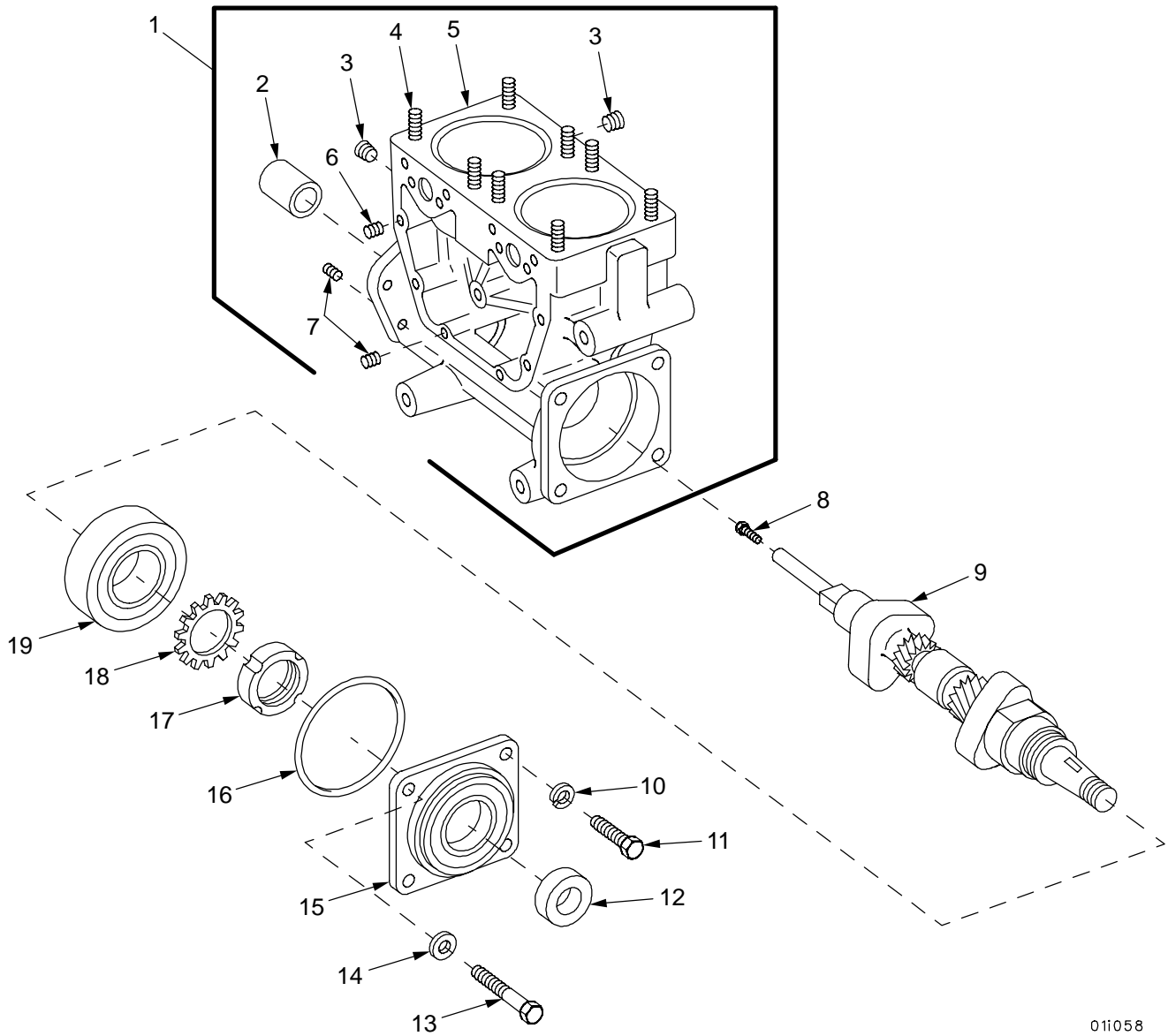
011053

Figure 10. Control Unit Assembly.

RPSTL WORK PACKAGE - CONTINUED

0040 00

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0302 FUEL PUMP FIGURE 10 CONTROL UNIT ASSEMBLY	
1	XAHZZ		01843	SH8823	SHAFT.....	2
2	PAHZZ	5330-00-618-1920	96906	MS28775-017	UOC: A, B, PACKING, PREFORMED CONTROL UNIT PART OF KIT P/N 5702632, 5702765.....	4
3	XAHZZ		01843	BG8810	BUSHING.....	2
4	KFHZZ		01843	SR8813	SPACER CONTROL UNIT LEVER PART OF KIT P/N 5702765.....	2
5	XAHZZ		01843	LE8831	LEVER, CONTROL UNIT.....	2
6	PAHZZ	5310-01-022-8861	01843	WA1648	WASHER, KEY CONTROL UNIT LEVER TO PART OF KIT P/N 5702765.....	2
7	XAHZZ		01843	NT1264	NUT, JAM CONTROL UNIT LEVER TO SHAFT	2
				END OF FIGURE		



011058

Figure 11. Housing, Camshaft, Plate and Associated Parts

RPSTL WORK PACKAGE - CONTINUED

0040 00

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 0302 FUEL PUMP FIGURE 11 HOUSING, CAMSHAFT, PLATE AND ASSOCIATED PARTS	
1	PFHHH	4320-01-146-1911	01843	HG8815A	HOUSING, LIQUI P PUMP.....	1
2	PAHZZ	3120-00-133-6755	19207	11662505	. BEARING, SLEEVE CAMSHAFT.....	1
3	PAHZZ	4730-00-964-7548	21450	444683	. PLUG, PIPE OIL GALLERY.....	2
4	PAHZZ	5307-00-596-8378	01843	SD881	. STUD INJECTION PUMP HOUSIG.....	8
5	XAHZZ		01843	HG8820C	. HOUSING, INJECTION P.....	1
6	PAHZZ		01843	IT403589	. HELICOIL, .25-20 X .50 UNC-2B USED ON ALL PUMPS BEGINNING WITH S/N 8F7790 & HIGHER.....	8
7	PAHZZ		01843	IT412663	. HELICAL, .25-20 X .25 UNC-2B USED ON ALL PUMPS BEGINNING WITH S/N 8F7790 & HIGHER.....	6
8	PAHZZ	5305-00-281-6384	01843	SC1149	SCREW, ASSEMBLED WAS CAMSHAFT.....	1
9	PAHZZ	2910-00-785-6344	01843	SH8824	CAMSHAFT, PUMP FUEL.....	1
10	PAHZZ	5310-00-637-9541	96906	MS38338-46	WASHER, LOCK.....	3
11	PAHZZ	5305-00-269-3213	80205	MS90725-62	SCREW, CAP, HEXAGON H.....	3
12	PAHZZ	5330-00-812-6435	80201	43547A	SEAL, PLAIN ENCASED PART OF KIT P/N 5702632.....	1
13	XAHZZ		01843	SC8818	SCREW BEARING RETAINING PLATE TO PUMP HOUSING.....	1
14	XAHZZ		01843	WA5-14BL	WASHER BEARING RETAINING PLATE TO PUMP HOUSING.....	1
15	XAHZZ		01843	PL8823	PLATE, BEARING RETAI CAMSHAFT.....	1
16	PAHZZ	5330-00-618-1603	96906	MS28775-240	PACKING, PREFORMED BEARING RETAINING PLATE PART OF KIT P/N 5702632.....	1
17	PAHZZ	5310-00-208-3447	96906	MS172244	NUT, PLAIN, ROUND BEARING RETAINING..	1
18	PAHZZ	5310-00-566-8871	96906	MS172209	WASHER, KEY BEARING RETAINING NUT...	1
19	PAHZZ	3110-00-554-5968	26385	BCA1308	BEARING, BALL, ANNULA CAMSHAFT.....	1

END OF FIGURE



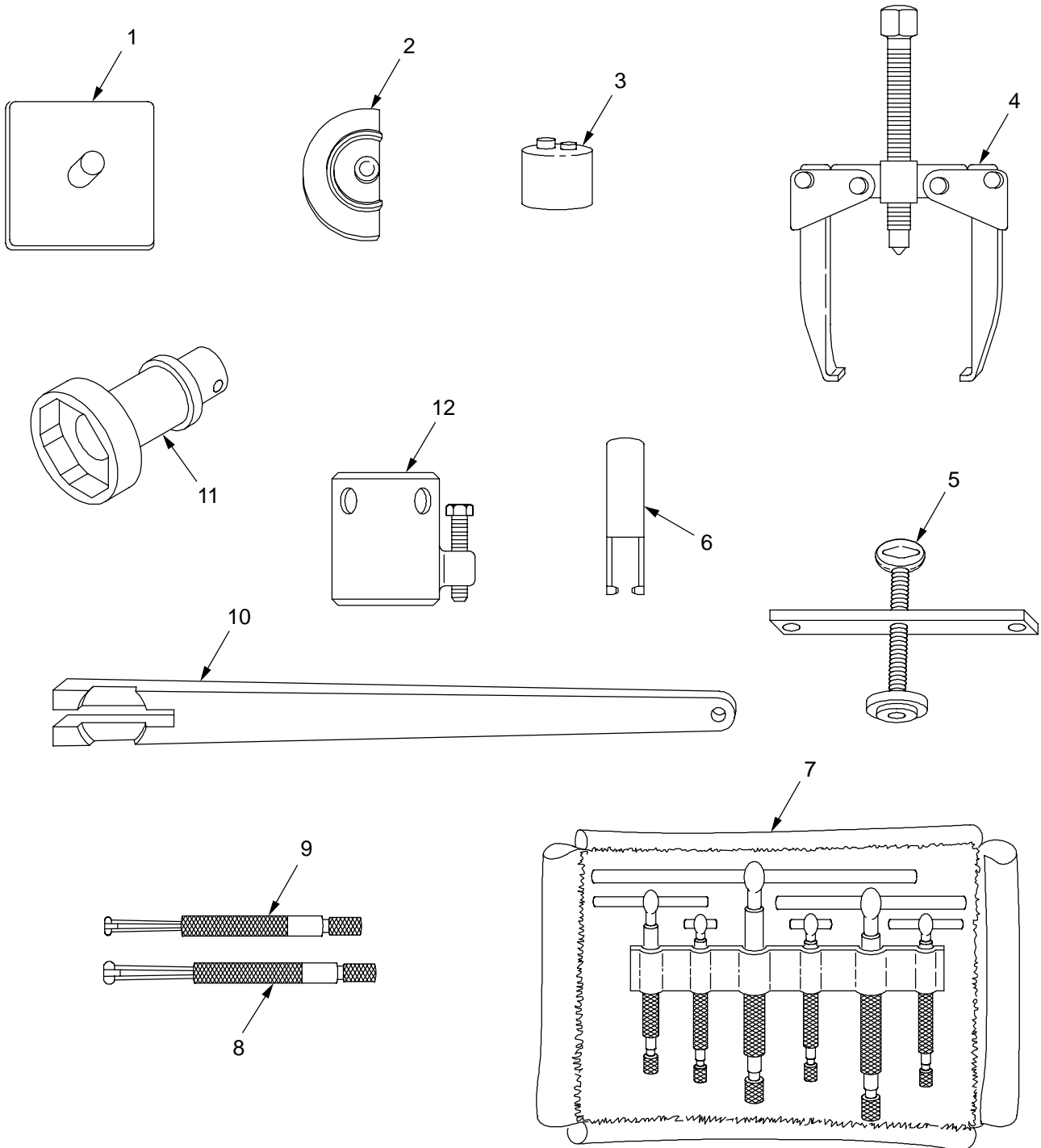


RPSTL WORK PACKAGE - CONTINUED

0040 00

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 94 REPAIR KITS	
					GROUP 9401 REPAIR KITS	
					FIGURE KITS REPAIR KITS	
PAHZZ	5330-00-786-5239	19207	5702632		GASKET AND PREFORME PART OF KIT P/N E8CR100-013.....	1
PAHZZ	5365-00-786-5238	19207	5702638		SHIM SET GOVERNOR SPRINGS..... UOC: A, C,	1
PAFZZ	4330-00-801-1154	19207	5702739		PARTS KIT, FLUID PRE PART OF KIT P/N E8CR100-013.....	1
					PACKING, PREFORMED ( 1) 2-7	
					FILTER ELEMENT ( 1) 2-8	
PAHZZ	2910-00-221-4809	19207	5702765		PARTS KIT, METERING PART OF KIT P/N E8CR100-013.....	1
PAHZZ	4330-00-134-4733	19207	5704356		PARTS KIT, FLUID PRE PART OF KIT P/N E8CR100-013.....	1
					NUT, CAP ( 2) 2-1	
					PACKING, PREFORMED ( 4) 2-3	
					FILTER ASSEMBLY ( 1) 2-4	
PAHZZ	2910-00-407-2618	19207	5704369		PARTS KIT, METERING PART OF KIT P/N E8CR100-013.....	1
					DISK ( 1) 6-2	
					DISK ( 1) 6-4	
					SPACER, RING ( 1) 6-5	
					SPACER, RING ( 1) 6-5	
					SPACER, RING ( 1) 6-5	
					SPACER, RING ( 1) 6-5	
					SPACER, RING ( 1) 6-5	
PAHZZ	2910-01-043-8182	19207	5705050		PARTS KIT, FUEL INJE PART OF KIT P/N E8CR100-013.....	1
					WASHER, LOCK ( 10) 3-2	
					NUT, PLAIN, HEXAGON ( 2) 5-21	
					SETSCREW ( 2) 5-22	
					SEAL, ANTIPI LFERAGE ( 1) 5-23	
					SCREW, CAP, HEXAGON H( 4) 5-25	
					BEARING PLATE ( 1) 5-33	
					SPRING, HELI CAL, TORS( 1) 5-35	
					PACKING, PREFORMED ( 1) 5-36	
					LEVER, MANUAL CONTRO( 1)	
PAHZZ	2910-01-050-2520	19207	5705051		PARTS KIT, FUEL INJE PART OF KIT P/N E8CR100-013.....	1
					WASHER, LOCK ( 10) 3-2	
					NUT, PLAIN, HEXAGON ( 1) 4-27	
					SPACER ( 1) 5-6	
					SPACER ( 1) 5-6	

END OF FIGURE



26i015

Figure 12. Special Tools

RPSTL WORK PACKAGE - CONTINUED

0040 00

(1) ITEM NO	(2) SMR	(3) NSN	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
					GROUP 26 SPECIAL TOOLS GROUP 2604 SPECIAL TOOLS & TEST EQUIPMENT FIGURE 12 SPECIAL TOOLS	
1	PEHZZ	5340-00-793-5039	19207	10882859	PLUNGER, DETENT FUEL INJECTION PUMP HEAD	1
2	PEHZZ	4820-00-793-5040	19207	10882854	CAP, VALVE GOVERNOR INNER SPRING GAP	1
3	PEHZZ	5120-00-793-5045	42225	TSE76157	SOCKET, WRENCH, FACE QUILL SHAFT PLUG	1
4	PEHZZ	5120-00-793-5048	19207	10882818	PULLER, MECHANICAL GOVERNOR WEIGHT AND SPIDER. ....	1
5	PEHZZ	5120-00-793-5049	19207	10882862	COMPRESSOR, SPRING S TAPPET. ....	1
6	PEHZZ	5120-00-793-5055	19207	10882856	INSERTER, BEARING AN PLUNGER LOCKS AND GOVERNOR. ....	1
7	PEHZZ	5210-00-473-9350	80204	GGG-G-17 TY3CL2SZ AA-E	GAGE SET, TELESCOPI. ....	1
8	PEHZZ	5210-00-221-2081	80204	GGG-G-17 TY3CL1ST ASZB	GAGE, SMALL HOLE 0.200 TO 0.300. ....	1
9	PEHZZ	5120-00-221-2080	80204	GGG-G-17 TY3CL1ST ASZA	GAGE, SMALL HOLE 0.125 TO 0.200. ....	1
10	PEHZZ	5120-00-615-8843	19207	10882857	LEVER TOOL, CATCH GOVERNOR FRICTION DRIVE. ....	1
11	PEHZZ	5120-01-034-1698	19207	12254213	SOCKET, SOCKET WRENCH FUEL INLET HOUSING CAP. ....	1
12	PEHZZ	5120-00-793-5057	19207	10882894	WRENCH, FUEL INJECTO CAMSHAFT. ....	1

END OF FIGURE



## RPSTL WORK PACKAGE - CONTINUED

0040 00

CROSS REFERENCE INDEXES  
NATIONAL STOCK NUMBER INDEX

	FIGURE NO	ITEM NO		FIGURE NO	ITEM NO		
5310-	00-038-0751	6	10	5310-	00-595-5313	4	30
5310-	00-038-0752	6	10	5310-	00-595-5315	4	31
5310-	00-038-0753	6	10	5365-	00-595-5318	6	5
5310-	00-038-0755	6	10	5365-	00-595-6388	6	5
2910-	00-064-6267	4	4	5310-	00-595-6391	4	30
3120-	00-133-6755	11	2	5307-	00-596-8378	11	4
4330-	00-134-4733	KI TS		5310-	00-599-5616	7	3
5310-	00-166-1412	3	10	5330-	00-608-6432	7	7
5310-	00-166-1412	6	10	4820-	00-613-6297	2	12
5310-	00-167-0823	4	31	5120-	00-615-8843	12	10
5310-	00-176-6677	5	14	5330-	00-618-1603	11	16
5310-	00-208-3447	11	17	5330-	00-618-1920	10	2
5120-	00-221-2080	12	9	5310-	00-637-9541	11	10
5210-	00-221-2081	12	8	5330-	00-640-9587	4	32
2910-	00-221-4809	KI TS		5310-	00-655-9484	5	32
5365-	00-245-5420	5	19	5365-	00-655-9589	2	16
2910-	00-247-6774	7	13	5310-	00-655-9590	1	4
5310-	00-253-8721	3	19	5310-	00-655-9593	1	10
5310-	00-262-5646	4	30	4820-	00-678-4724	1	5
5305-	00-269-3213	11	11	4820-	00-678-4724	2	11
5365-	00-274-9575	6	3	5340-	00-678-4727	2	17
5305-	00-281-6384	11	8	5315-	00-687-5218	9	4
5315-	00-282-0341	1	2	5365-	00-715-1152	9	1
5330-	00-310-6556	4	11	2910-	00-722-3536	7	6
5330-	00-310-6559	3	7	5310-	00-768-0319	5	21
5330-	00-310-6559	5	38	5340-	00-785-6339	8	24
3040-	00-362-7035	4	23	2910-	00-785-6344	11	9
5310-	00-362-7088	4	31	5360-	00-785-6345	5	35
5365-	00-362-7089	4	31	2910-	00-785-6350	7	15
5310-	00-362-7092	4	30	5315-	00-785-6352	7	22
5306-	00-366-8857	3	13	5365-	00-785-6355	7	9
4730-	00-402-5143	2	5	5360-	00-785-6358	4	36
5330-	00-406-7316	5	34	5340-	00-785-6360	7	14
2910-	00-407-2618	KI TS		5340-	00-786-0186	8	7
2920-	00-449-0107	3	5	5330-	00-786-0190	3	1
3040-	00-466-7469	3	12	2910-	00-786-0191	7	23
2910-	00-466-7473	3	4	5365-	00-786-5238	KI TS	
2910-	00-467-2582	3	6	5330-	00-786-5239	KI TS	
5210-	00-473-9350	12	7	5340-	00-793-5039	12	1
2910-	00-475-3463	1	7	4820-	00-793-5040	12	2
5340-	00-510-4117	2	15	5120-	00-793-5045	12	3
5310-	00-515-3030	5	3	5120-	00-793-5048	12	4
5340-	00-529-6945	6	4	5120-	00-793-5049	12	5
3110-	00-554-5968	11	19	5120-	00-793-5055	12	6
4730-	00-555-1764	1	8	5120-	00-793-5057	12	12
2990-	00-562-1146	4	16	4730-	00-800-2830	1	11
5310-	00-566-8871	12	18	4330-	00-801-1154	KI TS	
5330-	00-576-9733	7	8	5365-	00-804-2774	7	12
5330-	00-579-3156	1	6	5305-	00-810-8093	3	22
5330-	00-579-3156	2	3	5935-	00-810-8094	3	21
5310-	00-582-5965	3	14	5330-	00-812-6435	11	12
5310-	00-582-5965	3	2	5306-	00-816-5803	3	3
5310-	00-582-5965	4	2	5304-	00-816-5803	4	10
5310-	00-582-5965	4	7	5306-	00-816-5803	7	5
5310-	00-582-5965	5	24	5330-	00-819-5111	2	7
5310-	00-582-5965	5	28	5330-	00-827-5635	3	20
5330-	00-583-3473	3	8	5340-	00-830-3882	4	35
5330-	00-583-3473	5	37	3120-	00-845-5726	4	17
5330-	00-584-0263	7	20	2910-	00-871-5429	5	27

CROSS REFERENCE INDEXES  
NATIONAL STOCK NUMBER INDEX

	FIGURE NO	ITEM NO				
5310- 00-584-7888	1	3	5310-	00-880-7746	7	1
4730- 00-595-1868	1	8	2910-	00-886-5371	5	40
2910- 00-886-5371	8	21				
5340- 00-902-0426	2	10				
5340- 00-902-0426	5	23				
5340- 00-902-0426	5	31				
5310- 00-902-6676	4	18				
5310- 00-902-6676	5	16				
5365- 00-951-4318	6	5				
4730- 00-954-1281	4	37				
4730- 00-964-7548	11	3				
5310- 00-971-7989	4	28				
5310- 00-971-7989	4	6				
2990- 00-977-2591	3	17				
2990- 00-977-2591	4	34				
2990- 00-977-2591	5	26				
2990- 00-977-2591	7	4				
5330- 00-982-4259	7	10				
5305- 00-983-6652	5	15				
5365- 01-012-7353	3	11				
5310- 01-022-8861	10	6				
5310- 01-022-8946	7	25				
5120- 01-034-1698	12	11				
2910- 01-043-8182	KITS					
2910- 01-050-2520	KITS					
5310- 01-112-7922	3	18				
4320- 01-146-1911	11	1				
5365- 01-158-6753	6	5				
5365- 01-161-9993	6	5				
5315- 01-164-0635	6	9				
5305- 01-170-8472	4	27				
5365- 01-172-1823	5	20				
5325- 01-214-7758	4	26				
5305- 01-227-8675	5	22				
3040- 01-265-4021	5	39				
4820- 01-296-9362	2	13				
2910- 01-298-5376	2	18				
4310- 01-353-8446	7	11				
3040- 01-378-6184	4	33				
5330- 01-433-8430	8	19				
5330- 01-433-8434	8	23				
5360- 01-433-8974	5	10				
4730- 01-434-5207	1	11				
5340- 01-449-1424	5	9				
5365- 01-450-0691	5	12				
2990- 01-491-4821	4	24				
5305- 01-504-7169	4	22				
5330- 01-507-0760	4	12				

## RPSTL WORK PACKAGE - CONTINUED

0040 00

CROSS REFERENCE INDEXES  
PART NUMBER INDEX

CAGE	PART NUMBER	FIG NO	ITEM NO	CAGE	PART NUMBER	FIG NO	ITEM NO
19207	10865239	1	11	19207	7683464	4	16
19207	10882818	12	4	19207	7748546	4	15
19207	10882854	12	2	19207	7748547	4	21
19207	10882856	12	6	19207	7748622	4	17
19207	10882857	12	10	19207	7748811	7	6
19207	10882859	12	1	19207	8682456	2	17
19207	10882862	12	5	19207	8761412	1	2
19207	10882894	12	12	01843	8A881	4	14
19207	10885779	4	4	01843	AD882	1	11
19207	10885781	4	23	88044	AN960- 816	4	31
19207	10935512	2	18	26385	BCA1308	11	19
19207	10951143	2	14	01843	BG8810	9	3
19207	10951144	2	14	01843	BG8813A	9	5
19207	10951322	4	19	01843	BG8823	5	33
02978	10951334	2	5	01843	BK7938C	4	8
19207	10951481	2	8	01843	B0881	8	17
19207	11621586	5	22	01843	CA401255	4	23
19207	11621881	5	25	82254	CFN70306	3	19
19207	11662505	11	2	01843	CP883	2	6
19207	11668626- 1	1	1	01843	CP901	4	33
19207	11684113	2	15	01843	CU881A	7	23
19207	11684114	2	12	01843	CV8816A	3	4
19207	11684115	1	7	01843	CV8817A	3	9
19207	12254213	12	11	01843	CV9032C	4	9
21450	137128	4	20	01843	DC796	6	4
0AHP5	27D123	3	10	01843	DC797	6	2
0AHP5	27D123	6	10	01843	FE882A	2	4
21450	420429	3	22	01843	GA1144	3	8
80201	43547A	11	12	01843	GA1144	5	37
10001	43N71918- 10	5	32	01843	GA401271	7	3
21450	444683	11	3	01843	GA401346	3	7
6N299	4506994- 5	3	17	01843	GA401346	5	38
				01843	GA409963	8	18
6N299	4506994- 5	4	34	01843	GA410154	8	19
6N299	4506994- 5	5	26	01843	GA7965	5	19
6N299	4506994- 5	7	4	01843	GA8813	4	12
				01843	GA8814	3	1
81336	454098	1	8	01843	GA902	4	32
				01843	GA9031	5	34
21450	454724	4	1	01843	GA9035	8	23
19204	5153030	4	3	01843	GA908	4	11
19207	5702632	KIT		01843	GE881	9	3
19207	5702638	KIT		01843	GE882	8	8
19207	5702739	KIT		80204	GGG- G- 17 TY3CL1ST	13	8
19207	5702765	KIT		80204	GGG- G- 17 TY3CL1ST	13	9
19207	5704356	KIT		80204	GGG- G- 17 TY3CL2SZ	13	7
19207	5704369	KIT		01843	GU408541	5	9
19207	5705050	KIT		01843	GU8810	8	3
19207	5705051	KIT		01843	GU8812	8	7
02978	676679	7	9	01843	GU887	7	13
02978	679671	3	12	01843	GU888A	7	16
02978	679672	3	6	01843	GU889	8	5
19207	7320493	1	5	01843	HB9036	6	7
19207	7320493	2	11	01843	HD410303	8	10
19207	7340054	2	16	01843	HD410304	7	6
19207	7340055	1	10	01843	HD8815	8	12
19207	7340058	1	4	01843	HD8822A	8	10

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PART NUMBER INDEX

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19207	7383426	3	20	01843	HG8815A	11	1
19207	7383472	5	35	01843	HG8817	2	9
01843	HG8820C	11	5	01843	NT1218	5	2
01843	HG8822A	4	38	01843	NT1261	6	1
01843	HP885	8	2	01843	NT1264	10	7
01883	HP9025	6	6	01843	NT886	3	18
01843	IT1011	4	26	01843	NT888	2	1
01843	IT403589	11	6	01843	PC885	8	11
01843	IT412663	11	7	01843	PG886	5	20
01883	LE409004	5	7	01843	PG887	7	19
01843	LE409077	5	11	01843	PG889	8	14
01843	LE409078	5	8	01843	PL79123A	5	5
01843	LE8831	10	5	01843	PL8823	11	15
01843	LE8839	3	16	01843	PL8832A	5	36
01843	LE8855A	4	25	01843	PN402687	6	9
01843	LE8856A	4	24	01843	PN8821	5	3
01843	LE9083A	5	29	01843	PN8824	7	17
01843	LE9093A	5	27	01843	PN901A	4	13
96906	MS16624-1037	9	1	01843	PN9023	7	22
96906	MS16625-1212	7	12	01843	PSB12BT-130EH-9660A	1	1
96906	MS16998-29	5	15	01843	RD883A	5	5
96906	MS172209	11	18	01843	RG882	7	11
96906	MS172244	11	17	01843	RG883	8	1
96906	MS20995NC40-12	1	9	02978	RG886	3	11
96906	MS20995NC40-12	2	2	01843	RL883A	7	18
96906	MS21083N3	4	18	01843	RN887	7	24
96906	MS21083N3	5	16	01843	RN889	8	6
96906	MS28775-017	10	2	01843	S0882A	3	5
96906	MS28775-116	1	6	01843	SC1110	3	3
96906	MS28775-116	2	3	01843	SC1110	7	5
96906	MS28775-218	7	20	01843	SC1149	11	8
96906	MS28775-230	7	11	01843	SC1877	4	29
96906	MS28775-234	7	8	01843	SC1961	8	15
96906	MS28775-237	7	7	01843	SC400-698	5	40
96906	MS28775-240	11	16	01843	SC400-698	8	21
96906	MS28778-24	2	7	01843	SC7961	3	13
96906	MS3102R8S1P	3	21	01843	SC8813	8	18
80205	MS35338-44	3	2	01843	SC8814	4	22
80205	MS35338-44	3	14	01843	SC8815	8	22
80205	MS35338-44	4	2	01843	SC8817	7	26
80205	MS35338-44	4	7	01843	SC8818	11	13
80205	MS35338-44	5	24	21843	SC8825	5	17
80205	MS35338-44	5	28	01843	SC8828	8	22
96906	MS35338-46	11	10	01843	SC8829	8	18
96906	MS35338-51	1	3	01843	SC8830	4	27
96906	MS35691-5	3	15	01883	SC9043	5	30
96906	MS35691-5	4	6	01843	SD881	11	4
96906	MS35691-5	4	28	01843	SH8821A	7	21
96906	MS35756-3	10	4	01843	SH8821A	9	6
96906	MS51504A8	1	8	01843	SH8823	10	1
96906	MS51938-6	2	11	01843	SH8824	11	9
96906	MS51938-6	6	23	01843	SH8834A	5	39
96906	MS51938-6	6	31	01843	SP408500	5	10
96906	MS51968-2	6	21	01843	SP7950/3	4	36
96906	MS51968-5	8	1	01843	SP7951-13	4	35
96906	MS90725-62	11	11	01843	SP8819	7	14
01843	NP409942	8	20	01843	SP8820	8	24



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01843	NP906	8	20
01843	NT1161	5	14
01843	SP8821	8	4
01843	SP9014	5	4
01843	SR400410	4	31
01843	SR400412	4	31
01843	SR400440	4	30
01843	SR400441	4	30
01843	SR400442	4	30
01843	SR402771	6	3
01843	SR402773	6	5
01843	SR7914- 1	4	30
01843	SR7914- 5	4	30
01843	SR7914- 6	4	30
01843	SR794- 2	6	5
01843	SR794- 4	6	5
01843	SR794- 5	6	5
01843	SR794- 6	6	5
01843	SR794- 7	6	5
99066	SR799- 1	4	31
01843	SR799- 5	4	31
01843	SR799- 6	4	31
01843	SR8811- 1	5	6
01843	SR8811- 2	5	6
01843	SR8812	5	12
01843	SR8813	9	4
01843	SR888	9	2
01843	SV887	8	16
01843	SV888	7	2
01843	TP881A	7	15
42225	TSE76157	12	3
01843	VA409443	2	12
01843	VA885	8	13
01843	WA1448- 1	6	11
01843	WA1448- 2	6	11
01843	WA1448- 3	6	11
01843	WA1648	9	6
01843	WA1804	8	9
01843	WA1806	5	13
01843	WA22- 108L	5	18
01843	WA400108	6	11
01843	WA406076	7	25
01843	WA5- 14BL	11	14
01843	WT9027A	6	8
81348	WW- P- 471ACACB	4	37
01843	YO881A	5	1

**END OF WORK PACKAGE**



**EXPENDABLE AND DURABLE ITEMS LIST****0041 00****SCOPE**

This work package lists expendable and durable items that you will need to operate and maintain the American Bosch Model PSB-12BT Fuel Metering and Distributing Pump. This list is for information 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.

**EXPLANATION OF COLUMNS**

Column (1) Item Number. This number is assigned to the entry in the list and is referenced in the narrative instructions to identify the item (e.g., "Use brake fluid (item 5, WP 0098 00).").

Column (2) National Stock Number (NSN). This is the NSN assigned to the item which you can use to requisition it.

Column (3) Item Name, Description, Commercial and Government Entity Code (CAGEC), and Part Number (P/N). This column provides the other information you need to identify the item.

Column (4) Unit of Measure. Indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (2).

**Table 1. Expendable and Durable Items List.**

(1) ITEM NUMBER	(2) NATIONAL STOCK NUMBER	(3) ITEM NAME, DESCRIPTION, CAGEC, AND PART NUMBER	(4) UNIT OF MEASURE
1.	9150-00-082-5636	LUBRICATING OIL: 1 qt can, MIL-S-81087 (81349)	qt
2.	8030-00-088-7818	SEALING COMPOUND: 8 oz tube, MIL-S-7916 (81349)	oz
3.	9150-00-189-6727	LUBRICATING OIL: grade 10, 1 qt can, MIL-L-2104 (81349)	qt
4.	7920-00-205-1711	RAG, WIPING, COTTON SYNTHETIC: 50 lb bale, DDD-R-30 (81348)	lb
5.	9150-00-231-6689	LUBRICATING OIL: 1 qt can, VV-L-800 (81348)	qt
6.	3439-00-243-1882	SOLDER, LEAD ALLOY: 1 lb spool, 0.125 in. diameter, QQ-S-571 (81348)	spool
7.	6850-00-281-1985	DRY-CLEANING SOLVENT: 1 gal can, P-D-680, Type II (81348)	gal
8.	8030-00-291-1787	SEALING COMPOUND: Type II, 1 pt, MIL-S-45180 (81349)	pt
9.	7510-00-852-8179	TAPE, ADHESIVE: Type II, 36 yd roll, 1 in. wide, MIL-T-22085 (81349)	roll
10.	9525-00-990-7799	WIRE, NONELECTRICAL: 1 lb spool (234 feet per pound), MS20995NC40 (96906)	spool
11.	2990-00-977-2591	WIRE, BEARING PLATE: 17 in. lg, W1763 (01843)	ea

Table 1. Expendable and Durable Items List. - Continued

(1) ITEM NUMBER	(2) NATIONAL STOCK NUMBER	(3) ITEM NAME, DESCRIPTION, CAGEC, AND PART NUMBER	(4) UNIT OF MEASURE
12.	8135-00-281-4069	STRAPPING, STEEL; 100 to 110 lb coil, 17.1 ft per lb, QQ-S-781 (81348)	coil
13.	8135-00-239-5293	SEALING, STRAPPING: 1 7/8 in. lg, 5000 per box, QQ-S-781 (81348)	box

END OF WORK PACKAGE

**TOOL IDENTIFICATION LIST**

**SCOPE**

This work package is a cross-reference of item numbers and is included for that purpose only. Common tools are authorized in the supply catalogs listed in the "Reference" column. Special tools are also cross-referenced and the specific publication number is listed in the "Reference" column.

**EXPLANATION OF COLUMNS**

**Column (1) - Item number.** This number is assigned to the entry in the listing for cross-referencing to the stock number.

**Column (2) - Description.** This column matches tool nomenclature to the task nomenclature.

**Column (3) - NSN.** This is the national stock number assigned to the tool.

**Column (4) - Reference.** This column lists the supply catalog or publication number that contains complete description for the referenced tools.

**Table 1. Tool Identification List.**

(1) Item No.	(2) Description	(3) NSN	(4) Reference
1	Adapter Kit (P/N 74-8017)		
2	Air Regulator	4930-00-322-5910	
3	Arbor Press	3444-00-449-7295	
4	Bar, Steel (Fabricated Tool)		WP 0037 00 Fabricated Tools
5	Blocks, Wood (P/N MM-L-751)	5510-00-551-9659	
6	Brush, Bristle (P/N 8078883)	7920-00-291-5815	
7	Collector Cup		
8	Compressor, Spring Seat (P/N 10882862) (Special Tool)	5120-00-793-5049	WP 0040 00 Special Tools
9	Cover (Fabricated Tool)		WP 0037 00 Fabricated Tools
10	Indicator, Dial	5210-00-277-8840	
11	Indicator, Dial With Magnetic Base (P/N 200M)	5210-00-390-5446	
12	Drill, Twist (P/N 800434)	5133-00-293-0983	
13	File, Fine Mill	5120-00-247-2566	
14	Compressor Unit	4310-00-542-5466	
15	Fixture, Positioning (Special Tools)		WP 0040 00 Special Tools
16	Gauge, Depth, Micrometer	5210-00-619-4045	
17	Gauge, Hole 0.125 to 0.200 in. (P/N GGG-G-17-TY3CL1STASZA) (Special Tools)	5120-00-221-2080	WP 0040 00 Special Tools
18	Gauge, Hole 0.200 to 0.300 in. (P/N GGG-G-17-TY3CL1STASZB) (Special Tools)	5210-00-221-2081	WP 0040 00 Special Tools
19	Gauge, Pressure (0-50 psi) (P/N 7950330)	6620-00-795-0330	
20	Gauge, Telescope 0.3125 to 0.5000 in. (P/N GGG-G-17-TY3CL2SZAA-E) (Special Tools)	5210-00-473-9350	WP 0040 00 Special Tools
21	Gauge, Telescope 1.250 to 2.1250 in. (Special Tools) (P/N 124BZ)	5210-00-221-1921	WP 0040 00 Special Tools
22	Blade, Thickness Gauge (P/N 10882615)	5210-00-793-7898	
23	General Mechanic's Tool Kit	5180-00-177-7033	
24	Glass, Magnifying	6650-00-346-9106	
25	Holding Plate (Fabricated Tool)		WP 0037 00 Fabricated Tools
26	Iron, Soldering (P/N D-550-3)	3439-00-618-6623	

## TOOL IDENTIFICATION LIST - CONTINUED

0042 00

(1) Item No.	(2) Description	(3) NSN	(4) Reference		
27	Lever, Manual Control (P/N 7083883) (Special Tool)	5120-00-708-3883	WP 0040 00 Special Tools		
28	Micrometer, Inside 1-in.	5210-01-113-1548			
29	Micrometer, Outside 1-in.	5210-00-293-1683			
30	Micrometer, Outside 2-in.	5210-00-243-2933			
31	Micrometer, Outside 3-in.	5210-00-221-1945			
32	Nozzle Tester (P/N 7551255)	4910-00-255-8641			
33	Nut Driver, Fixed 3/8 in. (P/N 99PR)	5120-00-440-8008			
34	Ohmmeter	6625-01-139-2512			
35	Plastic Scraper (P/N TD5030C-IE)	1560-01-077-3383			
36	Holding Plate (Fabricated Tool)			WP 0037 00 Fabricated Tools	
37	Pliers, Flat Wide Nose (P/N 82201)	5120-01-460-7670			
38	Pliers, Internal/External Retaining Ring (P/N 4440R)	5120-00-789-0492			
39	Pliers, Lock Wire (P/N 8491162)	5120-00-542-4171			
40	Pliers, Seal (P/N 6796619)	5120-00-631-0842			
41	Plug, Plastic 5/8 in. (P/N 559876-1)	5340-01-176-7525			
42	Power Source, 24 Volt	6115-00-017-8236			
43	Probes, Wire	2432-00-252-8353			
44	Protractor (Fabricated Tool)				WP 0037 00 Fabricated Tools
45	Puller, Mechanical (P/N 10882818) (Special Tool)	5120-00-793-5048			
46	Remover and Replacer (P/N 7950177) (Special Tool)	5120-00-494-1846			WP 0040 00 Special Tools
47	Rod, Steel (Fabricated Tool)				
48	Rule, Machinist's Steel	5210-00-273-1962		WP 0037 00 Fabricated Tools	
49	Saw, Hand Cross Cut, Medium Base (P/N 10608313-1)	5110-00-203-8310			
50	Scale, Spring 0 to 10 lbs. (P/N WU18402)	1355-00-311-0830			
51	Socket, Wrench (P/N TSE76157) (Special Tool)	5120-00-793-5045			
52	Socket, Fuel Filter (Special Tool)				WP 0040 00 Special Tools
53	Tester, Fuel Injector Pump (P/N A8020)	4910-01-194-7667			
54	Tester, Spring	6635-00-918-2788		WP 0037 00 Fabricated Tools	
55	Tap & Die Set	5136-01-119-0005			
56	Tool Kit, Automotive Fuel and Electrical System Repair	5180-00-754-0655			
57	Tube (Fabricated Tool)				
58	Vise, Machinist's with Vise Jaw Caps	5120-00-293-1439			WP 0040 00 Special Tools
59	Wrench, Open End 1-1/8 in. (P/N A-A-1356)	5120-00-187-7133			
60	Wrench, Socket (P/N 12254213) (Special Tool)	5120-01-034-1658			
61	Wrench, Spanner (P/N 10884603)	5120-00-767-9099		WP 0040 00 Special Tools	
62	Wrench, Torque 0-150 lb.-in.	5120-00-230-6380			
63	Wrench, Torque 0-175 lb.-ft.	5120-00-640-6364			
64	Wrench, Fuel (P/N 10882894) (Special Tool)				

END OF WORK PACKAGE

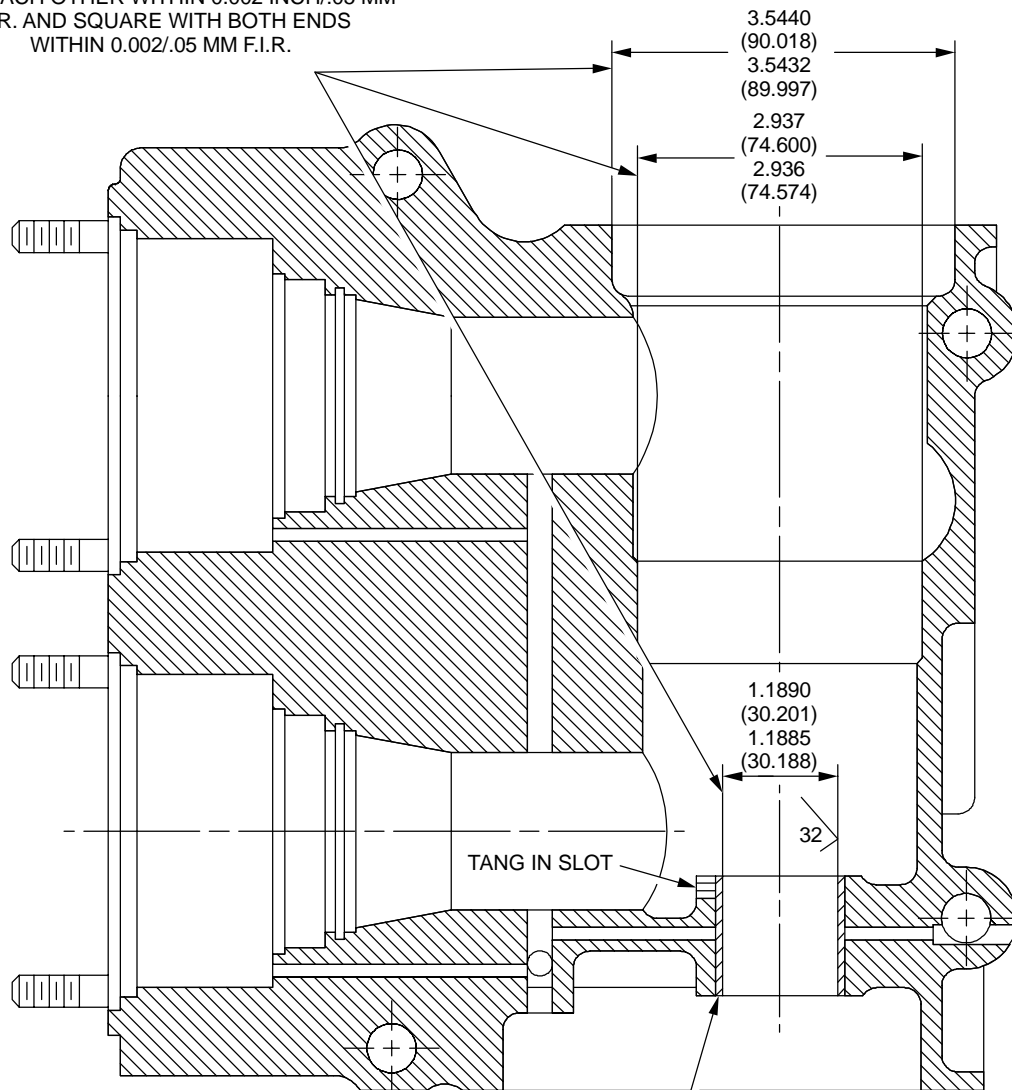
**MACHINING SPECIFICATIONS**

**0043 00**

**THIS WORK PACKAGE COVERS:**

Machining

BORING SPECIFICATIONS  
 THESE DIAMETERS MUST BE CONCENTRIC  
 WITH EACH OTHER WITHIN 0.002 INCH/.05 MM  
 F.I.R. AND SQUARE WITH BOTH ENDS  
 WITHIN 0.002/.05 MM F.I.R.



ALL DIMENSIONS ARE  
 IN INCHES WITH METRIC  
 FOLLOWING IN PARENTHESES

LINE BORE BEARING TO 1.1885 - 1.1890  
 IN. (30.188 - 30.201 MM). REMOVE  
 METAL CHIPS AFTER BORING OPERATION.

03i155ma

**END OF WORK PACKAGE**





# GLOSSARY

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## Section I. ABBREVIATIONS

C	Celsius
DIA or dia	Diameter
cm	Centimeters
DF	Diesel fuel
F	Fahrenheit
Kg	Kilograms
kPa	Kilopascals
MM or mm	Millimeters
N•m	Newton-Meters
SAE	Society of Automotive Engineers
TMDE	Test, Measurement, and Diagnostic Equipment

## Section II. SYMBOLS

°	Degrees
±	Plus or minus
%	Percent

END OF TASK



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By Order of the Secretary of the Army:

PETER J. SCHOOMAKER  
*General, United States Army*  
*Chief of Staff*

Official:

A handwritten signature in black ink that reads "Sandra R. Riley". The signature is written in a cursive style with a large, looping 'S' at the beginning.

SANDRA R. RILEY  
*Administrative Assistant to the*  
*Secretary of the Army*  
0530802

DISTRIBUTION: To be distributed in accordance with the Initial Distribution Number (IDN) 371463, requirements for TM 9-2910-212-34&P.



<b>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</b> For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II ( <i>reverse</i> ) for Repair Parts and Special Tools Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).	Date
TO: ( <i>Forward to proponent of publication or form</i> ) ( <i>Include ZIP Code</i> )	FROM: ( <i>Activity and location</i> ) ( <i>include ZIP code</i> )	

**PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS**

PUBLICATION/FORM NUMBER TM 9-2910-212-34&P	DATE 31 August 2005	TITLE Direct Support and General Support Maintenance Manual for Fuel Metering and Distributing Pump (Model PSB-12BT) including RPSTL
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ITEM	PAGE	PARA	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON
	0003 00-1					In "INITIAL SETUP" change Torque wrench (6) (item 62, WP 0044 00) to Spanner wrench (item 61, WP 0044 00).

\*Reference to line numbers within the paragraph or subparagraph.

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
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TO: <i>(Forward direct to addressee listed in publication)</i>	FROM: <i>(Activity and location) (Include Zip Code)</i>	DATE
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PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER TM 9-2910-212-34&P	DATE 31 August 2005	TITLE Direct Support and General Support Maintenance Manual for Fuel Metering and Distributing Pump (Model PSB-12BT) including RPSTL
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PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III - REMARKS *(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

SAMPLE

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
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<b>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</b>					Use Part II ( <i>reverse</i> ) for Repair Parts and Special Tools Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).		Date
For use of this form, see AR 25-30; the proponent agency is ODISC4.							
TO: ( <i>Forward to proponent of publication or form</i> ) ( <i>Include ZIP Code</i> )					FROM: ( <i>Activity and location</i> ) ( <i>include ZIP code</i> )		
<b>PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS</b>							
PUBLICATION/FORM NUMBER TM 9-2910-212-34&P				DATE 31 December 2005		TITLE Direct Support and General Support Maintenance Manual for Fuel Metering and Distributing Pump (Model PSB-12BT) including RPSTL	
ITEM	PAGE	PARA	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON	
*Reference to line numbers within the paragraph or subparagraph.							
TYPED NAME, GRADE OR TITLE				TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION			SIGNATURE

TO: <i>(Forward direct to addressee listed in publication)</i>	FROM: <i>(Activity and location) (Include Zip Code)</i>	DATE
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# CONVERSION TABLE

inch	decimal	mm	inch	decimal	mm	inch	decimal	mm
1/64	0.015625	0.3969	23/64	0.359375	9.1281			
1/32	0.031250	0.7938	3/8	0.375000	9.5250	45/64	0.703125	17.8594
3/64	0.046875	1.1906				23/32	0.718750	18.2562
1/16	0.062500	1.5875	25/64	0.390625	9.9219	47/64	0.734375	18.6531
			13/32	0.406250	10.3188	3/4	0.750000	19.050
5/64	0.078125	1.9844	27/64	0.421875	10.7156			
3/32	0.093750	2.3812	7/16	0.437500	11.1125	49/64	0.765625	19.4469
7/64	0.109375	2.7781				25/32	0.781250	19.8437
1/8	0.125000	3.1750	29/64	0.453125	11.5094	51/64	0.796875	20.2406
			15/32	0.468750	11.9062	13/16	0.812500	20.6375
9/64	0.140625	3.5719	31/64	0.484375	12.3031			
5/32	0.156250	3.9688	1/2	0.500000	12.7000	53/64	0.828125	21.0344
11/64	0.171875	4.3656				27/32	0.843750	21.4312
3/16	0.187500	4.7625	33/64	0.515625	13.0969	55/64	0.859375	21.8281
			17/32	0.531250	13.4938	7/8	0.875000	22.2250
13/64	0.203125	5.1594	35/64	0.546875	13.8906			
7/32	0.218750	5.5562	9/16	0.562500	14.2875	57/64	0.890625	22.6219
15/64	0.234375	5.9531				29/32	0.906250	23.0188
1/4	0.250000	6.3500	37/64	0.578125	14.6844	59/64	0.921875	23.4156
			19/32	0.593750	15.0812	15/16	0.937500	23.8125
17/64	0.265625	6.7469	39/64	0.609375	15.4781			
9/32	0.281250	7.1438	5/8	0.625000	15.8750	61/64	0.953125	24.2094
19/64	0.296875	7.5406				31/32	0.967500	24.6062
5/16	0.312500	7.9375	41/64	0.640625	16.2719	63/64	0.984375	25.0031
			21/32	0.656250	16.6688			
21/64	0.328125	8.3344	43/64	0.671875	17.0656			
11/32	0.343750	8.7312	11/16	0.687500	17.4625	1	1.000000	25.4000



# THE METRIC SYSTEM AND EQUIVALENTS

## LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches  
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches  
 1 Kilometer = 1000 Meters = 0.621 Miles

## WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces  
 1 Kilogram = 1000 Grams = 2.2 Lb.  
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

## LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces  
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

## SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches  
 1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet  
 1 Sq. Kilometer = 1,000 Sq. Meters = 0.386 Sq. Miles

## CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches  
 1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

## TEMPERATURE

$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$   
 $212^{\circ}\text{ Fahrenheit is equivalent to } 100^{\circ}\text{ Celsius}$   
 $90^{\circ}\text{ Fahrenheit is equivalent to } 32.2^{\circ}\text{ Celsius}$   
 $32^{\circ}\text{ Fahrenheit is equivalent to } 0^{\circ}\text{ Celsius}$   
 $(9/5 \times ^{\circ}\text{C}) + 32 = ^{\circ}\text{F}$

## APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Millimeters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

